Alaska Energy Authority
Renewable Energy Grant Recommendation Program

Process Evaluation Report

Volume 1

Prepared by:
Vermont Energy Investment Corporation

In Collaboration With:
Alaska Center for Energy and Power

April 30th, 2012

Acknowledgements

The Process Evaluation of the Alaska Renewable Energy Grant Recommendation Program was conducted by **Vermont Energy Investment Corporation (VEIC)** serving as Prime Contractor. VEIC team members participating in the evaluation included: David Hill serving as Project Team Leader; Chris Badger serving as Project Manager; Betsy Harper providing research and interview support; Leslie Badger designing and implementing the electronic survey; and Nikki Clace and Molly Taylor providing project administration, editing, and production support.

Alaska Center for Energy and Power (ACEP) served as subcontractor with Gwen Holdmann leading the ACEP team and providing direct experience with the Alaska renewable energy industry; Julie Estey coordinating engagement with Alaska stakeholders; and Dennis Witmer providing technical assessment and evaluation of the program database.

The VEIC team and the Alaska Energy Authority appreciate the significant time and thoughtfulness that individual stakeholders contributed through participation in individual interviews and responding to the online survey.

This report was written on behalf of the Alaska Energy Authority, but the views expressed in this report are those of the study authors, consistent with the commissioning of this work as an independent study.

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Executive Summary

The Vermont Energy Investment Corporation (VEIC) in partnership with the Alaska Center for Energy and Power (ACEP) was retained in mid-December 2011 by the Alaska Energy Authority (AEA) to conduct an independent program review of the Renewable Energy Grant Recommendation Program (REGRP). This report presents Phase I of the review - a process evaluation of the REGRP.

The findings and recommendations presented in this report are based on close to 700 hours of primary and secondary research and analysis by our team. Our research included:

- A thorough review of program documentation, program databases, authorizing legislation, supporting regulations, program reports, and related literature;

- The development of evaluation criteria and related questions[1] for six priority areas of interest:

    - Program Outreach
    - The Request for Applications (RFA) Process
    - The Request for Applications Project Feasibility and Evaluation
    - The Renewable Energy Fund Advisory Committee
    - Grant Awards Process, and
    - Grant Administration

- After reviewing the proposed evaluation criteria with AEA staff, our team conducted primary research gathering feedback from more than 182 stakeholders representing 45 different entities. Our primary research included completing or receiving:

    - 50+ in person interviews, some with multiple participants
    - 24 telephone interviews, and
    - 108 on-line survey responses

Based on this information, our team has developed dozens of individual findings and recommendations as presented in this report. In our reporting we consistently use the term "findings" to reflect feedback from stakeholders that was directly collected through one or more of the outreach channels. The term "recommendations" relates to the professional opinions of our team – based on the research findings and our collective experience in the promotion and development of renewable energy markets[2]. The

[1] The evaluation criteria and research questions are presented in the Study Methodology section and more completely in the Appendix B and C of this report.

[2] Information on our team's professional experience with renewable energy market development is found in the Introduction section of this report.

recommendations highlight opportunities for AEA to modify and enhance the REGRP process to better serve target markets and meet legislative objectives. Please note that many "findings" offered by stakeholders, include direct recommendations for program changes and many of these are reflected in our recommendations.

In presenting study results we also use the following terminology:

- **General Findings and Recommendations**: Tend to cut across more than one of the evaluation criteria. These highlight areas with the broadest implications for program design, management and implementation.
- **Detailed Findings and Recommendations**: Are more directly related to one of the six areas of inquiry and evaluation criteria.

In commissioning this research, AEA tasked our research team with collecting and soliciting open and honest feedback from the full range of program stakeholders. AEA and our research team recognize the importance of collecting this feedback in a manner that respects the confidentiality of respondents.

We also recognize that a quality process evaluation is based on soliciting feedback from a comprehensive set of program stakeholders. Our team, with the expert assistance and contacts provided by ACEP and through recommendations from AEA staff, was very successful in rapidly reaching a broad set of stakeholders. The number and breadth of stakeholders contacted lends credibility to the findings and recommendations. We informed interviewees that we would provide a list of the in-person and telephone interviews conducted, but that our research would protect confidentiality with no identifying attribution of statements or feedback.

General Findings

As noted above, the general findings and recommendations represent the "cross-cutting" results from our study – highlighting those areas with the broadest implications for program design, management and implementation.

Detailed level findings and recommendations are presented in tabular format in the Executive Summary with additional narrative in the appropriate sections of the report. We note the detailed findings and recommendations are all deemed to be "important" results – and taken collectively they represent the full suite of information and recommended changes that can be used to improve the program process and results.

General Finding 1:	**There is a broad level of support for renewable energy development.**

Stakeholders were nearly unanimous in stating broad support for funding and efforts by the State to support the development of renewable energy. Stakeholders agree that Alaska has plentiful opportunities to develop renewable energy resources and

projects that can provide economic and environmental benefits. Renewable energy resources and opportunities for their development are considered to be applicable for all regions of the state. Opportunities include those that are connected to the "Railbelt" transmission system as well as for remote communities, whether they are small and isolated or relatively larger "hub" communities. State support was considered by many to be a critical factor in helping to reduce the costs of renewable energy development and to help overcome market barriers by supporting, for example, resource assessments and feasibility studies.

General Finding 2: There is significant support for the program's efforts to address energy issues in remote and high cost of energy communities.

Stakeholders also broadly recognized the importance of renewable energy projects to help address the economic challenges facing remote communities with high energy costs, and consider renewable energy a key strategy in reducing the overall energy burden facing many households and communities. The energy burden – defined to include space heating, electricity, transportation, and community energy needs - is widely recognized as a critical issue even when other initiatives such as power cost equalization, fuel assistance and weatherization are available.

With respect to support for rural communities, a significant number of stakeholders commented that "Rural Energy Grant Program" might be a more appropriate title for the initiative. This finding suggests a lack of understanding for some stakeholders, both in terms of the program's historic distribution of funding and of the funding distribution guidelines, both of which explicitly encompass a regional balance.

General Finding 3: The REGRP fills a necessary role – and has room for improvements.

Stakeholders expressed consistent and broad support for the REGRP initiative, explicitly recognizing the important contributions to Alaskan renewable energy development over the first five years. At the same time most stakeholders identified one or more areas for program improvements and these are documented in the detailed findings and recommendations presented below.

General Finding 4: The program is generally well supported by AEA staff – although some markets may require more proactive engagement and/or clarity of roles.

Many respondents explicitly recognized the skills and dedication of AEA staff, and noted the credibility staff and program are building with stakeholders. It was also broadly recognized that reaching remote communities represents significant challenges.

Related comments indicated that in many cases a more explicit and clear understanding of AEA staff roles would be helpful. For example, a number of stakeholders indicated suggested that enabling the program and AEA staff to take a more proactive approach by targeting funding based on, coordination with regional energy planning, as a means to better address the energy efficiency and renewable energy needs of remote communities.

Other respondents indicated that in some cases AEA staff could usefully act in more of a "grant administrator" role and be less engaged as a "project manager."

General Finding 5: The program and staff have adapted and improved over the initial five years.

Stakeholders generally recognized the political, logistic and program management challenges facing this type of initiative and in most cases gave the program and staff high marks for seeking to make program changes and enhancements based on lessons learned. Ongoing efforts to improve communications with stakeholders and to continue seeking program improvements were widely encouraged.

General Finding 6: The REGRP covers a very wide range of project types and target audiences.

On a number of occasions, respondents indicated that the REGRP was trying to cover a large range of project type and scale under a single solicitation. Currently, applications for projects with very different characteristics, needs, and market barriers are scored and compared against each other. For example, a relatively large-scale Railbelt utility transmission project, and a small scale wind or heat recovery project serving a remote community are both considered and scored under the same solicitation. Projects at different stages of development - from resource assessment, pre-construction feasibility, and construction - are also scored and ranked against each other. Attempting to address such a broad span of project types and stages through a single solicitation creates structural challenges – requiring the comparison of "apples to oranges".

General Finding 7: The criteria weighting and scoring for applications is not sufficiently clear and could be improved.

A number of stakeholders indicated that the criteria weighting and scoring for applications is not sufficiently clear and could be improved. In part, this is likely due to the broad span of project types and stages compared against each other – as mentioned in the previous finding. It also indicates that some of the criteria – such as "most weight given to projects that serve any areas in which the average cost of energy exceeds the average cost of energy of other areas of the state" and "significant weight being given to a statewide balance of grant funds" may be difficult to reconcile. Stakeholder suggestions for improvements included defining more explicit guidelines on how the criteria of high cost of energy and statewide balance of funding are weighted, and/or more explicit regional funding allocations.

General Finding 8: The timing of grant application and funding cycles is a challenge.

Renewable energy project development in Alaska, and particularly in remote communities, entails a wide range of logistic and engineering challenges. Many respondents indicated that dealing with short construction and transportation seasons is often made more difficult by the timing of the current REGRP application cycle (applications due mid-late summer) and funding authorization, which has often not been finalized until late spring.

Detailed Findings

In addition to the general findings presented above, our research identified more than two dozen additional detailed findings – which are more directly related the individual areas of program activity. These detailed findings are summarized in Table 1 and are discussed more fully in the main body of the report.

Table 1: Summary of Findings

Program Outreach	**Pages 28-31**
1. There is a clear appreciation of the formidable and often unique challenges to be overcome when promoting the development of renewable energy projects in Alaska.	
2. More effectively coordinate the REGRP with regional planning and/or other rural infrastructure development activities.	
3. Identify opportunities for developing more targeted information and communications regarding renewable energy technologies and available in-state technical resources.	
4. Stakeholders noted significant improvements in the quality and quantity of information AEA shares with stakeholders – but suggested that more proactive communications and outreach would be very helpful.	
5. Increase the amount of outcome based reporting and information providing insights on "what we have done, and what we have learned" through the REGRP.	
6. Capitalize on the first point of contact through other AEA programs – most notably the Bulk Fuel and Rural Power System Upgrades and the Power Cost Equalization programs – to cross-promote the REGRP.	
Request for Applications (RFA) Process	**Pages 34-36**
1. AEA has developed a robust process for soliciting applications.	
2. Formalize procedures for addressing questions around RE fund process and around appeals.	
3. Consider more differentiated application requirements and processes for different types of projects and different project stages.	
4. Increase the training and support for smaller projects/communities during the application process. These communities typically face additional barriers in preparing applications in the current RFA process.	
5. Use regional planning or a more structured set of AEA program targets and goals to solicit and encourage a more coordinated set of applications – particularly for those relating to resource assessment and feasibility for smaller and remote projects.	
Request for Applications Project Feasibility and Application Evaluation	**Pages 40-41**
1. The weighted criteria and scoring get mixed reviews on how well they provide sufficient metrics for identifying strong projects while also meeting legislative intent.	
2. The REGRP process may not allow for an appropriate level of public input as part of the evaluation and scoring of applications. .	
3. The technical and economic review process does not reflect the full benefits to both the state, as well as individual communities.	
4. AEA's role in providing guidance best practices sometimes blurs the lines on impartiality and is perceived as placing unduly restrictive requirements on specific project designs.	
Renewable Energy Fund Advisory Committee Participation	**Pages 44-45**
1. Many stakeholders are not aware of the Renewable Energy Fund Advisory Committee, its responsibilities, or the composition of its membership.	
2. Public participation in the periodic REF Advisory Committee meetings may not allow for sufficient expression of local opposition or feedback on projects prior to the initial project evaluation by AEA.	

Grant Awards Process	Pages 48-49
1. The timing and duration of the award process can create significant negative impacts on efficient project development.	
2. Funding for sequential phases of development under separate rounds can slow project development significantly leading to higher costs.	
3. Allow AEA to grant awards directly, at least for feasibility and potentially smaller scale construction projects.	
Grant Administration	**Pages 51-53**
1. AEA has developed a dedicated and knowledgeable team to administer the program, but often appears stretched from a staffing level.	
2. Define AEA's role with respect to the RE Fund administration and the level of engagement with project design or active project management.	
3. AEA's required level of reporting for grantees, although appropriate, can vary between individual project managers and should reflect specific cost structures native to the RE industry.	
4. There are opportunities to improve post-operational performance reporting increasing the value of lessons learned and transparency to the public in this area.	

General Recommendations

The following five general recommendations are based on stakeholder feedback, our discussions with AEA staff, and our team's professional judgment. These recommendations include some structural and management level changes – while continuing to support the fundamental goals and objectives of the REGRP.

Adopting the recommendations will generally require careful management consideration, and the development and implementation of specific program design changes. In some cases, legislative action or changes to program regulations may also be required. While detailed design and implementation changes are beyond the scope of this Phase of the Process Evaluation, our team has aimed to make discrete, actionable, and concise recommendations for management.

General Recommendation 1: **Establish and maintain a higher level of program differentiation.**

The REGRP aims to serve a very wide span of project type and market actors. In the process of covering everything from relatively large, utility scale, transmission and generation projects to relatively small projects designed to serve the needs of isolated rural communities – the program's current single solicitation model is stretched too thin.

In addition to the variation in project scale and customer type, the current model also encompasses projects at all stages of development including resource assessment, pre-construction feasibility, and construction – and across a full range of renewable energy resources and technologies. It is our opinion that the key issues, market barriers, technical and financial needs, and applicant resources for the full spectrum of these projects is simply too broad for a single, undifferentiated, funding solicitation. The result is the program risks lumping together projects that have inherently different costs and benefits, challenges and

potential – and scoring, and administering these in a manner that is frustrating to the market and to program staff.

The recommended alternative is to create at least two – and possibly more – channels of program support, funding opportunities, and processes. The most apparent opportunity for differentiation is between the utility scale projects (e.g. those serving Railbelt communities) and those serving isolated communities. Another option is to differentiate between support for resource assessment, feasibility studies and construction – and not keep them tied to the same application pool and funding cycles.

Adopting this recommendation will require some management and communication modifications – but it will also more carefully match the level and types of support, and the program processes to the audiences and types of projects that the program aims to serve.

General Recommendation 2:	**Coordinate and/or tie program design and funding decisions more closely to rural infrastructure, regional energy planning and state level renewable energy goals.**

The current REGRP primarily relies on the open market – through solicitation applications – to define and identify the best opportunities for program support. While there is undoubtedly an important role for market actors, individual communities, and applicants in developing Alaska's renewable energy resources – there are also issues associated with only applying the current "bottoms-up" approach. These include missed project opportunities, overlooking opportunities for project coordination, potential conflicted interests, and duplication of efforts.

The REGRP could specifically seek to coordinate and or tie program funding to other efforts supporting rural infrastructure development, to regional and community level planning, or to statewide renewable energy goals. Ideally, this would create deeper impacts and sustained market development for a broad range of renewable technologies and applications. It would also continue to provide some funding for "bottoms-up" applications,

As an example, a more intentional focus on opportunities identified through regional energy plans – might lead the REGRP to concentrate a cluster of funding on biomass or heat pump technologies in Southeast. Another example could be a concerted effort to address renewable and efficiency opportunities and infrastructure spending for educational facilities. The concerted development of biomass heating, and wind-diesel hybrids are additional potential focal points.

These are illustrative examples of how REGRP might seek to catalyze more coordinated development. Changing the REGRP in this fashion – and selecting appropriate focal areas - would require careful review and discussion with the REFAC. It would also be essential to communicate the logic and benefits of such changes clearly to the legislature and other stakeholders.

General Recommendation 3:	Provide more proactive and targeted services to markets.

As AEA adopts a more differentiated approach to renewable energy market development (see Key Recommendation #1), there will be opportunities to distinguish the most effective and efficient services for each market segment and project type. Some projects will continue to require, and to be best served by, a grant model. Some may also need higher levels of technical assistance, training and outreach both in the pre-application and post-construction phases – as well as during project development and construction.

There are other projects and customers currently served by the REGRP that may not require a grant and that do not need significant levels of non-financial support. In such cases, alternative services – such as loan guarantees or other financing strategies, are likely to more effectively leverage state funds and program/staff resources. Some of the larger projects – that have relatively good access to experienced engineering and financing support might be more effectively through the Alaska Industrial Development and Export Authority AIDEA – and leverage higher levels of activity with available funds.

There may also be opportunities to distinguish target services for remote community projects where there is sufficient infrastructure and community capacity to support alternative strategies. In appropriate situations strategies including long-term power purchase agreements, or other financial risk reduction mechanisms, could complement or in some cases replace a direct grant.

Outreach and communications can also become more targeted and proactive through the adoption of a community manager – or key account manager – approach. On a regional or community by community basis, this approach aims to provide targeted services to the client communities helping them more actively to understand the program process and funding opportunities.

General Recommendation 4:	Increase sharing of lessons learned and emphasize economic as well as energy impacts.

After five years of operations, the benefits of the REGRP include lessons from early projects. These can help tell the story of how projects are benefitting target communities and building renewable energy capacity in Alaska. This information will help to build support for future funding. Detailed technical cost and performance data can be used to identify the positive and negative lessons learned on various technology and resources. To support enhanced reporting, the program should more actively and clearly require grant recipients to share technical data in a format that can be accessed by other current and future project developers (confidentiality or proprietary information can be protected to a degree – but with the acceptance of state funds – some disclosure on performance and costs should be expected).

The program should also maintain cumulative reporting on the dollar as well as energy impacts, with examples of what the dollar savings mean for residents and community members in participating communities. The human element of how these funds are benefitting

Alaskans is important. There is also a need to clarify the point that due to Power Cost Equalization, there are times when the program's economic benefits accrue primarily to the state (reduced PCE expenditures) – rather than directly to individual households or to the community.

General Recommendation 5:	**Streamline and modify funding timelines.**

There is an opportunity to modify and streamline at least some aspects of the current program funding cycles and timelines. This will help to reduce the scheduling and logistic problems facing most energy development projects in Alaska, For example, resource assessment and feasibility studies up to a certain funding level at the regional or state-wide basis could be pre-approved in the prior year's budget, thereby allowing for open enrollment, and potentially reducing or eliminating the amount of project level review conducted by the legislature and governor's office.

An accelerated tranche of construction season funding could also be submitted for early approval in the Governor's budget or could be pre-approved each year, pending early legislative action. Modifying the construction funds approval cycle could result in significant reductions to transportation and procurement costs. AEA should work proactively and closely with the Governor's office and the Legislature to examine, propose and adopt funding cycles that maintain an adequate level of political review and oversight, while seeking to streamline and shorten application to funding time requirements.

Detailed Recommendations

In addition to the general recommendations presented above, our research identified more than two dozen detailed recommendations – which are more directly related to the individual areas of program activity. The detailed recommendations are summarized in Table 3 and are discussed more fully in the main body of the report.

Table 3: Summary of Recommendations

Program Outreach	**Pages 31-32**
1. Carefully consider, and as appropriate test, implement and/or strengthen, a coordinated "account manager" model to providing outreach, communications and services, particularly for "harder" to serve target audiences.	
2. Increase emphasis of program outreach that is coordinated with regional energy planning and other infrastructure development and investments.	
3. Take a more proactive role in providing technical assistance to communities, including assessing and recommending possible application opportunities, identifying synergies with other projects within the community or in the region, and in local and regional planning efforts.	
4. Place an emphasis on documenting best practices and the collection and analysis of primary data from completed construction and feasibility projects.	
5. Improve branding of the program as well reviewing the accessibility and general format of content on the REGRP area of AEA website.	

Request for Applications (RFA) Process	Pages 36-37
1. The RFA process would benefit from a complementary framework that articulates regional and/or technology specific renewable energy goals.	
2. The RFA and overall REGRP program design can more clearly distinguish between project types and phases – and the type of support required.	
3. AEA should identify additional methods for providing high quality support and training for communities seeking to participate in the REGRP.	
4. Review options with the REFAC, RE industry and state government to authorize AEA to make direct grants to support feasibility studies and smaller renewable energy applications on a more continuous basis.	
5. Identify opportunities to create longer term visibility of the program goals and objectives, as well as limit the impact of the start/stop nature of the individual funding cycles.	
Request for Applications Project Feasibility and Application Evaluation	**Pages 42-43**
1. To avoid and/or reduce some of the inherent potential conflicts in the current system – AEA should establish more than one solicitation to better serve the target markets for the REGRP.	
2. Community derived matching funds should be given higher scores than matching funds that come from non-local sources.	
3. We recommend the AEA hire independent engineering firms to conduct technical feasibility reviews and/or provide increased technical support to potential applicants who are developing proposals.	
4. Establish a clear set of eligibility criteria for scoring in the REGRP and allow for technical and economic scoring and feedback on all applications.	
5. Review and revise program processes to allow for a structured opportunity for expressions of community support or opposition.	
Renewable Energy Fund Advisory Committee Participation	**Pages 45-46**
1. AEA and the REF Advisory Committee should consider developing a charter to outline their role with respect to the RE Fund as well as defining specific goals for the program on an annual basis.	
2. Increase and improve visibility to the public process and the REF advisory committee meetings on the Authority's website.	
3. Utilize the REFAC to review, endorse adopt, and/or modify specific recommendations or modifications, including for example, greater program differentiation.	
Renewable Energy Fund Award Process	**Pages 49-50**
1. AEA should seek authorization from the legislature to fund smaller projects and feasibility studies without needing to make recommendations that are subject to a further round of legislative review.	
2. AEA should work with the legislature and AIEDA to develop non-grant options for larger projects.	
3. AEA should develop grant milestone payments and phasing based on the experience of project teams and the level of matching funds provided.	
Grant Administration	**Pages 53-54**
1. Develop a detailed staffing plan to address the growing role of AEA in addressing rural and renewable energy development in the State of Alaska.	
2. Clarify AEA's role with respect to project developers and the evaluation of projects to retain a neutral stance in its administrative responsibilities.	
3. Conduct an internal review of how AEA organizes and manages information related to the REGRP.	
4. Modify reported savings to include gallons of fuel displaced and dollars saved to better reflect the economic benefit to Alaska ratepayers.	
5. Compile program data into a standard annual report format that includes cumulative information across rounds as well as more detailed information on current projects and expenditures.	

Looking Forward

The remainder of the Process Evaluation report documents, supports, elaborates and supplements upon the findings and recommendations presented above. While not all recommendations are likely to be adopted, we are confident the recommendations are reasonable, can be implemented efficiently, and most importantly, they will help AEA and the REGRP improve – and thereby capture significant net benefits and increase the deployment of renewable energy to target communities.

Some of the recommendations identified above and discussed in the remainder of this document can be addressed directly by AEA as program design and implementation changes. Others modifications will require changes in the authorizing legislation, and/or program regulations. We recognize the importance of distinguishing between management level program design changes, and those likely to require legislative or regulatory action. The AEA will work closely with the REFAC as it considers the recommendations in this report, and will continue to communicate with stakeholders – including the state legislature and Governor's office.

Phase II of this project is an impact evaluation (to be completed in late spring 2012) – providing more detailed information on the program accomplishments to date. The impact evaluation will summarize energy savings, avoided emissions and costs and benefits from REGRP supported projects – highlighting the full range of project types, renewable energy resources and communities that have participated in the program. Through the process and impact evaluations AEA has sought critical stakeholder feedback and information that will help to maintain and build program services and increase the benefits from renewable energy available to Alaskans for years to come.

Introduction

Alaska faces unique energy infrastructure challenges paired with an abundance of renewable and non-renewable energy resources. The costs and performance of renewable energy systems are often impacted by the conditions associated with remote rural communities in Alaska, and the strategies and delivery of renewable services to serve this market will often differ from those suited to urban, grid connected environments.

Context and Background

Since 2008 the Alaska Renewable Energy Grant Recommendation Program (REGRP) has provided support to utilities, independent power producers, and local governments, including tribal councils and housing authorities for the development of renewable energy projects. Administered by the Alaska Energy Authority (AEA) to date the program has issued five solicitations, reviewed 551 grant applications, and received appropriations of $177 million for 207 projects in the first four rounds, and reimbursed $76 million in project costs. The solicitation for the fifth round of program funding was issued in the summer of 2011 and recommendations to the legislature were presented in January of 2012.

The final recommendations to the legislature for Round V of the REGRP reflect two proposed levels of government funding – 19 projects with a cumulative cost of $25M and 41 projects with a cumulative cost of $43M.

Figure 1 illustrates the types of stakeholders and infrastructure that participate in and support the REGRP. The applicants in the REGRP, as well as AEA staff, are the two stakeholder groups with the most experience at all levels of the program, but clearly with very different and important perspectives on its internal processes.

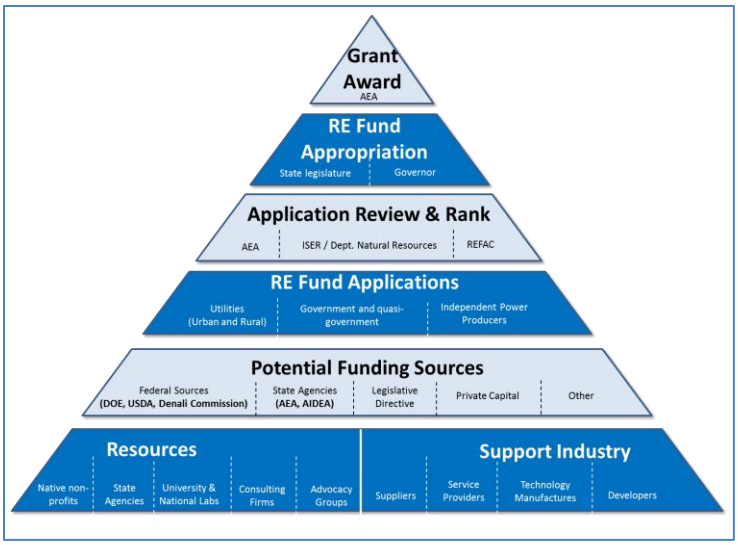


Figure 1: Alaska Renewable Energy Stakeholders and Program Infrastructure

As illustrated the REGRP depends on a broad foundation of human resources and industries to identify candidate projects and the potential funding sources. Funding sources include the grants offered by AEA through the REGRP as well as other sources of public and private capital.

RE Fund applications are generated by utilities, community, tribal and government organizations, and from independent power producers or developers working with communities. The REGRP differs from many other renewable energy incentive programs in that it does not directly support or receive applications for individual customer-sited projects.

Although the RE Fund has evolved over five funding cycles that have occurred since its inception in 2008, the four stages of the RFA Process summarized in the table below have remained relatively constant as a foundation for the program process.

Table 4: Stages in the REGRP Request for Applications Process

RFA Process Stage	Key Activities	Staff and Non-AEA Resources
Stage 1: Completeness and Eligibility Review	• Review applications for completeness • Key metrics: Include project details and establish that both the project and applicant are eligible for the RE Fund	• Grant Administrator • Program Manager(s)
Outcome Stage 1: Pass/Fail with appeal opportunity		
Stage 2: Feasibility and Public Benefit Review	• Review application for technical and economic merits • Key metrics: RE resource availability, cost-effectiveness and project development experience	• Project Managers • Dept. Natural Resources • ISER / Economists • Program Managers
Outcome Stage 2: Pass (Minimum score and adequate detail)/Fail with appeal opportunity		
Stage 3: Evaluation of Individual Applications	• Score and evaluate applications based on seven weighted criteria • Key criteria: Cost of Energy, Matching Funds, Feasibility, Project Readiness, Public Benefits, Sustainability and Local Support. High level requirements for statewide equitable distribution of funds and performance on previous grants	• Grant Administrator • (2) Program Managers • AEA Executive Director • REFAC • ISER (scoring)
Outcome Stage 3: Preliminary ranking and recommended funding levels (full/partial/none) with specific project guidance		
Stage 4: Regional and Final Ranking Recommendations	• Develop final statewide and regional ranking of applications • Key metrics: Annual funding availability, the number and types of project within each region, regional rank, and statewide rank of each application	• Grant Administrator • Program Manager • AEA Executive Director • REFAC (Regional Ranking)
Outcome Stage 4: Final report to the legislature summarizing applications and recommended priority for awarding grants		

At various points in these four stages, AEA draws upon external resources to help with the review and scoring of applications – including assistance from the Institute of Social and Economic Research, the Department of Natural Resources and the Renewable Energy Fund Advisory Committee.

After applications are reviewed and scored, AEA, with advice from the REFAC makes recommendations to the legislature for funding appropriations on a project by project basis. The ultimate appropriation for the funds is dependent upon both the legislature and the governor's office agreeing to the appropriations. This level of legislative review and appropriations approval is another factor that distinguishes the REGRP from many other state-run renewable energy program initiatives.

After appropriations are approved, AEA is responsible for grant awards and program administration.

Project Objectives

The research objectives are to assess the success and challenges of the program and provide recommendations to AEA, the Renewable Energy Fund Advisory Committee and the state government regarding the future of the program. To accomplish these objectives the study will include both process and impact evaluations.

Process evaluations are critical to help program managers, planners, and policy makers assess how well a program is functioning to effectively and efficiently meet its targets. Customer and stakeholder feedback is critical to inform process evaluations. In many ways process evaluations help to foster and support a culture of ongoing program improvement. As programs and initiatives mature and market conditions shift there are always lessons that can be learned from listening to market actors and stakeholders, and having a third party review how well practices, procedures, marketing, outreach, reporting, and management are aligned with the program's stated objectives.

Equally important, but with a different focus, impact evaluations document the outcomes of the program and initiative in terms of quantifiable and qualitative metrics. These include energy production, project benefits and costs – including off-set fuel use, environmental impacts, operations and maintenance issues and costs, job impacts, performance issues and other impacts – such as community infrastructure or educational development.

In combination, the process and impact evaluation components of the study will provide a solid foundation for recommendations to AEA and to the Legislature on the program's future, and on modifications to improve performance and enhance results.

Study Schedule and Team

AEA retained the Vermont Energy Investment Corporation (VEIC) in late 2011 to conduct an independent program review for the REGRP with assistance from the Alaska Center for Energy and Power (ACEP). This work is divided into a process evaluation, and an impact evaluation. The process evaluation was started in mid-December of 2011 and is the subject of this report, presented to AEA on March 23rd, 2012. The second phase of the study, an impact evaluation of the program was started in January of 2012, with a draft report due to AEA in late spring of 2012.

VEIC has a staff of 200 energy efficiency, conservation, demand response, smart grid, and renewable energy professionals, and operates on an annual budget of approximately $60 million. VEIC maintains an active Consulting Division staffed by 25 program design, planning, review, analysis, and implementation experts. Our Consulting Division serves a wide variety of public and private sector clients in 35 states, 6 Canadian provinces, and 5 European and Asian countries. Over the last 20 years, VEIC has been hired to design programs from the ground up, to critique existing programs, and to recommend improvements to literally hundreds of electric and gas efficiency programs. VEIC staff have developed and critiqued regulatory filings, and filed and defended expert witness testimony in more than 10 states on behalf of consumer advocates, regulators, utilities, and environmental groups.

VEIC also has extensive direct experience with the implementation of efficiency and renewable energy programs - through our successful operation of Efficiency Vermont (the first statewide energy efficiency utility in the nation operated by VEIC by since 2000), and through the more recently launched Efficiency Smart Power Plant portfolio of programs (on behalf AMP-Ohio and a collaboration of more than 40 of their member municipal utilities), and as the implementation contractor for the Washington, D.C. Sustainable Energy Utility (DCSEU).

VEIC has worked with regulators and utilities on renewable energy programs to define eligibility requirements, solicitation mechanics, standard contract terms and conditions, and project evaluation criteria. VEIC has written and reviewed grid supply competitive solicitations and evaluated responses using detailed and quantitative scoring criteria. We have recommended procurement design and implementation changes, in response to changing regulatory and market conditions, and are considered to be among the most experienced nationally in Renewable Energy Credit and Solar Renewable Energy Credit (SREC) market design. Currently, VEIC implements renewable energy programs in New Jersey, Vermont, and the District of Columbia.

The Alaska Center for Energy and Power (ACEP) is an applied energy research program at the University of Alaska Fairbanks, located within the Institute of Northern Engineering and the College of Engineering and Mines. ACEP was formed in January, 2008 with the goal of meeting state and local needs for applied energy research by working toward developing, refining, demonstrating, and ultimately helping commercialize marketable technologies. ACEP has developed key partnerships with over 75 private companies, utilities, and native organizations throughout Alaska, as well as

national laboratories and research centers world-wide. In addition, ACEP leverages resources from throughout the University of Alaska system through its model of building integrated, interdisciplinary teams to meet the research needs of our clients. ACEP currently manages over $15M in competitive research grants and contracts and has 20 active research projects.

VEIC and ACEP Team Roles

The overall REGRP Process Evaluation was led by VEIC with significant technical, stakeholder outreach and advisory support from ACEP.

The VEIC team, led by David Hill and Chris Badger, was responsible for the overall direction, management and final results of the Process Evaluation. Additional VEIC staff, Betsy Harper and Leslie Badger conducted phone interviews and led the development of the online survey for engaging the widest spectrum of Alaska renewable energy stakeholders.

The ACEP team, led by Gwen Holdmann and Julie Estey, provided the necessary context for understanding the breadth of the Alaska renewable energy industry, as well as the critical stakeholders in the REGRP process. The ACEP team was complemented by Dennis Witmer, who was responsible for managing and reviewing the REGRP data and conducting analysis for the process and impact evaluations

Over 50 in-person interviews were conducted in late January with two teams of interviewers - David Hill and Gwen Holdmann and Chris Badger and Julie Estey. The interviews were led by VEIC with ACEP support with appropriate stakeholders. Stakeholder phone interviews were led by Betsy Harper, but supported by Leslie Badger, David Hill, Chris Badger, Gwen Holdmann and Julie Estey. Leslie Badger was responsible for developing the stakeholder online survey and processing the results for the Process Evaluation.

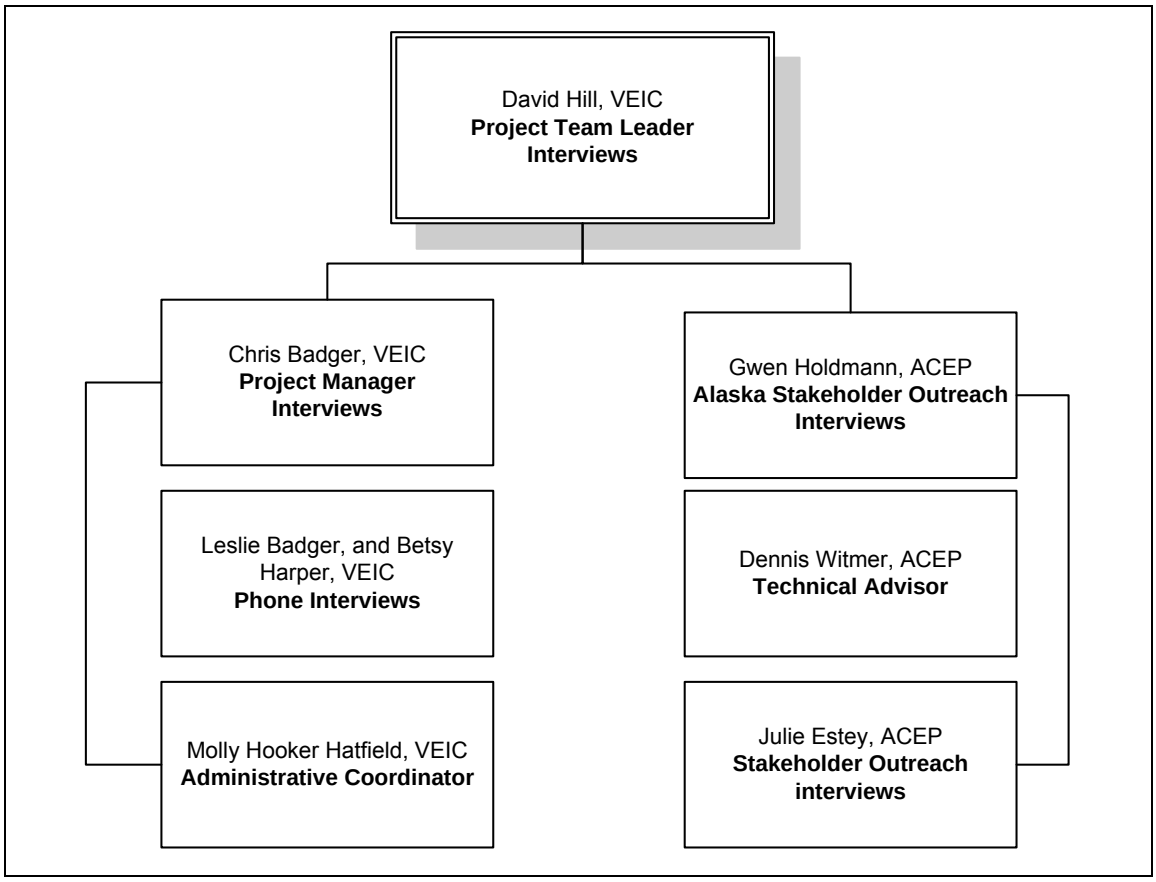


Figure 2: Alaska Renewable Energy Grant Recommendation Program Review Team

The VEIC team approaches this assignment with a fundamental viewpoint, based upon our mission and the experience cited above, that policy and program support are often valuable and/or necessary to reduce market barriers for renewable energy and to help reduce the environmental and economic costs of energy.

Organization of the Report

The next section describes our methodology, including the development of a structured set of evaluation criteria and questions used to elicit direct input from the various stakeholders in the REGRP. Our research activities included:

- Document review
- Online survey
- Telephone and In Person Interviews

The findings and recommendations section starts with summary tables that present results grouped by each of the major areas of inquiry defined for the study. Next, we present study findings organized by evaluation criteria. We present the findings from all three types of research in each section, starting with a presentation of the survey results –

followed by a synthesis of the findings and feedback gathered from the in-person and telephone interviews.

Recommendations are presented separately from the findings in each section. The findings directly reflect the information and feedback directly gathered from stakeholders. The findings may include specific recommendations from stakeholders, but it does not include recommendations from VEIC or ACEP staff. The recommendations are based on the synthesis of the research findings by the VEIC team and draw upon the professional experience of VEIC and ACEP team members.

Study Methodology

Our study methodology was designed to meet the twin objectives of conducting ato produce a rapid yet thorough assessment of the REGRP process. The research activities under-taken by our team included:

- Phone conferences with AEA to review priority areas of inquiry and to review and refine appropriate research questions;
- Review of program and background documents, including authorizing legislation, supporting regulations, program reports, program databases, and supporting literature on renewable energy in Alaska;
- Creation and scheduling of in-person and telephone interviews with a list of critical stakeholders;
- The development of interview guides for in-person and telephone interviews;
- The development of an on-line survey;
- Conducting over fifty in-person and twenty four telephone interviews;
- Compiling interview notes and survey results (108 responses);
- Drafting and reviewing preliminary key findings and recommendations with AEA; and
- Drafting, circulating for comment and revising written Process Evaluation Report (this document).

The findings and recommendations presented in this report are based on close to 700 hours of primary and secondary research and analysis by our team – and the inputs and feedback from over one hundred stakeholders. The process evaluation encompasses a variety of sources - RE Fund stakeholders, including AEA staff, as well as program documentation and external resources identified in the report bibliography. The evaluation was also balanced by the VEIC team experience and knowledge of other renewable energy programs, as well as evaluation and program studies from other states.

To solicit the greatest number of responses from stakeholders, as well as greater expressions of individual perspectives, the Process Evaluation methodology included multiple survey mechanisms. The VEIC team developed an online survey and guides for the in-person and phone interviews to allow for consistency of questioning regarding the specific criteria outlined below.
Appendices A through C present our on line survey and results, interview guides, and the list of interviewees that participated in the research. We would like to thank all of those who participated as interviewees and as survey respondents – providing their time, expertise and constructive insights on how the program can continue to improve and evolve.

The remainder of this section provides further detail on some of the critical elements of the study methodology.

Evaluation Priorities & Research Questions

Successful evaluation is dependent upon clear objectives – the metrics and indicators that will be used to measure progress towards the objectives – and sound methods for gathering data, analyzing and presenting non-biased valid results. For each area of inquiry the VEIC team worked with AEA staff to refine and review suitable questions to gather feedback on and characterize effectiveness of the program's processes and identify strengths, weaknesses and areas for potential improvement. Reviewing the research priorities and evaluation criteria with AEA our team developed the following list of research questions for use in the interview guides and the on-line surveys.[3]

Program Outreach

What current AEA approaches have been the most successful in promoting the RE Fund program in Alaska?

How effective is AEA is in supporting smaller and high cost of energy (COE) communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

Has AEA developed an effective process to identify and support the development of renewable energy projects in Alaska?

Request for Application (RFA) Process

Are the application procedures, the criteria for evaluation and the timeframes understandable and clearly communicated to communities and applicants?

Do communities or applicants generally require outside help with the RE Fund application? Are there areas where AEA could play a stronger role?

Are there specific areas that should be targeted for improvement, or have not functioned as originally intended by the enabling legislation?

Applicant and Project Evaluation Process

Are the metrics for the evaluation of RFA proposals appropriate and appropriately weighted?

Does AEA have a suitable process for evaluating the economic and technical feasibility of proposals?

Have AEA and the RE Fund Advisory Committee been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

Grant Award Process

Does the duration of the grant process from application to reimbursement create any notable concerns for applicants or awardees?

[3] The complete interview guides and online survey questions can be found in Appendix A and C.

Does the timing of when awardees receive funds create any adverse impacts for awardees?

Is AEA following through on assessing project performance and collecting data from completed projects to inform future rounds and identify best practices?

Grant Administration Process

Does AEA administer the grants in an effective and timely fashion?

What is AEA's level of communication with individual project awardees? Are there areas for improvement?

In what ways does AEA help coordinate the multiple funding sources from AEA's programs for communities?

Identify and Reach Out to Key Stakeholders

Our team, supported in particular by staff at ACEP, worked closely with AEA to identify and reach out to critical stakeholders to insure that interviews were offered to a broad and diverse group. We made efforts to schedule in person and telephone interviews with stakeholders that would provide feedback from a variety of perspectives including those from state government, tribal authorities and development corporations, private sector engineering and consulting firms, electric utilities, legislators, and renewable energy advocates. In addition, as part of our in-person and telephone interviews we solicited recommendations for additional respondents who might want to participate and provide feedback via the on-line survey.

Within a short, 3 week time horizon in early January, 2012, we were able to schedule and coordinate the telephone and in person interviews with more than 75 stakeholders.

Interviews

Starting with in person meetings with AEA staff – our team conducted in person interviews with more than 50 individuals in Anchorage, Juneau, Fairbanks and Unalakleet. Appendix C presents the full list of interview respondents. For most of these interviews, we had two members of our team participate, taking notes and comparing the responses and feedback after the interviews. In some cases an individual member of our team conducted solo interviews. We started the in-person and telephone interviews with an overview of the project and AEA's objectives and an introduction to our team members. Prior to the first interviews our team conducted a test-interview with a willing respondent and de-briefed as a team to discuss and review any ways to improve the interview process. In general, in person and telephone interviews took from 20 to 30 minutes – although in many cases the interviews lasted for up to an hour.

Online Survey

The online survey was developed to provide an opportunity for a larger community of stakeholders – including AEA staff, program advisors, rural organizations, legislators, energy advocates, participants and non-participants in the program – to participate in the *Renewable Energy Grant Recommendation Program Process Evaluation* [4]. The survey was developed by the VEIC team based on the key evaluation criteria identified by staff at the Alaska Energy Authority and posted on *Survey Monkey* for approximately 10 days during the first two weeks of February, 2011. The Alaska Energy Authority, as well as Alaska energy advocates, publicized this effort through their respective listservs for email contacts, as well as direct email distribution to all participants in the REGRP contact database. A total of 108 responses were collected. Appendix A presents more details regarding the on-line survey structure, responses and results, which include direct stakeholder written responses to open ended questions as well as quantitative results for discrete questions.

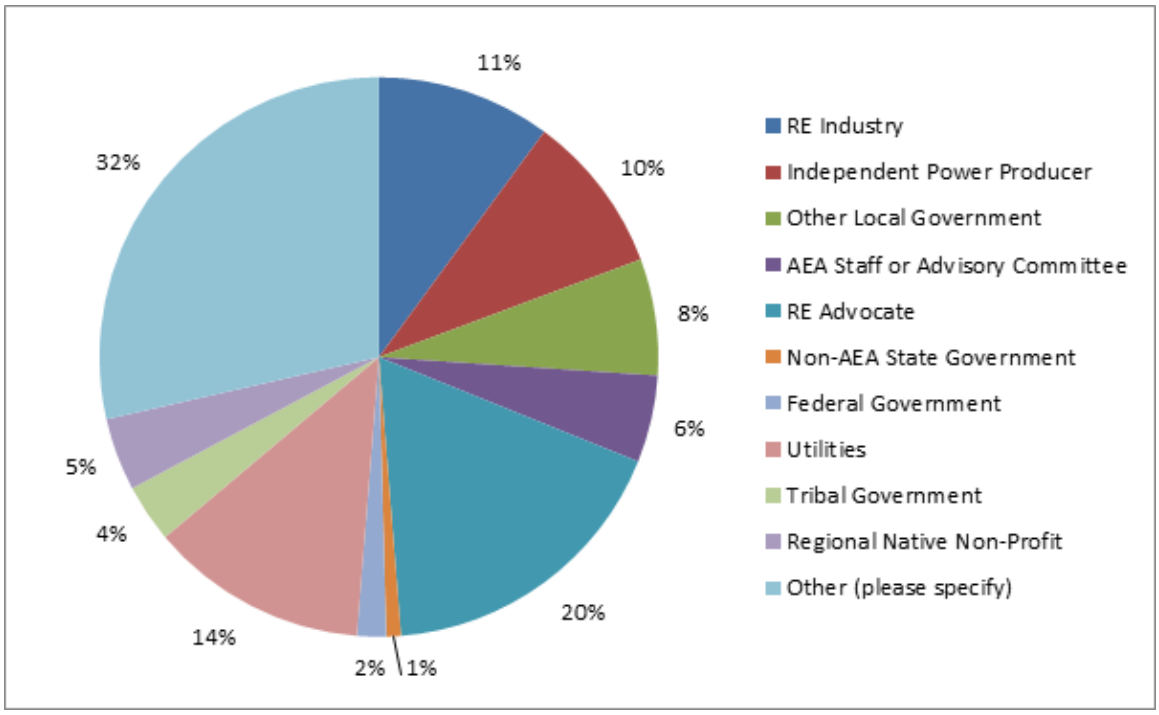


Figure 3: Online Survey Stakeholder Participation by Organization Type

[4] The Renewable Energy Grant Recommendation Program (REGRP) is often referred to as the Renewable Energy Fund or RE Fund by stakeholders and was the terminology used in this survey.

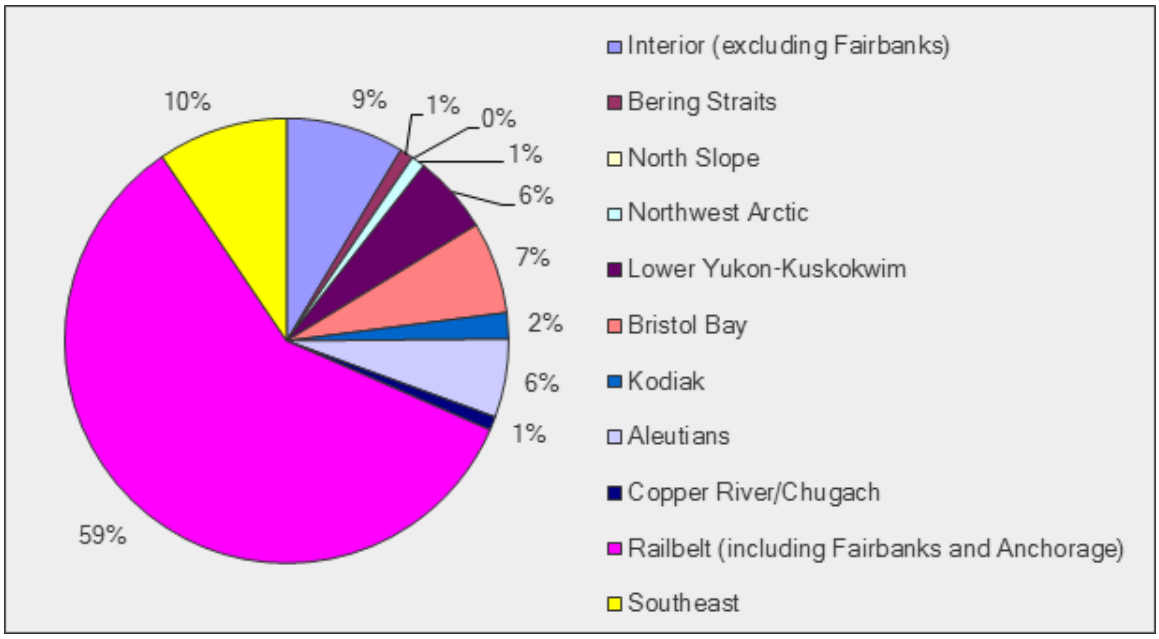


Figure 4: Online Survey Stakeholder Participation by Region

Detailed Findings and Recommendations

Based on the research we conducted as described in the preceding section including document review, in-person interviews, phone interviews and an online survey, our team has identified 23 findings and 26 recommendations summarized in Tables 5 and 6 respectively, and then presented with supporting text in the remainder of this section.

Table 5: Detailed Findings

Program Outreach	**Pages 28-31**
7. There is a clear appreciation of the formidable and often unique challenges to be overcome when promoting the development of renewable energy projects in Alaska.	
8. More effectively coordinate the REGRP with regional planning and/or other rural infrastructure development activities.	
9. Identify opportunities for developing more targeted information and communications regarding renewable energy technologies and available in-state technical resources.	
10. Stakeholders noted significant improvements in the quality and quantity of information AEA shares with stakeholders – but suggested that more proactive communications and outreach would be very helpful.	
11. Increase the amount of outcome based reporting and information providing insights on "what we have done, and what we have learned" through the REGRP.	
12. Capitalize on the first point of contact through other AEA programs – most notably the Bulk Fuel and Rural Power System Upgrades and the Power Cost Equalization programs – to cross-promote the REGRP.	
Request for Applications (RFA) Process	**Pages 34-36**
6. AEA has developed a robust process for soliciting applications.	
7. Formalize procedures for addressing questions around RE fund process and around appeals.	
8. Consider more differentiated application requirements and processes for different types of projects and different project stages.	
9. Increase the training and support for smaller projects/communities during the application process. These communities typically face additional barriers in preparing applications in the current RFA process.	
10. Use regional planning or a more structured set of AEA program targets and goals to solicit and encourage a more coordinated set of applications – particularly for those relating to resource assessment and feasibility for smaller and remote projects.	
Request for Applications Project Feasibility and Application Evaluation	**Pages 40-41**
5. The weighted criteria and scoring get mixed reviews on how well they provide sufficient metrics for identifying strong projects while also meeting legislative intent.	
6. The REGRP process may not allow for an appropriate level of public input as part of the evaluation and scoring of applications. .	
7. The technical and economic review process does not reflect the full benefits to both the state, as well as individual communities.	
8. AEA's role in providing guidance best practices sometimes blurs the lines on impartiality and is perceived as placing unduly restrictive requirements on specific project designs.	
Renewable Energy Fund Advisory Committee Participation	**Pages 44-45**
3. Many stakeholders are not aware of the Renewable Energy Fund Advisory Committee, its responsibilities, or the composition of its membership.	

4. Public participation in the periodic REF Advisory Committee meetings may not allow for sufficient expression of local opposition or feedback on projects prior to the initial project evaluation by AEA.	
Grant Awards Process	**Pages 48-49**
4. The timing and duration of the award process can create significant negative impacts on efficient project development.	
5. Funding for sequential phases of development under separate rounds can slow project development significantly leading to higher costs.	
6. Allow AEA to grant awards directly, at least for feasibility and potentially smaller scale construction projects.	
Grant Administration	**Pages 51-53**
5. AEA has developed a dedicated and knowledgeable team to administer the program, but often appears stretched from a staffing level.	
6. Define AEA's role with respect to the RE Fund administration and the level of engagement with project design or active project management.	
7. AEA's required level of reporting for grantees, although appropriate, can vary between individual project managers and should reflect specific cost structures native to the RE industry.	
8. There are opportunities to improve post-operational performance reporting increasing the value of lessons learned and transparency to the public in this area.	

As noted in the executive summary, most of the recommendations and modifications identified below can be addressed directly by AEA as program design and implementation changes. In some instances the recommended modifications may require changes in the authorizing legislation, and/or program regulations. We recognize the importance of distinguishing between these types of recommendations and note where appropriate the modifications likely to require legislative or regulatory action.

Table 6: Summary of Recommendations

Program Outreach	**Pages 31-32**
6. Carefully consider, and as appropriate test, implement and/or strengthen, a coordinated "account manager" model to providing outreach, communications and services, particularly for "harder" to serve target audiences.	
7. Increase emphasis of program outreach that is coordinated with regional energy planning and other infrastructure development and investments.	
8. Take a more proactive role in providing technical assistance to communities, including assessing and recommending possible application opportunities, identifying synergies with other projects within the community or in the region, and in local and regional planning efforts.	
9. Place an emphasis on documenting best practices and the collection and analysis of primary data from completed construction and feasibility projects.	
10. Improve branding of the program as well reviewing the accessibility and general format of content on the REGRP area of AEA website.	
Request for Applications (RFA) Process	**Pages 36-37**
6. The RFA process would benefit from a complementary framework that articulates regional and/or technology specific renewable energy goals.	
7. The RFA and overall REGRP program design can more clearly distinguish between project types and phases – and the type of support required.	
8. AEA should identify additional methods for providing high quality support and training for communities seeking to participate in the REGRP.	
9. Review options with the REFAC, RE industry and state government to authorize AEA to make direct	

grants to support feasibility studies and smaller renewable energy applications on a more continuous basis.	
10. Identify opportunities to create longer term visibility of the program goals and objectives, as well as limit the impact of the start/stop nature of the individual funding cycles.	
Request for Applications Project Feasibility and Application Evaluation	**Pages 42-43**
6. To avoid and/or reduce some of the inherent potential conflicts in the current system – AEA should establish more than one solicitation to better serve the target markets for the REGRP.	
7. Community derived matching funds should be given higher scores than matching funds that come from non-local sources.	
8. We recommend the AEA hire independent engineering firms to conduct technical feasibility reviews and/or provide increased technical support to potential applicants who are developing proposals.	
9. Establish a clear set of eligibility criteria for scoring in the REGRP and allow for technical and economic scoring and feedback on all applications.	
10. Review and revise program processes to allow for a structured opportunity for expressions of community support or opposition.	
Renewable Energy Fund Advisory Committee Participation	**Pages 45-46**
4. AEA and the REF Advisory Committee should consider developing a charter to outline their role with respect to the RE Fund as well as defining specific goals for the program on an annual basis.	
5. Increase and improve visibility to the public process and the REF advisory committee meetings on the Authority's website.	
6. Utilize the REFAC to review, endorse adopt, and/or modify specific recommendations or modifications, including for example, greater program differentiation.	
Renewable Energy Fund Award Process	**Pages 49-50**
4. AEA should seek authorization from the legislature to fund smaller projects and feasibility studies without needing to make recommendations that are subject to a further round of legislative review.	
5. AEA should work with the legislature and AIEDA to develop non-grant options for larger projects.	
6. AEA should develop grant milestone payments and phasing based on the experience of project teams and the level of matching funds provided.	
Grant Administration	**Pages 53-54**
6. Develop a detailed staffing plan to address the growing role of AEA in addressing rural and renewable energy development in the State of Alaska.	
7. Clarify AEA's role with respect to project developers and the evaluation of projects to retain a neutral stance in its administrative responsibilities.	
8. Conduct an internal review of how AEA organizes and manages information related to the REGRP.	
9. Modify reported savings to include gallons of fuel displaced and dollars saved to better reflect the economic benefit to Alaska ratepayers.	
10. Compile program data into a standard annual report format that includes cumulative information across rounds as well as more detailed information on current projects and expenditures.	

Program Outreach

Overview

Effective program outreach and communications contribute to success at many levels. First, at the most basic level, program outreach must make potential applicants aware of the funding opportunities, the process for applying, and the criteria that are used to judge applications. With more than $1.1 billion of requested project applications received during the first four funding rounds[5], the REGRP has been very successful in soliciting a high volume of grant requests to support renewable energy projects in the State.

At a second level, outreach is critical in determining how well a program reaches target audiences (some of which may be relatively "easy" to reach while others may be much "harder"). Program outreach also influences whether the available funding reaches and supports the types of projects envisioned in program and legislative objectives.

Finally, outreach is not limited only to recruitment for participation, but also includes reporting and general communications that informs stakeholders of results, highlights, and challenges.

The findings and recommendations on program outreach address each of these areas – emphasizing areas where the program process has been effective while also identifying opportunities for continued improvements.

Program Outreach Findings

Finding 1: **There is a clear appreciation of the formidable and often unique challenges to be overcome when promoting the development of renewable energy projects in Alaska**.

The success of each project depends on ingenuity, persistence, experience and sometimes luck to navigate many pitfalls and barriers including a wide range of transportation, design, engineering, operations, maintenance and environmental issues. These challenges include establishing and maintaining good outreach, working relationships and communications with remote communities. Several stakeholders observed that working with the remote communities can be difficult for all types of enterprises and initiatives, be they private or public sector – and this issue is not unique to AEA, renewable energy, or to the REGRP.

Small and remote communities often have limited financial, human, and infrastructure resources. This can limit or prevent their ability to develop and/or submit applications to

[5] Fay, G., P. Crimp, and A Villalobos-Melendez, 2011, *Alaska Renewable Energy Fund: How it Works and Lessons We've Learned*, Technical Report, Institute of Social and Economic Research, University of Alaska Anchorage in collaboration with the Alaska Energy Authority, prepared for the 8th International Conference on Environmental, Cultural, Economic and Social Sustainability, 19 pages. Review Draft.

the REGRP. It can also mean applications are not adequately prepared and either are not scored or score poorly in a larger competitive pool.

Several stakeholders complemented AEA and REGRP for holding good regional meetings and conferences, highlighting the Rural Energy Conference as particularly valuable. This was supported by responses in the online survey (**Figure 5)**, in which both email correspondence and rural energy conferences and workshops were identified as the leading methods for promoting the REGRP.

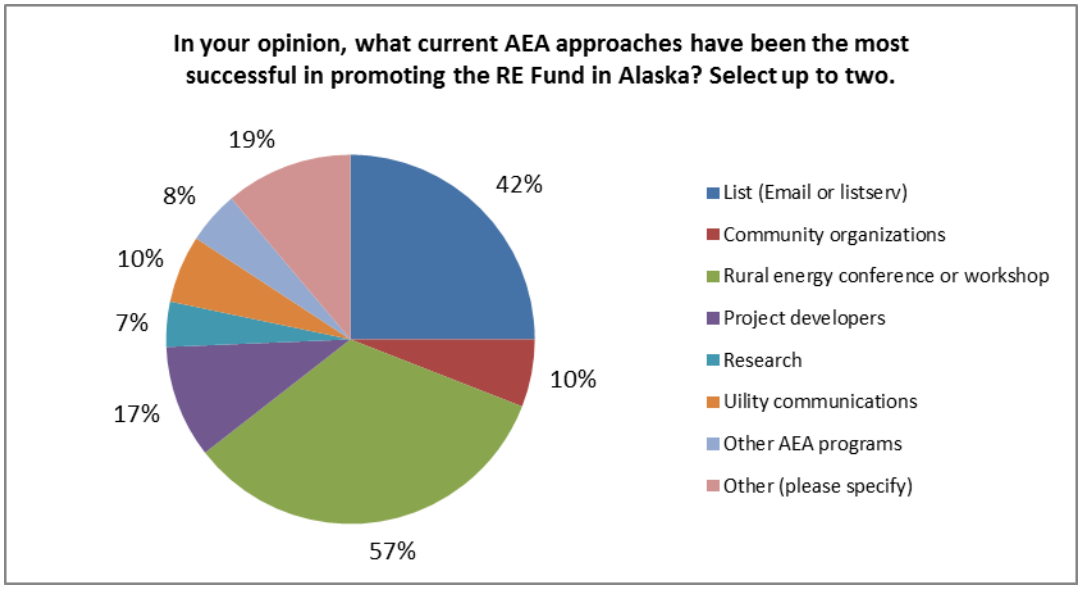


Figure 5: Online Survey results on successful REGRP promotion

At the same time, it was suggested that financial and time constraints often limit the participation of many small and remote communities in these meetings.

Finding 2: More effectively coordinate the REGRP with regional planning and/or other rural infrastructure development activities.

Energy is widely recognized as a critical issue for many remote communities and the state as a whole. Affordable and reliable energy supplies are needed to sustain remote communities – and to support the value of other infrastructure investments in housing, schools, water and other facilities.

A related finding is that the Alaska Energy Pathways work completed by AEA in July 2010 provides community level resource assessments and a planning framework – but that the REGRP solicitation process (including outreach) – continues to be less structured and less intentional, following a more "bottoms-up" approach to identifying cost-effective renewable energy projects. It was suggested that the REGRP may well be able to achieve a greater level of focus and effectiveness by more actively integrating outreach with support for regional planning based upon the Pathways resource assessments, and by coordinating outreach more actively with other rural infrastructure and services planning

and development.

Finding 3: **Identify opportunities for developing more targeted information and communications regarding renewable energy technologies and available in-state technical resources.**

As an example, one stakeholder noted that biomass systems, which can play an important role in meeting both thermal and electric energy needs for many Alaskan communities, are getting "a bad rap – based on false information about maintenance and emissions". This respondent recommended that AEA's outreach and communications could provide communities with credible, unbiased information on system options and performance. Another party noted that project developers are instrumental in moving successful projects forward with small and remote communities, and that more frequent and direct outreach and communications with this group could help improve the quality and quantity of project applications and completions.

Finding 4: **Stakeholders noted significant improvements in the quality and quantity of information AEA shares with stakeholders – but suggested that more proactive communications and outreach would be very helpful.**

A number of stakeholders suggested AEA maintain a more active internet presence, through channels such as a Facebook page, more regular electronic updates or news flashes. A regular program newsletter in printed form was also suggested. Several stakeholders noted that the program has a good presence at the rural energy conference and the utility's operations and maintenance conference, but that "getting AEA program staff out to more communities" would be beneficial.

Additional suggestions along the same lines were to utilize school or other community based teleconferencing capabilities for outreach and training via webinars and remote workshops. Several respondents noted that significant changes to the program requirements – such as the maximum cap on available funds – have not been sufficiently communicated to potential applicants. The continued, but not exclusive, use of email list-serve to communicate with stakeholders was also encouraged, but that this list should be reviewed periodically for additions or updates. Finally, there were some suggestions that additional internal communications with AEA staff working on other program areas would be helpful.

Finding 5: **Increase the amount of outcome based reporting and information on "what we have done, and what we have learned" through the REGRP.**

Several respondents and interviewees noted that outreach and communications tend to focus on up-coming or current solicitations – and give stakeholders less information than they would like to see on program accomplishments and lessons.

Stakeholders beyond program participants or potential applicants would like to know more about program results including dollars saved, and how the program has contributed to progress towards policy goals. There is an interest in hearing more about how the activities of the REGRP fit with other investments and opportunities in the energy sector.

Finding 6:	Capitalize on the first point of contact through other AEA programs – most notably the Bulk Fuel and Rural Power System Upgrades and the Power Cost Equalization programs – to cross-promote the REGRP.

Several stakeholders had identified program managers or consultants outside of the REGRP as their general point of contact with AEA and having raised awareness of the RE program. However, this cross promotion of programs was not experienced universally by communities, nor found explicitly within AEA. During the course of interviews in Unalakleet, coordination among the wind turbine and the diesel powerhouse upgrade projects (**Figure 6**) was highlighted for the success of the project in the community. The concurrence of the timing of the projects was noted as allowing for better communications between the local utility, the wind turbine manufacturer and the diesel control engineers.

Figure 6: Unalakleet Wind Diesel System

Establishing a more structured relationship between AEA and individual communities and regions was suggested as a method for addressing changes in individual positions within communities, as well as within AEA staffing.

Program Outreach Recommendations

Recommendation 1:	Carefully consider, and as appropriate test, implement and/or strengthen, a coordinated "account manager" model to providing outreach, communications and services, particularly for "harder" to serve target audiences.

The account manager approach emphasizes the perspectives, needs and barriers faced by participants, potential applicants, and other stakeholders – explicitly assigning staff to particular constituent groups and/or regions of the state.

For example, identifying a single AEA point of contact to proactively assist remote communities in a specific region(s), could help the communities understand and more actively participate in the REGRP and other AEA initiatives. The account manager would be responsible to identify, and in some cases prioritize, high value options for each community based on regional energy planning or individual community level assessments. They would also consider and coordinate potential REGRP applications with other AEA initiatives (power house upgrades) and possibly with other infrastructure investments, either within an individual community – or in nearby communities where there are opportunities to reduce development and/or transportation costs. Over time, this approach could complement the current model for the REGRP which is more structured around technology based project managers (e.g. wind, biomass, hydro).

Recommendation 2:	**Increase emphasis of program outreach that is coordinated with regional energy planning and other infrastructure development and investments.**

This recommendation may be tied to a higher level of program differentiation – for example program outreach and REGRP funding may focus on a particular regions and/or project types during a particular solicitation round.

Recommendation 3:	**Take a more proactive role in providing technical assistance to communities, including assessing and recommending possible application opportunities, identifying synergies with other projects within the community or in the region, and in local and regional planning efforts.**

AEA is moving in this direction and there are some positive examples of this sort of collaboration, and we recommend they AEA continue to expand their efforts in this area.

Recommendation 4:	**Place an emphasis on documenting best practices and the collection and analysis of primary data from completed construction and feasibility projects.**

This information should be made available publically to help inform future applicants, funding decisions and project design. We recommend consistent data management and reporting plans are developed with the awardee prior to final award. Timely collection and analysis of the data is a critical step to support documentation of best practices.

Recommendation 5:	**Improve branding of the program as well as reviewing the accessibility and general format of content on the REGRP area of AEA website.**

Awardees should be required to acknowledge AEA program funding in publications and on site. AEA should provide collateral to awardees such as signs to affix to buildings housing construction equipment, or at construction sites.

AEA should consider other outreach avenues, including a regular newsletter, and Facebook or other web content, highlighting certain projects and raising the general awareness of the types of projects being funded through this program.

A re-assessment of the web-based information available about the program is warranted. While there is a large amount of information on AEA site related to the request for applications scoring process, it is not necessarily well organized nor summarized in ways that interested parties can easily understand the full impacts of the program. In addition, there is little visible follow up information, such as reporting, on projects once awards have been made.

Finally, we recommend eliminating the duplicate web addresses for AEA, http://www.aidea.org/aea/ and http://www.akenergyauthority.org/. Although much of the content is on both pages, some is not and it increases confusion about where to find information on AEA programs.

Request for Applications (RFA) Process

Overview

Establishing a manageable and transparent application process is important for effectively identifying and evaluating the merits of individual renewable energy project applications, as well as developing strong engagement from potential applicants including communities, utilities and renewable energy industry. The Request for Applications Process serves several functions that are critical to program success:

- Solicit suitable projects - the RFA process needs to provide sufficient guidance and structure so that projects applying to the REGRP are suitable for consideration and development;
- Provide manageable amount of information and detail to enable review and scoring - The RFA process has to be manageable for potential applicants, their partners and AEA staff; and
- Provide transparent and fair opportunity for applicants - The RFA process has to have transparent, reasonable and clear requirements for submitting applications.

The enacted legislation of House Bill 152[6] authorized AEA to develop the renewable energy grant fund program (hereafter referred to as the RE Fund), with the AEA given the specific responsibility of soliciting, scoring, recommending and administering grants for renewable energy projects approved by the legislature.

In coordination with the Renewable Energy Fund Advisory Committee, the legislation required AEA to establish eligibility requirements for the RE Fund and prioritize the order of projects to receive assistance based on an established methodology. This methodology was to evaluate the benefit and feasibility of projects giving the most weight to projects that serve high average cost of energy areas of the state, as well to provide an equitable distribution of grant funds across the state regions.

The findings and recommendations on the RFA process consider both AEA's success in achieving the goals of the legislated intent of the program, as well as balancing against the needs of individual applicants and the RE industry in developing successful RE projects in the State of Alaska.

[6] Alaska HB 152, 2008 Session
http://www.akenergyauthority.org/RenewableEnergyFund/Chapter31_SLA08_HB152.pdf

Request for Applications (RFA) Process Findings

Finding 1: AEA has developed a robust process for soliciting applications.

The nature of the RFA, guidance around the specific weighted criteria for evaluation of the applications, and the overall review process were recognized as strengths of the program. Several stakeholders characterized the important role that AEA and the REGRP plays in creating a level playing field for applicants in receiving grant funding.

Finding 2: AEA should formalize procedures for addressing questions around RFA process and around appeals.

It was suggested that AEA formalize its procedures for addressing questions around RE Fund process or appeals. Although the RFA addresses this area, providing additional information and clarity with respect to applicant questions and appeals, as well as the specific roles and responsibility of parties, will enhance AEA's efforts to provide a fair and impartial application process.

Finding 3: Application requirements and processes for different types of projects and different project stages might be more effective if separated.

Applicants with highly cost-effective projects might be better served by providing non-grant financing support, allowing the REGRP grant funding to be appropriated for more financially constrained applicants, smaller projects, and feasibility studies.

The solicitation and scoring of projects that are at different stages of development and that represent fundamentally different scales and types of projects is also difficult. Separating the solicitation into more than one tranche could improve the ability to more accurately and fairly compare projects of similar type and scale.

Finding 4: Smaller projects/communities face barriers in the current RFA process and would benefit from training and support during the application process.

Stakeholders and applicants from small and remote communities often do not have the human resources required to effectively participate in the RFA, and may find the requirements and process overwhelming. Even at the resource assessment and feasibility stages of project development these communities may require assistance from external developers or consultants.

Stakeholders commented positively on the training offered by AEA at conferences and regional seminars. AEA is also recognized as providing a critical independent advisory role especially for small and rural communities. However, at the same time, accessibility and frequency can be barriers for participation by these groups. This applies to training and assistance at the application phase as well as later in the REGRP process. One alternative mentioned is to make more active use of video conferencing capabilities offered through schools or other community agencies.

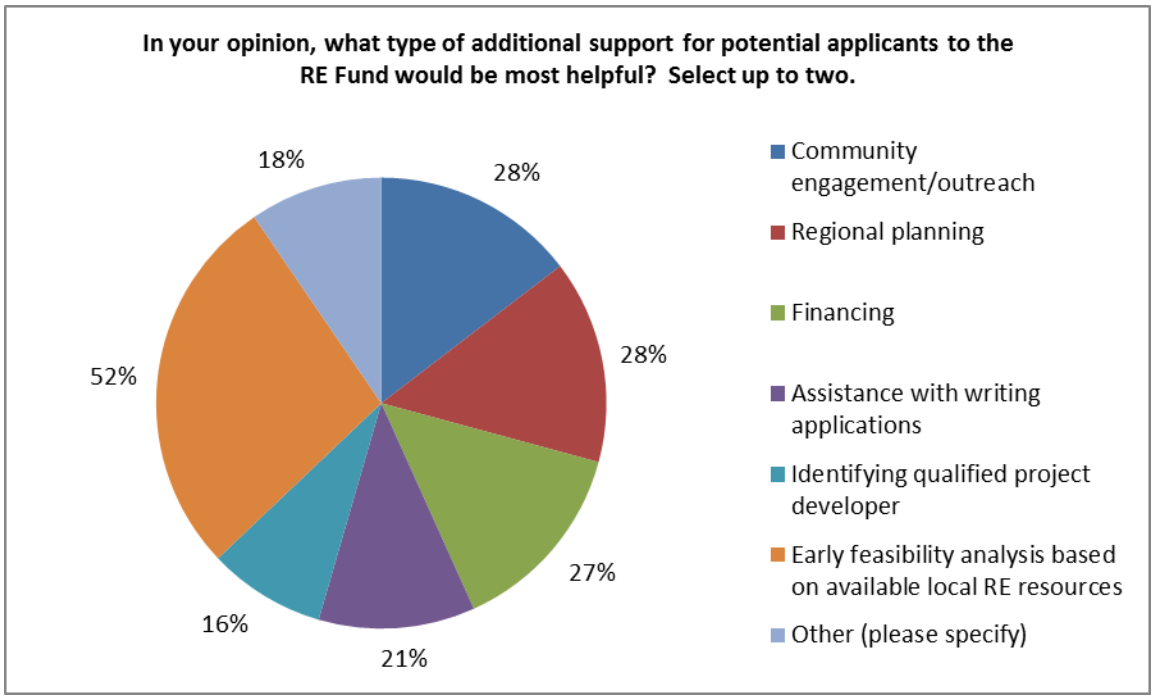


Figure 7: Online survey results on additional support to REGRP applicants

Specific areas of additional support were recommended in the responses to the online survey (**Figure 7).** Early feasibility analysis was ranked highest, though community outreach, regional planning, financing and assistance with application writing were also identified as critical areas of support.

In the interview process, utilities, independent power producers and project developers with experienced staff largely described the application process to be straight forward and appropriate for the types of projects that were submitted under their applications. These larger applicants often use consultants and/or in-house engineering staff during the application phase, and may bid out projects to achieve greater cost-effectiveness.

Finding 5: **Regional planning or a more structured set of AEA program targets and goals could be used to solicit and encourage a more coordinated set of applications – particularly for those relating to resource assessment and feasibility for smaller and remote projects.**

Several stakeholders emphasized the need for a framework of planning under which goals and targets are established and then a competitive solicitation or other mechanism is utilized to reach those targets. Absent this framework, stakeholders noted there is no structured environment for developing technical and infrastructure resources in remote communities and regions. Alternatively, regions with lower cost of energy (e.g. Railbelt including Anchorage and Fairbanks) are adversely penalized in the application process for having lower cost of energy, despite potentially offering cost-effective renewable energy projects.

Regional plans and/or targets can help potential applicants and AEA place individual projects within a bigger picture and may reduce some barriers faced by communities who find the timelines too short and level of detail required too burdensome to submit applications. Investing and supporting early stage resource reconnaissance was considered by many to be the best use of state funds and facilitate the additional investment of a larger share of private capital.

Request for Applications (RFA) Process Recommendations

Recommendation 1:	**The RFA process would benefit from a complementary framework that articulates regional and/or technology specific renewable energy goals.**

The RFA process does not substitute for the need to state renewable energy market development plans and program goals. Strong RE market development in other states is consistently tied to a stable and clear policy framework and long term goals. California, New Jersey, New York, Colorado and Arizona provide some examples of how stable and longer term goals are critical to market development. In Alaska, such planning would foster engagement with the RE industry and facilitate the long term development of business models and the investment of private capital in projects.

In addition to state or regional renewable energy plans, a program logic model is another tool that is often used in other state's renewable energy or energy efficiency programs to identify the specific barriers, goals, and metrics by which the program will be evaluated. A program logic model defines goals and provides context for processes and provides a framework for evaluation and for identifying opportunities for continued improvements and modifications as the market and programs co-evolve and develop.

Recommendation 2:	**The RFA (and overall REGRP program design) can more clearly distinguish between project types and phases – and the type of support required.**

Additionally separating resource evaluations (feasibility studies) from capital intensive construction applications would likely improve both the speed of the application process, as well as limit the burden to smaller communities in developing an understanding of their RE resource potential.

In several other states, as well as in Canada, renewable energy programs have developed multiple initiatives to support the development of RE resources. These include grants, rebates, attractive financing, feed-in-tariffs and renewable portfolio standards, each of which may be supported through a single renewable energy program, but address the specific opportunities and barriers to individual applicants and RE technology. A broader definition of the renewable energy program in Alaska through AEA, as well as considering additional approaches to leverage private investment will help to promote continued market development.

Recommendation 3:	**AEA should identify additional methods for providing high quality support and training for communities seeking to participate in the REGRP.**

The RE industry plays a strong role in supporting communities participating in the program, but the development of some additional regional and local technical resources can benefit the REGRP, as well as other AEA or state programs.

Increasing the accessibility of training on best practices for resource assessment and for completing application packages, for post-award project management and system operations, will complement the existing strengths of regional or annual conferences and increase the percentage of high quality applications.

Recommendation 4:	**Review options with the REFAC, RE industry and state government to authorize AEA to make direct grants to support feasibility studies and smaller renewable energy applications on a more continuous basis.**

Allowing AEA some authority to fund feasibility, resource assessment, or small scale construction projects without legislative review and approval would help to facilitate an important class of projects. Granting AEA "fast-track" funding authority could greatly increase the engagement of smaller communities. As noted earlier, coordinating this authority with regional planning and targets would significantly improve the ability for communities to develop successful projects, and more effectively leverage private RE industry support.

Request for Applications – Project Feasibility and Application Evaluation

Overview

The authorizing legislation of HB152 set high level objectives for the REGRP – to provide the greatest weight to support for high cost of energy communities while also maintaining a geographically balanced distribution of funds in the state – while leaving AEA, with REFAC input, the responsibility for defining the metrics and methodology by which projects would be scored and recommended for funding.

The success of a RE grant program is rooted in the effective evaluation of applications with a set of metrics that will result in supporting projects that meet the specific goals of the program, not the least of which is increasing the successful, long-term operation of renewable energy systems in the state.

As noted in the previous section on the RFA Process, there is a general consensus from stakeholders that AEA has developed an effective means for vetting projects that have applied to the program. However, as is often the case, stakeholders have a wide-range of perspectives on the outcomes, and on the type of projects most deserving of support and on the weighting of the metrics used to rank projects.

Since the program's inception in FY2009, there have been some small changes in the specific metrics and weighting, maximum allowed grant amount based on regions and evaluation methodology. In general, however, the RFA guidance around the metrics and criteria for the fifth and final round of the RE Fund program are representative of the previous rounds and were selected for review in this evaluation.

Table 7: Round V REGRP Criteria and Weighting

Evaluation Metric or Criteria	Description	Weighting in Round 5
Cost of energy in community	Per resident in the effected project area relative to other areas	*35%*
Commitment of matching funds	Type and amount of matching funds and other resources	*15%*
Project feasibility, both economic and technical	From Stage 2 – likelihood of the application resulting in a successful project	*20%*
Project readiness	To proceed with phases of the project proposed for the grant	*5%*
Creation of public benefits	Including economic benefit to the Alaska Public, health, local jobs, pollution & noise reduction	*15%*
Local support	Demonstration of local support and resolution of concerns	*5%*
Sustainability	The ability of the applicant to finance, operate and maintain the project for the life of the project	*5%*
Additional criteria for final ranking of recommendations (non-weighted)		
Statewide balance of grant funds	For example, if there is two or more similar competing projects in a given area the Authority may only recommend one.	Regional Ranking
Compliance with previous grant awards	In previous phases of project development	Pass/Fail

Ideally, the REGRP scoring and evaluation process balances several factors. First, the RFA scoring and evaluation criteria need to mitigate risk, identifying projects that are likely to be successful, and screening out those with unacceptable levels of technical or economic risk. The authorizing legislation also directs the program to place significant weight on communities with a high cost of energy and to provide regional statewide geographic balance.

At times, the scoring of these criteria and the resulting ranking of projects has the potential to come into conflict. For example, developing projects in high cost of energy communities can necessarily entail more technical, development and economic risk. The directive to have regional balance of fund distribution will also mean that some resources are allocated to regions and communities with lower energy costs.

The following findings and recommendations reflect on AEA's success in developing a set of metrics that effectively support the development of successful RE projects in the State of Alaska, while meeting the legislated intent of the Program.

Request for Applications Project Feasibility and Application Evaluation Findings

Finding 1: **The weighted criteria and scoring get mixed reviews on how well they provide sufficient metrics for identifying strong projects while also meeting legislative intent.**

The REGRP evaluation process is considered an important aspect of the program, providing a structured and transparent framework for scoring applications and avoiding placing the AEA or legislators in a more subjective and arbitrary "kingmaker" role.

However, there was often concern that the program was trying to evaluate a broad landscape of project applications through a single solicitation, which in some cases can result in adverse outcomes for achieving the objectives of the program.

Results of the online survey (**Figure 8**) demonstrate the wide array of perspectives on the specific metrics used in the evaluation process.

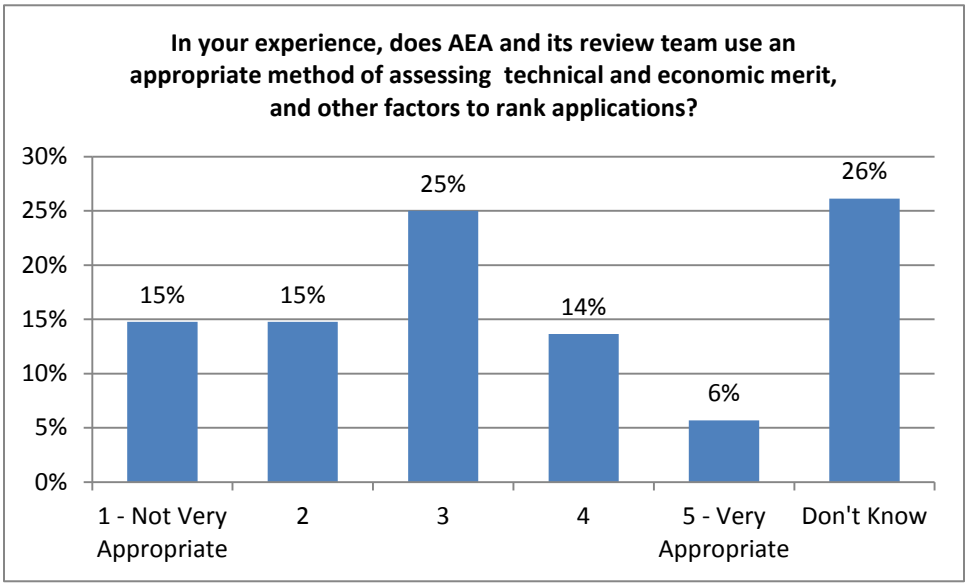


Figure 8: Online survey results on the RFA evaluation process methods

Specifically, several stakeholders expressed concern that by heavily weighting a project based on cost of energy, instead of having a separate evaluation process for "Rural Energy", a project that is marginal on other merits might be scored more favorably than it would be otherwise. Similarly, the ability of smaller community-scale projects to provide matching funds is at completely different scale than industrial-scale wind and hydro projects with greater resources and financing mechanisms.

Finding 2: **The REGRP process may not allow for an appropriate level of public input as part of the evaluation and scoring of applications.**

Concerns were raised by stakeholders that utilities and independent power producers often have a stronger voice in the process than municipalities and the potential concerns

of private citizens. Additionally, there were split perspectives on allowing for more public input in the process before recommendations are made, as the public REFAC meetings were seen as not sufficient by some, while deemed appropriate by others.

Although it was understood by respondents that AEA is not subsuming or superseding the siting and regulatory permit requirements of other agencies, siting and permitting for wind and hydro were identified as specific areas that would benefit from the opportunity for greater public input.

Finding 3: The technical and economic review process does not accurately reflect the benefits to both the state, as well as individual communities.

Renewable energy provides a hedge against long-term price escalation and volatility for diesel and natural gas. This value can be significant for communities and regions and it should be captured in the economic benefits assigned to projects.

The scoring and reporting from the program should more clearly recognize that the REGRP benefits often accrue to the state in the form of reduced Power Cost Equalization program payments. These benefits can be highlighted in the context of a broader focus on reducing the cost of rural energy through comprehensive planning – which incorporates additional economic and social public benefits (jobs, health, etc.).

Some of the effort currently dedicated to the extensive review of an applicant's economic assumptions and calculations – which are conducted by independent consultants, might be more effectively allocated to support communities during the preparation of applications.

Finding 4: AEA's role in providing guidance best practices sometimes blurs the lines on impartiality and is perceived as placing unduly restrictive requirements on specific project designs.

The REGRP needs to balance between the benefits of standardized approaches and technical solutions – versus the potential conflicts of interest and stifling of innovation or competition.

Stakeholders recommended the AEA seek a balance between standardization and diversity of design and technical solutions. The AEA needs to be very careful, when promoting any standard solutions, to avoid any apparent or perceived conflicts of interest or undue preference for incumbent solutions or providers. Some stakeholders expressed direct concern that AEA's process at times has at least the appearance of being anti-competitive and unfair – providing undue favoritism to a specific contractor or technical solutions.

Request for Applications - Project Feasibility and Application Evaluation Recommendations

Recommendation 1:	**To avoid and/or reduce some of the inherent potential conflicts in the current system – the REGRP should establish more than one solicitation.**

Currently, by seeking to serve high cost of energy communities and to simultaneously provide geographic balance the REGRP places two valid objectives against each other – leading to structural difficulties for the scoring of applications. Creating separate solicitations – by region – or by separating remote and rail-belt proposals - would result in applicant pools that are more easily compared and scored against each other. Applicant pools with projects that are of the same "family type" will help focus greater evaluation weight to the other criteria that promote success.

Developing regional allocations for RE projects will also support state-wide goals and the sustained development of regional and community level technical and infrastructure resources.

Recommendation 2:	**Community derived matching funds should be given higher scores.**

All matching funds are not equal. A million dollar match level from a federal source, with no local contribution, does not necessarily equate to community buy-in, whereas a small community with limited or no access to other sources of outside funding but willing to contribute labor and other local resources may result in a more positive long term outcome. Matching funds derived from local resources should be given higher scores than matching funds that are not derived from the local community. This change would help to promote higher levels of local 'skin in the game' and long-term commitment to successful project operations and results.

Recommendation 3:	**We recommend the AEA hire independent engineering firms to conduct technical feasibility reviews and/or provide increased technical support to potential applicants who are developing proposals.**

This approach would be similar to the economic analysis currently supported through independent 3rd party reviewers. This will reduce any perception of favoritism (real or imagined) and free program managers to more proactively work with communities and potential applicants to develop strong submissions.

An alternative approach worth considering is shifting the engineering and economic assistance to the field to improve the early development of strong proposals. AEA's support for technology specific working groups and proactive project development is recognized as supporting a greater number of qualified applications and general support of community-scale RE industry.

Recommendation 4:	Develop a clear set of eligibility criteria for scoring in the REGRP and allow for technical and economic scoring and feedback on all applications.

Under the current scoring system, there are economic and technical feasibility stage gates that can prevent an application from being scored. The evaluation process should be modified to avoid un-scored pre-screening based on technical or economic feasibility, as this prevents applicants from understanding how their proposal scored in other criteria.

Recommendation 5:	Review program processes to allow for a structured opportunity for expressions of community support or opposition.

A measure of community support or opposition should be an expanded element of the AEA scoring process under "the local support" criteria. Examples of application processes for the interconnection of renewable energy systems in other states can provide guidance as to appropriate levels of public input periods tied to the relative scale or impact of the system on a community or the state's resources.

Approaches by other state entities (e.g. Department of Natural Resources, etc.) may also serve as examples of an appropriate level of input towards the perceived impact of projects both positive and negatively on municipalities, private citizens or environmental concerns.

Renewable Energy Fund Advisory Committee Participation

Overview

The Renewable Energy Fund Advisory Committee (REF Advisory Committee) was established through the original legislation of HB152 to support the Alaska Energy Authority with its responsibility in administering the REGRP. The REF Advisory Committee was tasked with assisting AEA in the development of eligibility requirements and criteria for evaluating REGRP applications and ranking projects based on the intent of the legislation and guidelines developed by AEA.

The REF Advisory Committee consists of seven total members, five of which are appointed by the Governor with two members from the Alaska State Legislature – one each from the House and Senate, with the Legislative appointments made by the head of their respective bodies. The five members appointed by the Governor are comprised of representatives of small Alaska rural electric utilities; large Alaska urban electric utilities; Alaska Native organizations; businesses or organizations engaged in the renewable energy sector; and the Denali Commission.

AEA staff and committee meet approximately five times annually to review open issues associated with the RFA process; progress on funded projects; activities around regional energy planning, exploring opportunities for increasing the quantity, quality and breadth of applications; and to review recommendations for funding to meet the objectives of the program and support the successful development of renewable energy projects in the state.

Renewable Energy Fund Advisory Committee Findings

Finding 1: **Many stakeholders are not aware of the Renewable Energy Fund Advisory Committee, its responsibilities, or the composition of its membership.**

Many respondents both in the interviews, as well as the online survey (**Figure 9**) indicated a lack of knowledge and understanding on the Advisory Committee and its roles.

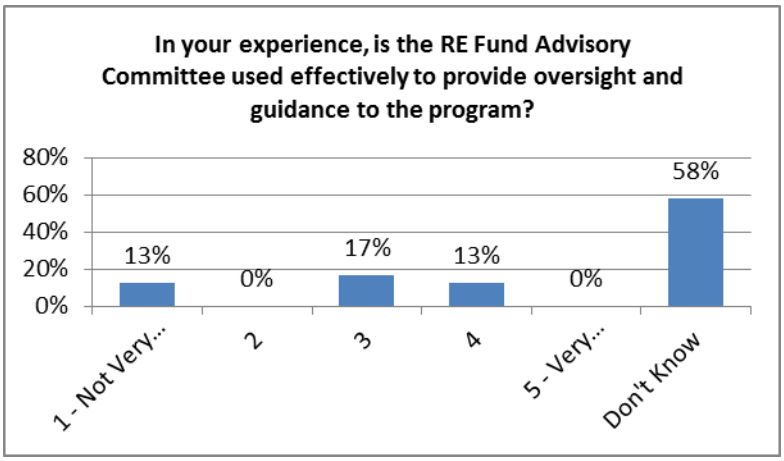


Figure 9: Online survey results on the effectiveness of the Advisory Committee

Although limited documentation of the committee meetings is included in annual reporting by AEA and updates on meetings were provided via the Alaska state public notice site, more detailed information, including a listing of members was only found on the Renewable Energy Alaska Program (REAP) website.[7]

Finding 2:	**Public participation in the periodic REF Advisory Committee meetings may not allow for sufficient expression of local opposition or feedback on projects prior to the initial project evaluation by AEA.**

As noted in the RFA Project Feasibility and Evaluation section, stakeholders have expressed a mixed response in regards to sufficient public input, several stating that the REF Advisory Committee meetings are adequate, while others felt the voices within communities are not being given proper consideration or avenues to participate in the REGRP process.

Renewable Energy Fund Advisory Committee Recommendations

Recommendation 1:	**AEA and the REF Advisory Committee should consider developing a charter to outline their role with respect to the RE Fund as well as defining specific goals for the program on an annual basis.**

Clearly defining REFAC's roles and developing actionable annual goals for AEA staff, the REF Advisory Committee and the REGRP can help provide a path for continued improvements in the program. This information should be shared with stakeholders, along with ongoing opportunities for stakeholders to provide feedback.

Recommendation 2:	**AEA should create visibility to the public process and the REF**

[7] http://alaskarenewableenergy.org/2011/04/reap-executive-director-reappointed-to-renewable-energy-grant-fund-advisory-committee/

advisory committee meetings on the Authority's website.

This information should be part of a broader expansion of the footprint of the REGRP on AEA website to allow for greater program outreach. Announcements of upcoming and past meetings, including presentations, documents and meeting minutes should be included.

Recommendation 3: **The REFAC is the appropriate body to recommend or endorse specific modifications, including for example, greater program differentiation.**

Based on meeting minutes, the VEIC team noted that AEA and the Advisory Committee have often debated the inherent struggle with achieving all of the goals of the program including addressing renewables in high cost of energy communities; equitable distribution of funds in the state; matching funding limitations from small communities; and funding only projects that demonstrate the highest confidence of success.

The REFAC can play an important ongoing role to help identify and vet potential program modifications, and to review and endorse of modify recommendations coming from this study or from other channels of feedback.

Renewable Energy Fund Award Process

Overview

Providing for an efficient and transparent grant award process is critical to sustainable project development – and is a high priority for the participating communities and the industry stakeholders supporting them. Efficient and effective grant award processes also help to create an atmosphere conducive to leveraging private capital. Alaska's relatively short construction season and limited access to remote communities place additional importance on the timing and expediency of the award process.

Following the ranking of recommended projects by AEA and REFAC the recommendations are subject to appropriation and approval by the legislature and ultimately signing of the budget authorization by the Governor. Following the approval of appropriations, AEA is responsible for notifying awardees and negotiating an award contract. The award includes required reporting and milestones in the terms of the contract. Below is the estimated timeline for the major stages of Round V of the REGRP[8]

Table 8: Round V REGRP Timeline

Task	Target Dates
RFA Issue Date for Round V	7/1/2011
Application Due Date	8/26/2011
Complete Evaluation of Applications	12/9/2011
Submit Projects for Approval by Legislature	1/27/2012
Projects Approved for Funding (contingent upon legislative action)	5/16/2012
Finalize Award Documents (Contingent upon the Authority receiving all documentation needed for award)	8/1/2012

The findings and recommendations in the following section reflect feedback on the timing and duration of the award process, its effectiveness, and the reporting and payment structure.

[8] http://www.akenergyauthority.org/re-fund-5/2_Project_Specific_Docs/R5_RFA_ApplicationForms.pdf

Renewable Energy Fund Award Process Findings

Finding 1: The timing and duration of the award process creates significant negative impacts on efficient project development.

Many parties recognized the particular issues surrounding funding cycles and the timing required to move from application to funding. New applications are due in August and awards are made typically in July of the following year. Issues noted included – cost increases from the time the grant application is due to when funding is received – and the difficulties of waiting until late spring to get funding approval, in terms of impacts on scheduling, costs, and logistics during the short construction season.

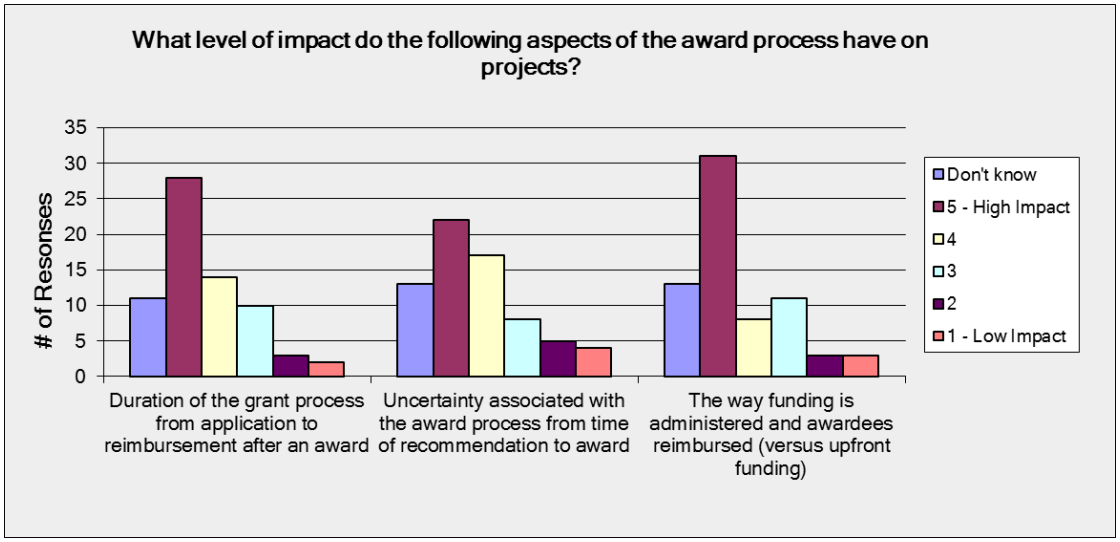


Figure 10: Online survey results of perceived impacts of the award process

Although larger developers and capitalized utilities have incorporated the schedule of the award process into their planning systems and can use bridge funding to prevent missing a construction season window, municipalities, independent developers and smaller independent utilities were not in the same position and must accept lengthy project development timelines.

Several stakeholders expressed a desire for retroactive allowance for funding to accommodate the award process overlap with ordering long lead equipment and the construction season.

Finding 2: Funding for sequential phasing can make projects ultimately more expensive and slower to complete.

Projects often move through several phases of project development during sequential funding cycles. For example a community may first get support for resource assessment, followed by pre-construction feasibility study support, and finally a construction grant. Stakeholders recognized that this phasing mitigates the risk to the program by developing sequential review and stage gates to help weed out weak projects. At the same time,

many stakeholders noted that these benefits need to be balanced against the increased time required and increased cost of installed systems – particularly for smaller scale projects.

In addition, several stakeholders were not clear about how the rounds and stages of project funding are complimentary. There were some concerns expressed that under the current structure, feasibility studies maybe creating a pipeline for projects that are found to be attractive but then not are not provided with subsequent funding.

It was also noted that for remote communities matching the timing of a renewable energy project with a diesel upgrade was very helpful, as this promotes coordination between engineers on important control and integration issues, ultimately leading to improved performance.

Finding 3: Allow AEA to grant awards directly, at least for feasibility and potentially smaller scale construction projects.

Many stakeholders think legislative appropriation for larger projects is warranted, but that the process would be improved if AEA was given authority to directly award – as opposed to recommend – funding for smaller projects. Several stakeholders noted that AEA has adequate resources and process in place to sufficiently mitigate risk for smaller projects.

Guidance from top-down resource assessments and goals set for RE for specific regions and technologies can help create the framework for the overall REGRP award process. For example, some projects may not score well on economic benefits, but still contribute to long term energy or community development planning goals.

Renewable Energy Fund Award Process Recommendations

Recommendation 1: AEA should seek authorization from the legislature to fund smaller projects and feasibility studies without a further round of legislative review.

By reserving the legislative review and approval process for larger construction projects that have significant impacts on the state and requiring higher capital expenditure, AEA can move forward with smaller projects and feasibility studies more expeditiously, under a set funding level. This will avoid delays in the program and reduce the occurrence where applicants submit proposals for design or construction before the feasibility study is completed, due to concerns of missing a field season. This approach is modeled by the guidelines for the Emerging Energy Technology Fund Grant Program, in which AEA working with an advisory committee has an increased level of autonomy in the award process.

Recommendation 2: AEA should work with the legislature and AIEDA to develop non-grant options for larger projects.

As noted above, a review of the guidelines for the REGRP should be explored to understand the types of projects that require grant-type funding, while working with the REF Advisory Committee, the RE Industry and the state government to identify preferred paths for larger, capital intensive projects that might benefit from either a fixed, long-term premium rate for renewable energy or other types of state supported financing.

Recommendation 3:	**AEA should develop grant milestone payments and phasing based on the experience of project team and the level of matching funds provided.**

Although the process of milestone payments reflects an effective method of mitigating risk to the Program, it can also increase the timeline and overall cost of a project. Project developers or communities with a proven track record – and higher levels of non-grant funding - might be given greater latitude – for example to conduct an accelerated resource assessment and feasibility study. Providing increased flexibility in these cases will likely improve the speed of installations of RE systems, as well as reduce the effective cost of RE energy to the State.

Grant Administration

Overview

In HB152, the legislation outlined the specific responsibilities of AEA with regards to the REGRP, notably to develop eligibility criteria and a methodology for prioritizing renewable energy projects for receiving financial assistance from the state, but also to administer the grants once the awards are made.

The findings and recommendations in this section review AEA's efforts to develop and implement clear and efficient procedures, and to provide well trained staff to work collaboratively with grant recipients on reporting, fund disbursement, and project oversight. Our recommendations identify several opportunities to modify the program to better serve the needs of stakeholders.

Grant Administration Findings

Finding 1: **AEA has developed a dedicated and knowledgeable team to administer the program, but often appears stretched from a staffing level.**

There is a general consensus from stakeholders that AEA has a tough role in that they need to please the state government, communities and the RE industry with "everyone nipping at their heels." However, AEA staff has shown appropriate flexibility with unforeseen changes in projects. They have also demonstrated an ability to work effectively in administering parallel funding sources, through partners such as the Denali Commission, the federal and other state government organizations.

Concerns were raised regarding AEA's ongoing ability to support effective and efficient grant administration of active projects, review of new applications, program outreach and reporting to the legislature and other stakeholders given current staffing levels and budgets. Stakeholders noted that there is a perceived resistance from the legislature to increasing staffing levels at AEA – which may be related to the notion that "non-incentive" represent overhead and do not directly serve program objectives.

Staff turnover was also identified as an area of concern, as without sufficient internal processes to support project manager training and transitions there have been some issues with projects that transition from one manager to another.

To alleviate work load on staff AEA might consider utilizing a technical assistance contract. This could help to retain AEA's focus on their role as grant administrators, and also be used to possibly provide greater resources to support applications from smaller communities.

Finding 2: **Define AEA's role with respect to the RE Fund administration and the level of engagement with project design or active project management.**

Several stakeholders suggested that AEA's proper role is to maintain the 20,000 foot level and get funds out the door, but that AEA project managers have a tendency to micro-manage. By defining its role clearly, AEA can avoid blurring the line with industry and avoid unnecessary conflict…being a "facilitator instead of a developer." AEA's role could also be effective in creating a "We" in the RE industry (AEA, communities, utilities, RE industry and legislators), while avoiding positioning itself as a "Kingmaker" for specific projects and technologies.

Finding 3: **AEA's required level of reporting for grantees, although appropriate, can vary between individual project managers and should reflect specific cost structures native to the RE industry.**

Some stakeholders expressed concern that AEA administrative and accounting reviews can be excessive or not streamlined, for example holding up a large invoice over a single item as opposed to providing payment for the items not in question. On the other hand – some utilities report little or no problems on reporting and invoicing.

There were some additional concerns over the level of cost accounting that AEA requires, noting that AEA can't accept an existing contract or third party bid structures as the basis for cost reimbursement. An example of the lack of flexibility cited was disputes over the cost and ownership structure for a crane required for wind installations at remote sites.

Lastly, the required level of reporting seems to vary and stakeholders suggested that effort should be made to insure consistency across staff, project types and awardees.

Finding 4: **There is an opportunity for improving performance reporting after award is paid and projects are operational, as well as increasing the transparency to the public in this area.**

Developing standards for performance reporting would benefit the development of the RE industry, and help to insure proper use of state funding. Compliance with providing this reporting was suggested as a metric for future funding requests to insure accountability.

The results of the online survey (**Figure 11**) highlight stakeholder's general regard for AEA's data collection, though there is also a significant percentage of respondents that have little visibility in this area.

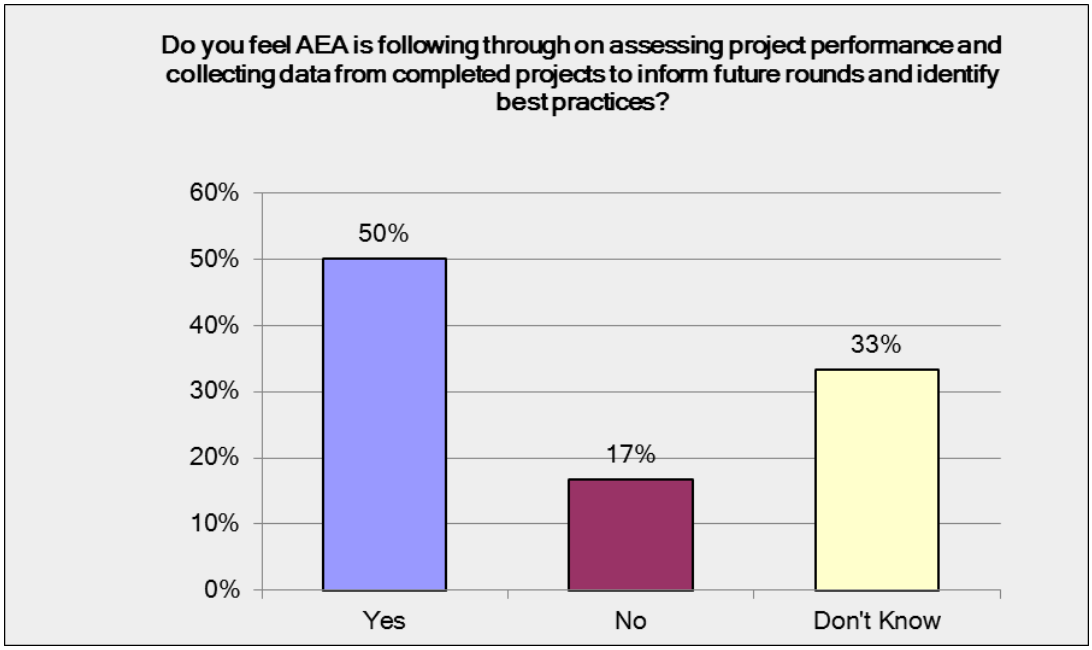


Figure 11: Online survey results of AEA's performance in data collection

Grant Administration Recommendations

Recommendation 1:	**Develop a detailed staffing plan to address the growing role of AEA in addressing rural and renewable energy development in the State of Alaska.**

Initiating a top down review of the objectives of the programs, as well as the renewable energy goals of the state can help identify the specific levels of staffing required within AEA to sufficiently support its goals, objectives and processes. Additional technical support may be warranted from independent engineering or consulting firms to support AEA staff.

Recommendation 2:	**Clarify AEA's role with respect to project developers and evaluations of projects to retain a neutral stance in its administrative responsibilities.**

Stakeholders clearly recognize the role that AEA provides with respect to supporting the development of the renewable energy industry in the state, but have reservations about the level of oversight of specific system designs and project management. The development of best practices in conjunction with working groups can allow for greater standardization, while allowing the RE industry to preserve its role and proprietary technologies.

Recommendation 3:	**Conduct an internal review of how AEA organizes and manages information related to the REGRP.**

AEA should seek opportunities to streamline information gathered by individual Project Managers and maintain consistent reporting practices. This would enhance internal reporting, and improved clarity on reporting requirements for awardees.

Recommendation 4: **Report savings in the form of gallons of fuel displaced and dollars saved in order to better reflect benefits to participants and to Alaska.**

With the significant variance in the cost of fuel within different regions and communities in the state, providing this metric in reporting will recognize one of the underlying objectives of the REGRP of reducing the high cost of energy in communities.

Active reporting of the performance of individual projects should also be supported to increase the awareness of the programs successes to support the long-term development of renewable energy in the state.

Recommendation 5: **Compile program data into a standard annual report format that includes cumulative information across rounds as well as more detailed information on current projects and expenditures.**

This would eliminate confusion over the most recent and up to date information on the program and projects, and provide greater awareness of the program's status and accomplishments.

Conclusions

The REGRP has played an important role in supporting the development of renewable energy systems in Alaska, serving both remote and Railbelt communities with significant financial assistance. There is great potential for continued REGRP support to help reduce energy costs in rural Alaska and to help the state tap more of its substantial renewable energy resources.

While the program successes are widely recognized, there are also many areas where stakeholders identified needs and opportunities for changes that can make the program more effective. Throughout this report we have documented, supported, and elaborated upon the key findings and recommendations presented in the Executive Summary.
We are confident the recommendations are reasonable, can be implemented efficiently, and most importantly, that they will help AEA improve the REGRP program and processes – and thereby capture significant net benefits and increase the deployment of renewable energy to target communities.

Phase II of this project is an impact evaluation (to be completed in late spring 2012) – providing more detailed information on the program accomplishments to date. The impact evaluation will summarize energy savings, avoided emissions and costs and benefits from REGRP supported projects – highlighting the full range of project types, renewable energy resources and communities that have participated in the program.

Through the process and impact evaluations AEA has sought critical market feedback and information that will help to maintain and build program services and increase the benefits from renewable energy available to Alaskans for years to come.

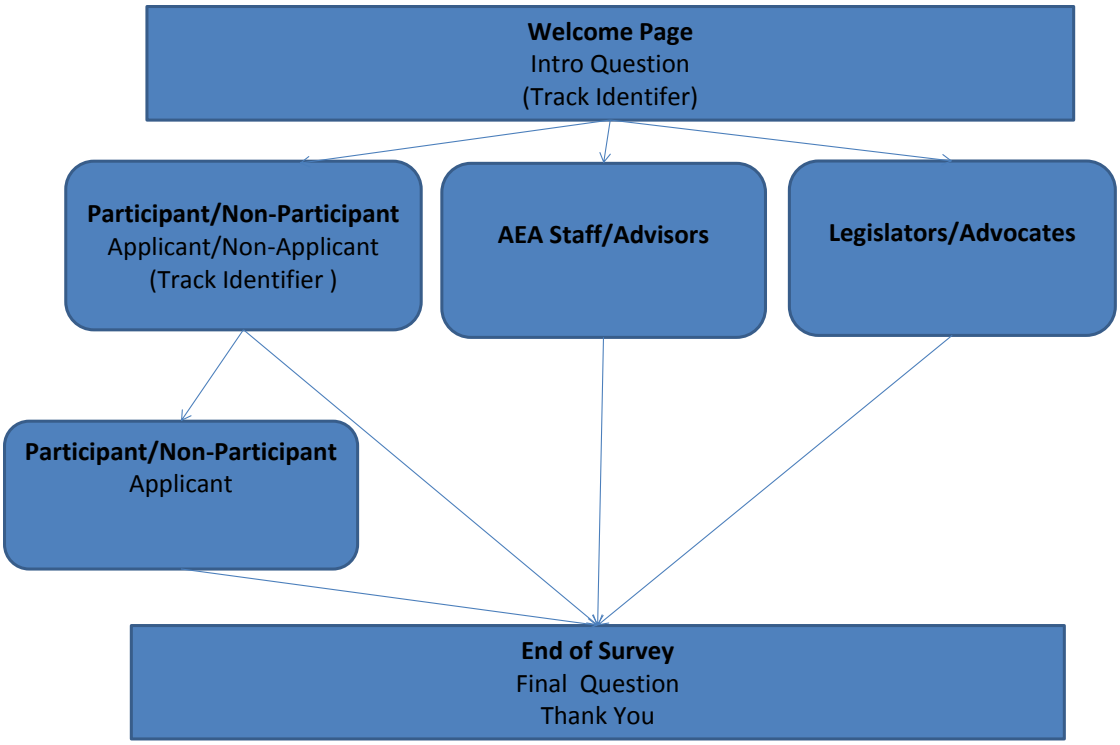
Appendix A: Alaska REGRP Process Evaluation Online Survey

The REGRP Process Evaluation online survey was developed to provide an opportunity for a larger community of stakeholders – including AEA staff, program advisors, rural organizations, legislators, energy advocates, participants and non-participants in the program – to participate in the *Renewable Energy Grant Recommendation Program Process Evaluation* [9]. The survey was developed by the VEIC team based on the key evaluation criteria identified by staff at the Alaska Energy Authority and posted on *Survey Monkey* for approximately 10 days during the first two weeks of February, 2011. The Alaska Energy Authority, as well as Alaska energy advocates, publicized this effort through their respective listservs for email contacts, as well as direct email distribution to all participants in the REGRP contact database. A total of 108 responses were collected. This data provides important insight into the views of Alaska stakeholders on key aspects of the REGRP and the processes that AEA developed to administer the program. The online survey protects the anonymity of the respondents while providing a combination of statistical and descriptive responses that are used by the study team to balance responses against individual responses received during the in-person and phone interviews.

Due to the wide range of potential respondents, three separate tracks were developed based on whether respondents classified themselves in the first question primarily as a Participant/Non-Participant in the REGRP, AEA Staff/Advisor, or a Legislator/RE Advocate. Many survey questions included in the three different tracks were very similar in nature, but worded specific to the target audience. Other questions were only included in a single track if they were not applicable to other respondent types. Respondents were allowed to select multiple responses for this question. When a respondent selected more than one response associated with different tracks, the first response selected determined the track that respondent followed for the remainder of the survey.

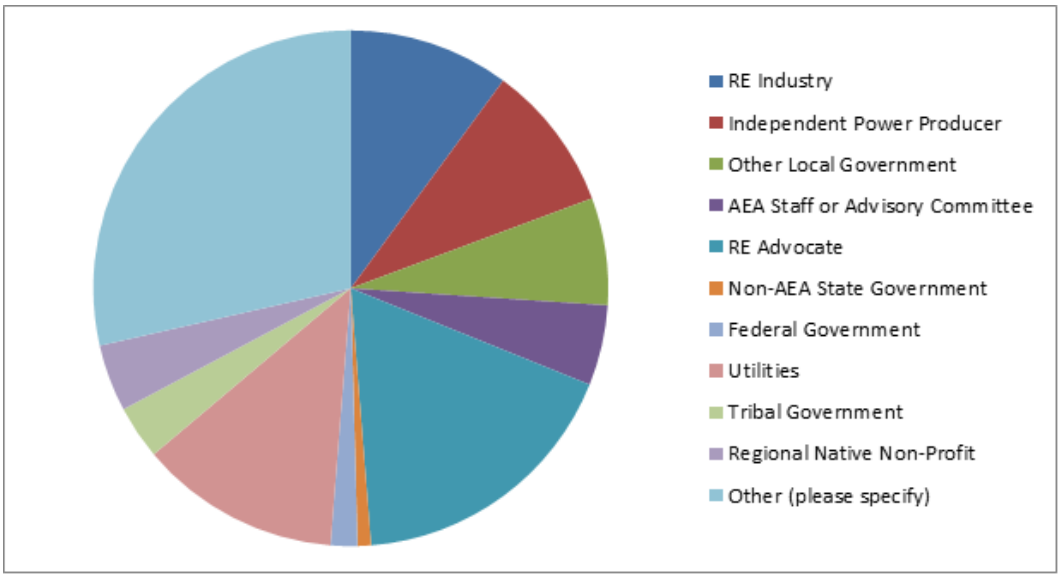
Results of the on-line survey are presented by track, or respondent type. Only questions applicable to a given track are reported for that track. As mentioned above, respondents had the opportunity to select more than one response for the initial track routing question. Therefore, some duplication of responses may be seen in the results. For example, if a respondent identified him/herself as both 'RE Fund Applicant' and 'Tribal Government', the responses for that individual are included in the overall results presented for both the Participant/Non-Participant track and the Legislator/Advocate track. The figure below provides a graphical representation of the survey tracks.

[9] The Renewable Energy Grant Recommendation Program (REGRP) is often referred to as the Renewable Energy Fund or RE Fund by stakeholders and was the terminology used in this survey.

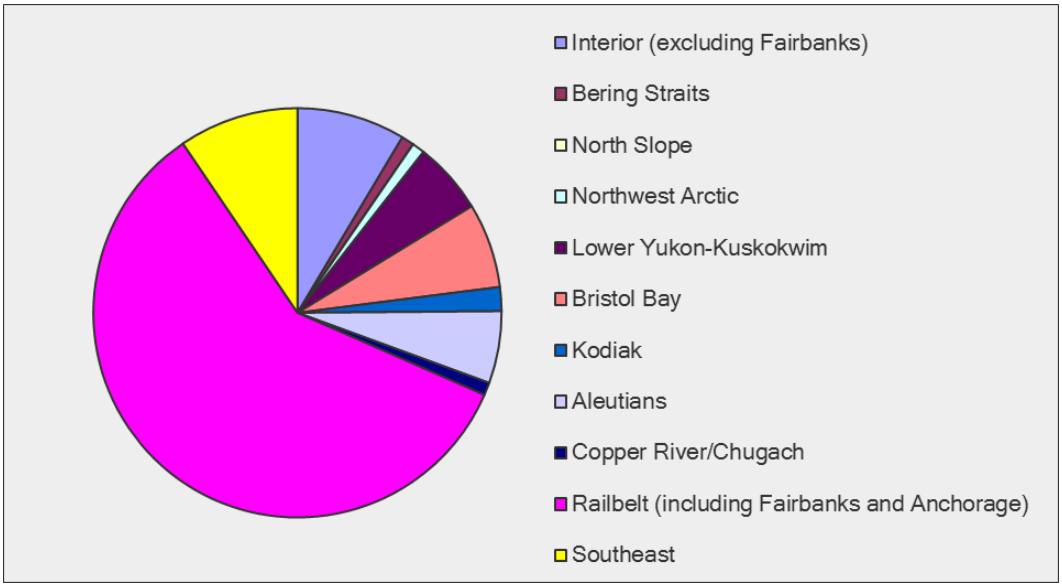


Summary of Demographic of Respondents and Online Survey Results

Nearly 80% of the respondents to the survey self-identified as having been applicants in the REGRP comprising a diverse sample of stakeholders.



Over two-thirds of the respondents were from the Railbelt and Southeast including AEA staff.



Alaska Renewable Energy Fund Survey

The Alaska Energy Authority (AEA) recently commissioned an independent evaluation of the Renewable Energy Fund grant recommendation program. The purpose of this evaluation is to identify ways to increase the effectiveness and efficiency of the processes used in the program and their impact in Alaskan communities.

This survey provides an opportunity for you, as a stakeholder in the program, to provide thoughts and ideas concerning the Renewable Energy Fund and its effectiveness in achieving its goals. Survey responses will provide important insights into the views of key stakeholders of the program and will be reviewed as part of the evaluation.

The survey should take no more than 10 minutes to complete and all responses will be treated as strictly confidential.

Thank you, in advance, for taking the time to participate in the survey and sharing your feed-back and ideas with us.

1. As you respond to the following questions, would you characterize yourself primarily as (you may choose more than one):

- [ ] RE Fund Applicant
- [ ] Eligible Non-Applicant
- [ ] RE Industry
- [ ] IPP
- [ ] Other Local Government
- [ ] AEA Staff or Advisory Committee
- [ ] RE Advocate
- [ ] Non-AEA State Government
- [ ] Federal Government
- [ ] Utilities
- [ ] Tribal Government
- [ ] Regional Native Non-Profit
- [ ] Other (please specify)

Alaska Renewable Energy Fund Survey

2. Please select the region where you are located.

- ◯ Interior (excluding Fairbanks)
- ◯ Bering Straits
- ◯ North Slope
- ◯ Northwest Arctic
- ◯ Lower Yukon-Kuskokwim
- ◯ Bristol Bay
- ◯ Kodiak
- ◯ Aleutians
- ◯ Copper River/Chugach
- ◯ Railbelt (including Fairbanks and Anchorage)
- ◯ Southeast

Alaska Renewable Energy Fund Survey

[Participant/Non-participant - ALL]

3. What is your level of awareness or engagement with specific programs run by the Alaska Energy Authority (AEA) to reduce the cost of energy in Alaskan communities?

	Low				High
Renewable Energy Fund	◯	◯	◯	◯	◯
Rural Power Systems Upgrade	◯	◯	◯	◯	◯
Bulk Fuel	◯	◯	◯	◯	◯
Emerging Energy Technology Fund	◯	◯	◯	◯	◯
Power Project Loan Fund	◯	◯	◯	◯	◯
State and Rural Energy Planning (e.g. Pathways)	◯	◯	◯	◯	◯

4. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Select up to two.

- ☐ List (Email or listserv)
- ☐ Community organizations
- ☐ Rural energy conference or workshop
- ☐ Project developers
- ☐ Research
- ☐ Uility communications
- ☐ Other AEA programs
- ☐ Other (please specify)

5. In your opinion, do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?

- ◯ 1 - Strongly Disagree
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Strongly Agree
- ◯ Don't Know

6. How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

- ◯ 1 - Very Ineffective
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5- Very Effective
- ◯ Don't Know

7. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Select up to two.

- ☐ Community engagement
- ☐ Regional planning
- ☐ Financing
- ☐ Technical
- ☐ Identifying project developer
- ☐ Early project development based on available local RE resources
- ☐ Other (please specify)

Alaska Renewable Energy Fund Survey

8. In your experience, do you feel the RE Fund application (RFA) process is clear and understandable for communities and applicants?

- ◯ 1 - Not Very Clear
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Clear
- ◯ Don't Know

9. In your experience, which outside organizations provide the most help in the application process? Please select up to two.

- ☐ Developer
- ☐ Regional Non-Profit
- ☐ Tribal or Government Entity
- ☐ University of Alaska Fairbanks
- ☐ Other (please specify)

10. In your experience, does AEA and its review team use an appropriate method of assessing technical and economic merit, and other factors to rank applications?

- ◯ 1 - Strongly Disagree
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Strongly Agree
- ◯ Don't Know

11. In your experience, what is the importance of non-energy benefits (e.g. health, local jobs, improved power service etc.) on the overall success of a project?

- ◯ 1 - Not Important
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Important
- ◯ Don't Know

Alaska Renewable Energy Fund Survey

12. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

- ◯ 1 - Not Reponsive
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Responsive
- ◯ Don't Know

13. What level of impact do the following aspects of the award process have on projects:

	1 - Low Impact	2	3	4	5 - High Impact	Don't know
Duration of the grant process from application to reimbursement after an award	◯	◯	◯	◯	◯	◯
Uncertainty associated with the award process from time of recommendation to award	◯	◯	◯	◯	◯	◯
The way funding is administered and awardees reimbursed (versus upfront funding)	◯	◯	◯	◯	◯	◯

14. Do you consider the reporting process to be appropriate or too complex for the grants?

- ◯ 1 - Too Complex
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Appropriate
- ◯ Don't Know

Alaska Renewable Energy Fund Survey

15. Did you, or your community/organization submit an RE Fund application?

- ◯ Yes
- ◯ No

Alaska Renewable Energy Fund Survey

[Participant/Non-participant - Applicant]

16. In which Round(s) did your organization submit an application to RE Fund? Please select all that apply.

- [ ] Round 1
- [ ] Round 2
- [ ] Round 3
- [ ] Round 4
- [ ] Round 5
- [ ] Don't Know

17. Which RE resource was proposed in your organizations application? Please select all that apply.

- [ ] Wind
- [ ] Solar
- [ ] Hydro
- [ ] Geothermal
- [ ] Biomass
- [ ] Transmission and Distribution
- [ ] Don't Know
- [ ] Other (please specify)

18. Did you or your community get outside help with the RE Fund application?

- ◯ Yes
- ◯ No
- ◯ Don't Know

19. Did your application(s) result in any of the following? Please select all that apply.

- [ ] Awarded
- [ ] Not awarded
- [ ] Recommendation to the legislature
- [ ] Pending (Round V)
- [ ] Completed
- [ ] An installed RE system

Alaska Renewable Energy Fund Survey

[Participant/Non-participant - Award]

20. In your experience, after a project award, does AEA administer the grants in an effective and timely fashion?

- ◯ 1 - Not Effective/Timely
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Effective/Timely
- ◯ Don't Know

21. What is your level of regular communication (E-mail, phone, etc.) with your AEA program manager?

- ◯ Weekly
- ◯ Monthly
- ◯ Quarterly
- ◯ Never
- ◯ Don't Know
- ◯ N/A (Not awarded)

22. Has AEA ever made a site visit for your project?

- ◯ Yes
- ◯ No
- ◯ N/A (Not awarded)

23. Have there been delays or major changes in direction to the scope or budget during the course of your project? If yes, please describe in 1-2 sentences.

- ◯ Yes
- ◯ No

If Yes, please specify

Alaska Renewable Energy Fund Survey

[Participant/Non-participant - No award]

24. How clearly were the reasons communicated for your organization's application not being recommended?

- ◯ 1 - Not Clearly
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Clearly
- ◯ Don't Know

25. Were you given adequate support to improve your proposal for submission for future RE Fund Rounds?

- ◯ 1 - No Support
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Adequate Support
- ◯ Don't Know

Alaska Renewable Energy Fund Survey

[AEA Staff]

26. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Please select up to two.

- [ ] Email or listserv
- [ ] Community organizations
- [ ] Rural energy conference or workshop
- [ ] Project developers
- [ ] Research
- [ ] Utility communications
- [ ] Other AEA programs
- [ ] Other (please specify)

27. Do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?

- ◯ 1 - Not Very Effective
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Effective

28. How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

- ◯ 1 - Not Very Effective
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Effective

29. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Please select up to two.

- [ ] Community engagement
- [ ] Regional planning
- [ ] Financing
- [ ] Technical
- [ ] Identifying project developer
- [ ] Early project development based on available local RE resources
- [ ] Other (please specify)

30. In your experience, do you feel the RE Fund application (RFA) process is clear and understandable for communities and applicants?

- ◯ 1 - Not Very Clear
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Clear

31. Do communities or applicants generally require outside help with the RE Fund application?

- ◯ Yes
- ◯ No
- ◯ Don't Know

32. In your experience, which outside organizations provide the most help in the application process? Please select up to two.

- [ ] Developer
- [ ] Regional Non-Profit
- [ ] Tribal or Government Entity
- [ ] University of Alaska Fairbanks
- [ ] Other (please specify)

33. In your experience, what is the importance of non-energy benefits (e.g. health, local jobs, improved power service etc.) on the overall success of a project?

- ◯ 1 - Not Important
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Important

34. In your experience, is the RE Fund Advisory Committee used effectively to provide oversight and guidance to the program?

- ◯ 1 - Not Very Effectively
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Effectively
- ◯ Don't Know

35. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

- ◯ 1 - Not Very Responsive
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Responsive
- ◯ Don't Know

Alaska Renewable Energy Fund Survey

36. In your capacity, what level of impact do you feel the following aspects of the award process have on projects:

	Low Impact				High Impact	Don't Know
Duration of the grant process from application to reimbursement after an award	◯	◯	◯	◯	◯	◯
Uncertainty associated with the award process from time of recommendation to award	◯	◯	◯	◯	◯	◯
The way funding is administered and awardees reimbursed (versus upfront funding)	◯	◯	◯	◯	◯	◯

37. Do you feel AEA is following through on assessing project performance and collecting data from completed projects to inform future rounds and identify best practices?

◯ Yes

◯ No

◯ Don't Know

38. If you are aware of specific projects that were cancelled or did not move towards construction, what were the primary reasons?

39. For cancelled projects, what additional support do you believe AEA should have provided to the applicants to help with success?

Alaska Renewable Energy Fund Survey

[Legislators]

40. What is your level of awareness or engagement with specific programs run by the Alaska Energy Authority (AEA) to reduce the cost of energy in Alaskan communities?

	Low				High	N/A
Renewable Energy Fund	◯	◯	◯	◯	◯	◯
Rural Power Systems Upgrade	◯	◯	◯	◯	◯	◯
Bulk Fuel	◯	◯	◯	◯	◯	◯
Emerging Energy Technology Fund	◯	◯	◯	◯	◯	◯
Power Project Loan Fund	◯	◯	◯	◯	◯	◯
State and Rural Energy Planning (e.g. Pathways)	◯	◯	◯	◯	◯	◯

41. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Please select up to two.

- ☐ Email or listserv
- ☐ Community organizations
- ☐ Rural energy conference or workshop
- ☐ Project developers
- ☐ Research
- ☐ Utility communications
- ☐ Other AEA programs
- ☐ Other (please specify)

42. Do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?

- ◯ 1 - Not Very Effective
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Effective

43. How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

- ◯ 1 - Not Very Effective
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Effective

44. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Please select up to two.

- ☐ Community engagement
- ☐ Regional planning
- ☐ Financing
- ☐ Technical
- ☐ Identifying project developer
- ☐ Early project development based on available local RE resources
- ☐ Other (please specify)

45. How do you feel about efforts by the state to promote the installation of RE technologies, by providing financial incentives and technical support through AEA?

- ◯ 1 - Strongly Disagree
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Strongly Agree

46. In your experience, do you feel the RE Fund application (RFA) process is clear and understandable for communities and applicants?

- ◯ 1 - Not Very Clear
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Clear
- ◯ Don't Know

47. Do communities or applicants generally require outside help with the RE Fund application?

- ◯ Yes
- ◯ No
- ◯ Don't Know

48. In your experience, which outside organizations provide the most help in the application process? Please select up to two.

- ☐ Developer
- ☐ Regional Non-Profit
- ☐ Tribal or Government Entity
- ☐ University of Alaska Fairbanks
- ☐ Other (please specify)

49. In your experience, does AEA and its review team use an appropriate method of assessing technical and economic merit, and other factors to rank applications?

- ◯ 1 - Strongly Disagree
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Strongly Agree
- ◯ Don't Know

50. In your experience, what is the importance of non-energy benefits (e.g. health, local jobs, improved power service etc.) on the overall success of a project?

- ◯ 1 - Not Important
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Important

Alaska Renewable Energy Fund Survey

51. In your experience, is the RE Fund Advisory Committee used effectively to provide oversight and guidance to the program?

- ◯ 1 - Not Very Effectively
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Effectively
- ◯ Don't Know

52. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

- ◯ 1 - Not Very Responsive
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Responsive
- ◯ Don't Know

53. Do you feel that the AEA provides an appropriate level of reporting back to the legislature and other stakeholders

- ◯ 1 - Strongly Disagree
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Strongly Agree
- ◯ Don't Know

54. Do you feel there are specific areas that should be targeted for improvement, or have not functioned as originally intended by the enabling legislation?

55. How effective do you think AEA has been in reaching out to communities with high COE and providing technical guidance on most likely successful projects?

- ◯ 1 - Not Very Effective
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 - Very Effective

Alaska Renewable Energy Fund Survey

[All respondents]

56. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

We would like to thank you for taking the time to provide input in to the Renewable Energy Fund Program evaluation. If you have any additional questions or input regarding aspects of the evaluation, please email members of the team, Chris Badger (cbadger@veic.org) or Julie Estey (julie.estey@alaska.edu).

The results of this evaluation and final report will be posted on the Alaska Energy Authority's website.

Alaska Renewable Energy Fund Survey

SurveyMonkey

1. As you respond to the following questions, would you characterize yourself primarily as (you may choose more than one):

	Response Percent	Response Count
RE Fund Applicant	**35.8%**	**38**
Eligible Non-Applicant	4.7%	5
RE Industry	11.3%	12
Independent Power Producer	10.4%	11
Other Local Government	7.5%	8
AEA Staff or Advisory Committee	5.7%	6
RE Advocate	19.8%	21
Non-AEA State Government	0.9%	1
Federal Government	1.9%	2
Utilities	14.2%	15
Tribal Government	3.8%	4
Regional Native Non-Profit	4.7%	5
Other (please specify)	23.6%	25
	answered question	**106**
	skipped question	**2**

2. Please select the region where you are located.

	Response Percent	Response Count
Interior (excluding Fairbanks)	8.6%	9
Bering Straits	1.0%	1
North Slope	0.0%	0
Northwest Arctic	1.0%	1
Lower Yukon-Kuskokwim	5.7%	6
Bristol Bay	6.7%	7
Kodiak	1.9%	2
Aleutians	5.7%	6
Copper River/Chugach	1.0%	1
Railbelt (including Fairbanks and Anchorage)	**59.0%**	**62**
Southeast	9.5%	10
	answered question	**105**
	skipped question	**3**

Alaska Renewable Energy Fund Survey

SurveyMonkey

1. As you respond to the following questions, would you characterize yourself primarily as (you may choose more than one):

	Response Percent	Response Count
RE Fund Applicant	**45.8%**	**38**
Eligible Non-Applicant	6.0%	5
RE Industry	14.5%	12
Independent Power Producer	13.3%	11
Other Local Government	6.0%	5
AEA Staff or Advisory Committee	0.0%	0
RE Advocate	13.3%	11
Non-AEA State Government	0.0%	0
Federal Government	0.0%	0
Utilities	18.1%	15
Tribal Government	2.4%	2
Regional Native Non-Profit	6.0%	5
Other (please specify)	30.1%	25
	answered question	**83**
	skipped question	**0**

2. Please select the region where you are located.

	Response Percent	Response Count
Interior (excluding Fairbanks)	8.6%	7
Bering Straits	0.0%	0
North Slope	0.0%	0
Northwest Arctic	1.2%	1
Lower Yukon-Kuskokwim	7.4%	6
Bristol Bay	7.4%	6
Kodiak	2.5%	2
Aleutians	4.9%	4
Copper River/Chugach	1.2%	1
Railbelt (including Fairbanks and Anchorage)	**58.0%**	**47**
Southeast	8.6%	7
	answered question	**81**
	skipped question	**2**

3. What is your level of awareness or engagement with specific programs run by the Alaska Energy Authority (AEA) to reduce the cost of energy in Alaskan communities?

	Low				High	Rating Average	Response Count
Renewable Energy Fund	12.9% (9)	7.1% (5)	12.9% (9)	22.9% (16)	**44.3% (31)**	3.79	70
Rural Power Systems Upgrade	**29.4% (20)**	14.7% (10)	22.1% (15)	19.1% (13)	14.7% (10)	2.75	68
Bulk Fuel	**29.4% (20)**	19.1% (13)	13.2% (9)	20.6% (14)	17.6% (12)	2.78	68
Emerging Energy Technology Fund	23.2% (16)	8.7% (6)	23.2% (16)	18.8% (13)	**26.1% (18)**	3.16	69
Power Project Loan Fund	**43.5% (30)**	20.3% (14)	21.7% (15)	5.8% (4)	8.7% (6)	2.16	69
State and Rural Energy Planning (e.g. Pathways)	**36.2% (25)**	15.9% (11)	17.4% (12)	15.9% (11)	14.5% (10)	2.57	69
					answered question		**70**
					skipped question		**13**

4. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Select up to two.

		Response Percent	Response Count
List (Email or listserv)		47.1%	32
Community organizations		7.4%	5
Rural energy conference or workshop		**60.3%**	**41**
Project developers		13.2%	9
Research		7.4%	5
Uility communications		11.8%	8
Other AEA programs		5.9%	4
Other (please specify)		17.6%	12
		answered question	**68**
		skipped question	**15**

5. In your opinion, do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?

	Response Percent	Response Count
1 - Not Very Effective	**27.1%**	**19**
2	22.9%	16
3	21.4%	15
4	20.0%	14
5 - Very Effective	2.9%	2
Don't Know	5.7%	4
answered question		**70**
skipped question		**13**

6. How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

	Response Percent	Response Count
1 - Not Very Effective	20.3%	14
2	**21.7%**	**15**
3	15.9%	11
4	17.4%	12
5 - Very Effective	2.9%	2
Don't Know	**21.7%**	**15**
answered question		**69**
skipped question		**14**

7. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Select up to two.

	Response Percent	Response Count
Community outreach	22.9%	16
Regional planning	27.1%	19
Financing	31.4%	22
Assistance with writing applications	18.6%	13
Identifying qualified project developer	18.6%	13
Early feasibility analysis based on available local RE resources	**47.1%**	**33**
Other (please specify)	18.6%	13
	answered question	**70**
	skipped question	**13**

8. In your experience, do you feel the RE Fund application (RFA) process is clear and understandable for communities and applicants?

	Response Percent	Response Count
1 - Not Very Clear	10.0%	7
2	18.6%	13
3	**25.7%**	**18**
4	18.6%	13
5 - Very Clear	7.1%	5
Don't Know	20.0%	14
	answered question	**70**
	skipped question	**13**

9. In your experience, which outside organizations provide the most help in the application process? Please select up to two.

	Response Percent	Response Count
Consultant	**51.6%**	**33**
Project Developer	34.4%	22
Regional Non-Profit	7.8%	5
Tribal or Government Entity	9.4%	6
Other State Agency or University	21.9%	14
Other (please specify)	17.2%	11
	answered question	**64**
	skipped question	**19**

10. In your experience, does AEA and its review team use an appropriate method of assessing technical and economic merit, and other factors to rank applications?

	Response Percent	Response Count
1 - Not Very Appropriate	15.7%	11
2	15.7%	11
3	21.4%	15
4	15.7%	11
5 - Very Appropriate	5.7%	4
Don't Know	**25.7%**	**18**
	answered question	**70**
	skipped question	**13**

11. In your experience, what is the importance of non-energy benefits (e.g. health, local jobs, improved power service etc.) on the overall success of a project?

	Response Percent	Response Count
1 - Not Very Important	11.4%	8
2	7.1%	5
3	10.0%	7
4	24.3%	17
5 - Very Important	**34.3%**	**24**
Don't Know	12.9%	9
	answered question	**70**
	skipped question	**13**

12. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

	Response Percent	Response Count
1 - Not Very Reponsive	17.4%	12
2	8.7%	6
3	18.8%	13
4	14.5%	10
5 - Very Responsive	2.9%	2
Don't Know	**37.7%**	**26**
	answered question	**69**
	skipped question	**14**

13. What level of impact do the following aspects of the award process have on projects:

	1 - Low Impact	2	3	4	5 - High Impact	Don't know	Response Count
Duration of the grant process from application to reimbursement after an award	2.9% (2)	4.4% (3)	14.7% (10)	20.6% (14)	**41.2% (28)**	16.2% (11)	68
Uncertainty associated with the award process from time of recommendation to award	5.8% (4)	7.2% (5)	11.6% (8)	24.6% (17)	**31.9% (22)**	18.8% (13)	69
The way funding is administered and awardees reimbursed (versus upfront funding)	4.3% (3)	4.3% (3)	15.9% (11)	11.6% (8)	**44.9% (31)**	18.8% (13)	69
						answered question	**69**
						skipped question	**14**

14. Do you consider the reporting process to be appropriate or too complex for the grants?

	Response Percent	Response Count
1 - Too Complex	4.3%	3
2	5.8%	4
3	17.4%	12
4	13.0%	9
5 - Appropriate	17.4%	12
Don't Know	**42.0%**	**29**
	answered question	**69**
	skipped question	**14**

15. Did you, or your community/organization submit an RE Fund application?

	Response Percent	Response Count
Yes	**61.8%**	**42**
No	38.2%	26
	answered question	**68**
	skipped question	**15**

16. In which Round(s) did your organization submit an application to RE Fund? Please select all that apply.

	Response Percent	Response Count
Round 1	51.2%	21
Round 2	**53.7%**	**22**
Round 3	51.2%	21
Round 4	43.9%	18
Round 5	36.6%	15
Don't Know	17.1%	7
	answered question	**41**
	skipped question	**42**

17. Which RE resource was proposed in your organizations application? Please select all that apply.

	Response Percent	Response Count
Wind	**36.6%**	**15**
Solar	7.3%	3
Hydro	29.3%	12
Geothermal	17.1%	7
Biomass	17.1%	7
Transmission and Distribution	12.2%	5
Don't Know	2.4%	1
Other (please specify)	19.5%	8
	answered question	**41**
	skipped question	**42**

18. Did you or your community get outside help with the RE Fund application?

	Response Percent	Response Count
Yes	41.5%	17
No	**53.7%**	**22**
Don't Know	4.9%	2
	answered question	**41**
	skipped question	**42**

19. Did your application(s) result in any of the following? Please select all that apply.

	Response Percent	Response Count
Awarded	**66.7%**	**26**
Not awarded	43.6%	17
Recommendation to the legislature	38.5%	15
Pending (Round V)	25.6%	10
Completed	28.2%	11
An installed RE system	20.5%	8
	answered question	**39**
	skipped question	**44**

20. In your experience, after a project award, does AEA administer the grants in an effective and timely fashion?

	Response Percent	Response Count
1 - Not Very Effective/Timely	17.2%	5
2	**24.1%**	**7**
3	20.7%	6
4	20.7%	6
5 - Very Effective/Timely	6.9%	2
Don't Know	6.9%	2
N/A	3.4%	1
	answered question	**29**
	skipped question	**54**

21. What is your level of regular communication (E-mail, phone, etc.) with your AEA program manager?

	Response Percent	Response Count
Weekly	13.8%	4
Monthly	**34.5%**	**10**
Quarterly	17.2%	5
Never	6.9%	2
Don't Know	20.7%	6
N/A	6.9%	2
	answered question	**29**
	skipped question	**54**

22. Has AEA ever made a site visit for your project?

	Response Percent	Response Count
Yes	**50.0%**	**14**
No	39.3%	11
N/A	10.7%	3
	answered question	**28**
	skipped question	**55**

23. Have there been delays or major changes in direction to the scope or budget during the course of your project? If yes, please describe in 1-2 sentences.

	Response Percent	Response Count
Yes	**44.8%**	**13**
No	31.0%	9
N/A	24.1%	7
	If Yes, please specify	11
	answered question	**29**
	skipped question	**54**

24. How clearly were the reasons communicated for your organization's application not being recommended?

	Response Percent	Response Count
1 - Not Very Clearly	11.8%	4
2	5.9%	2
3	23.5%	8
4	14.7%	5
5 - Very Clearly	11.8%	4
Don't Know	5.9%	2
N/A	**26.5%**	**9**
	answered question	**34**
	skipped question	**49**

25. Were you given adequate support to improve your proposal for submission for future RE Fund Rounds?

	Response Percent	Response Count
1 - No Support	**27.3%**	**9**
2	18.2%	6
3	12.1%	4
4	0.0%	0
5 - Adequate Support	9.1%	3
Don't Know	9.1%	3
N/A	24.2%	8
answered question		**33**
skipped question		**50**

26. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

	Response Count
	42
answered question	**42**
skipped question	**41**

Page 1, Q1. As you respond to the following questions, would you characterize yourself primarily as (you may choose more than one):	
1	retail consumer
2	energy policy consultant
3	Local Stakeholder
4	Impacted Community Member and LocalProperty Owner
5	concerned citizen
6	Environmental non-profit
7	university researcher
8	University
9	stakeholder as member of affected community
10	State University Employee
11	Engineer who formerly worked for a Anchorage-based consulting firm, and Native Corporation subsidiary, who worked on AREF-funded projects (I no longer live in Alaska)
12	rural community member
13	I have no idea.
14	Community Health Center
15	Regional Housing Authority / Weatherization
16	Former Non-AEA State Government employee
17	co aplicant energy fund
18	State Legislator
19	Program manager [redacted]
20	Education
21	non profit working on energy issues
22	Indivual Citizen
23	Private electric utility
24	Regional Corp
25	Conservation Advocacy Non Profit

Page 2, Q4. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Select up to two.	
1	building a constituency of grantees
2	not applicable
3	media reports
4	AEA website
5	I have never heard of the AEA or the RE Fund
6	colleagues, peers
7	Legislators
8	Website and emails from legislative offices
9	none
10	unaware of any promotion- private utilities discouraged?
11	General Media
12	RPSU

Page 2, Q7. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Select up to two.	
1	encouraging dialog with private utilities
2	DNR offices are not supporting rural project. Call me for more information.
3	Actual knowledge and understanding of Alaska
4	Perform grant, not project management.
5	Simplify the process
6	Identify emerging technologies to each of the specific applications.
7	Identiftying project NEW project (current group 30 yr behind)
8	Use of fewer buzzwords, less jargon
9	Significantly speed up the process.
10	allowing pre-grant approval project costs to be eligible for reimbursement
11	Provide formula used to evaluate projects (cost-benefit)
12	Discontinue the program
13	Programmatic Goals which go above and beyond funding.

Page 2, Q9. In your experience, which outside organizations provide the most help in the application process? Please select up to two.	
1	unknown
2	DId not need outside help
3	Never received any help. Only more forms to fill out.
4	We didn't request or use outside help - did all work in house
5	Local know of what is a viable project, knowing what we are talking about
6	Outside State of Alaska Consultant
7	Trial and error
8	Unknown
9	Don't use outside organization with application
10	not applicable
11	I haven't applied

Page 3, Q17. Which RE resource was proposed in your organizations application? Please select all that apply.	
1	Diesel Heat Recovery
2	Appropiate resources for the area, [redacted]
3	Hydrokinetic
4	Heat energy recovery
5	liquefied natural gas
6	Coal-To-Liquids Technology
7	energy audits and upgrades to lighting and boilers
8	emerging energy

Page 4, Q23. Have there been delays or major changes in direction to the scope or budget during the course of your project? If yes, please describe in 1-2 sentences.	
1	Scope and budget changes in early phases of project planning due to results of work, permitting issues, lack of clear process, and other outside factors.
2	Construction encountered challenging field conditions and contractor construction delays that delayed completion and created challenges for the award timelines.
3	We've had to rescope multiple projects due to the grant funding cap per community.
4	As the project has progressed, the cost has been reduces significantly, one device provider has all but dropped out, and 2 others have been added.
5	project not complete
6	The manufacturer listed in the original proposal had technical difficulties in delivering the heat to power unit to be tested. The proposed rescope (used a heat to power unit from a different manufacturer) maintained the major objectives of the original project.
7	Both scope and budget were changed on project to reflect changes in it current viability and potential.
8	Ahange in program schedule (delay wind until diesel power systems upgraded) Loss of major grant as result.
9	AEA changed scope to allow for larger size wind turbines.
10	For a long time we had very poor communication with the PRogram manager [redacted] It did improve, but the project took a very long time to even be awarded and then to get started. once it began we had major disagreements over what would be done. then it appeared that half our community's award would be used for overhead. then it seemed the program manager was going to set our priorities instead of us. we managed to make it through all that, including spreadsheets that were incomplete or had mistakes. then dealing with a contractor who did not have a license to work in alaska. even this survey is not well constructued. for example question 21 - should have a category like - irregular - or sporadically, as one choice. .question 11 is not clear.
11	AEA attempted to change project scope after contract award and took an excessive amount of time (more that 6 mo.) to reach resolution.

Page 7, Q26. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

1	[redacted] AEA must be restructured to provide for competent internal technical qualifications, merit-based standard procedures, competent applicant qualifications, a comprehensive public process, strict adherence to established public planning, and full consideration of social, economic and environmental impacts and risks. None of the foregoing now exists. Additionally, separate the REF from the Legislature, to stop this from being a brokerage for regional earmarks and speculators. [redacted]
2	There is no community coordination or consideration of the many public impacts, only an indifferent push to fund a favored project. The natural setting, water ecology, and my quality of life and property values are being directly affected by a poorly justified public grant process that totally ignores public input.
3	Continue funding important/most beneficial projects with as little interruption in work as possible.
4	A more level playing field betwen types of projects. Feasibility should be based on total project costs, not just cost to the project developer.
5	The process needs more opportunity for meaningful public input. There also needs to be a better vetting process to eliminate projects that are environmentally or socially infeasible, illegal or not in line with local area plans.
6	[redacted] has never received or seen materials relating to RE, RE funds or programs; are private utilities excluded?
7	Raise the cap for projects Raise value of job creation in scoring Improve the internal efficiency and effectiveness of the process as a whole Pay staff well and hold them accountable for results
8	The process is flawed, is political and funds projects that have no financial merit over those that do have financial merit. Some communities get special treatment and others are discriminated against...literally. There is a perception that the selection system is made by third parties who are directed by AEA staff on what projects are supported and which ones aer not. These third party reviewers have never built a power project in their life. Assignment of weights, subjective valuations all lead to a lack of credibility in the system. The system is so flawed and provides little incentive to match private funding against the grants. Private businesses are not encouraged to apply and must submit to RCA regulation if they accept funds. The risk reward benefit of using RE Funds is not positive and it is therefore for many projects, it is better to not apply. It is corrupt and a conflict when RE Board members and their organizations apply for grants...and then receive them.

Page 7, Q26. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

	numerous villages, there should be more funding to cover the logistics of serving the villages. A good Regional Energy plan would easily cost $300,000+ to hire a consultant and travel to the villages.
10	AEA needs to establish a contingency fund. With this many projects, there are bound to be some problems. A contingecy fund would allow AEA to address problems more quickly. Establish streamlined project administration agreements and procedures with common partners like utilities, statewide tribal organizations who are also working for sustainable villages.
11	Consider using a Facebook page to get the word out.
12	DNR does not support biomass projects on wet lands which is what most of Alaska is. I can produce enough peat pellets for the entire Kuskokwim River Valley but the DNR office in Anchorage is full conservationists that will not allow any development on wet lands. [redacted]
13	The award timelines can be a little difficult for a project that is already under construction. This is not as applicable now as for Round 1. The extension request process is straightforward and accommodated our need to extend completion time on (2) grant awards. The program works, very, very well from our perspective and we don't see a lot of ways to improve it.
14	[redacted] they spend the majority of their time in Anchorage. AEA doesn't do a honest economic analysis, their decisions are political not what is in the best interest of Alaska or Alaskan energy. [redacted]
15	The fund and it's intent is a great thing for rural alaska. Possibly less scrutiny and "milestones" for awarded projects and more requirements for meeting goals would be helpful. Upfront release of funds is critical for most project implementation.
16	I conducted my graduate research on wind energy development in rural communities, focusing on communities that had a class 4 or higher wind resource. Many of these communities were not even aware of the Renewable Energy Fund, suggesting that outreach to rural communities needs to be improved, as well as identifying a need to provide technical assistance with conducting assessment and competing applications.
17	The entire RE Program seems to have little or no public accountability...projects that are not supported by local communities are funded anyway, and there is no accounting for how previously awarded grants have performed. AEA seems to be primarily an entity devised to allocate publicly owned natural resources to private sector developers with the use of public money, despite in some cases, the objections of the public and affected communities. AEA would do well to realize Alaska's Constitution requires public resources must only be developed for clear public benefit. AEA and its Board of Directors should be much more responsive to concerns and criticisms brought by local communities and the

Page 7, Q26. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

	public regarding both overall Program function and the merit of individual RE projects - There should be clear justification for expending public funds to develop public resources, including strong public support.
18	AEA should have a better understanding and evaluation process regarding the wind projects. Our wind project was allowed to continue regardless of the failure to reach the milestones. There were inadequate verification to the plans (ie. blue prints, endorsements, etc.) and background checks of project management experience.
19	AEA Administration has seen some turn-over. This is a bit of an issue. Improved communication on changes in AEA staffing and its impact / no-impact on projects would be beneficial.
20	Too much emphasis on sole sourcing with what appears a favored contractors. Not enough new ideas comming in.
21	Alaska Renewable Energy Fund comments: I was an engineer working on several consulting projects funded by the Alaska Renewable Energy Grant Program between 2008 and 2010: at [redacted] Consultants and Native corporations "milking the system": One of the main reasons I quit [redacted] was ethical problems I had with our energy projects manager [redacted] "milking the system" for a profit- not only AEA grant funds but also federal DOE Tribal Energy Program grants. Native corporations like [redacted] were not eligible to apply directly for AREF grants, but were easily able to do so via "partnerships" with local organizations, who were basically used as puppets or front organizations. Basically, [redacted] wanted to make as much profit as possible on these grant funded projects for their own villages.. dragging out the feasiblity studies as long as possible to bill out more hours unnecessarily (like a law firm would drag out a case, etc.). And in the process, providing sub-par product and taking advantage of how the clients (rural villages) that were not sophisticated enough to be vigilant and really understand what was going on. Prime example: the wind project proposed for the three villages in the Northwest Arctic Borough was awarded $11 million from the Alaska Renewable Energy Fund grant program in 2008, and barely anything has happened more than THREE years later other than a couple more feasibility reports. At the end of the day, [redacted] behavior was/is wasting a lot of public funds with little to show for it, and AEA grant program overseers could have done a much better job preventing this in my opinion. And to top it off, [redacted] were by no means qualified, or had the project experience or people, to do the type of engineering work we were doing, even if we were not milking the grant system. So [redacted] the regional Native corporation was basically able to have a monopoly on these projects going on in their region for purely political reasons, even if they had no idea what they were doing. What AREF-funded projects need is support from consultants with a lot of technical experience with renewable technologies in general, and who have done a wide variety renewable energy projects in various places. This requires experienced, OUT-OF-STATE engineering firms, and NOT with local-yokel Alaska-based firms like [redacted] subsidiaries. At [redacted] I saw my dreams of helping rural villages with sustainable energy solutions crushed by mismanagement, incompetence, corruption, and occasional unethical behavior.

Page 7, Q26. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

	While allowing the free use of its lands for the feasibility study/resource collection activities, [redacted] would put up next to nothing in terms of cash to support these projects. [redacted] that would be spent inefficiently. Not a true 'investment' culture in the sense of terms of committing resources now for the interest of longer-term benefits. [redacted] Renewable energy projects in tough logistical locations like rural Alaska require a high degree of technical and organizational sophistication. So if [redacted] actually knew what the hell they were doing, they would not have such a poor project manager, with no track record of successful energy projects. [redacted] managing all there regional energy projects [redacted] were indisputably un-qualified contractors to work on village energy projects in its region. [redacted] wanted to milk federal and state grant money going to energy projects in [redacted] region villages, so that [redacted] could make profits off of these consulting projects. This business model was premised on deliberately dragging out these projects for years in a way to make the most amount of profit for [redacted] consultants while accomplishing very little real project development work. Main conclusions from my experience working at a [redacted] subsidiary on AREF-funded projects: 1. AEA needs to be far more vigilant, and critical of which consultants/contractors would by hired by grantees for AREF-funded projects, to prevent consultants driving the projects for their own, and not their clients or the public's benefit. 2. AEA needs more program managers, with years of experience in the type of energy projects they are overseeing, adequately over see renewable energy projects they are funding. This would cost money, but in my opinion, more expertise within AEA would more than pay for itself in terms preventing more AREF money being wasted by unscrupulous and even unethical consultants and contractors. Timing of AREF grant funds released: Waiting for the end of the legislative session, and for politicians to approve funding of individual projects, was very detrimental for the effective planning of summer field work as part of feasibility studies and construction work. In remote locations, planning for the summer field season must begin months before the end of the legislative session in May. The uncertainty regarding if funding would be approved for summer field work made project planning much more difficult and stressful.
22	A statewide radio talkshow to inform AK listeners about the program, what does, how it does it and who contact for more information (referrals too).
23	The reimbursement process is out ragously overbearing. It requires far more documentation than funding from the DOE, RUS and Denali commission combined. When expense reciepts less than $10 are ruotinely returned for explanation, the AEA is no longer providing a support and becoming a burden.
24	Expedite review and evaluation process. This is critical due to short construction season and logistic problems, costs in rural communities
25	I have no idea what the AEA is. I have no idea why I was identified as a

Page 7, Q26. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.	
	"stakeholder." I see nothing in any materials sent to me that is dissimilar from any other mass communication. All that changed was the proper nouns and the dates. Please save your money and my time, and close down this nonsensical waste of effort.
26	Yes. Energy Efficiency First. Then, supply energy. Alaska wastes its money and resources when it does not maximize its resources for the greatest benefit to its citizens. There is NO discussion about how efficient the end user is when any supply energy is considered. This, in truth, goes against the Constitution of Alaska.
27	1. About 100 pages of instructions on what's required to submit a four-page project proposal is a disincentive. 2. AEA attitude for this program seems aimed at small, rural technology rather than considering large-scale technologies that would benefit the entire state.
28	I would like to any information about this program sent to me via email and the application to see if our non-profit could benefit from this program.
29	Projects need to be sustainable in the community, proper training is essential
30	AEA and State Statute should allow municipalities the option of being an independent power producer and generating electricity for one or more public buildings.
31	Choose a program manager with organizational and written communication skills. Use building audits to help communities reach their goals, find out what those goals are, and choose expertise from Alaska, with licenses, and a history of professionalism and success. I don't think we would ever go with another "centralized" project administrator. The overhead was outrageous. which were eventually worked out. Choose grants administrators who like dealing with the public and who can communicate in a friendly, clear, organized, consistent manner.
32	More awards should be given to shovel-ready projects rather than conceptual projects. Likewise, awarded funds should expire on a certain date, so unused funds can be returned and awarded to new recipients.
33	There needs to be a better vetting on sustainability of the project.
34	I would recommend an abbreviated application to get get funding for doing initial feasibilty studies for projects.
35	Allow us to do what is best for our community with these funds don't force us to sign agreements with a utility before the project is built that forces us to use them long term or have other opptions but let communitys do whats best for our selves.
36	State energy programs discriminate between state-funded utilities and private, in my opinion, penalizing consumers and community organizations, denying equitable funding.

Page 7, Q26. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.	
37	Since the State of Alaska does not have expert geothermal consultants/staff they should look to world leaders in the industry.
38	Better communications to communities regarding availability and request for applications would be more beneficial. We do not recall hearing about this program prior to today.
39	Assisting development of alternative energy is not an appropriate function of the state government.
40	If reauthorized, please consider putting some money into advertising the program better in rural areas (newspapers, newsletters, local radio stations, faxing flyers, reaching out to regional entities regularly). If an application is weighted based on local readiness and capacity, please consider training workshops on the program and application process. Yes, this is a technical field so partnerships are paramount, but we ALL seem to be learning on the go. To that point, educating and nurturing interested parties is vital for the continued success of the program. Thank you.
41	RE Fund award evaluation and award decision should be primarily the result of reviews by independent committee of experts in the field to eliminate any AEA real or perceived bias in awards. AEA project managers should restrict their roles to ensuring that the awarded project meets schedule and budget and that modifications to the project are in keeping with the projects original intent as circumstances warrant. Project managers should not try to impose their personal opinion to try and change the overall direction of the project unilaterally.
42	Many of us working on renewable energy in Alaska feel that AEA is a competitor and is looking to take control of RE installations and take business away from Alaska businesses.

Alaska Renewable Energy Fund Survey

SurveyMonkey

1. As you respond to the following questions, would you characterize yourself primarily as (you may choose more than one):

		Response Percent	Response Count
RE Fund Applicant		0.0%	0
Eligible Non-Applicant		0.0%	0
RE Industry		0.0%	0
Independent Power Producer		0.0%	0
Other Local Government		0.0%	0
AEA Staff or Advisory Committee		**100.0%**	**6**
RE Advocate		0.0%	0
Non-AEA State Government		0.0%	0
Federal Government		0.0%	0
Utilities		0.0%	0
Tribal Government		0.0%	0
Regional Native Non-Profit		0.0%	0
Other (please specify)		0.0%	0
		answered question	**6**
		skipped question	**0**

2. Please select the region where you are located.

	Response Percent	Response Count
Interior (excluding Fairbanks)	0.0%	0
Bering Straits	0.0%	0
North Slope	0.0%	0
Northwest Arctic	0.0%	0
Lower Yukon-Kuskokwim	0.0%	0
Bristol Bay	0.0%	0
Kodiak	0.0%	0
Aleutians	0.0%	0
Copper River/Chugach	0.0%	0
Railbelt (including Fairbanks and Anchorage)	**100.0%**	**6**
Southeast	0.0%	0
	answered question	**6**
	skipped question	**0**

3. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Please select up to two.

	Response Percent	Response Count
Email or listserv	**40.0%**	**2**
Community organizations	20.0%	1
Rural energy conference or workshop	20.0%	1
Project developers	**40.0%**	**2**
Research	0.0%	0
Utility communications	0.0%	0
Other AEA programs	20.0%	1
Other (please specify)	20.0%	1
	answered question	**5**
	skipped question	**1**

4. Do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?

	Response Percent	Response Count
1 - Not Very Effective	0.0%	0
2	0.0%	0
3	16.7%	1
4	**66.7%**	**4**
5 - Very Effective	16.7%	1
	answered question	**6**
	skipped question	**0**

5. How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

		Response Percent	Response Count
1 - Not Very Effective		0.0%	0
2		0.0%	0
3		**50.0%**	**3**
4		33.3%	2
5 - Very Effective		16.7%	1
		answered question	**6**
		skipped question	**0**

6. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Please select up to two.

	Response Percent	Response Count
Community engagement	16.7%	1
Community outreach	33.3%	2
Regional planning	**50.0%**	**3**
Financing	16.7%	1
Assistance with writing applications	16.7%	1
Identifying qualified project developer	0.0%	0
Early feasibility analysis based on available local RE resources	**50.0%**	**3**
Other (please specify)	16.7%	1
	answered question	**6**
	skipped question	**0**

7. In your experience, do you feel the RE Fund application (RFA) process is clear and understandable for communities and applicants?

	Response Percent	Response Count
1 - Not Very Clear	0.0%	0
2	33.3%	2
3	16.7%	1
4	**50.0%**	**3**
5 - Very Clear	0.0%	0
	answered question	**6**
	skipped question	**0**

8. Do communities or applicants generally require outside help with the RE Fund application?

	Response Percent	Response Count
Yes	33.3%	2
No	0.0%	0
Don't Know	**66.7%**	**4**
	answered question	**6**
	skipped question	**0**

9. In your experience, which outside organizations provide the most help in the application process? Please select up to two.

	Response Percent	Response Count
Consultant	**40.0%**	**2**
Project Developer	**40.0%**	**2**
Regional Non-Profit	0.0%	0
Tribal or Government Entity	20.0%	1
Other State Agency or University	20.0%	1
Other (please specify)	20.0%	1
	answered question	**5**
	skipped question	**1**

10. In your experience, what is the importance of non-energy benefits (e.g. health, local jobs, improved power service etc.) on the overall success of a project?

	Response Percent	Response Count
1 - Not Very Important	0.0%	0
2	20.0%	1
3	20.0%	1
4	**40.0%**	**2**
5 - Very Important	20.0%	1
	answered question	**5**
	skipped question	**1**

11. In your experience, is the RE Fund Advisory Committee used effectively to provide oversight and guidance to the program?

	Response Percent	Response Count
1 - Not Very Effectively	16.7%	1
2	0.0%	0
3	0.0%	0
4	**50.0%**	**3**
5 - Very Effectively	0.0%	0
Don't Know	33.3%	2
	answered question	**6**
	skipped question	**0**

12. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

	Response Percent	Response Count
1 - Not Very Responsive	0.0%	0
2	0.0%	0
3	0.0%	0
4	**66.7%**	**4**
5 - Very Responsive	0.0%	0
Don't Know	33.3%	2
	answered question	**6**
	skipped question	**0**

13. In your capacity, what level of impact do you feel the following aspects of the award process have on projects:

	Low Impact				High Impact	Don't Know	Rating Average	Response Count
Duration of the grant process from application to reimbursement after an award	16.7% (1)	0.0% (0)	16.7% (1)	**33.3% (2)**	16.7% (1)	16.7% (1)	3.40	6
Uncertainty associated with the award process from time of recommendation to award	0.0% (0)	0.0% (0)	33.3% (2)	**50.0% (3)**	0.0% (0)	16.7% (1)	3.60	6
The way funding is administered and awardees reimbursed (versus upfront funding)	**33.3% (2)**	0.0% (0)	16.7% (1)	**33.3% (2)**	0.0% (0)	16.7% (1)	2.60	6
						answered question		**6**
						skipped question		**0**

14. Do you feel AEA is following through on assessing project performance and collecting data from completed projects to inform future rounds and identify best practices?

	Response Percent	Response Count
Yes	**50.0%**	**3**
No	16.7%	1
Don't Know	33.3%	2
	answered question	**6**
	skipped question	**0**

15. If you are aware of specific projects that were cancelled or did not move towards construction, what were the primary reasons?

	Response Count
	2
answered question	2
skipped question	4

16. For cancelled projects, what additional support do you believe AEA should have provided to the applicants to help with success?

	Response Count
	2
answered question	2
skipped question	4

17. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

	Response Count
	2
answered question	2
skipped question	4

Page 5, Q3. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Please select up to two.

1	Regional and statewide partners (SE Conference/Denali Commission)

Page 5, Q6. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Please select up to two.

1	Better engineering analysis based on experience in rural Alaska

Page 5, Q9. In your experience, which outside organizations provide the most help in the application process? Please select up to two.

1	don't know

Page 5, Q15. If you are aware of specific projects that were cancelled or did not move towards construction, what were the primary reasons?

1	Actual energy data was less than projected and could not support an economic project. Lack of a power sales agreement between applicant and utility. Grantee or developer jumping to construction phase prior to completing feasibility, design and permitting.
2	Insufficient matching funds as stated in grant agreement. Resource assessment showed too much uncertainty to proceed.

Page 5, Q16. For cancelled projects, what additional support do you believe AEA should have provided to the applicants to help with success?

1	We already provide clear expectations of what is needed in the feasibility and design phases. Our current solution is to no longer award construction money until final design is completed. Removing unallocated construction funds from a grant keeps the grantee focused on a thorough project design.
2	None

Page 7, Q17. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.	
1	There is too much political influence in awards. Advisory Committee members should not be eligible to apply for grants. More weight should be given to independent engineering analysis. Grantees should be required to estimate project impact on electric rates so that millions aren't spent on power generation projects that don't reduce the rates.
2	For very small communities, the match requirement should be waived. We end up having to play games on how to value their administrative time and equipment rental rates to meet a 10% match on feasibility studies. Let them offer what assistance is necessary, but don't hold them to a specific in-kind match amount. It delays getting the grant agreement in place.

Alaska Renewable Energy Fund Survey

SurveyMonkey

1. As you respond to the following questions, would you characterize yourself primarily as (you may choose more than one):

	Response Percent	Response Count
RE Fund Applicant	29.4%	10
Eligible Non-Applicant	2.9%	1
RE Industry	5.9%	2
Independent Power Producer	8.8%	3
Other Local Government	23.5%	8
AEA Staff or Advisory Committee	0.0%	0
RE Advocate	**61.8%**	**21**
Non-AEA State Government	2.9%	1
Federal Government	5.9%	2
Utilities	8.8%	3
Tribal Government	11.8%	4
Regional Native Non-Profit	8.8%	3
Other (please specify)	11.8%	4
	answered question	**34**
	skipped question	**0**

2. Please select the region where you are located.

	Response Percent	Response Count
Interior (excluding Fairbanks)	3.0%	1
Bering Straits	3.0%	1
North Slope	0.0%	0
Northwest Arctic	0.0%	0
Lower Yukon-Kuskokwim	3.0%	1
Bristol Bay	9.1%	3
Kodiak	0.0%	0
Aleutians	9.1%	3
Copper River/Chugach	3.0%	1
Railbelt (including Fairbanks and Anchorage)	**54.5%**	**18**
Southeast	15.2%	5
	answered question	**33**
	skipped question	**1**

3. What is your level of awareness or engagement with specific programs run by the Alaska Energy Authority (AEA) to reduce the cost of energy in Alaskan communities?

	Low				High	N/A	Rating Average	Response Count
Renewable Energy Fund	16.7% (3)	5.6% (1)	27.8% (5)	16.7% (3)	**33.3% (6)**	0.0% (0)	3.44	18
Rural Power Systems Upgrade	22.2% (4)	27.8% (5)	**33.3% (6)**	5.6% (1)	11.1% (2)	0.0% (0)	2.56	18
Bulk Fuel	33.3% (6)	16.7% (3)	**38.9% (7)**	0.0% (0)	11.1% (2)	0.0% (0)	2.39	18
Emerging Energy Technology Fund	**33.3% (6)**	0.0% (0)	27.8% (5)	16.7% (3)	22.2% (4)	0.0% (0)	2.94	18
Power Project Loan Fund	**61.1% (11)**	5.6% (1)	11.1% (2)	11.1% (2)	11.1% (2)	0.0% (0)	2.06	18
State and Rural Energy Planning (e.g. Pathways)	**27.8% (5)**	22.2% (4)	16.7% (3)	16.7% (3)	16.7% (3)	0.0% (0)	2.72	18
						answered question		**18**
						skipped question		**16**

4. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Please select up to two.

	Response Percent	Response Count
Email or listserv	23.5%	4
Community organizations	17.6%	3
Rural energy conference or workshop	**52.9%**	**9**
Project developers	23.5%	4
Research	5.9%	1
Utility communications	5.9%	1
Other AEA programs	11.8%	2
Other (please specify)	23.5%	4
	answered question	**17**
	skipped question	**17**

5. Do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?

	Response Percent	Response Count
1 - Not Very Effective	16.7%	3
2	**27.8%**	**5**
3	22.2%	4
4	**27.8%**	**5**
5 - Very Effective	5.6%	1
	answered question	**18**
	skipped question	**16**

6. How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

		Response Percent	Response Count
1 - Not Very Effective		27.8%	5
2		22.2%	4
3		**33.3%**	**6**
4		16.7%	3
5 - Very Effective		0.0%	0
		answered question	**18**
		skipped question	**16**

7. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Please select up to two.

	Response Percent	Response Count
Community outreach	38.9%	7
Regional planning	22.2%	4
Financing	11.1%	2
Assistance with writing applications	33.3%	6
Identifying qualified project developer	11.1%	2
Early feasibility analysis based on available local RE resources	**72.2%**	**13**
Other (please specify)	16.7%	3
	answered question	**18**
	skipped question	**16**

8. Do you support the state's efforts to promote the installation of RE technologies by providing financial incentives and technical support through AEA?

	Response Percent	Response Count
1 - Do Not Support	0.0%	0
2	5.6%	1
3	16.7%	3
4	22.2%	4
5 - Strongly Support	**55.6%**	**10**
	answered question	**18**
	skipped question	**16**

9. In your experience, do you feel the RE Fund application (RFA) process is clear and understandable for communities and applicants?

	Response Percent	Response Count
1 - Not Very Clear	16.7%	3
2	**33.3%**	**6**
3	16.7%	3
4	11.1%	2
5 - Very Clear	0.0%	0
Don't Know	22.2%	4
	answered question	**18**
	skipped question	**16**

10. Do communities or applicants generally require outside help with the RE Fund application?

	Response Percent	Response Count
Yes	**50.0%**	**9**
No	0.0%	0
Don't Know	**50.0%**	**9**
	answered question	**18**
	skipped question	**16**

11. In your experience, which outside organizations provide the most help in the application process? Please select up to two.

	Response Percent	Response Count
Consultant	**50.0%**	**8**
Project Developer	31.3%	5
Regional Non-Profit	18.8%	3
Tribal or Government Entity	25.0%	4
Other State Agency or University	18.8%	3
Other (please specify)	12.5%	2
	answered question	**16**
	skipped question	**18**

12. In your experience, does AEA and its review team use an appropriate method of assessing technical and economic merit, and other factors to rank applications?

	Response Percent	Response Count
1 - Not Very Appropriate	11.1%	2
2	11.1%	2
3	**38.9%**	**7**
4	5.6%	1
5 - Very Appropriate	5.6%	1
Don't Know	27.8%	5
	answered question	**18**
	skipped question	**16**

13. In your experience, what is the importance of non-energy benefits (e.g. health, local jobs, improved power service etc.) on the overall success of a project?

	Response Percent	Response Count
1 - Not Very Important	11.1%	2
2	11.1%	2
3	11.1%	2
4	22.2%	4
5 - Very Important	**44.4%**	**8**
	answered question	**18**
	skipped question	**16**

14. In your experience, is the RE Fund Advisory Committee used effectively to provide oversight and guidance to the program?

	Response Percent	Response Count
1 - Not Very Effectively	11.1%	2
2	0.0%	0
3	22.2%	4
4	0.0%	0
5 - Very Effectively	0.0%	0
Don't Know	**66.7%**	**12**
	answered question	**18**
	skipped question	**16**

15. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

	Response Percent	Response Count
1 - Not Very Responsive	11.1%	2
2	16.7%	3
3	5.6%	1
4	0.0%	0
5 - Very Responsive	5.6%	1
Don't Know	**61.1%**	**11**
	answered question	**18**
	skipped question	**16**

16. Do you feel that the AEA provides an appropriate level of reporting back to the legislature and other stakeholders

	Response Percent	Response Count
1 - Not Very Appropriate	11.1%	2
2	11.1%	2
3	22.2%	4
4	0.0%	0
5 - Very Appropriate	5.6%	1
Don't Know	**50.0%**	**9**
	answered question	**18**
	skipped question	**16**

17. Do you feel there are specific areas that should be targeted for improvement, or have not functioned as originally intended by the enabling legislation?

	Response Count
	9
answered question	**9**
skipped question	**25**

18. How effective do you think AEA has been in reaching out to communities with high COE and providing technical guidance on most likely successful projects?

		Response Percent	Response Count
1 - Not Very Effective		17.6%	3
2		**29.4%**	**5**
3		**29.4%**	**5**
4		17.6%	3
5 - Very Effective		5.9%	1
	answered question		**17**
	skipped question		**17**

19. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

	Response Count
	16
answered question	**16**
skipped question	**18**

Page 1, Q1. As you respond to the following questions, would you characterize yourself primarily as (you may choose more than one):

1	Local Stakeholder
2	stakeholder as member of affected community
3	State University Employee
4	Engineer who formerly worked for a Anchorage-based consulting firm, and Native Corporation subsidiary, who worked on AREF-funded projects (I no longer live in Alaska)

Page 6, Q4. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska? Please select up to two.

1	Posting webpage applications for free money
2	ignoring lack of local community support for projects
3	Don't know
4	consultants contacting village leaders

Page 6, Q7. In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful? Please select up to two.

1	a genuine public process to vet potential projects
2	basic training on the entire process from start to finish
3	Maintaining a list of qualified consultants/vendors to go to for advice developing/evaluating a concept

Page 6, Q11. In your experience, which outside organizations provide the most help in the application process? Please select up to two.

1	ANTHC
2	Don't Know

Page 6, Q17. Do you feel there are specific areas that should be targeted for improvement, or have not functioned as originally intended by the enabling legislation?	
1	AEA internal competence
2	1. Greatly simplify application process for recon. feasibilty studies and small projects, say less than 2 million dollars 2. Simplification of progress reporting - most agencies require this quarterly, not monthly. 3. Set aside a portion of the fund for rural assistance with start up costs, training and operations of new technology in their village.
3	It is critical that projects meet full approval of stakeholders in the area, and the entity requesting the project be a stakeholder in the area of the project.
4	AEA needs to implement a public process whereby local communities can provide comments on projects affecting those communities. The public process should be structured so that projects with little or no local support are not funded. AEA needs to do a much better job of analyzing project feasibiity prior to providing funding, including whether or not the project would violate Law, Regulation or established public policy to avoid funding projects that are not legally feasible, and/or against established public interests.
5	I am only just beginning to learn about AEA.
6	D/k
7	Feasibility of wood boiler projects based on available resources and making sure a management plan for sustainability is in place when the project comes on line.
8	Economic benefits are claimed, but are results ever compared to original claims? Are results publicized. Don't see much of a change in diesel consumption for some project about which I'm familiar. Don't see any reduction in electric bills, either. So what is the benefit besides feeling good about having a renewable resource in your community?
9	Please reconsider or discuss the possibility of regional rural entities (profit & non-profit) as eligible to apply on behalf of local entities. The legislation allows for housing authorities.

Page 7, Q19. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

1	[redacted] EA must be restructured to provide for competent internal technical qualifications, merit-based standard procedures, competent applicant qualifications, a comprehensive public process, strict adherence to established public planning, and full consideration of social, economic and environmental impacts and risks. None of the foregoing now exists. Additionally, separate the REF from the Legislature, to stop this from being a brokerage for regional earmarks and speculators [redacted]
2	there needs to be a program clearinghouse for the various funding and grant programs out there. One single website that spells them all out.
3	AEA needs to establish a contingency fund. With this many projects, there are bound to be some problems. A contingecy fund would allow AEA to address problems more quickly. Establish streamlined project administration agreements and procedures with common partners like utilities, statewide tribal organizations who are also working for sustainable villages.
4	The award timelines can be a little difficult for a project that is already under construction. This is not as applicable now as for Round 1. The extension request process is straightforward and accommodated our need to extend completion time on (2) grant awards. The program works, very, very well from our perspective and we don't see a lot of ways to improve it.
5	The fund and it's intent is a great thing for rural alaska. Possibly less scrutiny and "milestones" for awarded projects and more requirements for meeting goals would be helpful. Upfront release of funds is critical for most project implementation.
6	The previous comment applies here too.
7	The entire RE Program seems to have little or no public accountability...projects that are not supported by local communities are funded anyway, and there is no accounting for how previously awarded grants have performed. AEA seems to be primarily an entity devised to allocate publicly owned natural resources to private sector developers with the use of public money, despite in some cases, the objections of the public and affected communities. AEA would do well to realize Alaska's Constitution requires public resources must only be developed for clear public benefit. AEA and its Board of Directors should be much more responsive to concerns and criticisms brought by local communities and the public regarding both overall Program function and the merit of individual RE projects - There should be clear justification for expending public funds to develop public resources, including strong public support.
8	Too much emphasis on sole sourcing with what appears a favored contractors. Not enough new ideas comming in.
9	Alaska Renewable Energy Fund comments: I was an engineer working on

Page 7, Q19. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

several consulting projects funded by the Alaska Renewable Energy Grant Program between 2008 and 2010[redacted] Consultants and Native corporations “milking the system”: One of the main reasons I quit [redacted] was ethical problems I had with our energy projects manager [redacted] "milking the system" for a profit- not only AEA grant funds but also federal DOE Tribal Energy Program grants. Native corporations [redacted] were not eligible to apply directly for AREF grants, but were easily able to do so via “partnerships” with local organizations, who were basically used as puppets or front organizations. Basically [redacted] wanted to make as much profit as possible on these grant funded projects for their own villages.. dragging out the feasiblity studies as long as possible to bill out more hours unnecessarily (like a law firm would drag out a case, etc.). And in the process, providing sub-par product and taking advantage of how the clients (rural villages) that were not sophisticated enough to be vigilant and really understand what was going on. Prime example: the wind project proposed for the three villages in the Northwest Arctic Borough was awarded $11 million from the Alaska Renewable Energy Fund grant program in 2008, and barely anything has happened more than THREE years later other than a couple more feasibility reports. At the end of the day, [redacted] behavior was/is wasting a lot of public funds with little to show for it, and AEA grant program overseers could have done a much better job preventing this in my opinion. And to top it off, [redacted] were by no means qualified, or had the project experience or people, to do the type of engineering work we were doing, even if we were not milking the grant system. So [redacted] the regional Native corporation was basically able to have a monopoly on these projects going on in their region for purely political reasons, even if they had no idea what they were doing. What AREF-funded projects need is support from consultants with a lot of technical experience with renewable technologies in general, and who have done a wide variety renewable energy projects in various places. This requires experienced, OUT-OF-STATE engineering firms, and NOT with local-yokel Alaska-based firms like [redacted] subsidiaries. At [redacted] saw my dreams of helping rural villages with sustainable energy solutions crushed by mismanagement, incompetence, corruption, and occasional unethical behavior. While allowing the free use of its lands for the feasibility study/resource collection activities, [redacted] would put up next to nothing in terms of cash to support these projects. [redacted] that would be spent inefficiently. Not a true ‘investment’ culture in the sense of terms of committing resources now for the interest of longer-term benefits. [redacted] Renewable energy projects in tough logistical locations like rural Alaska require a high degree of technical and organizational sophistication. So if [redacted] actually knew what the hell they were doing, they would not have such a poor project manager, with no track record of successful energy projects, [redacted] managing all there regional energy projects. [redacted] were indisputably un-qualified contractors to work on village energy projects in its region. [redacted] wanted to milk federal and state grant money going to energy projects in [redacted] region villages, so that [redacted] subsidiaries, and ultimately [redacted] could make profits off of these consulting

Page 7, Q19. Do you have any other specific recommendations or comments on the RE Fund program, its processes or administration by AEA that you wish to convey as part of this evaluation process? If so, please respond in 4 to 5 sentences.

	projects. This business model was premised on deliberately dragging out these projects for years in a way to make the most amount of profit for [redacted] consultants while accomplishing very little real project development work. Main conclusions from my experience working at a [redacted] subsidiary on AREF-funded projects: 1. AEA needs to be far more vigilant, and critical of which consultants/contractors would by hired by grantees for AREF-funded projects, to prevent consultants driving the projects for their own, and not their clients or the public's benefit. 2. AEA needs more program managers, with years of experience in the type of energy projects they are overseeing, adequately over see renewable energy projects they are funding. This would cost money, but in my opinion, more expertise within AEA would more than pay for itself in terms preventing more AREF money being wasted by unscrupulous and even unethical consultants and contractors. Timing of AREF grant funds released: Waiting for the end of the legislative session, and for politicians to approve funding of individual projects, was very detrimental for the effective planning of summer field work as part of feasibility studies and construction work. In remote locations, planning for the summer field season must begin months before the end of the legislative session in May. The uncertainty regarding if funding would be approved for summer field work made project planning much more difficult and stressful.	
10	Expedite review and evaluation process. This is critical due to short construction season and logistic problems, costs in rural communities.	
11	AEA and State Statute should allow municipalities the option of being an independent power producer and generating electricity for one or more public buildings.	
12	Facilitate entry level and early stage participation as much as possible.	
13	Make the Regional Planning Money fair and equitable to All regions.	
14	Need to spend more time to evaluate the applications.	
15	With all the wood boilers going in, there needs to be replanting of vegetation for biomass particularly in light of changing climate and effect on growth of local trees.	
16	If reauthorized, please consider putting some money into advertising the program better in rural areas (newspapers, newsletters, local radio stations, faxing flyers, reaching out to regional entities regularly). If an application is weighted based on local readiness and capacity, please consider training workshops on the program and application process. Yes, this is a technical field so partnerships are paramount, but we ALL seem to be learning on the go. To that point, educating and nurturing interested parties is vital for the continued success of the program. Thank you.	

Appendix B: List of Process Evaluation Interviewees

The list of identified interviews, both in-person and phone, were chosen to reflect the breadth of stakeholders affiliated with the REGRP and the diversity of perspectives and input that they could provide a balanced evaluation of the program. Not all originally identified stakeholders were available for interviews during the process evaluation timeframe and during the public announcements of this effort, several stakeholders were added to this list based on individual request or identification by other stakeholders as persons of interest to the program.

LAST	FIRST	TITLE	ORGANIZATION	TYPE	REGION
Baker	Andy	Consultant	Alaska Sea Life Center	Consultant	Kenai
Baldwin	Bob	Trustee	Kenai River Watershed Foundation	Conservation	Kenai
Bell	Susan	Commissioner	State of AK	AEA BOD	SE
Beltrami	Vince	Commissioner - Denali Commission	Denali Commission and Executive President of the Alaska AFL-CIO	REFAC	ANC
Binnian	Emily	GIS, Data Mapping	AEA	Current AEA	ANC
Carlson	Dave	Executive Director	Southeast Alaska Power Association	IPP	SE
Catugan	Sissy	Environmental Coordinator	Native Village of Unalakleet	Tribal Non Profit	
Coffee	Chris	Project manager	City of Juneau	Municipality	SE
Conner	Valerie	Conservation Director	Alaska Center for the Environment	Conservation	ANC
Cooney	Mike	Concerned citizen	Moose Pass	Conservation	Kenai
Coplin	Clay	General Manager	Cordova Electric	Rural Utility	SE
Craft	Mike	President	Alaska Environmental	IPP	Interior
Crimp	Peter	Deputy Director - AEEE	AEA	Current AEA	ANC
Daniels	Denali	Energy Project Manager	Denali Commission	Funder	Federal
Deering	Bob		US Coast Guard	Federal	federal
Edgemon	Bryce	Previous House Energy Co-chair	State of AK	Legislature	YK Delta
Eller	Don	General Manager	Tanana Power	Rural Utility	Interior
Fay	Ginny	Project Manager, Economic Analysis	ISER	ISER	ANC
Fisher-Goad	Sara	Executive Director	AEA	Current AEA	ANC
Fredenberg	Connie	Ex Grant Administrator	TDX Power	Rural Utility	Aleutians
Haagenson	Steve	Previous ED 2008-2011	AEA	Prev AEA	FAI

LAST	FIRST	TITLE	ORGANIZATION	TYPE	REGION
Handeland	John	GM	Nome Joint Utility System	Rural Utility	Western
Hirsch	Brian	Alaska Coordinator	National Renewable Energy Lab	Federal	Federal
Hoffman	Lyman F.	Legislative Senator	Alaska Senate - Chair of Finance Committee, others	REFAC	YK Delta
Isaac	Jerry	Director	Tanana Chiefs Conference	Regional Non proft	Interior
Ivanoff	Herb	City Administrator	City of Unalakleet	Municipality	Western
Ivanoff	Paul	Community Development Director	Norton Sounds Economic Development Corp	Econ Dev	Western
Jensen	James	Previous Wind PM	AEA	Prev AEA	ANC
Johnson	Douglas	VP Development - Alaska	ORPC	Product Developer	ANC
Karl	Bernie	President	Chena Power	IPP	Fairbanks
Ketzler	Bear	City Manager	City of Tanana	Rural Community	Interior
Kohler	Meera	CEO	Alaska Village Electric Cooperative	Rural Utility	statewide
Lamal	Kate	VP of Transmission	Golden Valley Electric Association	Railbelt Utility	FAI
Leland	Marilyn	Executive Director	Alaska Power Association	Utility Rep	statewide
Lockard	David	Current Bulk Fuel Eng, previous geothermal PM	AEA	Current AEA	ANC
Lutz	Susan	Associate City Administrator	City of Akutan	Rural Utility	YK Delta
MacMillan	Linda	Deputy Director - Operations	AEA	Current AEA	ANC
Maguire	Lesil	R. Senate Finance, Previous Energy Co-chair	State of AK	Legislature	ANC
Mann	Ray	Consultant	City of Akutan	Consultant	Bristol Bay
Mathiasson	Ingemar	"Energy person"	Northwest Artic Borough	Non Profit	NWA
Meiners	Dennis	President	EIS	Project Developer	ANC
Millet	Cherisse	R. Previous House Energy Co-chair	State of AK	Legislature	ANC
Moeller	Sandra	Deputy Director - Rural Energy Group	AEA	Current AEA	ANC
Naoroz	Peter	Executive Director	Kootsnoowoo	Tribal Non Profit	SE
Nibeck	Melody	Energy Coord	Bristol Bay Native Association	Tribal Non Profit	YK Delta
Ott	Douglas	Hydro Program Manager	AEA	Current AEA	ANC
Paskvan	Joe	Dem. Co-Chair, Senate Resources	State of AK	Legislature	statewide
Petrie	Brent	Manager, community Development	AVEC	Rural Utility	statewide
Plentovich	Devany	Biomass Program Manager	AEA	Current AEA	ANC

LAST	FIRST	TITLE	ORGANIZATION	TYPE	REGION
Pruitt	Lance	House Energy Co-Chair	State of AK	Legislature	
Rehfeld	Karen	Director	Office of Management and Budget	AK Gov	statewide
Rose	Chris	Business/Organization involved in renewable energy	Renewable Energy Alaska Project	REFAC	ANC
Rose	Walter	Energy Specialist	Kewerak	Tribal Non Profit	Western
Ruaro	Randy	Governor's Chief of Staff	State of AK	AK Gov	statewide
Rutz	Christopher	Procurement Officer	AEA	Current AEA	ANC
Sargent	John	Grant Manager	City of Bethel	Municipality	YK Delta
Schaefermeyer	Darryl	Operations Manager	Alaska Sealife Center	Non Profit	Kenai
Scott	Darron	Kodiak, recipient	Kodiak Electric Association	Rural Utility	Kodiak
Sharp	John		Twin Hills Native Group	Local Native	YK Delta
Short	Hugh	Chair - AEA BOD		AEA BOD	ANC
St. George	Jim	President	STG	Project Developers	ANC
Steyer	Phil	Manager	Chugach Electric Association	Railbelt Utility	ANC
Strandberg	Jim		AEA	Current AEA	ANC
Stromberg	Rich	Wind Program Manager	AEA	Current AEA	ANC
Swenson	Bob	Alaska State Geologist	Department of Natural Resources	AK Gov	statewide
Thomas	Bill (William)	Legislative Representative	Alaska House - Chair of Finance Committee, others	REFAC	SE
Thomas	Mayor	Mayor	Angoon	Rural Community	SE
Towerak	Ike	General Manager	Unalakleet Village Electric Coop	Rural Utility	Western
Venables	Robert	Energy Coodinator	Southeast Conference	Regional Rep	SE
Wagoner	Tom	Senate Resources Co-Chair	State of AK	Legislature	ANC
Weilokowski	Bob	D. Previous Energy Co-chair	State of AK	Legislature	ANC
White	Butch	Previous Grant Manager	AEA	Prev AEA	ANC
White	Clinton		STG	Project Developer	ANC
Woracheck	Alden	Head of Accounting	AVEC	Rural Utility	ANC

Appendix C: Process Evaluation Interview Guides

The following guides, like the online survey, were developed to reflect three separate core stakeholder groups, Participants and Non-participants, AEA Staff and REF Advisory Committee; and State Government and RE Advocates.

AEA Staff or REFAC Interview Guide

Prior to interview, interviewer will have general background of interviewee, RFA for Round V; general information regarding grant awards or declines; general characteristics of regions (as per Alaska Wiki and other background documents); general understanding of cost of energy in regions; and when appropriate, types of renewable resource strengths/potential opportunities in regions.

"Thank you for your willingness to speak with me (us) today. [Quick personal introduction]

As you might already know from announcements from the Alaska Energy Authority, VEIC and the Alaska Center for Energy and Power were selected to perform an independent evaluation of the Renewable Energy Fund grant recommendation program. The purpose of this evaluation is to identify ways to increase the effectiveness and efficiency of the processes used in the program and their impact in Alaskan communities. Our intent is to allow as many stakeholders as is feasible to have input into this evaluation.

As part of the process evaluation we are both performing one-on-one interviews such as this one, as well as asking you and a wider group to complete an on-line survey which you will receive next week. Your comments will be kept confidential, and will be an invaluable contribution to our work. Thank you again for taking the time to talk with me today.

We have a group of six topics which we'd like to cover today, but we'll make sure to leave some time at the end for you to address issues that are important to you and that we haven't touched on. If at any point, you would like further clarification or feel you do not have an informed position on a particular question, please let me know and we can proceed accordingly.

Do you have any questions for me before we begin?

The first topic is program outreach:

Criteria 1: Program Outreach

1. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund program in Alaska?
    - Do you think AEA's efforts in building awareness of its programs are sufficient? ....If not, how could they be improved?

2. In your opinion, do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?
    - Are there RE opportunities in communities being missed?
    - [If yes] What is your opinion of the reasons for these not being pursued?

    - How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

    - How effective do you think AEA has been in reaching out to communities with high COE and providing technical guidance on most likely successful projects?

    - In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful?

Criteria 2: RFA Process

Now I want to ask you a little about the application process itself.

3. Based on your experience, do you feel the application procedure, the criteria for evaluation and the timeframes are understandable and clearly communicated to communities and applicants?
    - [If not] Why not, and what could be improved?

    - Do communities or applicants generally require outside help with the RE Fund application? …. If so, who was that assistance from? [AEA, the utility, a private developer, other] In your opinion, was that partner working in close contact with the community?

    - Was that help sufficient?... and if not, how could the process have been improved?

- Are there specific areas where applicants have the most difficulty in completing an application? [Timing, technical documentation, economic, etc.]

4. Do any parts of the process strike you as particularly fair in leveling the playing field or particularly unfair?

Criteria 3 & 4: Applicant and Project Evaluation Process

Thank you. Let's turn to the evaluation criteria. To remind you, there seven criteria weighted according to the order that I'll read to you. There are an additional two criteria that AEA uses in making final recommendations. The weights range from 5-25% and I'm going to list them in order of highest to lowest:

cost of energy in community	*[*per resident in the effected project area relative to other areas]
commitment of matching funds	*[*type and amount of matching funds and other resources]
project feasibility, both economic and technical	*[Stage 2]*
project readiness	*[*to proceed with phases of the project proposed for the grant]
creation of public benefits	*[*including economic benefit to the Alaska Public, health, local jobs, pollution & noise reduction]
local support	
sustainability	*[*the ability of the applicant to finance, operate and maintain the project for the life of the project]
Additional criteria for final recommendations (non-weighted)	
statewide balance of grant funds	[For example, if there is two or more similar competing projects in a given area the Authority may only recommend one.]
compliance with previous grant awards	[in previous phases of project development]

5. In your opinion, is this an appropriate set of criteria? Are there other criteria that are missing?

6. Is this rank order appropriate? In your opinion, are there specific scoring metrics that create the most difficulty for potential applicants?

- In you experience, what is the importance of non-energy benefits on the overall success of a project? (e.g. Health, local jobs, improved power service, etc.)

7. Regarding the third criteria – project feasibility, which includes both economic and technical elements – Are there specific difficulties in attributing appropriate technical scores for the various different project types?

8. What about the second part of the project feasibility – the economics portion? In your opinion, do you feel that that scoring process is an appropriate reflection of the economics of the project and calculated consistently across projects?

9. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

    a. In your experience, is the RE Fund Advisory Committee used effectively to provide oversight and guidance to the program?

    b. Do you feel that the AEA and the REFAC provides an appropriate level of reporting back to the legislature and other stakeholders

10. Do you feel there are specific areas that should be targeted for improvement, or have not functioned as originally intended by the enabling legislation?

When projects are not recommended for funding:

11. When AEA determines which projects are being recommended for funding, how are applicants notified of their status?
    c. What details are included in this correspondence?

12. How does AEA support applicants in potentially improving their proposal for submission in future funding rounds?

Let's talk about the Grant Award Process. [Don't mention the criteria #s, as this will confuse the interviewee with the seven "criteria" given to them to evaluate the project.]

Criteria 5: Grant Award Process [only for those participants who were successful]

13. In any industry grant awards seem to take longer than is ideal. In your experience, does the duration of the grant process from application to reimbursement create any notable concerns for applicants or awardees?

14. Are you aware as to whether the timing of when awardees receive funds create any concerns for awardees? (no upfront funds, construction season, etc.)

15. Based on your experience, is the level of reporting required appropriate? Do you feel AEA is following through on assessing project performance and collecting data from completed projects to inform future rounds and identify best practices?

Criteria 6: Grant Administration

16. In your experience, after a project award, are there particular areas that pose the most difficulties for AEA in administering the grants in an effective and timely fashion?

17. How would you characterize AEA's level of communication with individual project awardees? Are there areas for improvement?

18. Are there specific types of delays that affect awarded projects? (Why?) What has AEA done to address them in the award process?

19. If there have been major changes in direction to the scope or budget during the course of a project, was AEA able to adapt to those changes?

20. In your experience, in what ways does AEA help coordinate the multiple funding sources from AEA's programs for project applicants?

General

21. Do you have any other specific recommendations or comments on the RE Fund programs, its processes or administration by AEA that you'd like to share with me?

AEA Participant Interview Guide

Prior to interview, interviewer will have general background of interviewee, reviewed high level data on any application(s); grant awards or declines; characteristics of community (as per Alaska Wiki and other background documents); cost of energy in community; presence of renewable installations; and when appropriate, types of renewable resource strengths/potential opportunities in community/region.

"Thank you for your willingness to speak with me (us) today. [Quick personal introduction]

As you might already know from announcements from the Alaska Energy Authority, VEIC and the Alaska Center for Energy and Powers were selected to perform an independent evaluation of the Renewable Energy Fund grant recommendation program. The purpose of this evaluation is to identify ways to increase the effectiveness and efficiency of the processes used in the program and their impact in Alaskan communities. Our intent is to allow as many stakeholders as is feasible to have input into this evaluation.

As part of the process evaluation we are both performing one-on-one interviews such as this one, as well as asking you and a wider group to complete an on-line survey which you will receive next week. Your comments will be kept confidential, and will be an invaluable contribution to our work. Thank you again for taking the time to talk with me today.

We have a group of six topics which we'd like to cover today, but we'll make sure to leave some time at the end for you to address issues that are important to you and that we haven't touched on. If at any point, you would like further clarification or feel you do not have an informed position on a particular question, please let me know and we can proceed accordingly.

Do you have any questions for me before we begin?

The first topic is program outreach:

Criteria 1: Program Outreach

1. In your opinion, what current AEA approaches have been the most successful in promoting the RE Fund program in Alaska?
    - Do you think AEA's efforts in building awareness of its programs are sufficient? ....If not, how could they be improved?

2. In your opinion, do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?
    - Are there good RE opportunities in your community or surrounding communities that are being missed?
    - [If yes] What is your opinion of the reasons for these not being pursued?

    - How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

    - How effective do you think AEA has been in reaching out to communities with high COE and providing technical guidance on most likely successful projects?

    - In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful?

Criteria 2: RFA Process

Now I want to ask you a little about the application process itself.

3. Based on your experience, do you feel the application procedure, the criteria for evaluation and the timeframes are understandable and clearly communicated to communities and applicants?
    - [If not] Why not, and what could be improved?

    - Did you get outside help with the grant application…. If so, who was that assistance from? [AEA, the utility, a private developer, other] In your opinion, was that partner working in close contact with the community?

    - Was that help sufficient?... and if not, how could the process have been improved?

- Are there specific areas that you would identify as being the most difficult in completing an application? [Timing, technical documentation, economic, etc.]

4. Did any parts of the process strike you as particularly fair in leveling the playing field or particularly unfair?

Criteria 3 & 4: Applicant and Project Evaluation Process

Thank you. Let's turn to the evaluation criteria. To remind you, there seven criteria weighted according to the order that I'll read to you. There are an additional two criteria that AEA uses in making final recommendations. The weights range from 5-25% and I'm going to list them in order of highest to lowest:

cost of energy in community	*[*per resident in the effected project area relative to other areas]
commitment of matching funds	*[*type and amount of matching funds and other resources]
project feasibility, both economic and technical	*[Stage 2]*
project readiness	*[*to proceed with phases of the project proposed for the grant]
creation of public benefits	*[*including economic benefit to the Alaska Public, health, local jobs, pollution & noise reduction]
local support	
sustainability	*[*the ability of the applicant to finance, operate and maintain the project for the life of the project]
Additional criteria for final recommendations (non-weighted)	
statewide balance of grant funds	[For example, if there is two or more similar competing projects in a given area the Authority may only recommend one.]
compliance with previous grant awards	[in previous phases of project development]

5. In your opinion, is this the appropriate set of criteria? Are there other criteria that are missing?

6. Is this rank order appropriate? In your opinion, are there specific scoring metrics that in your opinion create the most difficulty for an applicant?

For applicants:

7. If you were given specific feedback on item #3 as part of an application – project feasibility, which includes both economic and technical elements. In your opinion, was the evaluation of the technical feasibility appropriate? [And if you submitted multiple applications, was this evaluation consistently applied across those several applications?]

8. What about the second part of the project feasibility – the economics portion? In the written feedback from AEA, you were provided a Benefit/Cost Ratio score. In your opinion, was that score an appropriate reflection of the economics of the project and calculated consistently across projects?

9. In your opinion, was the overall score that your project received appropriate?
    - Were there barriers that prevented the project from receiving a higher score?
    - In your opinion, was this a fair representation of the strengths and weaknesses of your project?

For those whose projects were not funded:

10. When you received word that your project was not given an award, how clearly were the reasons communicated?

11. Did the timing of when you received this feedback create any concerns for you?

12. Have you been given adequate support to improve your proposal for submission for future funding rounds?

For both successful and not successful participants:

13. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns? (Not sure a participant would have sufficient perspective to answer this.)

End interview for applicants that were not successful.

Let's talk about the Grant Award Process. [Don't mention the criteria #s, as this will confuse the interviewee with the seven "criteria" given to them to evaluate the project.]

Criteria 5: Grant Award Process [only for those participants who were successful]

14. In any industry grant awards seem to take longer than is ideal. In your experience, does the duration of the grant process from application to reimbursement create any notable concerns for applicants or awardees?

15. Did the timing of when you received funds create any concerns for you? (no upfront funds)

16. Based on your experience, is the level of reporting required appropriate? Do you feel AEA is following through on assessing project performance and collecting data from completed projects to inform future rounds and identify best practices?

Criteria 6: Grant Administration

17. In your experience, after a project award, does the AEA administer the grants in an effective and timely fashion?

18. How would you characterize your level of communication and your satisfaction with that communication with your AEA program manager? Room for improvement?

19. Have there been delays or major changes in direction to your scope or budget during the course of your project(s)? How did AEA work with you to address them?

20. In your experience, in what ways does AEA help coordinate the multiple funding sources from AEA's programs for communities?

Other

21. Do you have any other specific recommendations or comments on the RE Fund programs, its processes or administration by AEA that you'd like to share with me?

Legislator or RE Advocate Interview Guide

Prior to interview, interviewer will have general background of interviewee, RFA for Round V; general information regarding grant awards or declines; general characteristics of regions (as per Alaska Wiki and other background documents); general understanding of cost of energy in regions; and when appropriate, types of renewable resource strengths/potential opportunities in regions.

"Thank you for your willingness to speak with me (us) today. [Quick personal introduction]

As you might already know from announcements from the Alaska Energy Authority, VEIC and the Alaska Center for Energy and Power were selected to perform an independent evaluation of the Renewable Energy Fund grant recommendation program. The purpose of this evaluation is to identify ways to increase the effectiveness and efficiency of the processes used in the program and their impact in Alaskan communities. Our intent is to allow as many stakeholders as is feasible to have input into this evaluation.

As part of the process evaluation we are performing one-on-one interviews such as this one, as well as asking you and a wider group to complete an on-line survey which you will receive next week. Your comments will be kept confidential, and will be an invaluable contribution to our work. Thank you again for taking the time to talk with me (us) today.

We have a group of six topics which we'd like to cover today, but we'll make sure to leave some time at the end for you to address issues that are important to you and that we haven't touched on. If at any point, you would like further clarification or feel you do not have an informed position on a particular question, please let me know and we can proceed accordingly.

Do you have any questions for me before we begin?

The first topic is program outreach:

Criteria 1: Program Outreach

1. How do you feel about efforts by the state to promote the installation of RE technologies, by providing financial incentives and technical support through AEA?
2. Regarding the RE fund program, in your opinion, what current AEA approaches have been the most successful in promoting the RE Fund in Alaska?
    - Do you think AEA's efforts in building awareness of its programs are sufficient? ....If not, how could they be improved?

3. In your opinion, do you feel that the AEA has developed an effective process to identify and support the development of renewable energy projects in Alaska?

- Are there RE opportunities in communities being missed?
- [If yes] What is your opinion of the reasons for these not being pursued?

- How effective do you believe AEA is in supporting smaller communities in pre-proposal activities, such as identifying viable projects, and local and regional energy planning activities?

- How effective do you think AEA has been in reaching out to communities with high COE and providing technical guidance on most likely successful projects?

- In your opinion, what type of additional support for potential applicants to the RE Fund would be most helpful?

Criteria 2: RFA Process

Now I want to ask you a little about the application process itself.

4. Based on your experience, do you feel the application procedure, the criteria for evaluation and the timeframes are understandable and clearly communicated to communities and applicants?
    - [If not] Why not, and what could be improved?

    - Do communities or applicants generally require outside help with the RE Fund application? …. If so, who was that assistance from? [AEA, the utility, a private developer, other] In your opinion, was that partner working in close contact with the community?

    - Was that help sufficient?... and if not, how could the process have been improved?

    - In you experience, what is the importance of non-energy benefits on the overall success of a project? (e.g. Health, local jobs, improved power service, etc.)

    - Are there specific areas where applicants have the most difficulty in completing an application? [Timing, technical documentation, economic, etc.]

5. Do any parts of the process strike you as particularly fair in leveling the playing field or particularly unfair?

Criteria 3 & 4: Applicant and Project Evaluation Process

Thank you. Let's turn to the evaluation criteria. To remind you, there seven criteria weighted according to the order that I'll read to you. There are an additional two criteria that AEA uses in making final recommendations. The weights range from 5-25% and I'm going to list them in order of highest to lowest:

cost of energy in community	*[*per resident in the effected project area relative to other areas]
commitment of matching funds	*[*type and amount of matching funds and other resources]
project feasibility, both economic and technical	*[Stage 2]*
project readiness	*[*to proceed with phases of the project proposed for the grant]
creation of public benefits	*[*including economic benefit to the Alaska Public, health, local jobs, pollution & noise reduction]
local support	
sustainability	*[*the ability of the applicant to finance, operate and maintain the project for the life of the project]
Additional criteria for final recommendations (non-weighted)	
statewide balance of grant funds	[For example, if there is two or more similar competing projects in a given area the Authority may only recommend one.]
compliance with previous grant awards	[in previous phases of project development]

6. In your opinion, is this an appropriate set of criteria? Are there other criteria that are missing? [Non-energy benefits, heating, etc.]

7. Is this rank order appropriate? In your opinion, are there specific scoring metrics that create the most difficulty for potential applicants?

8. In your experience, do you feel AEA and the RE Fund Advisory Committee have been responsive to stakeholder input and made appropriate adjustments to the program in response to issues or concerns?

    a. In your experience, is the RE Fund Advisory Committee used effectively to provide oversight and guidance to the program?

b. Do you feel that the AEA and the REFAC provides an appropriate level of reporting back to the legislature and other stakeholders

9. Do you feel there are specific areas that should be targeted for improvement, or have not functioned as originally intended by the enabling legislation?

Let's talk about the Grant Award Process. [Don't mention the criteria #s, as this will confuse the interviewee with the seven "criteria" given to them to evaluate the project.]

Criteria 5: Grant Award Process [only for those participants who were successful]

10. In any industry grant awards seem to take longer than is ideal. In your experience, does the duration of the grant process from application to reimbursement create any notable concerns for applicants or awardees?

11. Are you aware as to whether the timing of when awardees receive funds create any concerns for awardees? (no upfront funds, construction season, etc.)

12. Based on your experience, is the level of reporting required appropriate? Do you feel AEA is following through on assessing project performance and collecting data from completed projects to inform future rounds and identify best practices?

Criteria 6: Grant Administration

13. In your experience, after a project award, does the AEA administer the grants in an effective and timely fashion?

14. How would you characterize AEA's level of communication with individual project awardees after awards? Are there areas for improvement?

15. In your experience, in what ways does AEA help coordinate the multiple funding sources from AEA's programs for project applicants?

General

16. Do you have any other specific recommendations or comments on the RE Fund programs, its processes or administration by AEA that you'd like to share with me?

Appendix D: Bibliography

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Alaska Energy Authority
Renewable Energy Grant Recommendation Program

Impact Evaluation Report

Volume 2

Prepared by:
Vermont Energy Investment Corporation

In Collaboration With:
Alaska Center for Energy and Power

January 22nd, 2013

Acknowledgements

The Impact Evaluation of the Alaska Renewable Energy Grant Recommendation Program was conducted by **Vermont Energy Investment Corporation (VEIC)** serving as Prime Contractor. VEIC team members participating in the evaluation included: David Hill serving as Project Team Leader; Chris Badger serving as Project Manager; Leslie Badger conducting impact and benefit cost analysis; and Nikki Clace and Molly Taylor providing project administration, editing, and production support.

Alaska Center for Energy and Power (ACEP) served as subcontractor with Gwen Holdmann leading the ACEP team and providing direct experience with the Alaska renewable energy industry; Julie Estey coordinating engagement with Alaska stakeholders; and Dennis Witmer providing technical assessment, analysis and evaluation of the program database.

The VEIC team and the Alaska Energy Authority appreciate the significant time and thoughtfulness of the AEA project managers, AEA management, ISER staff and individual stakeholders contributed through participation in individual telephone and in person interviews.

This report was written on behalf of the Alaska Energy Authority, but the views expressed in this report are those of the study authors, consistent with the commissioning of this work as an independent study.

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Executive Summary

The Vermont Energy Investment Corporation (VEIC) in partnership with the Alaska Center for Energy and Power (ACEP) was retained in mid-December 2011 by the Alaska Energy Authority (AEA) to conduct an independent program review of the Renewable Energy Grant Recommendation Program (REGRP). This report presents Phase II of the review – an impact evaluation of the REGRP.

The impact evaluation summarizes energy savings, avoided emissions and costs and benefits from REGRP supported projects – highlighting the full range of project types, renewable energy resources and communities that have participated in the program. Our research included:

- A thorough review of program documentation, program databases, authorizing legislation, supporting regulations, program reports, and related literature;
- Telephone and in person interviews with individual REGRP Program Managers, AEA management, program stakeholders and, Institute for Social and Economic Research (ISER) staff;
- Analysis of AEA/ISER program tracking data, and
- Reporting on four core areas of program impacts:
    - Overview and analysis of REGRP program participation and demographics
    - Portfolio Level Cost Benefit Analysis
    - Renewable Energy Resource Sector Sub-analysis
        - Project level Benefit/Cost Results
        - Sector based lessons learned
    - Renewable Energy Market Development in Alaska

Overall, the impact evaluation findings indicate the REGRP is cost effective, and the current portfolio of projects that have reached the construction phase are projected to provide more than $500 million of net present value benefits during their lifetimes. In addition, the REGRP is beginning to provide a resource base of knowledge on the challenges and opportunities for renewable energy development in Alaska that can help inform and improve future projects.

Participation

The Alaska Renewable Energy Grant Recommendation Program (REGRP) was established in 2008 to support the development of renewable energy projects and to reduce the impact of the high cost of energy for rural communities.

Alaska boasts an abundance of fossil and renewable resources that rival many countries, but Alaskan consumers pay among the highest rates for heating and electricity in the country—50% higher than the U.S. average[1]. According to the Energy Information Administration, in 2012, Alaska ranked second in 2012 for high residential electricity costs with an average price of 17.91 cents/kWh as compared to the national average of 11.52 cents/kWh. However many of Alaska's rural villages mirror 1st ranked Hawaii's $37.05 cents/kWh.

The REGRP has now completed five rounds of funding as summarized in Table ES-1.

Table ES.1 REGRP Participation and Funding by Round[2]

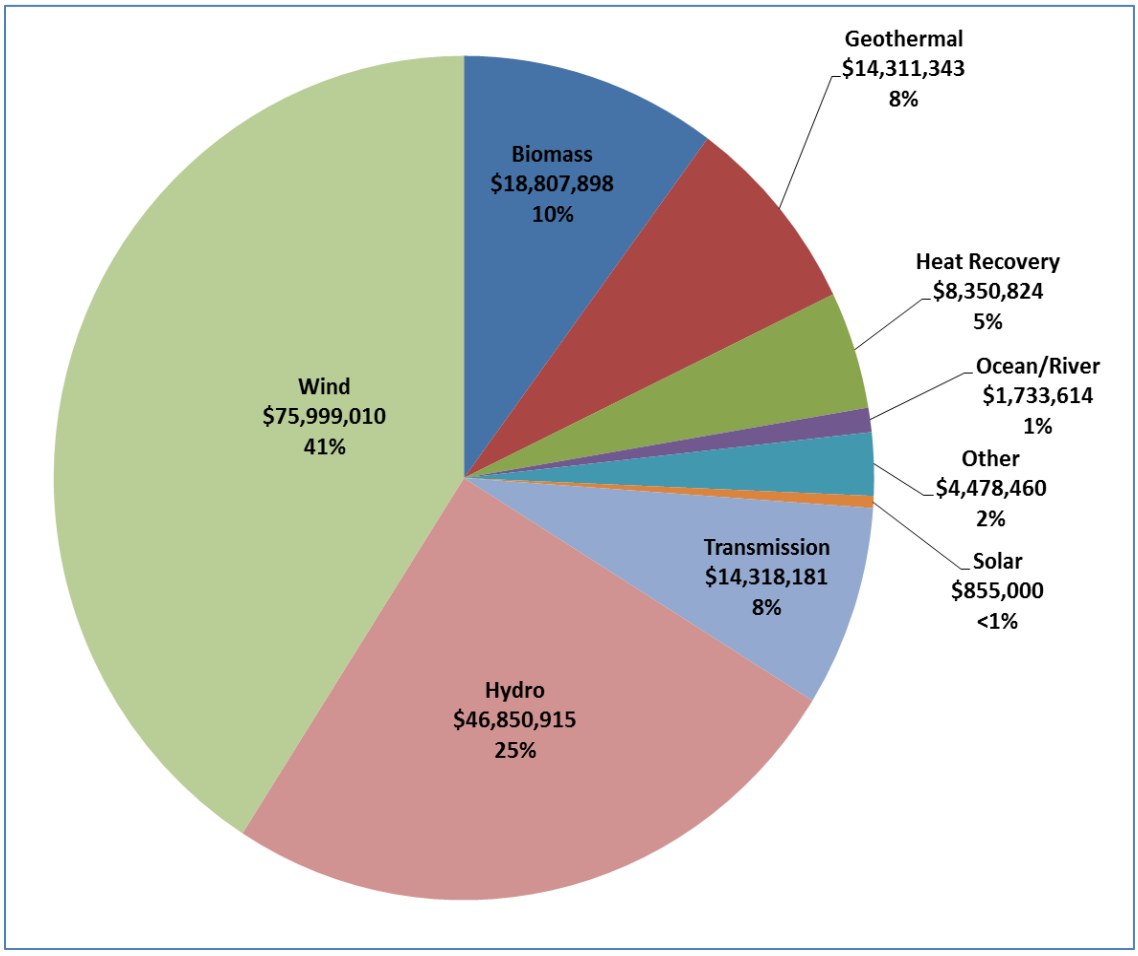
Round	I - IV	V	Total
Applications Received	461	97	558
Projects Funded	208	19	227
Grants in Place	180	5	185
Grants Completed	38	0	38
Grants Cancelled	14	0	14
Amount Requested ($M)	$1,094	$133	$1,227
AEA Recommended ($M)	$239	$43	$282
Appropriated ($M)	$177	$26	$202
Cash Disbursed ($M)	$100	$8	$108

The solicitation for the fifth round of program funding was issued in the summer of 2011 and recommendations for $43 million of REGRP projects at two funding levels were presented to the legislature in January, 2012. The governor approved $26 million of appropriations for the REGRP projects in the State's FY 2013 capital budget in May, 2012.[3]

[1] EIA SEDS Database
[2] AEA Renewable Energy Fund Update, October 2012.
[3] The Impact Evaluation was completed prior to Alaska Governor Sean Parnell signing House Bill 250 in May of 2012 reauthorizing the Renewable Energy Grant Recommendation Program for 10 years until 2023.

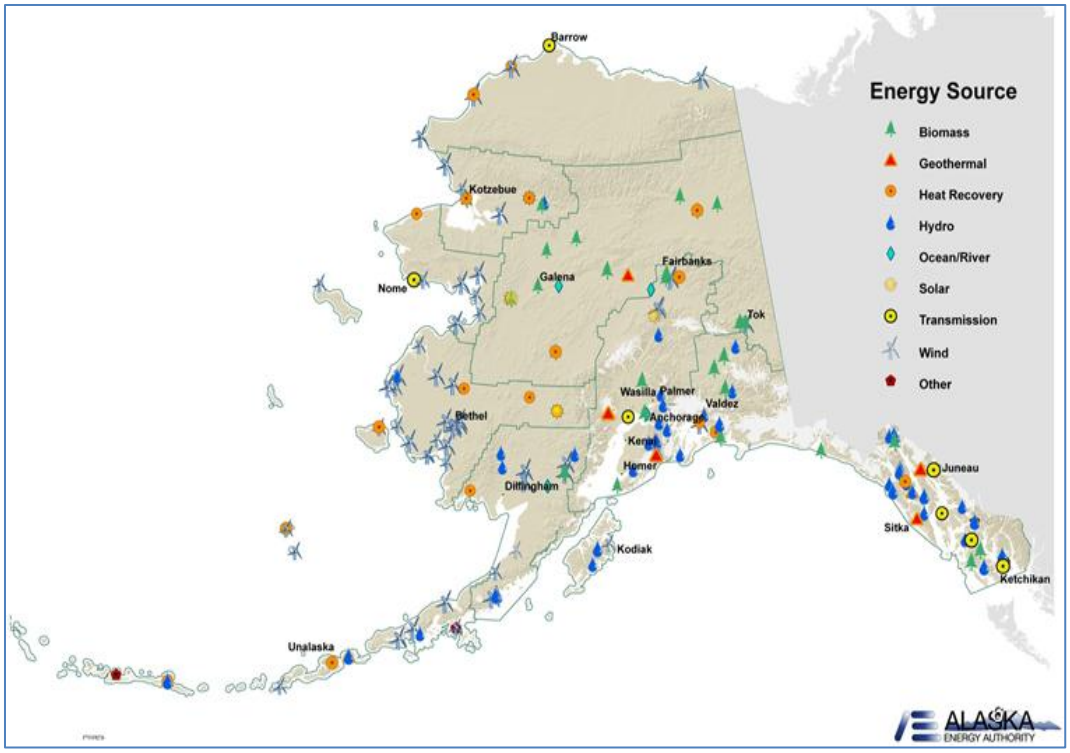
All of the primary renewable energy resources have been represented in the application pool during the 5 rounds of funding. Through the first four rounds approximately 80% of the appropriated funds have been for hydro, wind and biomass projects (Figures ES-1 and 2).

Figure ES.1 Appropriated Funds by Resource (Rounds I-IV)



The funding of REGRP projects during the first four rounds generally reflects the maturity of renewable energy technology sectors coupled with the existing knowledge base for developing cost-effective projects in communities across the state with available renewable resources. More recently additional focus has been given to biomass, geothermal, heat recovery and emerging technologies, with a higher percentage of support for early development (through feasibility studies and design).

Figure ES.2 Geographic Distribution and Type of Projects



The concentration of wind projects in the west and southwest, hydro projects in the south and southeast, and biomass projects in the interior tend to reflect the availability of the renewable resource available in defined regions of the state.

Economic Impacts

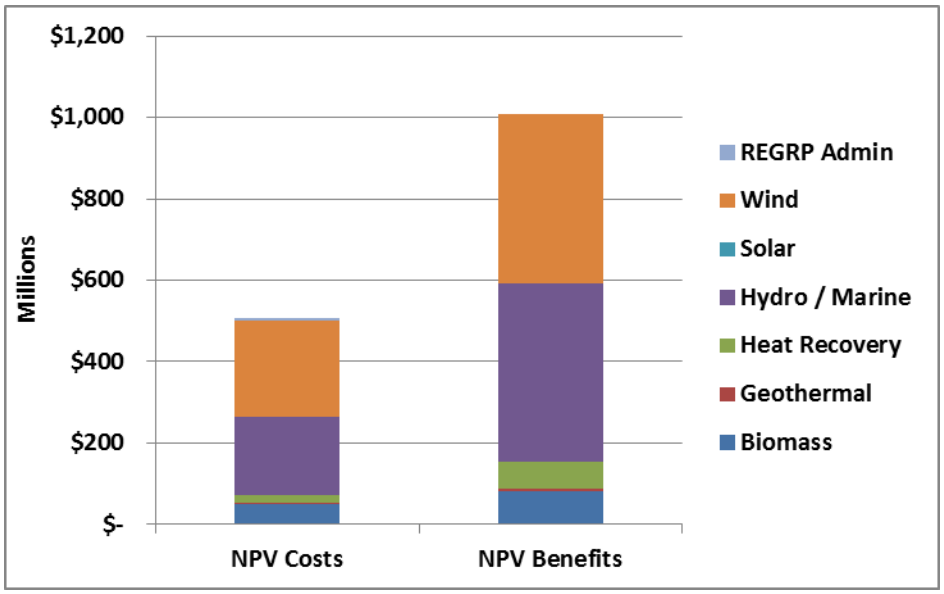
One of the fundamental concerns of policy makers, program administrators, and participants is whether the investment of state funds in the development of renewable energy through the REGRP is providing a net economic benefit. There are a variety of regulatory and economic tests and approaches to assessing the benefits and costs of renewable energy investments – and comparing these to alternative existing or conventional non-renewable supply options.

After review and discussion of various approaches with AEA, we concluded the ***Total Resource Cost (TRC)*** and ***Participant Cost Tests (PCT)*** were most appropriate in addressing the priority questions related to this impact study. The TRC cost test results for the construction portfolio are included in the Executive Summary. The benefit cost analysis methodology is discussed in Section 3 and additional results are presented in Section 4 of this report.

In our analysis we use the term "construction portfolio" to refer to a group of 62 projects. Of these 43 projects were under construction or had construction grants in place during 2011 and 19 are complete and have 2011 operating data.[4] All together, these projects serve 77 unique rural and Railbelt communities (note, some projects serve multiple communities). The program has established grants of $112 million to support these projects, and leveraged $246 million in non-REGRP funds from the state and other sources.

The benefit cost results for the construction portfolio include 2011 operating data from 19 of the 62 projects. The results for the other 43 projects are based on expected operational savings and costs. In some cases early project operations have not met expectations – due to a variety of factors highlighted in the subsector analysis section. However, even when lower than expected project level performance is factored into the cost benefit analysis, the overall portfolio remains cost effective – with total net benefits of more than $500 million (Figure ES 3).

Figure ES.3 2011 Construction Portfolio Benefits and Costs with Operational Data



As indicated in Table ES-2, with the exception of solar, all of the resources are expected to have net positive benefits. Over the course of their operating lifetimes, these projects are expected to return more than $501 million in net benefits to Alaska's economy, returning almost $2 of value for every dollar invested.

[4] Two projects, Kongiganak High Penetration Wind-Diesel Smart Grid project and Wrangell Hydro Based Electric Boilers Construction project, were not included in this count based on absence of descriptive performance data in the 2012 Alaska Renewable Energy Fund Status Report Appendix.

Table ES.2 Construction Portfolio Benefits and Costs With Operational Results

RE Resource Sector	Total Project Cost	Total Non-State Leveraged Funds	Electricity Act/Proj	Diesel Act/Proj	Annual Electricity	Annual Diesel Displaced	Annual Natural Gas	NPV Costs	NPV Benefits	Net Benefits	NPV Benefit to Cost Ratio
	($ Millions)	($ Millions)	%	%	(MWh)	(gal x 1000)	(Mmbtu x 1000)	($ Millions)	($ Millions)	($ Millions)	
Biomass	$27	$10		34%	27,282	606	319	$49	$82	$33	1.68
Geothermal	$1.5	$0.6		34%		92		$4.6	$6.6	$2.1	1.46
Heat Recovery	$15	$7.8	30%	54%	3,318	613		$20	$65	$45	3.23
Hydro / Hydrokinetic	$133	$85	67%	78%	33,550	2,525	24	$192	$438	$246	2.28
Solar	$0.3	$0.01	0%	38%	42	3.2		$0.3	$0.3	($0)	0.99
Wind	$182	$121	73%	60%	87,556	5,999		$234	$417	$183	1.78
REGRP Admin								$7.4			
REGRP Construction Portfolio (Actual)	$358	$223			151,747	9,838	343	$508	$1,009	$501	1.99

Overall, our research confirms that the successful development of renewable energy projects in Alaska is difficult, and is often more costly than elsewhere, but that there are abundant opportunities to benefit the state economy and local communities due to the high and volatile costs of providing diesel fuel and other non-renewable energy resources.

The benefits and costs results presented above account for the direct energy and operational costs and savings. In addition, we have estimated the job related impacts, the impact to the state and residents for communities participating the Power Cost Equalization (PCE) Program, and the monetized value of environmental benefits (Tables ES-3 and ES-4).

Table ES.3 Jobs and Avoided Carbon Emission Impacts

RE Resource Sector	Jobs		Avoided Carbon Emissions	
	Person-Years	# of Jobs	Tonnes/Year	Project Lifetime Savings ($ Millions)
Biomass	180	9	23,083	$2.4
Geothermal	18	0.9	930	$0.1
Heat Recovery	71	3.6	6,225	$0.7
Hydro / Marine	445	9	25,117	$6.8
Solar	0.3	0.0	33	$0.0
Wind	294	15	60,139	$6.4
Totals for REGRP in Construction Portfolio	1009	37	115,527	$16.4

The development of renewable energy projects in communities participating in the PCE program creates direct savings for residential customers and eligible public buildings that participate in the PCE program, a reduction in the expenditures by the state to off-set fossil fuel costs for these customers, and also savings for those customers who are not eligible for the PCE program (primarily private, non-residential buildings) who benefit directly from the lower levels of fossil fuel consumption.[5]

Table ES.4 Power Cost Equalization Impacts

	Annual Residential Customer Savings		Annual Non-Residential Building Savings		Annual State PCE Program Savings		Total Annual Project Savings	Total Annual Project Savings
	MWh(s)	$ Millions	MWh(s)	$ Millions	MWh(s)	$ Millions	MWh(s)	$ Millions
2011 Operational REGRP Projects (Actual)	421	$0.1	15,993	$8.2	6,233	$2.8	22,647	$11.2
2011 Operational and Projects in Construction (Projected)	354	$0.3	35,739	$12.6	16,812	$5.1	52,905	$18

The job, environmental and PCE benefits further enhance the program's overall value to the state economy and communities participation in the REGRP. Section IV of this report provides more detail on these analyses.

Lessons Learned

The development of each renewable energy resource sector in Alaska faces unique challenges and opportunities. Section 5 of this report presents greater details – with benefit cost ratios at the project level – for each resource sector. The studies and projects funded to date through the REGRP, and the ongoing collection and monitoring of project data – will provide a valuable resource to assist and inform future policy, project investments and development.

[5] An analysis of the impacts of REGRP projects on public buildings was not performed based on the limited visibility of the energy usage of this customer class in the 2010 Alaska Power Statistics Tables. Including the benefits for public buildings in this analysis would be reflected largely as an increase in the Annual State PCE Program Savings and a proportional decrease in the Annual Non-Residential Building Savings.

Table ES.5 Renewable Resources

Renewable Resource	Lessons Learned and Sector Analysis
Wind	Pages 54 – 60
Hydro Power and Hydrokinetic Energy	Pages 61 – 67
Biomass and Landfill Gas	Pages 68 – 73
Geothermal	Pages 74 – 78
Heat Recovery	Pages 79 – 83

Alaska's Renewable Energy Market Development

Finally, the last section of this report discusses the REGRP in the broader context of renewable energy market development conditions and trends in Alaska. The REGRP has been a critical catalyst for activity across resources and stages of project development. Section 6 provides insights into the job and market growth that the REGRP and other policy and market actors have helped to foster. As the market continues to grow the human resource and knowledge base that helps Alaska to successfully develop renewable energy projects and resources will become an increasingly valuable asset and driver of economic development.

Conclusions

The REGRP has played an important role in supporting the development of renewable energy systems in Alaska, serving both remote and Railbelt communities with significant financial assistance. There is great potential for continued REGRP support to help reduce energy costs in rural Alaska and to help the state tap more of its substantial renewable energy resources. Looking forward, the REGRP has already created a solid foundation for accelerating the development of renewable energy markets and infrastructure in Alaska – and created a robust pipeline for near term project development.

This evaluation has two primary areas of focus: 1) To characterize the economic benefits as estimated by the applicants for projects in the REGRP construction portfolio in 2011 and compare against the actual performance reported in 2011 and 2) Assess the REGRP's progress in meeting the stated priorities of the legislature in supporting cost-effective projects on an equitable geographic basis and prioritizing projects in the communities experiencing the highest energy costs.

In conclusion, despite the high costs and challenges associated with developing renewable energy across the state, the REGRP is found to be cost-effective at both the program and individual renewable resource sector level providing a significant net benefit to the state. Underperformance, or alternatively, overestimation of the energy savings in the application process, is relatively broad based and although this can be attributed in part to the early startup performance of many projects in 2010 and 2011, is a

recommended area of continued focus by AEA. Improving the tracking of total system costs and performance will contribute to future evaluation efforts, as well as assisting in ongoing communications by program staff with industry stakeholders in establishing best practices for project development.

The benefits of the renewable energy development in the state were characterized as having primary economic benefits – avoided fuel, operation and maintenance costs, as well as reducing expenditures through the Power Cost Equalization program – and secondary benefits including avoided carbon emissions and increased employment in the state. As the secondary benefits have direct implications to the state in creating jobs, as well as improving air quality in Alaskan communities, creating discrete metrics for capturing these benefits going forward will increase the value of the REGRP to the state and the cost-effectiveness of individual projects.

The wide array of renewable resources, applicant types and geographic regions supported by the REGRP represents an ongoing challenge to AEA in appropriately balancing equitable distribution of funds and prioritizing projects in the communities experiencing the highest energy costs. However, in this area as well, the REGRP is found to be successful with two-thirds of funding being appropriated to communities with higher costs of energy and a generally consistent funding success rate across different regions in the state.

The AEA is well positioned to continue providing support through the REGRP and to serve as an increasing knowledge base for lessons learned that will help improve future project development and operations.

1. Introduction

Alaska is home to an abundance of renewable and non-renewable resources, but harsh climate, limited infrastructure, a distributed population, and a short construction season are common barriers to resource development. The costs and performance of renewable energy systems are often impacted by local factors, with rural communities disproportionately effected. However, even in the more populated regions of the state, the delivery to market of renewable services will often differ from those suited to urban, grid connected environments typical of most areas of the U.S.

Context and Background

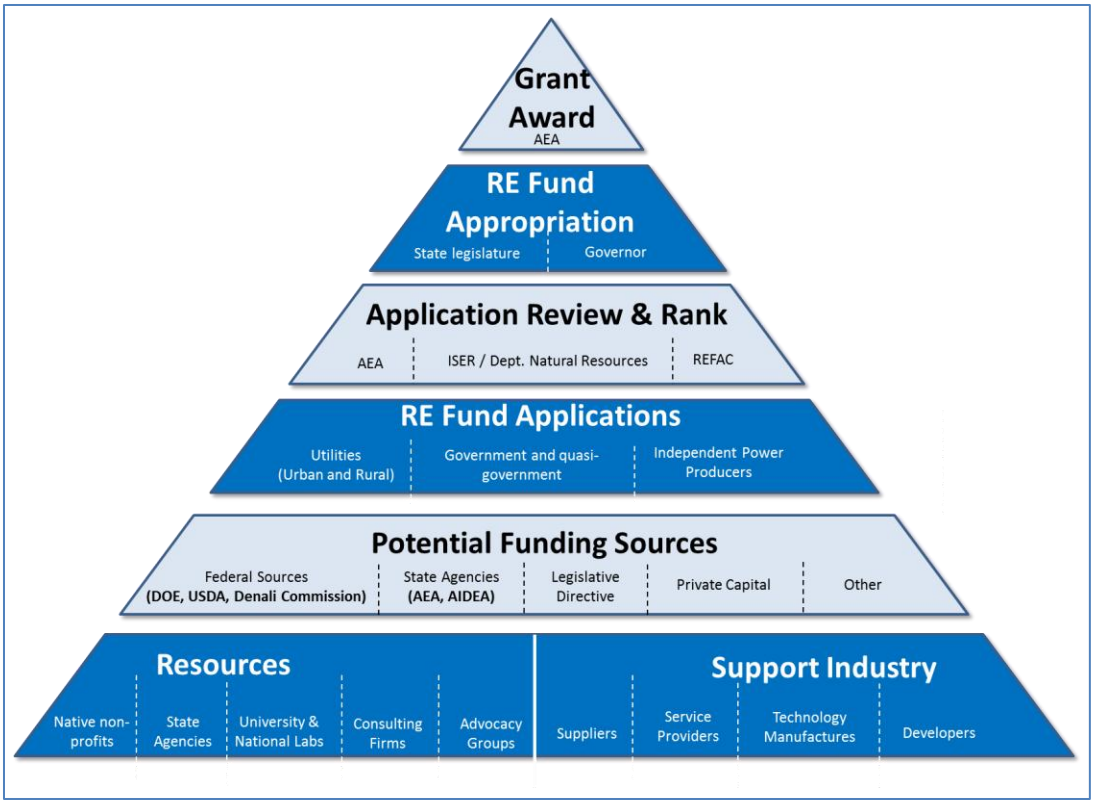
Since 2008, the Alaska Renewable Energy Grant Recommendation Program (REGRP) has provided support to utilities, independent power producers, and local governments, including tribal councils and housing authorities for the development of renewable energy projects. Administered by the Alaska Energy Authority (AEA), to date the program has issued five solicitations, reviewed 558 grant applications, and received appropriations totaling $177 million for 208 projects in the first four rounds, and reimbursed grant recipients for $82 million in project costs.[6] The solicitation for the fifth round of program funding was issued in the summer of 2011 and recommendations for $43 million of REGRP projects at two funding levels were presented to the legislature in January, 2012. The governor approved $26 million of appropriations for the REGRP projects in the State's FY 2013 capital budget in May, 2012.

Alaska boasts an abundance of fossil and renewable resources that rival many countries, but Alaskan consumers pay among the highest rates for heating and electricity in the country—50% higher than the U.S. average[7]. According to the Energy Information Administration, in 2012, Alaska ranked second in 2012 for high residential electricity costs with an average price of 17.91 cents/kWh as compared to the national average of 11.52 cents/kWh. However, 159 rural villages or 85% of Alaska's communities surpass 1st ranked Hawaii's $37.05 cents/kWh, highlighting the wide disparity of rates across the state.[8]

Figure 1 illustrates the types of stakeholders and infrastructure that participate in and support the REGRP. The applicants in the REGRP, as well as AEA staff, are the two stakeholder groups with the most experience at all levels of the program, but clearly with very different and important perspectives on its internal processes.

[6] REGRP results presented by AEA at the Business of Clean Energy in Alaska Conference, April 2012.
[7] Energy Information Administration, State Energy Data System (SEDS) Database
[8] 2010 Alaska Power Statistics Tables

Figure 1.1 Alaska Renewable Energy Stakeholders and Program Infrastructure



As illustrated, the REGRP depends on a broad foundation of human resources and industries to identify candidate projects and the potential funding sources. Funding sources include the grants offered by AEA through the REGRP as well as other sources of public and private capital.

RE Fund applications are generated by utilities, community, tribal and government organizations, and from independent power producers or developers working with communities. The REGRP differs from many other renewable energy incentive programs in that it does not directly support or receive applications for individual customer-sited projects.

Report Objectives

The objective of this report is to document the outcomes of the REGRP in terms of quantifiable as well as qualitative metrics. These include energy production, project benefits and costs (including offset fuel use), environmental impacts, operations and maintenance issues and costs, job impacts, performance issues and other more difficult to measure impacts such as increased awareness of and education about renewable energy, and ancillary economic benefits to communities.

As a compliment to the REGRP Process Evaluations completed in March, 2012, the Impact Evaluation is intended to be useful in helping program managers, planners, and

policy makers assess how well the program is functioning, and how effective and efficient it is in meeting its stated objectives.

In general, process and impact evaluations help to foster and support a culture of ongoing program improvement. As programs and initiatives mature and market conditions shift there are always lessons that can be learned from measuring the program's success and applying these insights to future program planning.

Study Schedule and Team

AEA retained the Vermont Energy Investment Corporation (VEIC) in late 2011 to conduct an independent program review for the REGRP with assistance from the Alaska Center for Energy and Power (ACEP). This work is divided into a process evaluation, and an impact evaluation. The process evaluation was started in mid-December of 2011 and was presented to AEA on March 23rd, 2012. The impact evaluation of the program was started in March 2012, with a presentation of preliminary results to the Renewable Energy Advisory Committee (REFAC) in June, and delivery of this report in August.

VEIC has a staff of 200 energy efficiency, conservation, demand response, smart grid, and renewable energy professionals, and operates on an annual budget of approximately $60 million. VEIC maintains an active Consulting Division staffed by 25 program design, planning, review, analysis, and implementation experts. Our Consulting Division serves a wide variety of public and private sector clients in 35 states, 6 Canadian provinces, and 5 European and Asian countries. Over the last 20 years, VEIC has been hired to design programs from the ground up, to critique existing programs, and to recommend improvements to literally hundreds of electric and gas efficiency programs. VEIC staff have developed and critiqued regulatory filings, and filed and defended expert witness testimony in more than 10 states on behalf of consumer advocates, regulators, utilities, and environmental groups.

VEIC also has extensive direct experience with the implementation of efficiency and renewable energy programs - through our successful operation of Efficiency Vermont (the first statewide energy efficiency utility in the nation operated by VEIC by since 2000), and through the more recently launched Efficiency Smart Power Plant portfolio of programs (on behalf AMP-Ohio and a collaboration of more than 40 of their member municipal utilities), and as the implementation contractor for the Washington, D.C. Sustainable Energy Utility (DCSEU).

VEIC has worked with regulators and utilities on renewable energy programs to define eligibility requirements, solicitation mechanics, standard contract terms and conditions, and project evaluation criteria. VEIC has written and reviewed grid supply competitive solicitations and evaluated responses using detailed and quantitative scoring criteria. We have recommended procurement design and implementation changes, in response to changing regulatory and market conditions, and are considered to be among the most experienced nationally in Renewable Energy Credit and Solar Renewable Energy Credit (SREC) market design. Currently, VEIC implements renewable energy programs in New Jersey, Vermont, and the District of Columbia.

The Alaska Center for Energy and Power (ACEP) is an applied energy research program at the University of Alaska Fairbanks, located within the Institute of Northern Engineering and the College of Engineering and Mines. ACEP was formed in January, 2008 with the goal of meeting state and local needs for applied energy research by working toward developing, refining, demonstrating, and ultimately helping commercialize marketable technologies. ACEP has developed key partnerships with over 75 private companies, utilities, and native organizations throughout Alaska, as well as national laboratories and research centers world-wide. In addition, ACEP leverages resources from throughout the University of Alaska system through its model of building integrated, interdisciplinary teams to meet the research needs of our clients. ACEP currently manages over $15M in competitive research grants and contracts and has 20 active research projects.

VEIC and ACEP Team Roles

The Impact Evaluation was led by VEIC with significant technical, stakeholder outreach and advisory support from ACEP.

The VEIC team, led by David Hill and Chris Badger, was responsible for the overall direction, management and final results of the Process and Impact Evaluations. Leslie Badger contributed to the impact evaluation cost effectiveness analysis.

The ACEP team, led by Gwen Holdmann and Julie Estey, provided the necessary context for understanding the breadth of the Alaska renewable energy industry and have contributed significant portions to the Market Development section of the impact evaluation. The ACEP team was complemented by Dennis Witmer, who was responsible for managing and reviewing the REGRP data and conducting analysis for impact evaluation.

Organization of the Report

This report is organized into seven sections, including this Introduction. In the next section, we describe our methodology. This includes both the development of a structured set of evaluation criteria and results-oriented questions used to guide our analysis, an analytical framework for processing program data, and input from AEA program managers and industry stakeholders involved in the REGRP.

The third section, titled the 'Program Participation and Demographics', reviews the success of the program in supporting a broad spectrum of renewable energy resources and applicants, as well as meeting the stated priorities of the legislature in supporting projects on an equitable geographic basis and prioritizing projects in the communities experiencing the highest energy costs.

The fourth section, titled 'Benefit/Cost Analysis Results', evaluates quantitative performance of the REGRP as it relates to providing a net benefit to the state, as well as

in its ability to leverage non-state (match) funding for renewable energy projects. Secondary benefits including PCE program impacts, jobs, and environmental benefits are also reviewed, with an emphasis on the performance of operational projects in 2011.

The fifth section, titled the 'Renewable Energy Resource Subsector Analysis', will review individual renewable resources in the state and identify lessons learned from projects included in the 2011 construction portfolio. Documentation of both the actual performance and sector barriers can help identify areas for improvement for future projects, as well as guide focused improvements in both program and policy design.

The sixth section of this report includes a high level overview of the renewable energy market in the State of Alaska, documenting the progress and ongoing efforts to spur growth in the renewable energy sector. Although many of the market activities cannot be solely attributed to the REGRP, documentation of the program contributions and evolution of the market is key to mapping the progress of renewable energy in the state. Finally, section seven presents our conclusions.

2. Study Methodology

This impact evaluation is the second of two phases in the VEIC team's evaluation of the REGRP. Phase I consisted of the Process Evaluation, which was conducted during the first quarter of 2012. As directed by AEA, our team used the research and results from the Process Evaluation to inform and prioritize the tasks and approach for the Impact Evaluation, which is the subject of this report. For this reason, much of the background research and interviews conducted for the Process Evaluation were used to inform this report.

Our study methodology for both the Impact and Process portions of the evaluation has been designed to meet the twin objectives of conducting a rapid yet thorough assessment of the REGRP program.

The process evaluation included an extensive number of interviews, in person meetings, and on-line surveys with current and potential (future) program stakeholders. The impact evaluation has involved more analysis of program databases, and a limited number of telephone interviews and meetings with AEA program staff. Activities undertaken during the impact evaluation have included:

- Phone conferences with AEA to review process evaluation results and use these to refine and identify priority areas of inquiry for the impact evaluation;
- Review of program reports, databases, and analyses;
- In-person and telephone interviews with select AEA program managers and staff;
- A limited number of clarifying interviews with program participants and stakeholders.
- The development of a spreadsheet-based benefit cost analysis;
- Analysis of the impacts for both construction and operational projects within the REGRP portfolio using both projected and (for operational projects) available data on actual performance;
- Secondary research and interviews to provide information on renewable energy market development in Alaska and to place the REGRP in a broader context of statewide activity;
- Drafting and reviewing preliminary impact evaluation results with the Renewable Energy Advisory Committee; and
- Preparation of the written Impact Evaluation Report (this document).

The remainder of this section provides detail on critical elements of the impact study methodology.

Evaluation Priorities & Research Questions

When conducting any evaluation, it is critical to define both clear objectives as well as a defined set of related research questions. For each area of inquiry, the VEIC team worked with AEA staff to refine the impact evaluation priorities, the available data, the approach

to answering key questions, and reviewing the analysis that has already been conducted. As a result of this process, the team identified the following key questions:

- What are the societal- and participant- perspective benefits and costs of the REGRP?
- Who has participated?
    - What has been the technology and geographic mix?
    - What has been the mix between funded projects in rural and urban communities?
    - To what degree have high cost of energy communities been served?
- What are the projected and actual energy savings, and how well have these matched? How much impact has any discrepancy had on overall program cost-effectiveness?
- How much total external (match) funding has the state's investment in the REGRP leveraged?
- What are the impacts of the REGRP on the Power Cost Equalization (PCE) program?
- What are the environmental and job related impacts of the REGRP?
- How many projects have moved successfully from assessment to construction (is a good pipeline being built?)
- Have there been resource assessment projects that have helped identify and avert the construction of non-cost effective projects?
- What are the lessons learned in each renewable resource category as they relate to the barriers and opportunities for project development – giving special attention the unique obstacles and market conditions faced in much of the state?

Using these questions as a guide, our team focused on review of datasets, existing analyses, select interviews, and the building of a benefit cost analysis spreadsheet with the goal of providing useful insights on program and project performance to date for both program managers as well as current and future participants.

Data Sets and Previous Analyses

Our team worked closely with AEA to identify existing data sets and prior analyses, including the important and valuable work that has been conducted by the Institute of Social and Economic Research (ISER) to support program data tracking, reporting and analysis. The databases and analyses we reviewed include the following. Unless otherwise noted, those appearing in bold represent the primary data sources for the benefit cost analyses presented in this report.

Resources:

- **2012 RE Fund Status Report & Appendix**
- ***Alaska Renewable Energy Fund Grant Program: How it Works and Lessons We've Learned***
- **2009 & 2011 Alaska Renewable Energy Atlas**
- **2010 Alaska Energy Pathway**

- AEA REGRP Database queries
- EIA Energy Data for Alaska

The REGRP encompasses a wide array of types of projects (upgrade, new, expansion, transmission) with multiple funding sources and applicant types. This diversity makes the consistency of the reporting on total project costs (feasibility, transmission, etc), savings and operational performance critical for the accuracy of reporting performance of the program. In this evaluation, efforts were made to balance the need for confirming the reported costs and savings against secondary sources, while managing the scope of the evaluation. Continued efforts on improving the tracking of costs and performance data will provide greater accuracy in reporting, as well as insights in to improving the cost-effectiveness of the projects and the program.

Interviews

Although analyzing objective performance metrics is an important aspect of conducting a comprehensive impact evaluation, engaging primary stakeholders, including program managers, project developers and other key parties, provides a better framework for understanding the REGRP and the broader context of renewable energy development in Alaska. For the REGRP impact evaluation, interviews were conducted with:

- Individual interviews with AEA Program Managers to review relevant project performance, solicit insights related to corresponding market challenges and opportunities, and to catalogue ongoing program efforts to improve the performance of existing and future projects within their respective technology areas.
- Additional interviews with other AEA staff centered on obtaining program documentation, including both data for REGRP applications through the first five rounds and cost and performance data for projects in AEA's construction portfolio outside the REGRP. Since the initiation of the Process and Impact evaluation, there have been continued efforts by AEA to enhance consistency of data management within and between programs, focused on more streamlined and compatible processes to enhance tracking at both the individual and overall program level. However, for the purpose of the analysis described in this report, we were limited to data pulled from a number of existing sources including the REGRP application database, the AEA/ISER RE Fund Performance Report, the 2012 RE Fund Status Report and individual program manager performance tracking.
- A smaller subset of industry stakeholders, including project developers. These supplementary interviews were pooled with the extensive stakeholder interviews conducted for the Process evaluation and described in that report.

In addition to direct interviews and conversations, significant indirect support was provided by the prior work completed by ISER on behalf of AEA. Key inputs for the evaluation of both the costs and benefits of individual projects were directly supported through their existing database, supplemented by additional industry research.

Benefit Cost Analyses

One of the fundamental concerns of policy makers, program administrators, and participants is whether the investment of state funds in the development of renewable energy through the REGRP is providing a net economic benefit. There are a variety of regulatory and economic tests and approaches to assessing the benefits and costs of renewable energy investments – and comparing these to alternative existing or conventional non-renewable supply options.

After review and discussion of various approaches with AEA, we concluded the ***Total Resource Cost (TRC)*** and ***Participant Cost Tests (PCT)*** were most appropriate in addressing the priority questions related to this impact study. The TRC test compares the societal level benefits and costs of the projects and helps to answer the question of whether the REGRP is making investments that serve the general best interests of the state's economy. The PCT results are helpful in illustrating how attractive participation in the program is for current and potential future applicants.

These tests provide good insight to the fundamental questions of the nature (positive or negative) and magnitude of the economic benefits to the state and to program participants. The following table summarizes the elements included in each of these cost tests, followed by two illustrative examples.

Table 2.1 Summary of Costs an d Benefit Tests Applied to Impact Evaluation

	Total Resource Cost Test	Participant Cost Test	Notes:
Benefits:			
Electric Savings	✓	✓	Value of electric savings for remote communities based on the avoided local diesel fuel costs as estimated by ISER. For Railbelt communities the value of electric savings is based on avoided electric costs. Note for this analysis the PTC uses total offset local fuel costs – in many cases differ from local retail rates due to the Power Cost Equalization (PCE). See discussion of the PCE impacts in the Benefit/Cost Analysis results section for further details.
Diesel Fuel Savings	✓	✓	
Other Fuel Savings	✓	✓	Example: Anchorage landfill project benefits offset natural gas
Non-Energy Benefits	NA	NA	In this analysis non-energy benefits (such as improved community services, jobs or environmental impacts) are not included in the benefit cost ratios. We do estimate - and report separately from the benefit cost tests – the job, avoided carbon emission, and PCE program impacts of the REGRP.
Costs:			
Total Project Capital Costs	✓	-	Based on available program database information on project construction costs. In some cases these include pre-construction (e.g. feasibility or design costs) and in other cases only construction phase costs are captured.
REGRP Program Funds	-	✓	For participant test reduce local costs
Other Federal, State or Non-Local Funds	-	✓	Although federal tax credits, including both the Performance Tax Credit and the Investment Tax Credit are applicable in the participant test, they were not included in this analysis due to the absence of clear documentation at an individual project level.
Local Funds	-	✓	For the PCT, the total capital costs minus all other known sources is equal to local funds invested in the project.
REGRP Program Administration Costs	✓	-	Included in the portfolio level analysis for the TRC.
Operations and Maintenance	✓	✓	Includes gross operations and maintenance costs for RE systems – at this time does not capture off-set of O&M for alternative systems. O&M estimates also include increase in biomass fuel consumption.

The TRC and the PCT both estimate the discounted present value of the projects over their expected operating lifetimes.[9] This means that the anticipated stream of costs and benefits are discounted to present values to account for the time value of money – and also to permit for escalation of costs[10] for offset fuels or for operations and maintenance costs. The TRC and PCT project level benefit cost ratios are calculated as follows.

$$\textbf{TRC Benefit/Cost Ratio} = \frac{\sum_0^{\text{project life}} \text{Present Value Annual Energy Savings}}{\text{Total Project Capital Costs} + \sum_0^{\text{project life}} \text{Present Value Annual Operations and Maintenance}}$$

[9] A discount rate of 3% is assumed for both the Total Resource Cost Test and the Participant Test.
[10] Fuel escalation costs are tracked at a community level as part of the economic review conducted by ISER of RE Fund project applications.

The PCT is similar in structure, but as indicated above, costs are limited to the local portion of the project development costs – subtracting the REGRP and other non-local funds from the total project capital cost.

$$\textbf{PCT Benefit/Cost Ratio} = \frac{\sum_{0}^{\text{project life}} \text{Present Value Annual Energy Savings}}{\text{Local Project Capital Costs} + \sum_{0}^{\text{project life}} \text{Present Value Annual Operations and Maintenance}}$$

An example of the TRC and PCT project level benefit cost analysis is presented in the following text box.

Unalakleet Wind Farm Construction Project:

$$\textbf{TRC Benefit/Cost Ratio} = \frac{\$7.8\ Million\ (NPV\ Fuel\ and\ O\&M\ Savings)}{\$4.1\ Million\ (NPV\ Total\ Project\ Installed\ Cost + \$0.7\ Million\ (NPV\ of\ O\&M)} = 1.64$$

$$\textbf{PCT Benefit/Cost Ratio} = \frac{\$7.8\ Million\ (NPV\ Fuel\ and\ O\&M\ Savings)}{\$0.9\ Million\ (NPV\ Local\ Share\ of\ Installed\ Cost + \$0.7\ Million\ (NPV\ of\ O\&M)} = 8.83$$

Our impact evaluation includes a portfolio (as well as project) level analysis. The TRC test for the portfolio includes program administration costs for the REGRP. The included program administration costs represent all of the AEA's program administration costs for the REGRP, including projects that are in the feasibility or design stages as well as those receiving construction funding.

Although not included in this impact evaluation, the levelized cost of energy is another metric that we recommend AEA begin to track and report, in addition to maintaining information on the benefit/cost ratios that we have included in this analysis.

The levelized cost is based upon the initial capital costs, operating costs, and the total expected output of a system over its lifetime. In its simplest form:

$$\textbf{Levelized Cost of Energy} = \frac{\sum_{0}^{\text{project life}} \text{Present Value of Capital and Operating Costs}}{\sum_{0}^{\text{project life}} \text{Present Value Annual Energy Savings}}$$

The levelized cost of energy is most commonly presented in $/kWh or $/gallon of avoided fuel, and for this reason it can easily and directly be compared to the cost of existing or projected alternatives. In many instances, this simple comparison of the cost of renewable energy to alternative provides an easily understood metric for judging project cost effectiveness.

The drawback is that, in contrast the to the TRC and PCT tests that we have applied, the levelized cost of energy does not capture the relative scale of benefits and costs associated with each project, and therefore is less helpful in assessing the total net economic impacts.

Federal incentives for renewable energy projects were not included in the cost benefit analysis due to the lack of visibility in the reporting documentation from individual projects. Although federal grants and incentives are treated as a transfer payment and not included in the TRC, they can be applied in the Participant Test in reducing the effective cost of the project. As few of the projects are for private utilities or independent power producers, who have an effective tax basis, the impact on the overall results of the REGRP are limited. However, federal incentives for applicants paying federal taxes (e.g. independent power producers and private utilities) can be a significant factor in increasing cost-effectiveness of associated projects. Two incentives are currently applicable to qualifying REGRP projects:

- The federal renewable electricity production tax credit (PTC) is a per-kilowatt-hour tax credit for electricity generated by qualified energy resources, including wind, biomass and geothermal (¢2.2/kWh) and landfill gas, municipal solid waste, hydro, hydrokinetic, tidal, wave and ocean thermal energy (¢1.1/kWh).

  Renewable energy projects under construction prior to December 31, 2011 and qualifying for the PTC, could opt to receive a federal business investment tax credit or grant in lieu of the tax credit for 30% of the total installed cost of the system.[11] The expiration of the PTC for wind already appears to have had a chilling effect on the market in the United States resulting in approximately 50% reduction in the expected annual increase in installed wind capacity between 2009 and 2010.[12] Industry advocacy groups like the American Wind Energy Association (AWEA) indicate that creating long-term stability for project developers is critical for sustainable growth of the renewable industry.

- Solar electric (PV) and solar thermal qualify for the federal business investment tax credit (ITC) of 30% of the total installed cost of the system until December 31, 2016. Similar to the PTC, solar energy projects that were under construction prior to December 31, 2011 and qualified for the ITC, could opt to receive a federal grant in lieu of the tax credit.

An additional metric used in this analysis to track REGRP project performance is their system *Capacity Factor* (CF). The net capacity factor of a project is the ratio of the actual output of a power plant over a period of time and its potential output if it had operated at full nameplate capacity during that same time period. Although not tracked uniformly across programs, capacity factor can be an effective measurement of an individual project's success in meeting its predicted performance, as well as provide a universal metric for comparing multiple projects of different scale both within an individual renewable sector, and across sectors.

[11] Database of State Incentives for Renewables and Efficiency (DSIRE), *Renewable Electricity Production Tax Credit (PTC)*, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US13F&re=1&ee=1
[12] American Wind Energy Association (AWEA), *Production Tax Credit*, April, 2011.

3. Program Participation and Demographics

Summary

The Alaska Renewable Energy Grant Recommendation Program (REGRP) was established in 2008 to support the development of renewable energy projects and to reduce the impact of the high cost of energy for rural communities. In this section we will review the diversity of the 558 REGRP applications evaluated by AEA during the five rounds, as well as the 208 renewable energy projects that received funding appropriations of $177 million through the first four rounds. These projects have impacted 77 unique Alaskan communities, and helped develop renewable energy resources across the state with $135 million in state funding granted under the REGRP and other state funding.

Table 3.1 REGRP Participation and Funding by Round

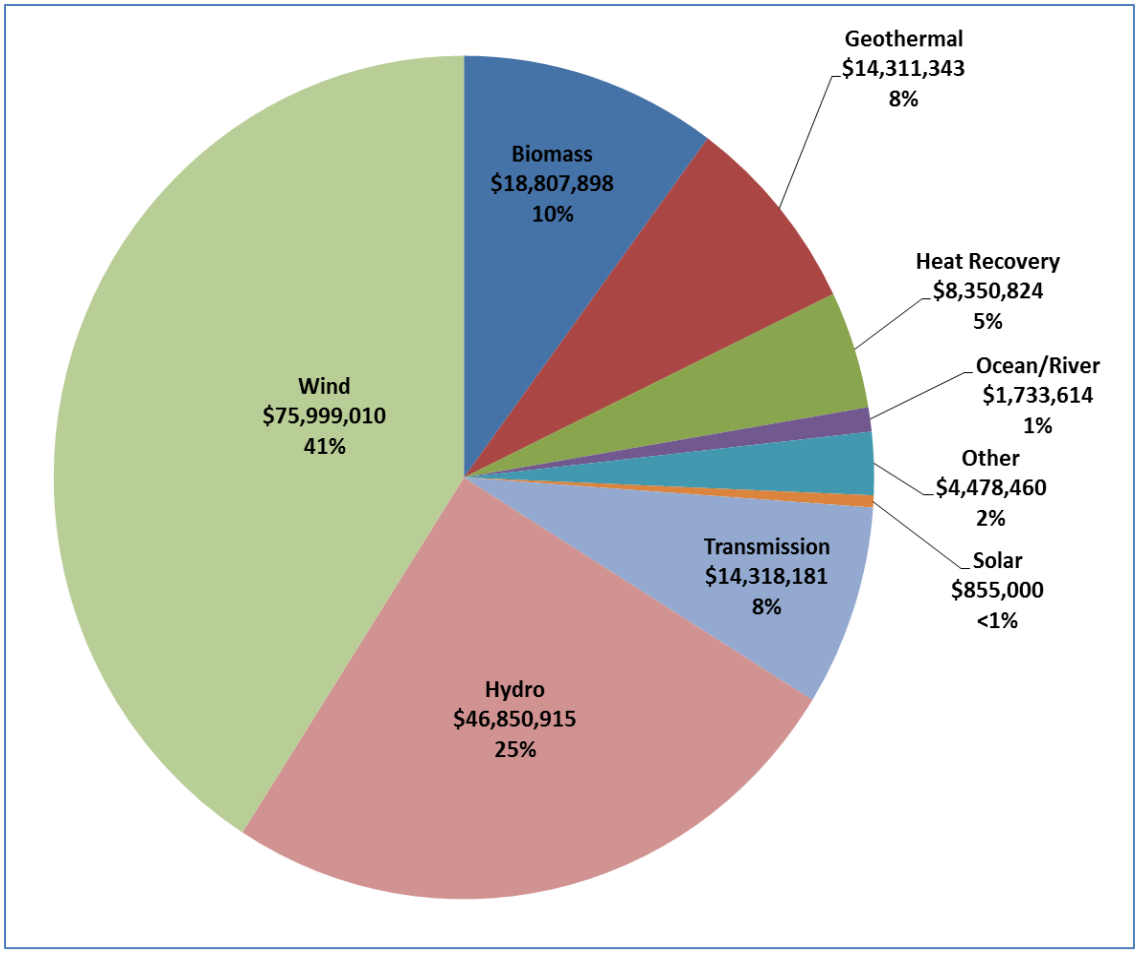
Round	I - IV	V	Total
Applications Received	461	97	558
Projects Funded	208	19	227
Grants in Place	180	5	185
Grants Completed	38	0	38
Grants Cancelled	14	0	14
Amount Requested ($M)	$1,094	$133	$1,227
AEA Recommended ($M)	$239	$43	$282
Appropriated ($M)	$177	$26	$202
Cash Disbursed ($M)	$100	$8	$108

As part of the analysis we will:

- Review performance of the REGRP in meeting its primary goals of supporting high cost of energy communities and achieving an equitable distribution of funds across the state.
- Assess the funding success of applicants, tracking awards by type of applicants, statewide regions, and type of resource.
- Analyze and discuss the different stages of renewable energy project development.

Although all of the primary renewable energy resources were represented in the application pool during the 5 rounds of funding, approximately 80% were for hydro, wind and biomass (Figure 33.1).

Figure 3.1 Appropriated Funds by Resource (Rounds I-IV)



Applicants requested over $1.2 billion in funding support through the REGRP, ranging from the largest individual request of $79 million in Round 1 of the REGRP[13], to the smallest request of $15,000.This wide disparity in project funding level and corresponding scope also highlights the capacity of larger, better capitalized applicants to obtain alternative funding sources for projects despite the funding limitations set for individual projects. [14]

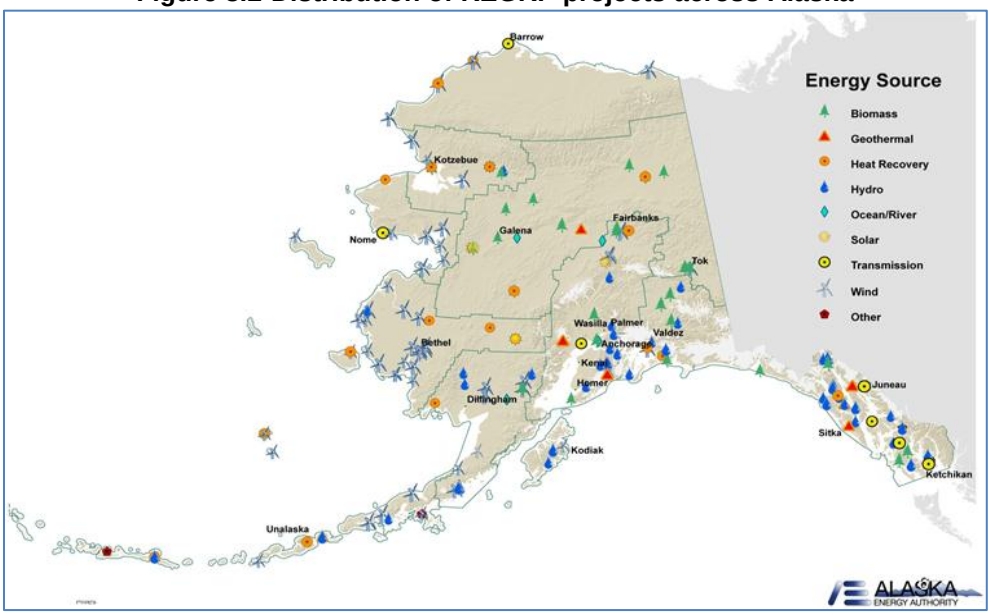
Supporting High Cost of Energy Communities and Projects in Alaska

During the first four rounds of the REGRP, a wide mix of renewable energy projects ranging in both resource type and stage of development (feasibility, design and

[13] The largest request was for GVEA's Eva Creek wind farm, which ultimately received $2 million in Round 1 and capitalized the balance through financing.
[14] Construction projects on the Railbelt, Juneau, Sitka, Ketchikan, Wrangell, and Petersburg electrical grids are limited to $4 million in grant funding and other areas of the state to $8 million.

construction) have been supported across the state. The heavy concentrations of wind in the west and southwest, hydro in the south and southeast, and biomass in the interior tend to reflect the availability of the renewable resource available in defined regions of the state.

Figure 3.2 Distribution of REGRP projects across Alaska

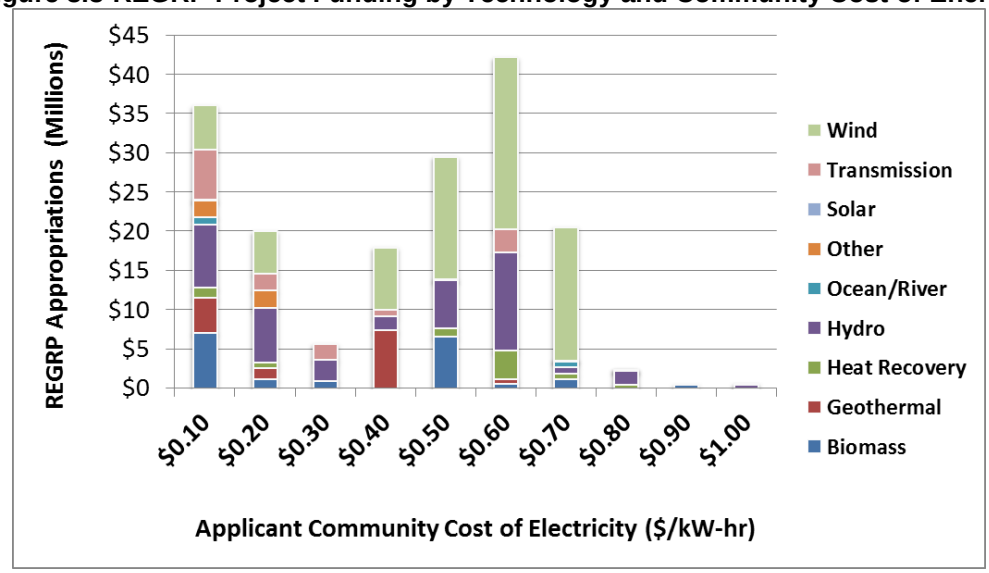


The REGRP's rule of thumb of obligating 20% of available funding to support the reconnaissance, feasibility and design of renewable energy projects has complemented a broader effort by AEA, the Denali Commission, the University of Alaska and other organizations to map the state's options for meeting the goal of generating 50% of its electric power from renewable resources by 2025. Individual feasibility studies – notably AEA's MET tower loan program for wind, as well as broader renewable resource analyses completed for the AEA Alaska Energy Pathway report have contributed to the opportunities for individual communities to identify and invest in the development of local renewable energy resources to reduce dependence on more expensive, non-renewable sources of energy.

Approximately two thirds of projects appropriated funding in the first four rounds of the REGRP were in communities with reported energy costs above $0.30 per kWh. The highest percentage of funding was for wind energy projects, with 85% of total REGRP appropriations for wind projects in the state invested in higher cost of energy communities. The investment in prior feasibility studies for wind applications, leading to "shovel ready" construction projects likely led to the strength of this sector in the early rounds of the REGRP.[15]

[15] Interviews with AVEC highlighted the immediate opportunity created for early wind projects with the establishment of the REGRP in 2008.

Figure 3.3 REGRP Project Funding by Technology and Community Cost of Energy

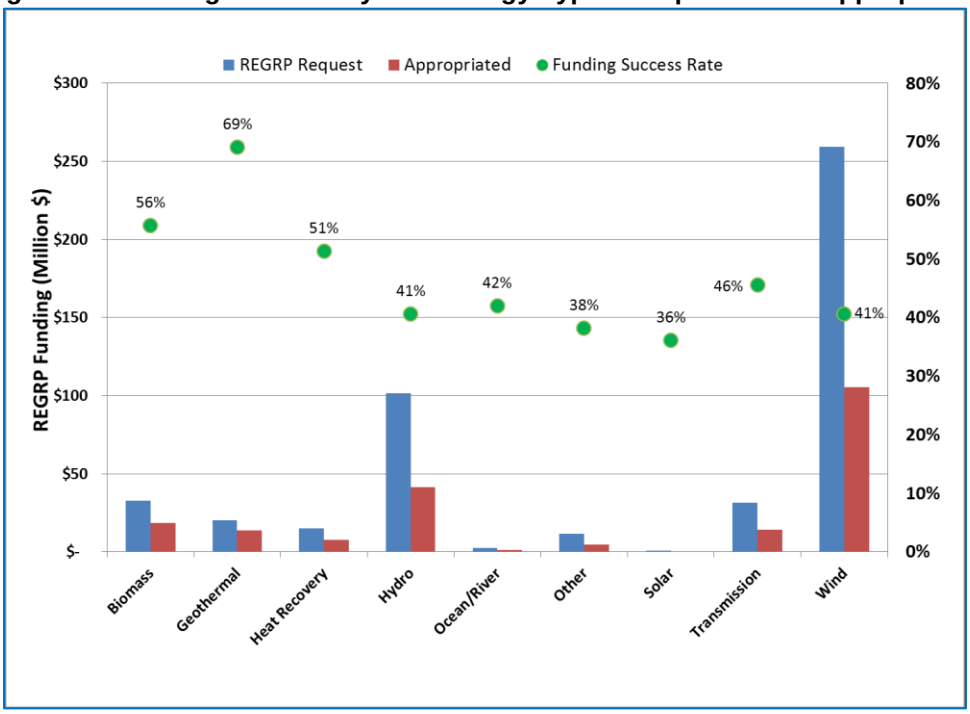


REGRP Support for a Broad Mix of Applicants and Renewable Resources

The funding of REGRP projects during the first four rounds generally reflects the maturity of renewable energy technology sectors coupled with the existing knowledge base for developing cost-effective projects in communities across the state with available renewable resources. More recently additional focus has been given to biomass, geothermal, heat recovery and emerging technologies, with a higher percentage of support for early development (through feasibility studies and design).

In the figures below, a comparison is made between the amount of funds requested versus the funds ultimately appropriated for the various renewable resources, as well as for applicant types. Based on these values, a funding success rate is the ratio between these two funding levels. Although there is a significant funding disparity between the various renewable resources, which generally reflects the percentage of projects types applying for construction funding, there is a relatively even distribution of funding success for individual applicants within the same group.

Figure 3.4 Funding Success by Technology Type – Requested vs. Appropriated



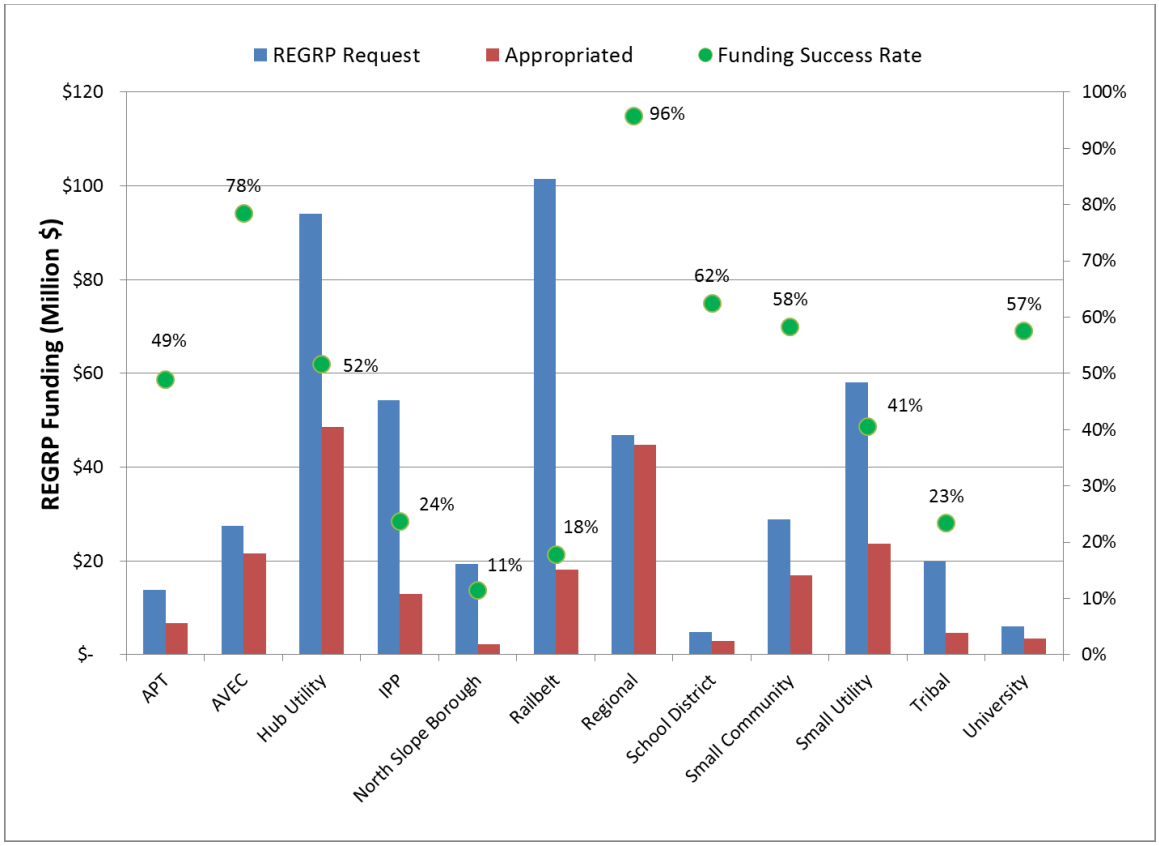
More notable is the success of different applicant types in moving from an application to the REGRP to an appropriation through the state legislature. The various stages of the REGRP process was discussed in greater detail in the Process Evaluation, but at the highest level reflects four general stages:

1. AEA evaluation and ranking
2. AEA & Renewable Energy Fund Advisory Committee recommendations to the state legislature
3. Appropriation by the legislature
4. Final budget approval by Governor

The ranking of projects by AEA generally reflects the final appropriations, but changes in budget, regional distribution of funding, and other factors has occasionally impacted the final prioritization of funding and awards by the legislature.

Some applicants have navigated this process better than others, based primarily on experience of the applicant, as well as the cost-effectiveness of the proposed project. Below are the results of a comparison of the total amount of REGRP funding received by applicant types against the funding requested in its original applications. Although this review of applicant success is not comprehensive, it highlights the wide disparity in funding success rates and the particular success of AVEC, as an individual applicant, in receiving REGRP support for 78% of its funding requests.

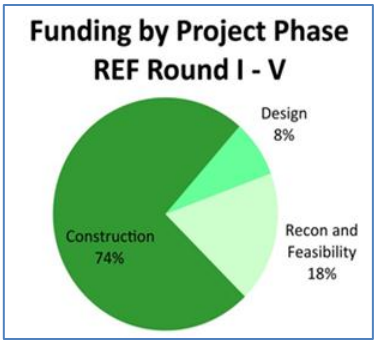
Figure 3.5 Funding Success by Applicant Type – Requested vs. Appropriated



Tracking Projects through Stages of Development

Guidance established for the REGRP recommends that 20% of the funding be allocated to reconnaissance, feasibility and resource studies and 80% be awarded to final design, permitting and construction projects. This funding allocation is designed to support the early development of renewable energy projects across Alaska, creating a pipeline of projects for future construction. Although individual projects move from recommendations to final appropriations by the legislature and approval of the budget by the Governor, the REGRP has largely succeeded in balancing the mix of projects funded, with 18% for reconnaissance and feasibility, 8% for design and 74% for construction.[16]

Figure 3.6 Funding by Phase



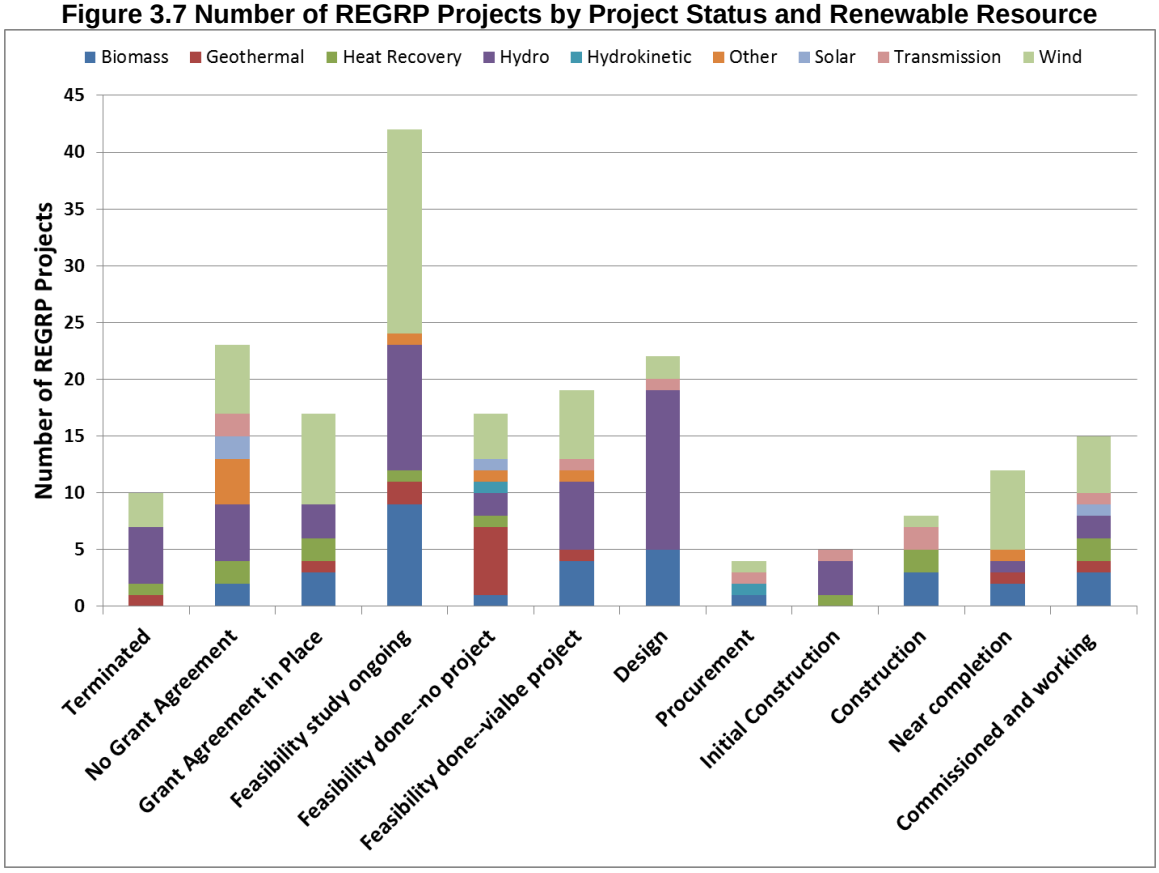
Projects typically proceed from the grant award process, through the feasibility phase, to design, procurement, construction, completion, and commissioning. However, as the

[16] REGRP results presented by AEA at the Business of Clean Energy in Alaska Conference, April 2012.

application process does not restrict funding for specific phases, the identification of the project phase and status is tracked by AEA through its grant administration process.

In an effort to characterize the performance of the funded projects by phase, each project was given a specific status value reflected in the figure below. Based on a review of the most recent reporting by AEA in the annual RE Fund status report[17] and AEA REGRP program documentation, wind projects represent the largest portion of projects completed or nearing completion, while hydro projects encompass the greatest share of projects in the design phase (due to the typical length of a hydropower project development cycle).

Figure 3.7 Number of REGRP Projects by Project Status and Renewable Resource



Although only 35% of REGRP projects are categorized within the design to construction phase, they represent nearly 60% of the total project funding appropriated during the first four rounds (82% of the first five rounds). This can be expected, as construction is almost always the most costly phase for an individual project.

[17] Grant status for individual projects was last reported in the 2012 Alaska Renewable Energy Fund Status Report in January, 2012 and is the basis for this analysis. It should be noted that Figure 3.7 reflects the current status of projects and not the cumulative funding for specific project types noted in Figure 3.6.

Table 3.2 Multi-phase REGRP Projects

Biomass	4
Geothermal	2
Hydro	2
Transmission	1
Wind	6
Grand Total	**15**

Because some projects completed one or more phases of development outside of the REGRP process, it can be difficult to develop a comprehensive picture that includes all of the true project costs from resource evaluation through completion. In this case, the benefit to cost analysis as presented in the following section may be skewed, representing lower than actual total project costs.

A review of the 208 funded projects in the first four rounds found 15 individual projects moved from pre-construction phases to the construction phase. This total, representing approximately 8% of the REGRP projects, does not reflect non-REGRP support for project construction received through AEA, the Denali Commission or other external funding sources. Increasing the ability to track and report on projects across the various phases of project development should be a priority for future project and program tracking metrics.

A significant finding is that there are a total of 17 feasibility projects that resulted in a determination of no viable/cost-effective project. Nonetheless, the resultant insights from mapping renewable resources across the state while simultaneously avoiding more costly investment of investing construction funding in non-viable projects has been well balanced. The value of the information generated from the projects that did not progress to construction may be underestimated. These results are key to insuring that continued improvements to project designs or siting can be made, raising the cost-effectiveness of future proposals if lessons learned are applied prudently.

4. Benefit/Cost Analysis Results

Summary

Through the first four rounds of funding 62 projects have moved to the construction or operational phase. In this section we review the benefit cost analysis results for this cohort of projects. The analyses and results include the following:

- The benefit cost results for all 62 projects based upon the costs and projected energy savings contained in the program data base and project applications.

- The benefit cost results for 19 operational projects reflecting 2011 calendar year operational costs and savings. In many cases, the energy savings and operations during 2011 are less than projected and consequently the benefit cost ratios are reduced. Note also that the operational benefit cost results assume that the operational and energy savings achieved in 2011 will be maintained throughout the project lifetime. In many cases it is reasonable to expect that operations and energy savings will improve – coming closer to the projected energy savings – as operational and start up issues are resolved.

- The Benefit/Cost test results are presented for the Total Resource Cost (TRC) test and for the Participant Test (PCT). The TRC test compares the societal level benefits and costs of the projects and helps to answer the question of whether the REGRP is making investments that help to serve the general best interests of the state's economy. The Participant Test results are helpful to illustrate how attractive participation in the program is for current and potential future applicants. The technical details for each test are addressed more specifically in the methods section of this report.

- An analysis and discussion of the total investments leveraged by the State's investment of funds in the REGRP program.

- A discussion and analysis of the aggregate impact of the program on the power cost equalization (PCE) program.

- Discussion of the aggregate portfolio level job and environmental impacts from the REGRP's construction and operational projects.

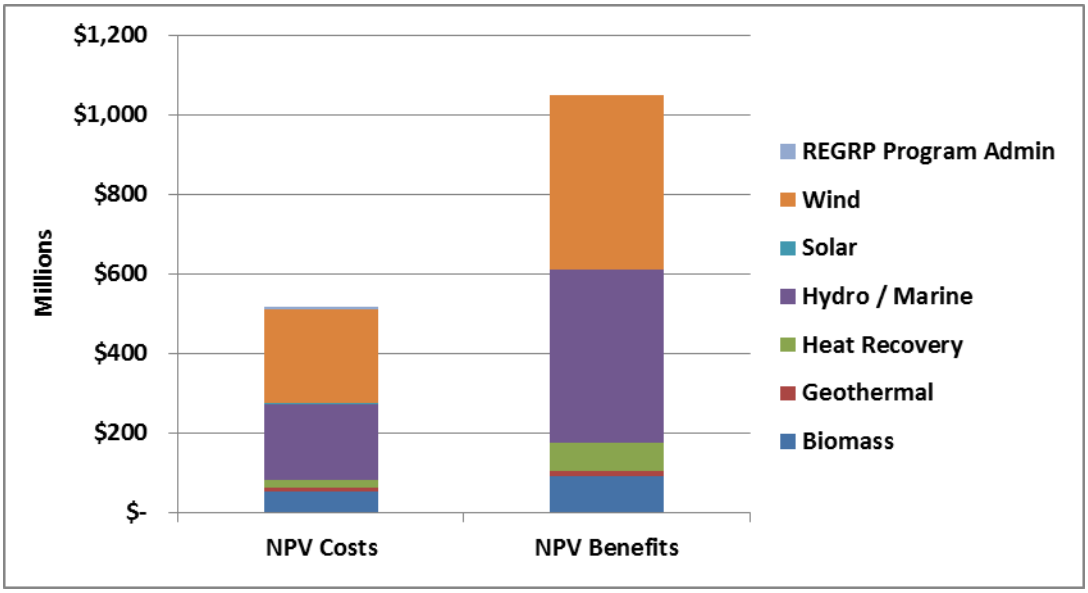
The REGRP encompasses a wide array of types of projects (upgrade, new, expansion, transmission) with multiple funding sources and applicant types. This diversity makes the consistency of the reporting on total project costs (feasibility, transmission, etc), savings and operational performance critical for the accuracy of reporting performance of the program. In this evaluation, efforts were made to balance the need for confirming the reported costs and savings against secondary sources, while managing the scope of the evaluation. Continued efforts on improving the tracking of costs and performance data

will provide greater accuracy in reporting, as well as insights in to improving the cost-effectiveness of the projects and the program.

Construction Portfolio – Projected Benefit Cost Results

Based on the projected costs and benefits – the construction portfolio for the REGRP (which includes 19 projects that have been operational in 2011, and 43 that have received construction grants) – originally was expected to provide more than $531 million in present value net benefits for Alaskans over the life of the projects.

Figure 4.1 2011 Construction Portfolio Benefits and Costs for REGRP Projects



The projects are primarily rural based offsetting the extremely high cost of diesel generation and represent the broad spectrum of renewable energy resources in the state. The $7.4 million in REGRP administration costs are a small fraction, slightly over 1%, of the cumulative costs of the project installed and operation and maintenance costs.

Table 4.1 Benefits and Costs for the REGRP 2011 Construction Portfolio

RE Resource Sector	Total Project Cost	Annual Electricity	Annual Diesel Displaced	Annual Natural Gas	NPV Costs	NPV Benefits	Net Benefits	NPV Benefit to Cost Ratio
	($ Millions)	(MWh)	(gal x 1000)	(Mmbtu x 1000)	($ Millions)	($ Millions)	($ Millions)	
Biomass	$27	27,282	718	319	$52	$92	$40	1.77
Geothermal	$2.4		164		$9.7	$12.5	$2.8	1.29
Heat Recovery	$15	4,352	681		$22	$71	$49	3.21
Hydro / Hydrokinetic	$131	35,093	2,618	24	$190	$435	$245	2.29
Solar	$0.3	42	4.8		$0.3	$0.3	($0.0)	0.99
Wind	$182	90,102	6,371		$236	$438	$202	1.85
REGRP Program Admin					$7.4			
REGRP Construction Portfolio (Est)	$357	156,870	10,556	343	$518	$1,049	$531	2.03

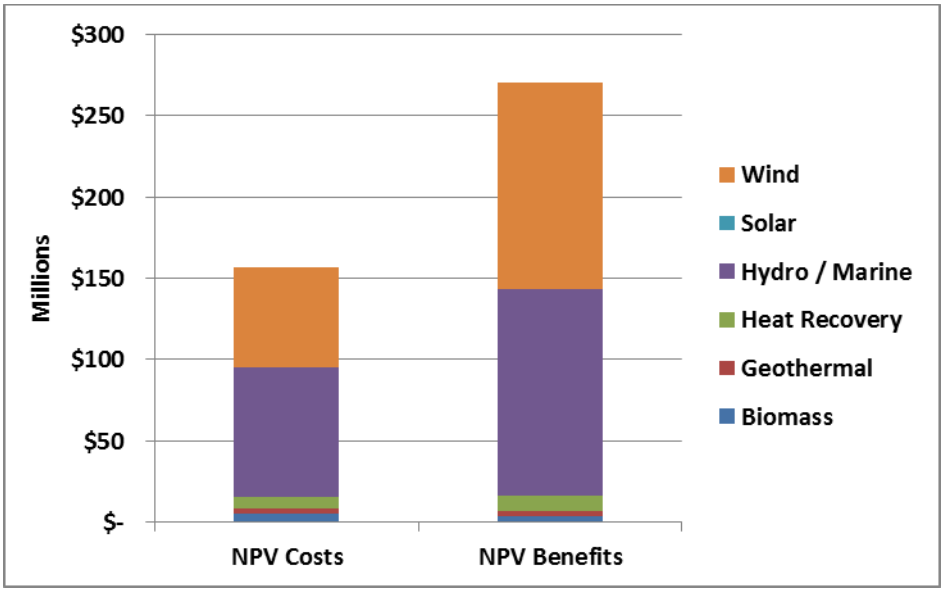
Operating Portfolio – Benefit Cost Results Reflecting Early Operational Data

Of the construction portfolio, 19 projects now have early operational experience and data. Therefore, we also conducted a benefit cost analysis for this sub-set of operational projects including available reported data on energy savings and costs.

The benefit cost results based on the early experience of the operating projects is less favorable than the construction portfolio results based on projected costs and savings. This clearly indicates, that at least in the early phases of project operations and startup – the projects have "under-performed" compared to the expectations in the project application and in the program database.

When the actual savings and costs for operational projects are analyzed the total present value benefits are greater than the total present value costs by a factor of 1.7 – with the portfolio expected to provide more than $114 million in present value net benefits for Alaskans over the life of the projects.

Figure 4.2 Benefits and Costs of the 2011 Operating Portfolio of REGRP Projects



It should be noted that performance for many projects can be expected to improve after the initial commissioning, as the projects develop more operational experience, reduce downtime and in some cases fully bring an individual system up to operational capacity. During interviews and in reviewing RE industry presentations and evaluations, it was apparent that AEA Program Managers and project operators were aware of specific cases of underperformance and working to address many of the issues that have led to lower than expected performance numbers. Ongoing tracking of project performance, ideally even beyond the stipulated requirement of up to 5 years after commissioning, will provide insights for continued improvements on renewable energy project design, development and deployment.

Below is an example of a REGRP wind project that has underperformed in electricity generation, but also installed under budget. The significant value placed on the benefits of offsetting diesel generation outweighs the project savings associated with a lower installed cost, affecting both economic impacts to both the program as well as to the community.

Table 4.2 As Built Versus Projected Costs and Operating Project Performance

Quinhagak Wind Farm Construction		
	Total Project Cost	**Annual Electricity**
	($ Millions)	**(MWh)**
Estimated	$4.8	649
Actual	$3.8	409
Difference	-22%	-37%

Table 4.3 Total Resource Cost Versus Participant Cost Test

Quinhagak Wind Farm Construction	Total Resource Cost Test			Participant Cost Test		
	NPV Costs $ Millions	NPV Benefits $ Millions	TRC Benefit to Cost Ratio	NPV Costs $ Millions	NPV Benefits $ Millions	TRC Benefit to Cost Ratio
Estimated	($5.2)	$5.1	0.98	($0.5)	$5.1	11.17
Actual	($3.9)	$3.2	0.81	($0.8)	$3.2	3.92
Difference	-24%	-37%	-18%	79%	-37%	-65%

Table 4.4 Benefits and Costs for the REGRP 2011 Operating Portfolio

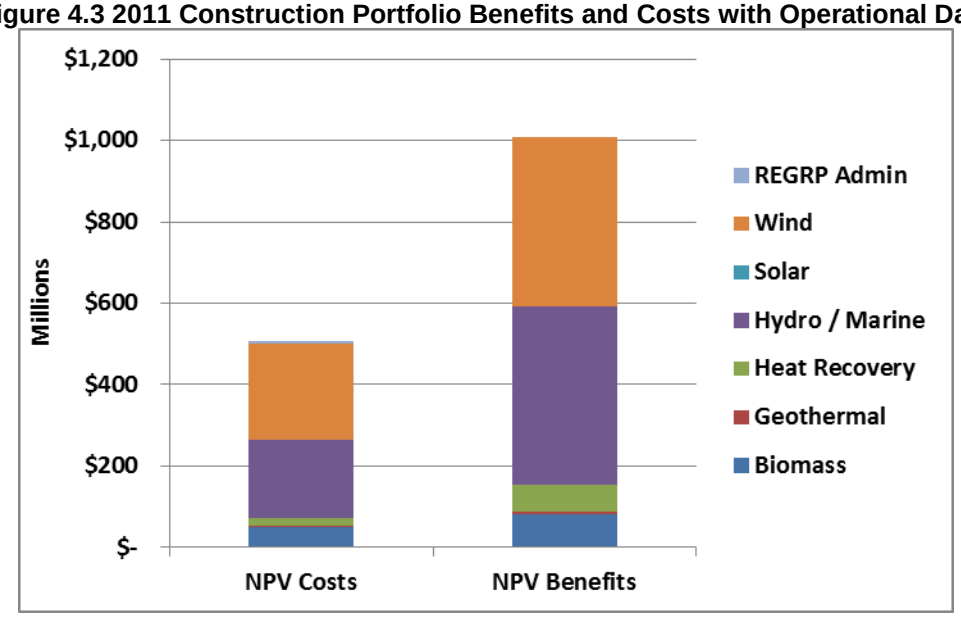
RE Resource Sector	Total Project Cost	Electricity Act/Proj%	Diesel Act/Proj%	Annual Electricity	Annual Diesel Displaced	Annual Natural Gas	NPV Costs	NPV Benefits	Net Benefits	NPV Benefit to Cost Ratio
	($ Millions)	%	%	(MWh)	(gal x 1000)	(Mmbtu x 1000)	($ Millions)	($ Millions)	($ Millions)	
Biomass	**$ 3,898,109**		**34%**		**42**		**$5.6**	**$3.9**	**$10**	**0.70**
Geothermal	**$ 1,026,000**		**34%**		**37**		**$3.1**	**$3.2**	**$6.4**	**1.03**
Heat Recovery	**$ 2,004,225**	**30%**	**54%**	**442**	**57**		**$7.1**	**$9.2**	**$16**	**1.31**
Hydro / Hydrokinetic	**$ 37,633,019**	**67%**	**78%**	**5,344**	**437**		**$79**	**$127**	**$206**	**1.61**
Solar	**$ 193,600**	**0%**	**38%**		**0.9**		**$0.2**	**$0.2**	**$0.4**	**1.14**
Wind	**$ 51,248,202**	**73%**	**60%**	**17,472**	**1,183**		**$62**	**$127**	**$188**	**2.06**
REGRP Operational Projects	**$ 96,003,155**	**68%**	**56%**	**23,089**	**1,756**		**$157**	**$270**	**$114**	**1.73**

Construction Portfolio – Including Operating Data

The first set of Construction Portfolio benefit cost results presented in this section were based on projected savings and costs. In this sub-section we investigate the impact on the portfolio's benefit cost results if the early results from operating projects are included, and assumed to be representative of the operations and savings over the life of this sub-set of projects.

As expected, the benefit cost results for the construction portfolio that reflects the early under-performance of operating projects is less favorable than the construction portfolio results based on projected costs and savings.

Figure 4.3 2011 Construction Portfolio Benefits and Costs with Operational Data



When the actual savings and costs for operational projects are included in the analysis the overall construction portfolio remains cost effective with total present value benefits of $1,009 million and total present value costs of $508 million. Understanding which project types and applications have the greatest potential risks of underperformance improves the program's ability to track specific areas of project development and operations, as well tailoring assistance to assure performance is met moving forward. These early efforts in evaluating program and sector level performance can help in avoiding more broad based underperformance of the construction and preconstruction projects.

Table 4.5 Benefits and Costs for the 2011 Construction Portfolio with Operating Data

RE Resource Sector	Total Project Cost	Total Non-State Leveraged Funds	Electricity Act/Proj	Diesel Act/Proj	Annual Electricity	Annual Diesel Displaced	Annual Natural Gas	NPV Costs	NPV Benefits	Net Benefits	NPV Benefit to Cost Ratio
	($ Millions)	($ Millions)	%	%	(MWh)	(gal x 1000)	(Mmbtu x 1000)	($ Millions)	($ Millions)	($ Millions)	
Biomass	$27	$10		34%	27,282	606	319	$49	$82	$33	1.68
Geothermal	$1.5	$0.6		34%		92		$4.6	$6.6	$2.1	1.46
Heat Recovery	$15	$7.8	30%	54%	3,318	613		$20	$65	$45	3.23
Hydro / Hydrokinetic	$133	$85	67%	78%	33,550	2,525	24	$192	$438	$246	2.28
Solar	$0.3	$0.01	0%	38%	42	3.2		$0.3	$0.3	($0)	0.99
Wind	$182	$121	73%	60%	87,556	5,999		$234	$417	$183	1.78
REGRP Admin								$7.4			
REGRP Construction Portfolio (Actual)	$358	$223			151,747	9,838	343	$508	$1,009	$501	1.99

Operating Portfolio - Participant Test – Benefit Cost Results

The results presented above are based on the societal perspective and use the total resource cost test as described in the methods section of the report. This section reviews the participant test benefit costs results for the Operational Portfolio – accounting for both the initially projected savings and costs, and based on the early operational data.

It is important to consider the participant test results – since this provides insights into how attractive the program appears to current and potential applicants. It also provides an indicator of whether the program may have opportunities to support a greater number of projects by reducing the grant dollars given to individual applicants – while still maintaining very favorable participant perspective economics – and thereby allowing a greater number of grants in each funding cycle.

As REGRP projects often receive funding from multiple sources, including REGRP, federal, external organizations (e.g. native non-profits), consistency of reporting on total project costs is critical for the accuracy of reporting performance of the program. In this evaluation, efforts were made to balance the need for confirming the reported costs and savings against secondary sources, while managing the scope of the evaluation.

Figure 4.4 Participant Cost Test for 2011 Operating Portfolio

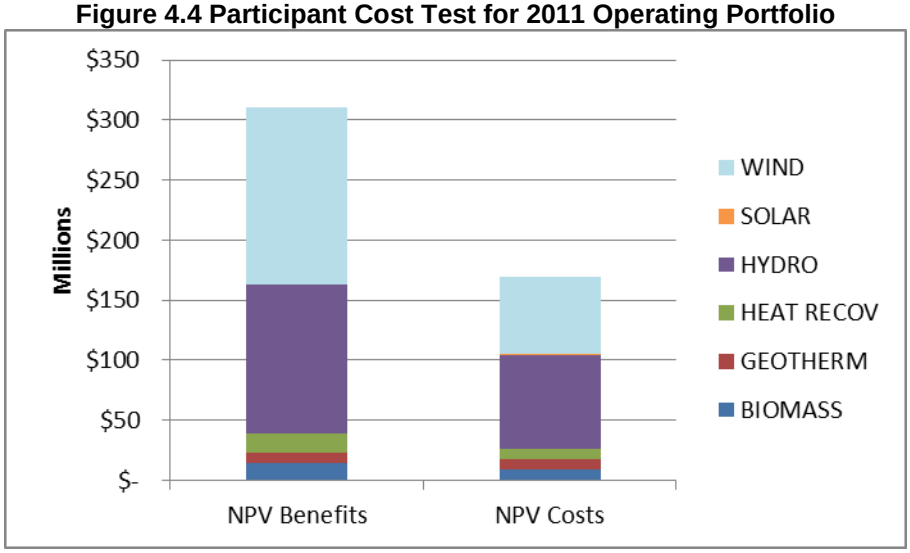


Table 4.6 Participant Cost Test Results for 2011 Operating Projects

RE Resource Sector	NPV Costs	NPV Benefits	Net Benefits	NPV Benefit to Cost Ratio
	($ Millions)	($ Millions)	($ Millions)	
Biomass	$1.8	$3.9	$2.1	2.12
Geothermal	$2.6	$3.2	$0.6	1.22
Heat Recovery	$5.6	$9.2	$3.7	1.66
Hydro / Hydrokinetic	$64	$127	$63	1.98
Solar	$0.0	$0.2	$0.2	
Wind	$35	$127	$92	3.64
REGRP Operational Projects	$109	$270	$161	2.48

Although the overall operational projects participant benefit to costs ratio is 50% higher, this is dominated by the larger projects that have significantly more non-state funds invested versus the smaller, less capitalized rural projects. Individual project performance can range up to 8.83 in the case of the Unalakleet wind project, where the REGRP funding covered over 90% of the project cost.

Construction Portfolio – Leveraged Investment

Through five rounds the REGRP has recommended $282 million in funding, with $202 million appropriated. Of the projects in construction, the $112 million in REGRP appropriations and $23 million in other state funds has leveraged a further $223 million of investments.

The non-state investments encompass a wide variety of sources including federal grants – most notably through the Denali Commission, individual utility funded investments through debt and equity, and regional contributions through either community in-kind funding matches, as well as grants from regional tribal organizations.

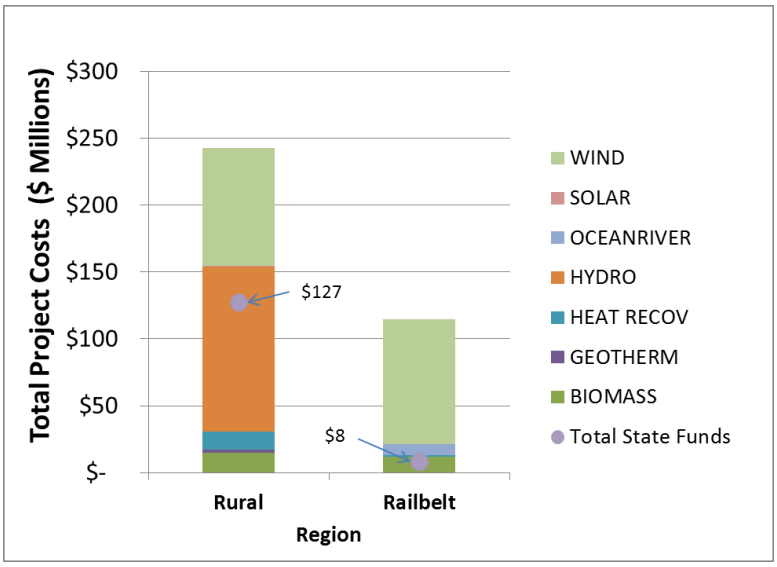
Investments in these renewable energy projects reflect deliberate efforts by organizations and communities to spur project development with goals of reducing the high cost of energy for communities, creating jobs and reducing the flow of money out of communities and the state from non-renewable energy sources.

Table 4.7 REGRP Funding Sources – State and Leveraged Funds

RE Resource Sector	REGRP Funding	Other State Funding	Non-State Funds	Ratio of Non-State to State Funds	State Funding to Total Project Cost (Rural)
	($ Millions)	($ Millions)	($ Millions)		%
Biomass	$16	$0.9	$10	0.60	87%
Geothermal	$0.9		$0.6	0.60	63%
Heat Recovery	$7.0		$7.8	1.12	45%
Hydro / Hydrokinetic	$31.2	$17	$85	1.75	37%
Solar	$0.3		$0.01	0.04	97%
Wind	$56	$4.8	$121	1.97	67%
REGRP Construction Portfolio	$112	$23	$223	1.66	52%

State investment, including both REGRP appropriations and other state funding, represented nearly 52% of the total project costs in rural areas during Rounds 1-4, whereas only 7% of project costs in Railbelt projects were supported through state funding.[18]

Figure 4.5 Rural and Railbelt REGRP Appropriations



[18] GVEA's Eva Creek $93M Wind Project represents a major portion of the Railbelt total project costs, but received only $3.4M in two rounds (1 & 4) of REGRP funding.

There are a number of factors affecting the ability of individual regions of Alaska to develop successful, cost-effective projects. Although a suitable renewable resource is a critical element, access to project funding is also vitally important. The figures below highlight the wide disparity of individual regions in providing non-state "match funding", though this funding may be from a variety of sources, including in-kind, federal grants, local or utility debt and equity financing and other organizational grants. Identifying sources for non-state leveraged funds is a key area of support, that AEA and other organizations have and continue to provide.

In the figures below the total state funds invested in the REGRP projects in regions across the state is represented by the dot, while the stacked bar chart is the cumulative project costs. The higher the dot is on the stacked bars, the greater the share of the state's investment in the RE projects in the region.

Figure 4.6 Breakdown of State and Leveraged Funds for the 2011 Construction Portfolio

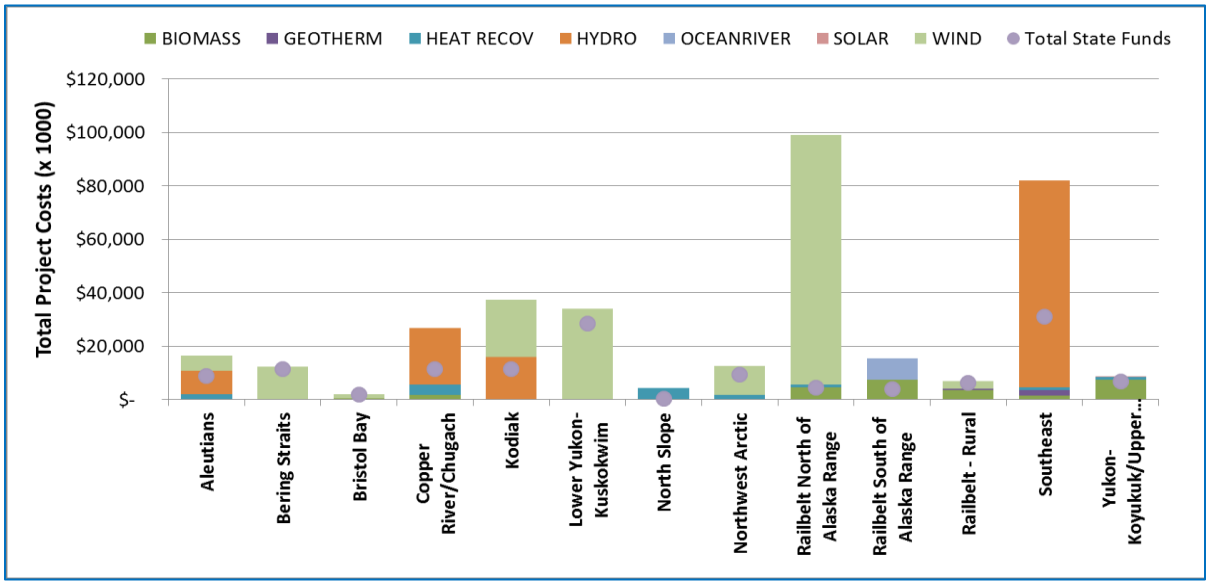
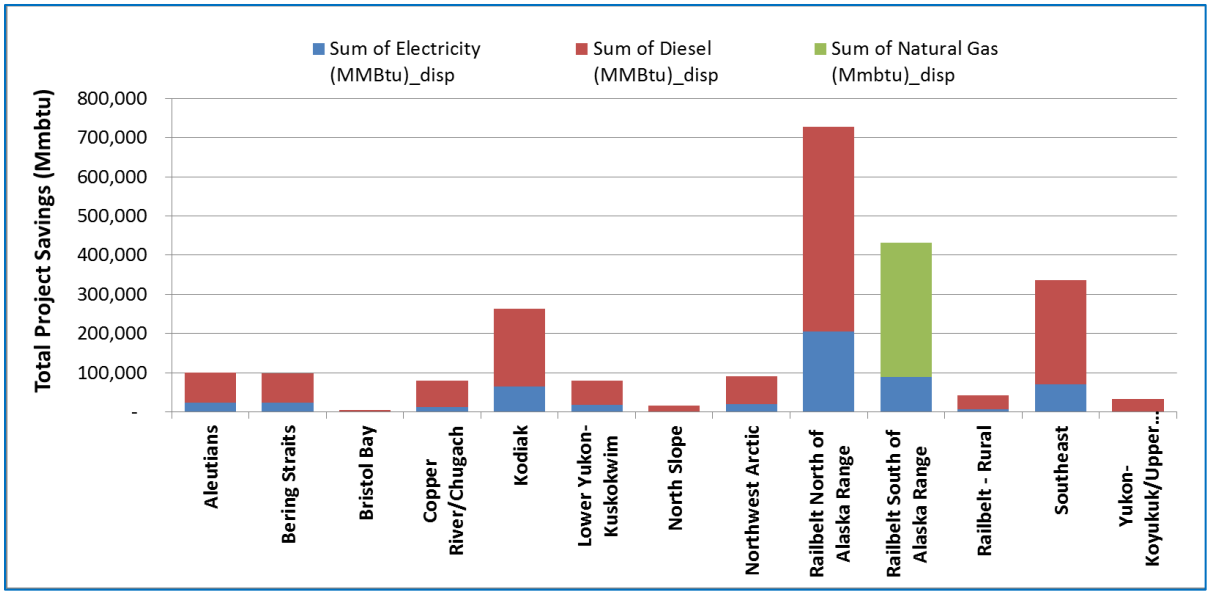
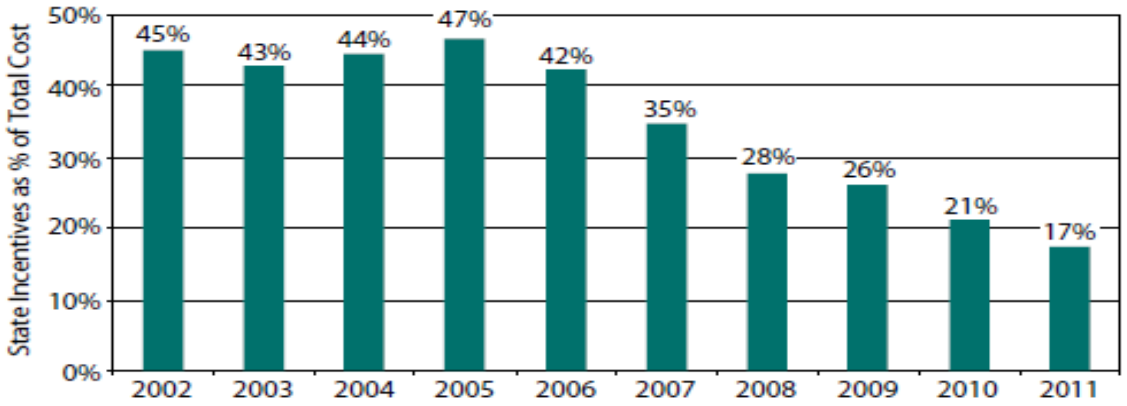


Figure 4.7 Breakdown of Energy Savings for the 2011 Construction Portfolio



The Clean Energy States Alliance (CESA), a national organization representing state-based public clean energy funds including Alaska, tracks this metric of leveraged program funds at a national level. Increased federal and state investment in renewable energy, notably incentives, tax credits and grants, have accelerated the market development, as well as improvements in RE technology, installation practices and financing.

Figure 4.8 State Incentives Contributions per kW as Percentage of Total Cost from CESA Project Database



Power Cost Equalization Impacts

The Power Cost Equalization (PCE) program, originally established in 1984 to address significant increases in the cost of electric rates in rural Alaska, aims to normalize the high costs of electricity in rural communities with the lower costs in more urban areas through direct-rate reductions. The PCE program provides important support to

communities and households that struggle with meeting the challenge of high energy costs in most of Alaska's remote communities.

Currently, the PCE program allows eligible utilities to provide a monthly PCE credit to residential customers up to the first 500 kWhs and to community facilities up to a maximum of 70 kWh per month per community member. Businesses, schools and state and federal customers are not eligible for the program.

The Regulatory Commission of Alaska determines the PCE level for each utility based on the fuel and applicable non-fuel costs of generating electricity in an individual community. The specific PCE rate for a community is computed on a kWh basis and reflects:

- 95% of a utility's costs between 14.12¢/kWh and $1.00/kWh
- Maximum PCE level is 81.59¢/kWh

In 2011 the PCE program reported supporting 183 Alaskan communities with over 434 GWh of total kWh sold, including 93 GWh of eligible residential electricity and 33 GWh of eligible community electricity or approximately 29% of total electricity sold in these communities is eligible for a PCE credit. Legislative funds appropriated for the PCE program in 2011 were $36 million.

Impacts of the REGRP

The renewable energy projects supported by the REGRP can have several types of impacts on the PCE program and PCE participants. For example:

- An REGRP project developed and owned by a community utility may directly off-set the fossil fuel costs borne by that utility. Increased operations and maintenance costs will off-set some of the avoided fossil fuel costs – but usually the net result will be to lower the utility's costs. These lower overall costs will provide some direct benefits to the utilities' customers, and will also provide benefits to the state – by lowering the PCE payments to the community.

- An REGRP project developed and owned by an independent power producer – could provide a local utility with a lower power purchase cost than existing fossil fuel options (that are provided by the community or by an IPP). Presumably, the renewable power purchase agreement will lower the utilities total costs (in comparison to an existing or new fossil alternative) – and therefore will again result in a decrease to utilities total costs. As in the previous case, these lower costs will benefit local ratepayers, and also provide benefits to the state – by lowering PCE payments.

- In both cases, the greatest share of the PCE related benefits will go to local ratepayers who are not eligible for the PCE program – and therefore are directly off-setting their current non-PCE supported electric rates.

Our approach to estimate the PCE impacts of the REGRP is to allocate the benefits associated with the total projected (or actual for operating) MWh production to:

1. The PCE Program (Reduced State PCE payments)
2. PCE in-eligible local ratepayers (Reduction in the non-PCE supported rate for electricity they must pay), and
3. PCE eligible local ratepayers (May see relatively small change to their PCE supported rate – and therefore a smaller share of the PCE impact benefit than the other two groups).

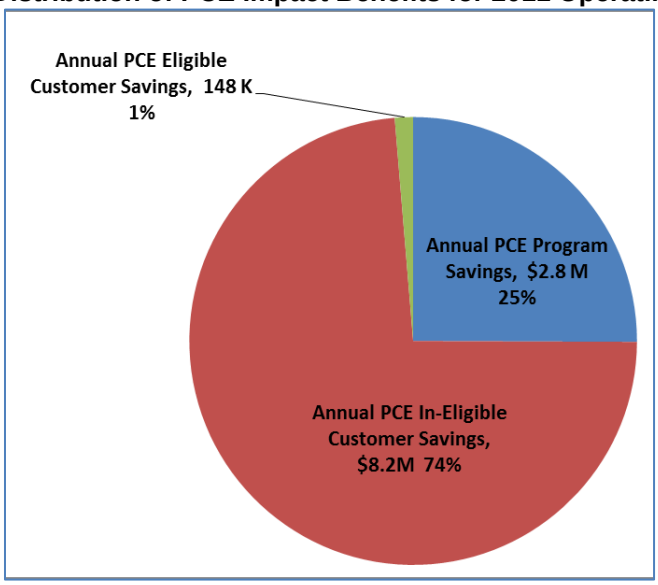
Estimated PCE impacts are presented in Table 6.6 and the following figures. The first row in table 6.6 contains the estimated impacts for 10 communities with operation REGRP projects in 2011. The second row represents projected impacts for 26 communities that have projects that are operational or that have received REGRP construction grants.

Table 4.8 PCE Impacts

	Total Annual Project Savings	Total Annual Project Savings	Annual PCE Eligible	Annual PCE Program Savings	Annual PCE In-Eligible	Annual PCE In-Eligible Savings	Annual PCE Eligible Savings
	MWh(s)	$ Millions	MWh(s)	$ Millions	MWh(s)	$ Millions	$ Millions
2011 Operational REGRP Projects (Actual)	22,647	$11.2	6,233	$2.8	15,993	$8.2	$0.1
2011 Operational and Projects in Construction (Projected)	52,905	$18	16,812	$5.1	35,739	$12.6	$0.3

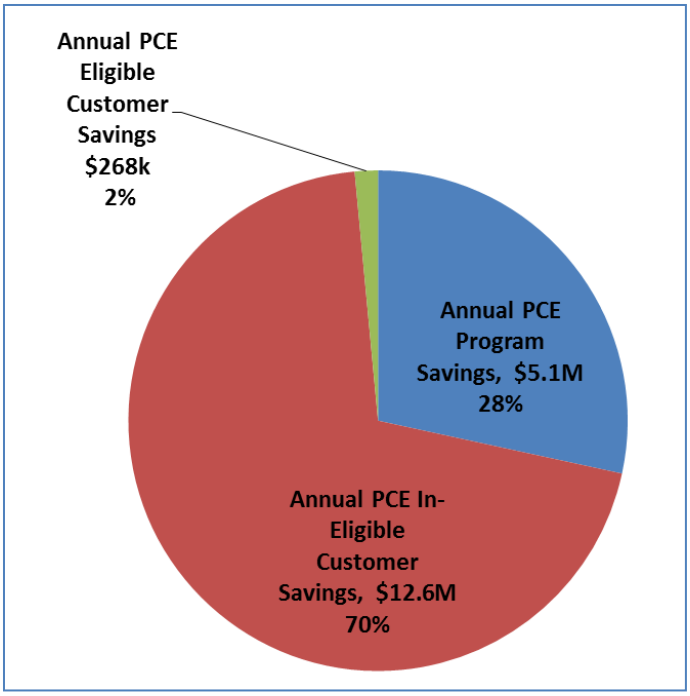
As illustrated in the Figure 6.8 pie chart, for the operational projects roughly one quarter - $2.8 million annually out of $11.2 million - of the estimated PCE benefits go the state as Program Savings, and three-quarters of the benefits (approximately $8.2 million annually) going to the non-PCE eligible ratepayers in the participating communities. Only 1% of the PCE benefit is realized by the PCE eligible ratepayers in these same communities.

Figure 4.9 Distribution of PCE Impact Benefits for 2011 Operating Portfolio



Similarly, Figure 6.9 illustrates the estimated distribution for PCE benefits for the Construction and Operational Portfolio. The largest share of the benefits are realized by the non-PCE eligible ratepayers (70%), followed by the State through lower PCE program payments (28%), and then by PCE eligible ratepayers (2%).

Figure 4.10 Distribution of PCE Impact Benefits for 2011 Operating and Construction Portfolio



Due to limitations on the available data our PCE impact analysis excluded 5 projects that were identified as operated by independent power producers (IPP) due to a lack of information on power purchase agreement terms. As noted above, a the cost of renewable electricity offered by the IPP to the local utility will likely be at lower rates than the diesel generated electricity, this should in effect also reduce the PCE program costs incurred for that community to a lesser degree.

Also note, that while renewable project operation and maintenance costs may be included in PCE cost calculations they are not included in this analysis due to inconsistency of reporting.

Job Impacts

In order to develop a high level assessment of job impacts for the 62 projects in the REGRP Construction Portfolio, industry averages for individual renewable energy resource sectors were applied against the 19 projects currently in operation and the 43 in the construction phase (post-grant).

The industry averages for job impacts were the result of a compilation by the University of California – Berkeley of existing studies on renewable energy projects.[19] The study

[19] Max Wei, Shana Patadia, Daniel Kammen, "Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the US?", Energy Policy, November 14, 2009.

proposes a generation based (GWh) factor for each renewable energy sector including boththe shorter term employment in construction, installation and manufacturing (CIM) and the longer term employment in operation and maintenance (O&M). The resultant average allows for calculating both the total person-years of employment, as well as jobs if the result is divided by the operating life of the project.[20] (See Appendix A for additional background on the Univ. California – Berkley study)

The equations listed below were developed to equate an average employment per unit energy produced over a project's lifetime.

$$\textbf{Job Impacts}_{\text{Electric}} = Electric\ Savings * RE\ Resource\ Job\ Factor\ \left(in\ \frac{Person-years}{GWh}\right) * Project\ Life$$

$$\textbf{Job Impacts}_{\text{Heating}} = Heat\ Savings * RE\ Resource\ Job\ Factor\ \left(in\ \frac{Person-years}{GWh}\right) * Project\ Life$$

Employing this model for the RE Fund program suggested a creation of 37 jobs based on the amount of energy being displaced (or projected displacement) by the projects. During the early stages of renewable development in the state, skilled labor was often needed from outside the state to assist in the feasibility, design, construction and maintenance of the renewable energy projects. For this reason, it should be noted that not all of these jobs should be equated with Alaska employment, but that with continued growth in the Alaska renewable industry, this balance will continue to shift.

Table 4.9 Job and Environmental Benefits of REGRP 2011 Construction Portfolio

RE Resource Sector	Sector Job Impact Factor	Jobs	
	Person-years per GWh [21]	Person-Years	# of Jobs
Biomass	0.21	180	9
Geothermal	0.25	18	0.9
Heat Recovery	0.25	71	3.6
Hydro / Hydrokinetic	0.27	445	9
Solar	0.23	0.3	0.0
Wind	0.17	294	15
REGRP in Construction Portfolio		1009	37

[20] Most renewable sectors have a 20 year project life, but hydro has a longer 50 year life.
[21] Due to a significantly higher estimate for landfill gas projects, the lower estimate of 0.32 referenced from the EPRI 2001 evaluation was utilized. As heat recovery was not included in the study, the job impact factor for geothermal was assumed due to the lower O&M.

Due to the unique challenges of installing renewables in Alaska and associated costs, it is very likely that these employment factors from other areas of the United States underestimate the benefits to the state.

Environmental Impacts

Although not included in either the TRC or PCT, reducing diesel and natural gas emissions from offsetting fuel usage offers both benefits to the air quality in Alaskan communities, as well as a monetized benefit to the state. For this evaluation, we solely calculated the monetized avoided carbon emissions, though the additional particulate of generated emissions are monitored by the Alaska Department of Environmental Conservation – Division of Air Quality.

The monetized avoided emissions for the 62 projects in the REGRP Construction Portfolio are 115 thousand metric tonnes of carbon dioxide with a monetized value of over $16 million during the lifetime of the projects.

Table 4.10 Avoided Carbon Emissions

RE Resource Sector	Avoided Fuel		Avoided Carbon Emissions	
	Diesel (x1000 Gal)	Natural Gas (MMBTU)	Tonnes/Year	Project Lifetime Savings ($ Millions)
Biomass	606	319,162	23,083	$2.4
Geothermal	92		930	$0.1
Heat Recovery	620		6,225	$0.7
Hydro / Hydrokinetic	2,419	24,071	25,117	$6.8
Solar	1.7		33	$0.0
Wind	5,822		60,139	$6.4
REGRP in Construction Portfolio	9,560	343,233	115,527	$16.4

Avoided emissions are calculated as part of the individual project evaluations conducted by ISER during the REGRP applications and included in this analysis. The avoided emissions for the two primary generation sources are:

Table 4.11 Avoided Emissions Factors for Diesel and Natural Gas Generation[22]

	Avoided Metric Tonne CO_2	Carbon Price 2011$ (Low)	Carbon Price 2011$
Diesel	0.010 per gal	$5.42 per Tonne	0.05 per gal
Natural Gas	0.053 per Mcf		$0.29 per Mcf

[22] Carbon pricing and avoided emissions are based on ISER analysis of National Bureau of Economic Research, "*Estimating the Social Cost of Carbon for Use in the U.S. Federal Rulemakings: A summary and Interpretations"* and US Energy Information Administration, Voluntary Reporting of Greenhouse Gases Program, *Table1. Carbon Dioxide Emission Factors for Stationary Combustion.*

5. Renewable Energy Resource Subsector Analysis

Overview

This section will present a closer review of the REGRP construction portfolio for the individual primary RE resources of Wind, Hydro, Biomass, Geothermal and Heat Recovery. In addition, we review the operational portfolio for these resource subsectors to identify lessons learned that may help guide future management of the Program, and provide valuable input to industry stakeholders and future participants related to the relative performance of individual systems and designs.

Included in this section are:

- A review of the resource potential for individual renewable energy resources in the State of Alaska, as well as the development of the related industry sub-sector since the inception of the REGRP.
- A project level Benefit/Cost analysis based on the best available data. This includes present value of savings in fuel, as well as capital and O&M over the expected life of the project versus cost. For operational projects, the estimated performance of projects is compared against the operational performance in 2011.
- A high level discussion of secondary benefits associated with the employment, infrastructure development and environmental benefits associated with specific renewable energy resources.

It is important to note that our analysis is limited by the quality of the available data, since VEIC is not familiar with most individual projects operating in the state. In some cases, especially when projects are only partially funded through the REGRP and rely on prior infrastructure or earlier phases of development funded outside the REGRP program, the Benefit/Cost analysis for a given project may not accurately capture the full costs.

This is most evident in the wind energy section, since AEA was a relative late comer in funding projects in this technology sector. By the time the first AEA project was completed (in Unalakleet), a number of other projects had been operational around the state for several years. These projects were originally constructed using other sources of funding and/or financing, but later submitted applications to the REGRP to expand or upgrade their systems. For this reason, the full capital costs are not necessarily reflected in the Benefit/Cost analysis. When possible, we note this probable discrepancy for individual projects. We expect as the program matures and fewer projects are funded entirely outside of the REGRP, the costs reported through the program will better reflect the actual costs for the project in its entirety. In addition, this finding highlights the continued need for a robust and consistent data collection and management plan across programs and technology sectors.

Wind

There is significant potential for wind energy in the State of Alaska with more than 134 rural communities identified as having potentially viable wind resource.[23] In addition, there are opportunities for larger commercial and industrial sized systems along the Railbelt and offshore applications. However, to achieve appropriate economies of scale for cost-effective offshore applications, siting may be restricted to areas in the southeast with access to the larger BC Hydro electrical transmission system in Canada. [24] A map of the wind energy resource at 50 meters above the surface of the earth highlights the significant potential in the coastal and western parts of the state, as well as elevated areas of the interior. However, in order to take full advantage of the potential wind energy available to larger population centers, continued investments in transmission infrastructure will be required as many of the best resources are not co-located with population centers and existing transmission lines have limited capacity to carry additional wind power.

Wind generation capacity has grown significantly since the inception of the REGRP in 2008 with more than 15 MW of installed generation capacity currently operational and an additional 24.6 MW (Golden Valley Electric Association - Eva Creek Wind Project) and

Figure 5.2 50 Meter Wind Map of Alaska

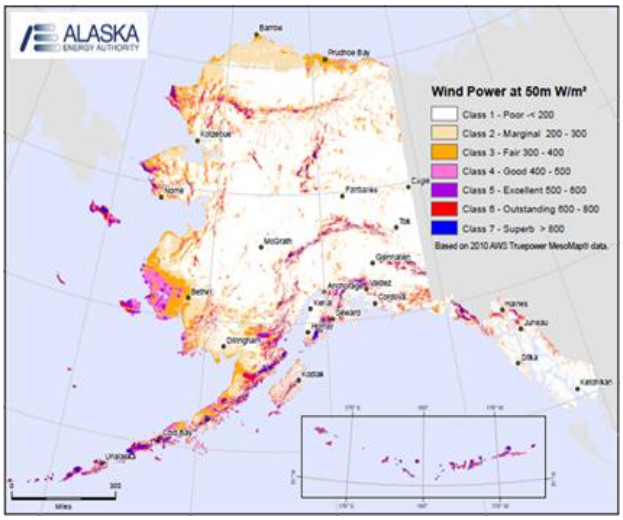
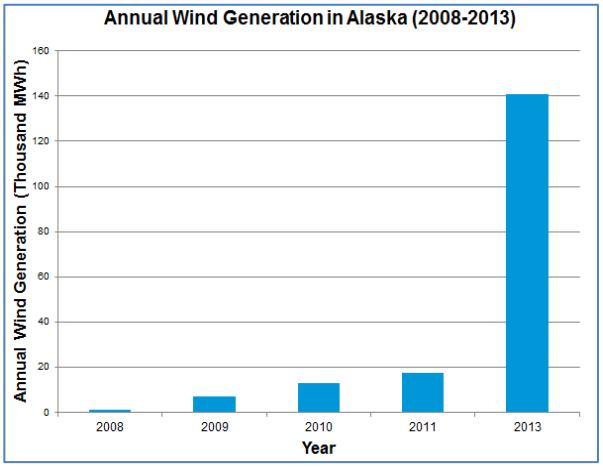


Figure 5.1 Wind Generation in Alaska



17.6 MW (Fire Island Wind LLC) expected to come online by 2013.[25]

The REGRP has provided grant funding to 9 of the 20 wind systems in the state that were operational in 2011. An additional 12 systems are currently in the construction phase and

[23] Alaska Energy Authority & Alaska Center for Energy and Power, Alaska Energy: A First Step Toward Energy Independence (January 2009) www.akenergyauthority.org/PDF%20files/AK%20Energy%20Final.pdf
[24] Comments attributed to AEA Wind Program Manager Rich Stromberg
[25] Data provided by Rich Stromberg, AEA Wind Program Manager, June 2012.

41 in the pre-construction phase including reconnaissance, feasibility, and design. Of the 11 systems operating in Alaska in 2011 that were not originally funded through the REGRP, several have been awarded funds to expand or update their systems.

The 62 wind projects funded through the REGRP have had a total of $73.7M in funding appropriated through Round 4 of the REGRP.[26] Of the total funding for this sector, $56M is for the 21 REGRP projects operational or in construction as of 2011, and in sum will leverage over $125M of external federal, state, local match including utility debt and equity sources.

Based on the reported performance of the operational systems in 2011[27], the projected cost-effectiveness of the operational REGRP wind systems ranged from 4.66 (Nome Banner Peak[28]) to 0.36 (Emmonak)[29] with an average of 2.39.

However, as previously noted, several REGRP awards capture only a subset of total infrastructure costs, and costs not funded through the REGRP program or reported as match often difficult to reconstruct. The Nome Banner Peak project is an example, as the only cost for the project funded through the REGRP was a transmission line upgrade. This means that none or few of the capital or O&M costs for the project are captured in the Cost/Benefit analysis. It is tempting for this reason to exclude the Nome Banner Peak project from the analysis, however since anecdotal evidence suggests similar circumstances exist to varying degrees in relation to other projects, we have chosen to report values based on the best available data provided to AEA for each project. We leave it to the discretion of the program manager and the reader to use caution in interpreting the output, particularly for very high or low values.

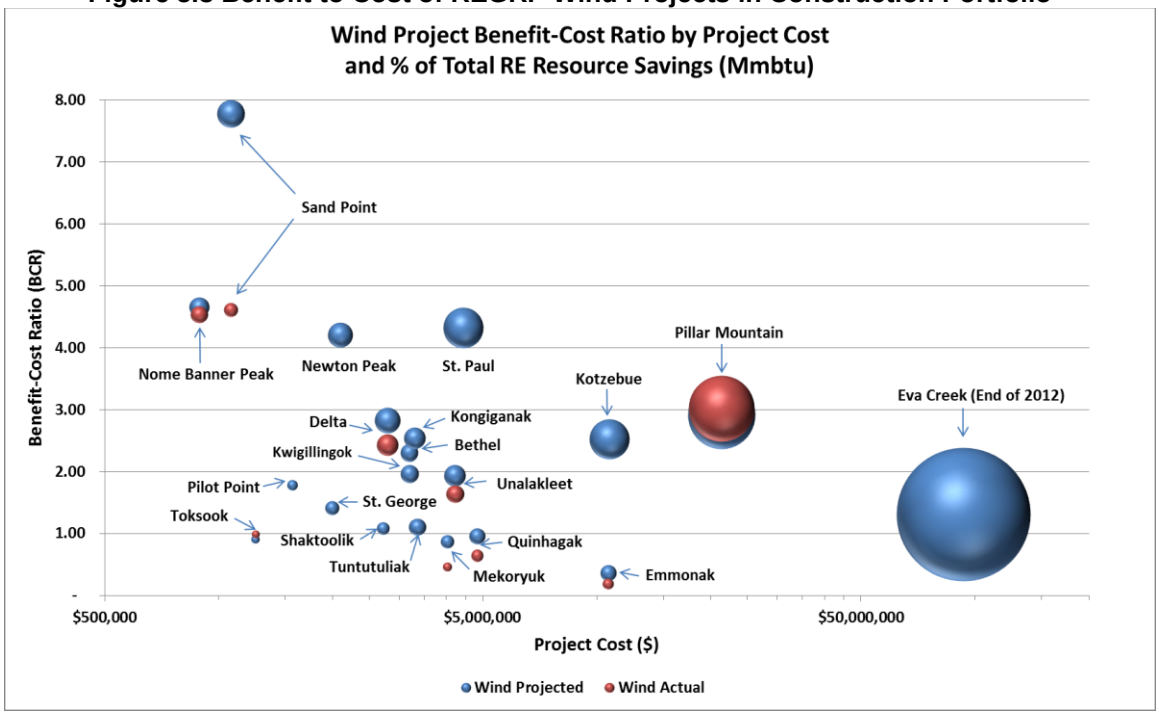
The graph represents the cost-effectiveness of the REGRP funded wind projects that were either operational or in construction in 2011. Projects operational in 2011 have two spheres – one in red representing actual performance and the other in blue for the originally estimated performance. Projects in construction phase have a single sphere representing their estimated performance.

The scale of the individual bubbles that represent projects are relative to the total wind sector annual energy generation with the largest project, GVEA's Eva Creek, projected to generate 35% more energy than the combined total of all of the other projects. However, due to the relatively low avoided cost of energy for GVEA ($0.17/kWh in 2013)[30], the

[26] Fifty-two of the wind systems funded through Round 4 are for separate community applications, representing nearly 40% of communities in the State of Alaska with viable wind.
[27] Reported performance was based on the Alaska Renewable Energy Fund 2011 Status Report
[28] The Nome Banner Peak project is for a transmission intertie for a wind project and the relatively high BCR of 4.66 does not reflect the cost of the installation and operation of the wind turbines.
[29] Based on feedback from AEA Program Manager Rich Stromberg, the Emmonak project is anticipated to increase in performance with additional operational experience.
[30] ISER avoided fuel costs included in individual project analysis for Eva Creek.

overall project cost-effectiveness is lower than many of the rural wind projects that are offsetting extremely high diesel-based generation costs averaging $0.44/kWh.[31]

Figure 5.3 Benefit to Cost of REGRP Wind Projects in Construction Portfolio[32]



* Note a logarithmic scale was used for the Project Cost due to the wide spread in scale of the projects.

[31] Based on 2010 Alaska Power Statistics Table and an average diesel generation efficiency of 13 kWh/gal.
[32] The bubble chart represents the cost-effectiveness of the REGRP funded wind systems that were either operational (actual - red) or in construction (estimated - blue) in 2011.

Table 5.1 Costs and Benefits of REGRP Wind Projects in the Construction Portfolio

Project Name	Total Project Cost_est	Electricity Act/Proj%	Diesel Act/Proj%	Annual Electricity (kWh)	Annual Diesel Displaced (gal)	Annual Natural Gas (Mmbtu)	NPV Costs	NPV Benefits	NPV BCR_TRC
Bethel Wind Power Project Times Four	$ 3,197,986			817,000	62,846		($3,626,531)	$8,560,035	2.36
Delta Area Wind Turbines-Construction	$ 2,801,500	81%	62%	1,424,640	109,588		($3,676,956)	$9,144,260	2.49
Emmonak/Alakanuk Wind Design and Construction	$ 10,733,179	49%	45%	338,526	26,040		($10,649,890)	$1,983,686	0.19
GVEA Eva Creek Wind Turbine Purchase	$ 93,300,000			55,510,204	3,469,388		($127,091,567)	$170,298,889	1.34
Kotzebue High Penetration Wind-Battery-Diesel Hybrid	$ 10,808,919			4,266,667	328,205		($13,300,282)	$34,405,418	2.59
Kongiganak High Penetration Wind-Diesel Smart Grid	$ 3,300,000			1,167,000	89,769		($3,971,419)	$10,331,581	2.60
Kwigillingok High Penetration Wind-Diesel Smart Grid	$ 3,200,000			742,636	69,305		($3,595,228)	$7,248,665	2.02
Mekoryuk Wind Farm Construction	$ 4,031,406	50%	37%	238,706	18,362		($4,075,693)	$1,889,693	0.46
Nome Newton Peak Wind Farm	$ 4,444,444			4,266,667	328,205		($7,121,180)	$31,348,510	4.40
Nikolski Wind Integration Construction	$ 450,930			84,054	10,255		($496,106)	$1,278,698	2.58
Nome Banner Peak Wind Farm Transmission Construction	$ 890,000	93%	68%	955,148	73,473		($1,505,733)	$6,833,906	4.54
Pillar Mountain Wind Project - Construction	$ 21,400,000	102%	93%	12,448,474	957,575		($29,139,412)	$87,996,435	3.02
Pilot Point Wind Power & Heat	$ 1,571,240			240,000	22,644		($1,683,324)	$3,083,221	1.83
Quinhagak Wind Farm Construction	$ 4,838,603	63%	58%	409,240	31,480		($4,983,221)	$3,190,343	0.64
Sand Point Wind Construction	$ 1,077,706	28%	24%	522,085	55,460		($1,410,603)	$6,516,122	4.62
Shaktoolik Wind Construction	$ 2,727,960			360,289	32,715		($2,892,576)	$3,208,497	1.11
St. George Wind Farm Construction	$ 2,000,000			511,221	39,325		($2,268,184)	$3,280,739	1.45
St. Paul Wind Diesel Project	$ 2,100,000			1,600,000	123,077		($3,091,154)	$13,251,063	4.29
Toksook Wind Farm Construction	$ 1,253,056	107%	93%	176,834	13,603		($1,339,945)	$1,322,312	0.99
Tuntutuliak High Penetration Wind-Diesel Smart Grid	$ 3,360,000			517,878	63,496		($3,602,744)	$4,087,939	1.13
Unalakleet Wind Farm Construction	$ 4,222,752	80%	63%	958,350	73,719		($4,768,451)	$7,810,497	1.64
Wind Program Summary	**$ 181,709,681**	**73%**	**60%**	**87,555,619**	**5,998,529**		**($234,290,199)**	**$417,070,508**	**1.78**

Wind Costs, Performance and Lessons Learned

Of the 20 operational wind turbine sites AEA currently monitors for performance, the REGRP has supported the development of 9 systems that are functioning today. Once the additional 12 projects currently in the construction portfolio are brought on-line, a more comprehensive picture will emerge of the value in wind-diesel hybrid systems in reducing energy costs. In addition, since numerous technologies and strategies have been employed in the construction of the systems, additional data will continue to expand the industry's knowledge about developing reliable, cost-effective projects in Alaska. This is especially true because the range of funded projects represents a broad spectrum, including both smaller, rural wind diesel systems and several larger multi-Megawatt projects.

Generally, larger utility-scale wind power systems (e.g. Pillar Mountain - 9MW and Eva Creek - 24MW) offer lower installed costs compared to the smaller distributed wind turbine systems in rural Alaska. However, no systems in Alaska have been installed for capital costs approaching those in other, more developed parts of the country. This is not surprising based on the climate and infrastructure challenges experienced to varying degrees for all construction projects in the state.

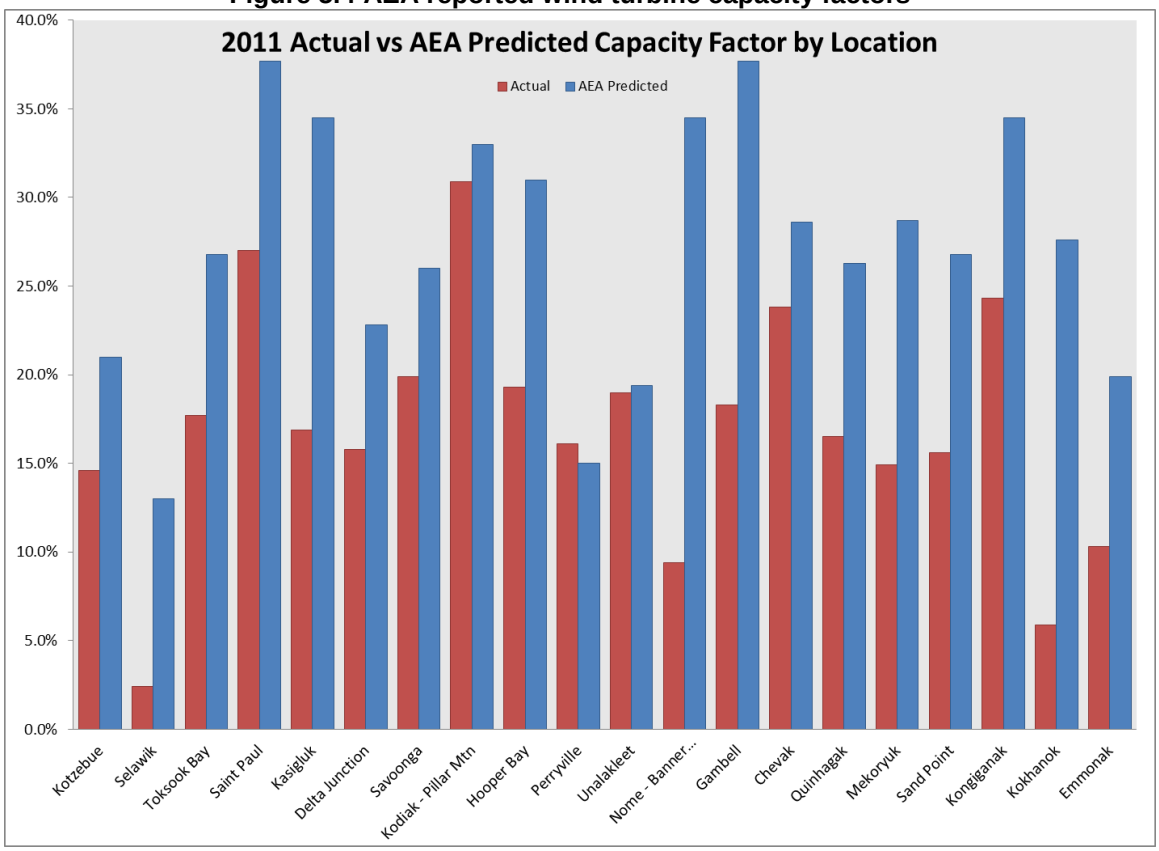
Table 5.2 Installed Cost of Wind Projects by Capacity

Wind Type	NREL ($/kW)	REGRP ($/kW) Operational/Construction Phase in 2011		
	Average	Average	Max	Min
Utility >1MW	$1,631	$3,133	$3,888	$2,378
Distributed <1MW	$2,500	$10,579	$26,833	$1,078

Because wind is variable in speed and availability, a turbine normally operates at less than its rated maximum output power. The average output of the turbine, as compared to its maximum rated nameplate power, is expressed as the *Capacity Factor*. Turbines in Alaska were found to have capacity factors in 2011 ranging from approximately 10% to greater than 30% for the year 2011.[33] The overall average capacity factor for Alaska wind turbines, calculated by comparing the total wind energy generated in 2011 with the installed nameplate wind capacity was 28.5%.

[33] Wind performance data provided by AEA Wind Program Manager, Rich Stromberg. Two wind systems not funded through the REGRP – Selawik and Kokhanok - performed at or below 5% capacity in 2011.

Figure 5.4 AEA reported wind turbine capacity factors[34]



A recent study of wind diesel systems documented the trend of improvements in wind capacity factors[35], but also noted the significant investments that are required to allow higher penetration of wind as a percentage of the total electric load.

Demonstrations of high penetration wind-diesel systems are incorporating the use of active load dumps for heating, as well as other strategies such as the use of battery storage systems, synchronous condensers, and grid forming inverters to achieve higher levels of wind penetration. None of these strategies are without challenges, and as a result AEA has focused on funding low and medium penetration systems in Round 5 of the REGRP until earlier high penetration systems are operational. The recently established Emerging Energy Technology Fund has provided an alternative option for state research towards developing high penetration systems using energy storage and other non-commercial ready technologies.

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[34] Note this includes capacity factors for projects not funded under the REGRP – which can help to provide broader view of projected and actual installed wind capacity factors. The wind sites - Quinhagak, Mekoryuk, Sand Point, Kongiganak, Kokhanok and Emmonak – are all currently completing commissioning and data does not yet reflect full year performance.

[35] Ginny Fay, Institute of Social and Economic Research (UAA) and Kat Keith, Alaska center for Energy and Power (UAF). University of Alaska, *Alaska Isolated Wind-Diesel Systems: Performance and Economic Analysis*, June 2010

Looking forward, operation and maintenance (O&M) for the installed systems was reported by AVEC as one of the largest unknowns for wind turbine projects, as the operational projects may begin to require more substantial repairs, especially in light of Alaska's harsh environment.[36] Continuing to collect information both on performance and additional incurred costs should be a priority, particularly as systems begin to age.

Barriers

There are significant challenges to integrating wind energy into the State's electric grid, especially in regard to rural Alaska:

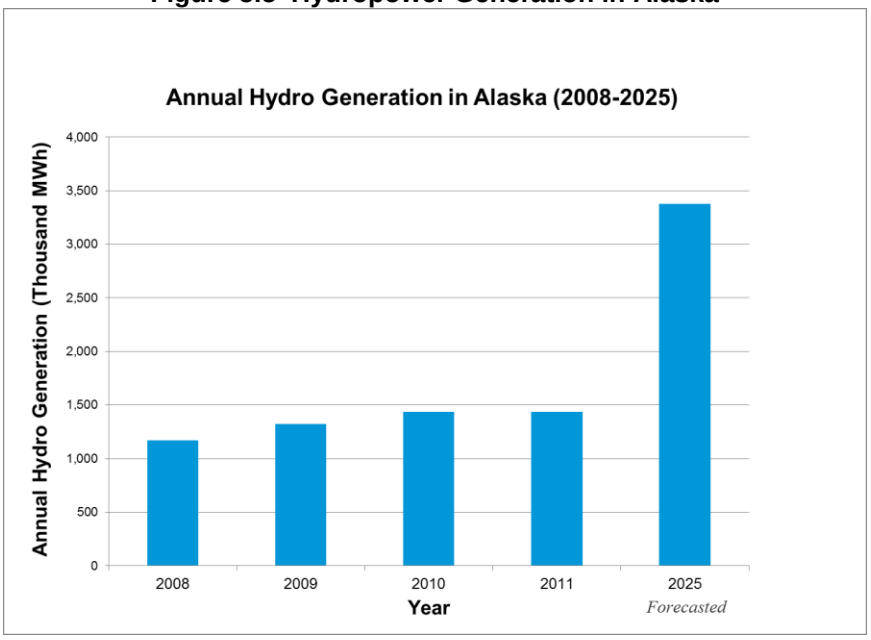
- Variable resource – The variability of both the wind and the electric load during the year requires appropriate system design to insure the electric energy supply matches the demand. Absent energy storage or a strong baseline source of generation (hydro or diesel), higher penetration as a percentage of total load can present challenges to utilities, who must be sure demand and supply always match in order to maintain grid stability.
- Stranded resource - The places where wind is most abundant are not necessarily where most electricity usage takes place, requiring investments in the transmission or storage of wind energy.
- Turbine Siting – Significant improvements have been made in the siting of turbines both at the national level and in Alaska. Developers are learning to avoid areas with excessive wind speeds or turbulence, and have improved foundation designs suitable for geotechnical and/or permafrost conditions.
- Due to the relatively high capital costs associated with wind energy, funding support including the Federal Production Tax Credit (PTC) can be critical for project development. In other parts of the United States, the continuation of the PTC program is probably the most critical factor to ensure the continued growth of wind energy. However, because many of the utilities investing in wind energy in Alaska are organized as cooperatives, the PTC is less of a driver to development in this state than elsewhere.[37]

[36] Interview with Meera Kohler and Brent Petrie of AVEC regarding the REGRP impacts on their efforts to replace 25% of the diesel fuel within the 52 communities they serve.
[37] Currently, the Fire Island Wind Project is the only project in the state affected by the PTC.

Hydropower and Hydroelectric Energy

Hydropower is the most mature renewable energy resource in Alaska with over 442MW of installed capacity reported in 2010 distributed across 34 individual power plants. The plants range from 550kW (10 Mile) to 126MW (Bradley Lake).[38] The majority of the current large hydro installations are located in the population dense areas of southeast and southcentral Alaska.

Figure 5.5 Hydropower Generation in Alaska



The additional proposed development of large hydro projects to serve the Railbelt region, notably the proposed 600 MW Susitna-Watana hydroelectric project in 2025, was cited as necessary to achieve the goals set forth in the 2010 state energy plan of achieving 50% of the state's electrical generation from renewable and alternative energy sources by 2025.[39] However, this project would cost many billions of dollars to construct and would not be funded through the REGRP program as it is currently structured.

Including all potential resources, there is significant potential for both conventional hydro and hydrokinetic energy. Hydrokinetic energy takes direct advantage of the energy in moving water in a river or tidal environment without the use of a dam or diversion channel, but is a much less mature technology than conventional hydropower. In total, hydropower energy potential in Alaska totals an estimated 45,000 MW. Traditional hydropower generation has continued to increase under the REGRP, producing over 1,466 GWh of electricity in 2011. Emerging technologies in the hydropower sector for

[38] *Power Statistics Tables 2010*
[39] *Railbelt Large Hydro Evaluation - Preliminary Decision Document*, Alaska Energy Authority, November 2010.

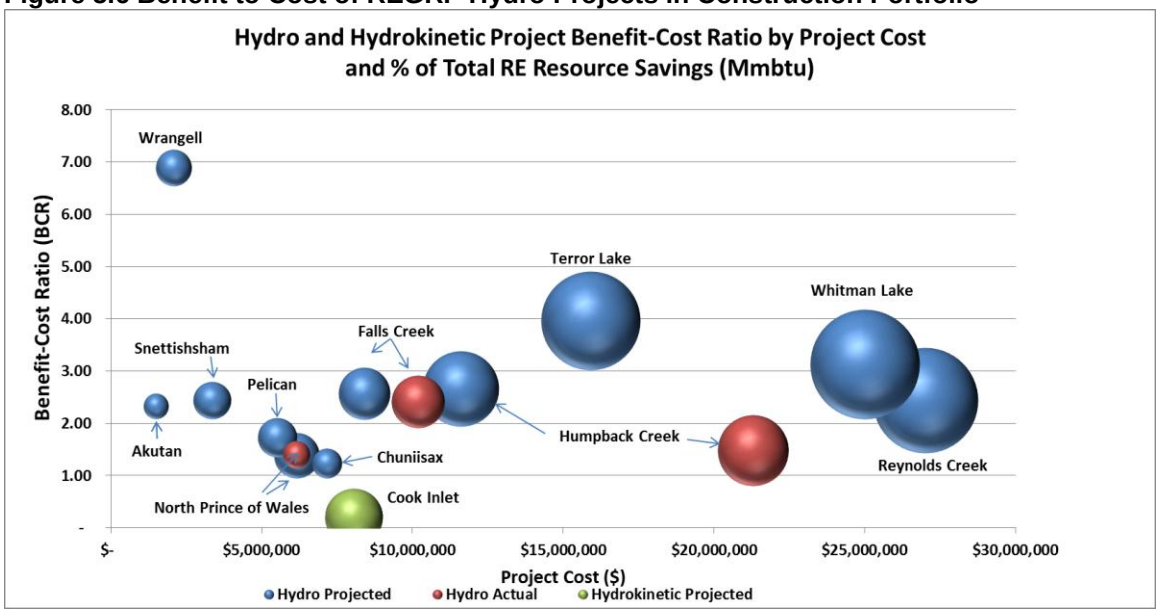
Alaska are tidal, river and wave energy. While there is significant interest by communities and developers, there are currently no active grid-connected marine or wave energy projects installed in the state and no projects funded through the REGRP after Round 1, when two resource assessment projects were funded. Two pilot projects installed in Ruby and Eagle were discontinued due to challenges with debris.

The REGRP has provided grant funding to 2 of the 34 operational hydroelectric sites in the state in 2011, as well as a transmission intertie to expand the service territory of an existing dam. An additional 9 systems are currently in the construction phase, including 2 project infrastructure upgrades and 2 transmission intertie projects. Finally, 43 projects are in the pre-construction phase including reconnaissance, feasibility and design.

The state has provided REGRP appropriations through Round 4 of $42.9M for hydroelectric and other river and marine energy projects. Of the total funding for this sector, $31M has been allocated to the 11 REGRP projects currently operational or in construction as of 2011. These projects will leverage over $100M of external federal, state, local match and utility debt and equity sources.

The graph represents the cost-effectiveness of the REGRP funded hydro projects that were either operational or in construction in 2011. Projects operational in 2011 have two spheres – one in red representing actual performance and the other in blue for the originally estimated performance. Projects in construction phase have a single sphere representing their estimated performance. The scale of the individual projects in the figure below is relative to the total hydroelectric and hydrokinetic energy sector annual energy generation.

Figure 5.6 Benefit to Cost of REGRP Hydro Projects in Construction Portfolio[40]



[40] The graph represents the cost-effectiveness of the REGRP funded hydro and hydrokinetic projects that were either operational (actual - red) or in construction (estimated - blue) in 2011. The scale of the individual projects in the figure is relative to the total hydro sector annual energy generation. In the case of Falls Creek and Humpback Creek project costs in original estimates did not capture total project costs.

Table 5.3 Costs and Benefits of REGRP Hydro Projects in Construction Portfolio

Project Name	Total Project Cost_est	Electricity Act/Proj%	Diesel Act/Proj%	Annual Electricity (kWh)	Annual Diesel Displaced (gal)	Annual Natural Gas (Mmbtu)	NPV Costs	NPV Benefits	NPV BCR_TRC
Akutan Hydroelectric System Repair and Upgrade	$ 1,491,000			420,000	32,308		($2,068,929)	$4,920,503	2.38
Chuniisax Creek Hydroelectric Construction	$ 7,167,332			567,870	43,682		($7,982,849)	$10,148,359	1.27
Falls Creek Hydroelectric Construction	$ 10,178,000	109%	102%	1,933,407	148,724		($11,416,849)	$27,609,838	2.42
Humpback Creek Hydroelectric Construction	$ 21,300,000	91%	87%	3,764,000	289,538		($54,032,617)	$80,180,891	1.48
North Prince of Wales Island Intertie Project	$ 6,155,019	0%	46%	1,356,224	104,325		($13,687,394)	$19,289,315	1.41
Pelican Hydroelectric Upgrade Project	$ 5,520,836			1,000,000	76,923		($6,298,714)	$11,168,957	1.77
Reynolds Creek Hydroelectric Project	$ 27,000,000			7,351,000	565,462		($29,779,235)	$74,667,786	2.51
Snettishsham Transmission Line Avalanche Mitigation	$ 3,344,260			935,606	71,970		($4,311,064)	$10,772,945	2.50
Terror Lake Unit 3 Hydroelectric Project	$ 15,907,950			6,456,150	496,627		($21,525,370)	$87,239,685	4.05
Whitman Lake Project	$ 25,000,000			7,926,000	609,692		($29,758,380)	$95,523,739	3.21
Wrangell Hydro Based Electric Boilers Construction	$ 2,082,000				85,821		($2,021,359)	$14,356,170	7.10
Cook Inlet TidGen Project	$ 8,050,538			1,839,600		24,071	($9,142,488)	$1,956,160	0.21
Hydro / Hydrokinetic Program Summary	**$ 133,196,935**	**67%**	**78%**	**33,549,857**	**2,525,072**	**24,071**	**($192,025,246)**	**$437,834,347**	**2.28**

Based on the reported performance of the operational systems in 2011[41], the projected cost-effectiveness of the operational REGRP hydroelectric projects of Falls Creek and Humpback Creek were 2.18 and 1.47 respectively, with an average of 1.83. Although included in the construction portfolio, it was noted that the Cook Inlet Tidal Generation project is not currently a construction project and does not reflect the total anticipated costs of development of the project.

Hydro Costs, Performance and Lessons Learned

The two operational hydro projects with available performance data[42] were within 10% of the estimated performance in 2011. This can in large part be attributed to the maturity of the technology in Alaska and the relatively consistent nature of the resource. However, the inability to consistently predict the installed cost based on the lengthy pre-construction and permitting phase of the projects, as well as the site specific conditions for individual hydroelectric projects, can lead to significant variances from the estimated project costs.

Both operational projects (at Falls Creek and Humpback Creek) originally proposed lower installed costs in their applications to the REGRP, but ultimately revised costs upward with increases of 21% and 81% respectively documented in the final installed cost. For Falls Creek, the increase was in part attributed to the project cost not originally capturing the cost of prior feasibility studies. In the case of Humpback Creek, two separate applications were submitted in Rounds 1 and 3 and the project received two appropriations of $4M each for a total of $8M in REGRP funding.

Table 5.4 Total Installed Cost of Hydro Projects

Hydroelectric Project	REGRP Hydro Installed Costs Operational Projects in 2011 ($ Million)		
	Original	Final	% Variance
Falls Creek	$8.4M	$10.2M	21%
Humpback Creek	$11.6M	$21M	81%

In an analysis of the installed costs of operational and projects in construction in 2011, the conventional hydropower projects included dam and run-of-river systems, covering a full spectrum of upgrades, new construction, transmission interties and the installation of new electric boilers to reduce diesel heating costs. The table below reflects projects identified as new construction.

[41] Reported performance was based on the Alaska Renewable Energy Fund 2011 Status Report
[42] The third operational project is an intertie to the Reynolds Creek hydro project.

Table 5.5 Installed Cost of Hydro Projects by Capacity

Hydroelectric Project	NREL ($/kW)	REGRP ($/kW) Operational/Construction Phase in 2011		
	Average	Average	Max	Min
Hydro – New	$2,240	$8,534	$16,800	$4,536

The two operational projects in Alaska, Falls Creek and Humpback Creek, were found to have capacity factors of 0.28 and 0.31, respectively,[43] for the year 2011. The overall average capacity factor for the hydro projects Alaska, calculated by comparing the projected total hydro energy generation with the installed nameplate capacity, was 0.22. Oversizing of hydro projects for future increases in electric load, as in the case of Falls Creek,[44] affects these first year calculations of capacity factors.

Lower capacity factors in Alaska for hydro projects are typically attributed to the lower flow rates during winter months. In some cases, as the generated energy is utilized to offset high cost diesel generation, specific efforts are made to increase head levels of the dam prior to low flow periods on rivers to insure a minimum generation capacity is retained year round. [45] The relatively predictable nature of this seasonality and storage capability of the energy capacity in dam applications allows hydro projects to serve as base loads for other non-dispatchable renewable resources (e.g. wind turbines).

Although hydropower is the most mature developed renewable resource in Alaska and most project funded through the REGRP are conventional systems, more emerging applications of hydrokinetic and tidal energy have also been funded. Ongoing efforts at resource assessment (conducted through both the University of Alaska Fairbanks and the University of Alaska Anchorage), as well as a tidal energy feasibility study for Cook Inlet led by ORPC will improve the understanding of the potential of hydrokinetic and marine energy applications in the state.

Barriers

Broad adoption of hydropower isimpacted by several market and technology barriers including:

- Scale vs. Cost-effectiveness – As with other technologies, the most cost-effective applications of hydro are often tied to conventional hydro at a larger utility scale (>1MW). However, efforts in supporting emerging technologies to allow for more community scale projects may see significant cost reductions with the development of an early industry adoption.

[43] NREL analysis of new hydro construction projects estimates capacity factors between 0.34 and 0.53. http://www.nrel.gov/analysis/tech_cap_factor.html
[44] In its grant application, Gustuvus Electric estimated 2,000 MWh for first year generation, but suggested the site was capable of 6,300 MWh annually with increased customer electric loads.
[45] Comments from Doug Ott, the AEA Hydro Program Manager.

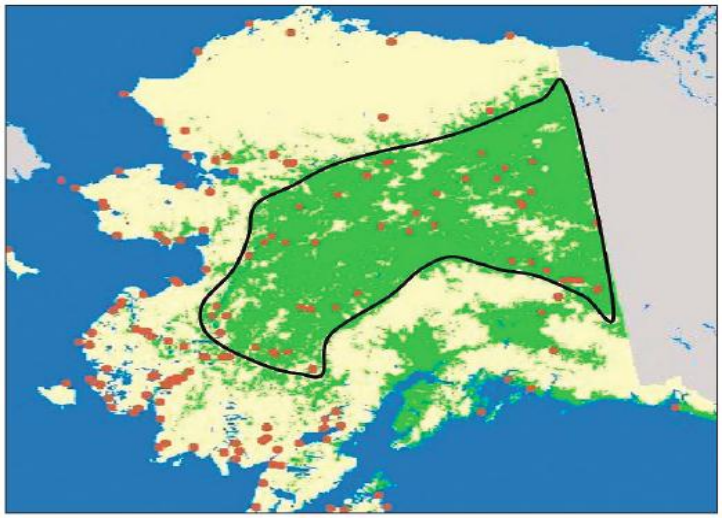
- Limited sites – Although Alaska has a significant untapped hydropower potential in the state, assessing the viability of individual sites, as well as balancing the development of a hydropower project on a river against competing interests (environmental impacts, fishing, etc.) limits the number of suitable sites. Equipping existing non-powered dams with turbines and repowering existing dams with new turbines is often considered a preferred path to reducing the permitting and development costs per kW for installations.
- Stranded resources - Significant investments in transmission are often required to allow for the utilization of a hydropower resource, whether centered on a river system, lake tap hydro, or in the ocean.
- Permitting remains as one of the biggest barriers to expediting the hydro development timeline, as multiple organizations at the state and federal level, notably the Federal Energy Regulatory Commission (FERC), have jurisdiction over proposed hydro projects.[46]
- Assessing the potential of smaller community-sized or microhydro run-of-river conventional hydropower installations having 100 kW average power output or less, as well as addressing technical barriers, could lower the costs and complexity of hydropower projects going forward.

[46] Legislation currently being proposed in the US legislature (H.R. 5892 - Hydropower Regulatory Efficiency Act) is targeted to streamline the efficiency of the process and expand FERC's ability to grant exemptions to their review process.

Biomass and Landfill Gas

Biomass represents one of the broadest spectrums of energy generation in Alaska, ranging from residential space heating applications to community scale combined heat and power plants and utility scale landfill gas applications. Several community scale wood boiler projects are currently operational in Alaska with a total capacity of 1.75 MWth[47]. Chena Power's waste to energy CHP system (400kWe) and Anchorage's landfill gas-to-energy project (3.2MWe) will add 3.6MWe of biomass electric power generation in 2012, becoming the state's first commercial and utility scale projects generating electricity. Not included in this estimate is the existing UniSea 2MWe generator that utilizes processed fish oil for over 70% of its blended fuel, as well as other examples of the use of fish oil by fish processors in the state.

Figure 5.7 Alaska Forested Regions



Biomass potential is widely distributed, with Alaska's forests capable of growing over 3.5 million cords of wood a year, the fishing industry generating over 21 million gallons of fish oil, and 7 class 1 landfills.[48] A recent evaluation by the USDA Forest Service identified a significant opportunity for biomass development, especially in Interior Alaska, where approximately half of the communities bordered by forested regions are located.[49] This study also identified the natural fit of biomass boilers with the more than 50 communities that currently have combined heat and power (CHP) systems in place with the necessary infrastructure for distribution of the generated heat and power.

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[47] Total installed capacity estimated based on installed wood boilers in the communities of Dot Lake, Craig, Gulkana, Tanana and Tok, as well as the Sealaska Plaza.

[48] Renewable Energy Alaska Project (REAP) website - http://alaskarenewableenergy.org/alaskas-resources/types-renewable-energy/biomass/

[49] *Assessing the Potential for Conversion to Biomass Fuels in Interior Alaska*, United States Department of Agriculture – Forest Service, Nancy Fresco and Stuart Chapin, June 2009.

The Alaska Energy Authority, in partnership with the US Forest Service and NREL, established funding for a Wood Energy Pre-Feasibility Grant initiative to provide feasibility funding for "community heating projects of individual facility, community and district heating projects with high efficiency, low-emission, wood-fired systems." Twenty-six applications were received and currently being processed for design/permitting support through USDA grants.[50]

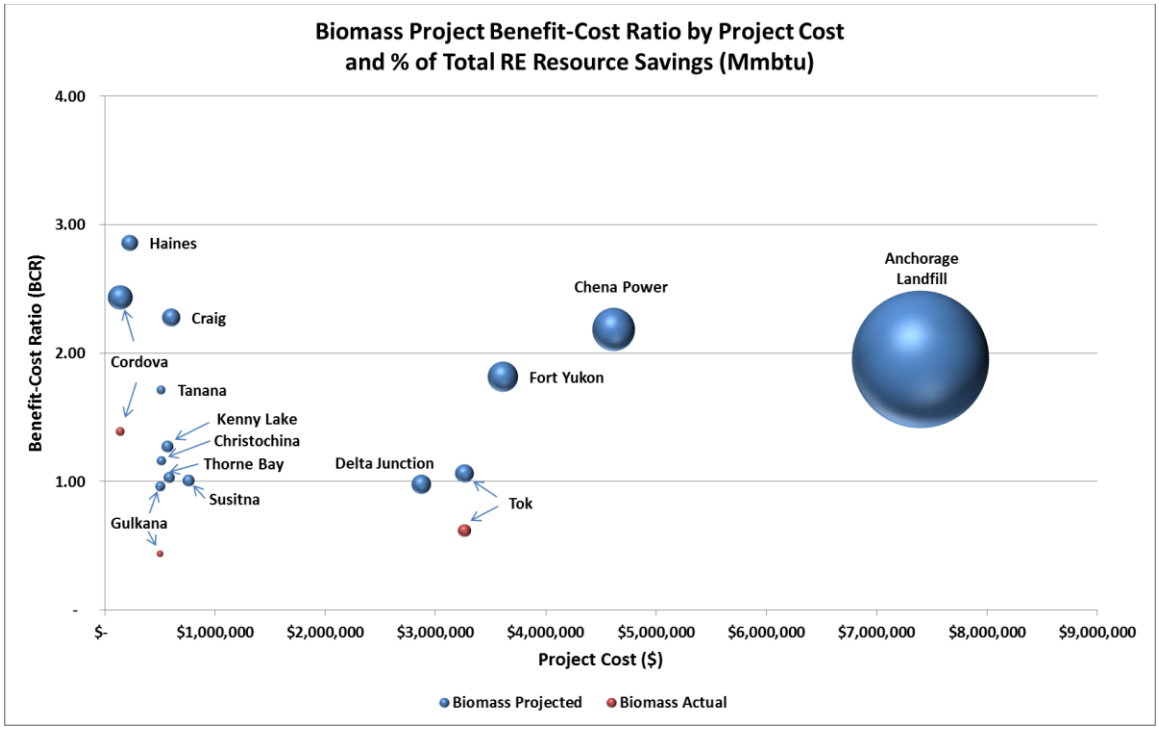
The REGRP has provided grant funding to 3 of the operational biomass projects in the state in 2011, including 2 wood boilers and 1 wood processing facility. An additional 12 systems are currently in the construction phase, including both wood boilers and processing facilities. An additional18 projects are in the pre-construction phase including reconnaissance, feasibility, and design.

The state has provided REGRP appropriations through Round 4 of $18.3M for biomass energy projects. Of the total funding for this sector, $15.8M was designated for the 15 REGRP projects currently operational or in construction as of 2011. These projects leverage over $10.8M of external federal, state, local match and utility debt and equity sources.

The graph represents the cost-effectiveness of the REGRP funded biomass projects that were either operational or in construction in 2011. Projects operational in 2011 have two spheres – one in red representing actual performance and the other in blue for the originally estimated performance. Projects in construction phase have a single sphere representing their estimated performance. The individual scale of the projects is relative to the total biomass energy sector annual energy generation.

[50] AEA Biomass Program Update 2011, Presentation by Devany Plentovich.

Figure 5.8 Benefit to Cost of REGRP Biomass Projects in Construction Portfolio [51]



Based on the reported performance of the operational systems in 2011[52], the projected cost-effectiveness of the operational REGRP biomass projects in Cordova, Gulkana and Tok were 0.98, 0.59 and 0.61 respectively with an average of 0.73. The consistent spread between actual and estimated performance for all three of the operational biomass projects is more prominent than other sectors. Continuing to track performance of these systems will be an important area of focus for the biomass sector of the program.

[51] The graph represents the cost-effectiveness of the REGRP funded biomass projects that were either operational (actual - red) or in construction (estimated - blue) in 2011. The scale of the individual projects in the figure is relative to the total biomass sector annual energy generation.
[52] Reported performance was based on the Alaska Renewable Energy Fund 2011 Status Report

Table 5.6 Costs and Benefits of REGRP Biomass Projects in Construction Portfolio

Project Name	Total Project Cost_est	Electricity Act/Proj%	Diesel Act/Proj%	Annual Electricity (kWh)	Annual Diesel Displaced (gal)	Annual Natural Gas (Mmbtu)	NPV Costs	NPV Benefits	NPV BCR_TRC
Anchorage Landfill	$ 7,395,200			24,183,132	0	319,162	($16,799,890)	$33,281,086	1.98
Biomass Fuel Dryer Project	$ 600,000				47,742		($1,470,769)	$3,392,415	2.31
Biomass-fired Organic Rankine Cycle System	$ 4,612,900			3,098,413	201,114		($4,478,544)	$10,097,555	2.25
Chistochina Central Wood Heating Construction	$ 512,000				13,210		($1,051,954)	$1,243,319	1.18
City-Tribe Biomass Energy Conservation	$ 508,365				11,600		($684,978)	$1,201,843	1.75
Cordova Wood Processing Plant-Purchase and setup	$ 137,760		13%		11,400		($819,275)	$1,140,501	1.39
Delta Junction Wood Chip Heating	$ 2,868,000				52,508		($4,523,082)	$4,528,145	1.00
District Wood Heating in Fort Yukon	$ 3,606,255				137,282		($8,264,591)	$15,217,666	1.84
Gulkana Central Wood Heating Construction	$ 500,000		40%		5,900		($1,199,462)	$530,388	0.44
Haines Central Wood Heating Construction	$ 225,120				38,362		($1,419,394)	$4,080,735	2.87
Kenny Lake School Wood Fired Boiler	$ 565,485				20,000		($1,183,546)	$1,534,031	1.30
Lake and Peninsula Wood Boilers	$ 493,200				3,902		($594,879)	$578,053	0.97
Susitna Valley High School Wood Heat	$ 755,500				20,800		($1,575,785)	$1,617,165	1.03
Thorne Bay Wood Boiler	$ 580,179				17,500		($1,255,155)	$1,318,104	1.05
Tok Wood Heating Construction	$ 3,260,349		48%		24,400		($3,588,610)	$2,228,822	0.62
Biomass Program Summary	**$26,620,313**		**34%**	**27,281,545**	**605,720**	**319,162**	**($48,909,916)**	**$81,989,829**	**1.68**

Biomass Costs, Performance and Lessons Learned

With three projects providing operational data for 2011, and a further 12 biomass projects approved through the construction phase, the REGRP is starting to develop a useful base of knowledge on the projected and actual costs, as well as the performance of individual systems. This will provide valuable lessons for future program management, industry project development, and ongoing operation and maintenance of existing projects.

All of the operational biomass projects significantly underperformed in comparison to initial estimates. This variance was accredited to the relative immaturity of the industry in Alaska with limited standardization of system designs, as well as lack of full system hookups and need for trained operation and maintenance staff. AEA is working with industry groups to standardize biomass system designs, particularly around wood boilers, to improve performance and reduce costs.[53]

Table 5.7 2011 Performance of Biomass Projects

Biomass Project	REGRP Biomass 2011 Performance Against Goal (PAG) (Diesel gallons offset for heating)		
	Estimated	Actual	% Variance
Cordova	88,700	11,400	13%
Gulkana	14,643	5,900	40%
Tok	50,400	24,400	48%

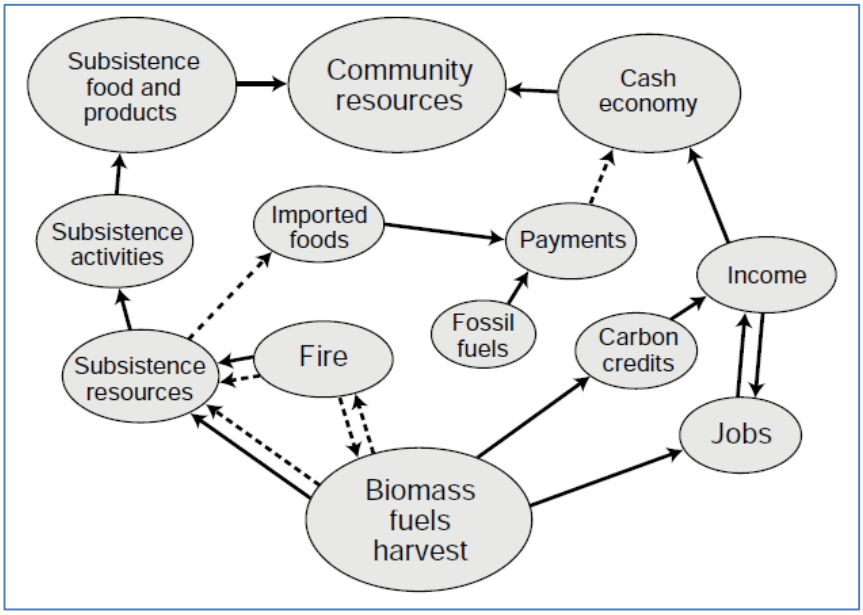
Table 5.8 Installed Cost of Biomass Projects by Capacity

Biomass Project	NREL ($/kW)	REGRP ($/kW) Operational/Construction Phase in 2011		
	Average	Average	Max	Min
Biomass CHP	$3,000/$5,500	$11,532	n/a	n/a
Landfill Gas	$2,360	$2,311	n/a	n/a
Wood Boiler	$1,000	$2,503	$3,826	$1,072

Not included in this analysis are any secondary benefits associated with biomass energy projects. The illustration to the right from a 2009 USDA study[54] identifies the myriad societal benefits associated with the harvesting of biomass fuels and the influx of payments associated with potential carbon credits from reduced diesel emissions. As forestry fire management is a critical effort in Alaska, the parallel benefits to removing hazardous wood fuels and providing a fuel source to community biomass projects are specifically noteworthy.

[53] Interview with AEA Biomass Program Manager, Devany Plentovich.
[54] United States Department of Agriculture, *Assessing the Potential for Conversion to Biomass Fuels in Interior Alaska,* June 2009.

Figure 5.9 Biomass Fuel Harvest Benefits



Barriers

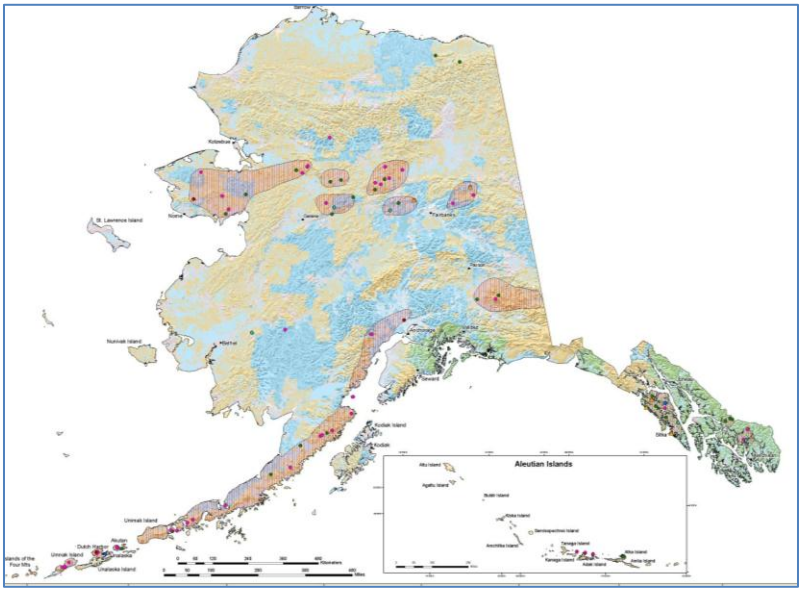
Challenges for developing a more robust biomass energy industry in Alaska include:

- Maturity of the technology and market infrastructure development – The necessary support functions such as availability of spare parts and trained operator and maintenance personnel can increase O&M costs, as well as lead to lengthy downtimes. Additionally, fuel processing of both woody biomass and biofuels require investments in pellet manufacturing plants, fuel dryers for cord wood, wood harvesting equipment, and (potentially) fish oil processing plants.
- Transportation – The cost and difficulty of delivering biomass fuels depending on the source and processing location can be a limiting factor for biomass energy project development.
- Environmental – Recent advances in biomass technology have significantly improved the emissions of wood boilers to meet and exceed federal standards. Proper forestry management practices are also critical to insure a sustainable source of biomass fuel without impacting the surrounding environment.

Geothermal

Alaska is home to almost every major type of geothermal resource, but in most cases these resources are not located near major population centers where the energy could be used. Alaska has three distinct geothermal regions: the interior hot springs belt including Chena Hot Springs, the Aleutians and Alaska Peninsula with world-class high temperature geothermal resources associated with active volcanoes, and hot springs in southeast Alaska that are caused by deep circulation of water along open faults.

Figure 5.10 Geothermal Resource Map for Alaska



Currently, Alaska has one geothermal power plant located at Chena Hot Springs, which has been operating since 2006 with a rated capacity of 400 kW and notable as the first combined heat and power (CHP) application in the state.

The state has provided REGRP appropriations through Round 4 of $13.9 million for geothermal energy projects. Of the total funding for this sector, approximately $0.9 million is for the 3 REGRP projects currently operational or in construction in 2011. These projects will leverage over $0.5 million of external federal, state, local match and utility debt and equity sources.

Several exploration projects have been funded through the REGRP in areas with known geothermal resources, as evidenced by hot springs and/or fumeroles. In fact, with the exception of Chena Hot Springs, no significant geothermal resource assessment work has occurred in Alaska since the early 1980's prior to the development of the REGRP.

In addition to traditional geothermal energy, heat pumps and enhanced geothermal projects are included in the geothermal energy category under the REGRP.

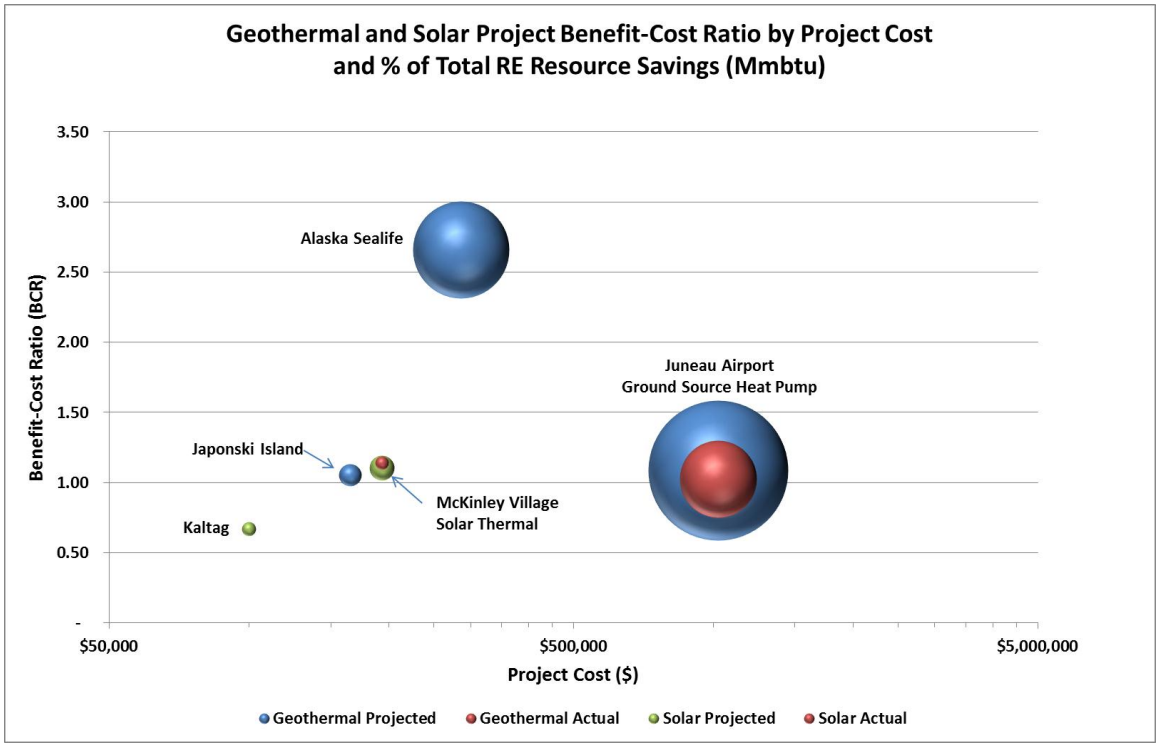
Three heat pump projects have been funded through the REGRP, located in the communities of Juneau, Seward, and Sitka. Although none are strictly using geothermal energy they are categorized under the broad category of 'geothermal energy' by the Alaska Energy Authority. The project in Juneau is installed at the airport and is a ground source heat pump system, utilizing heat stored in the near-surface ground through horizontal loops rather than vertical wells. Both the Seward Sealife Center and Japonski Island Boathouse use seawater-source heat pump systems. The Seward Sealife Center also received funding under the Emerging Energy Technology Fund (funded through the Denali Commission and managed by the Alaska Center for Energy and Power at UAF) to fund Phase I of the project, which is not reflected in the Benefit-Cost ratio reported for the project.

The graph represents the cost-effectiveness of the REGRP funded geothermal projects that were either operational or in construction in 2011. Projects operational in 2011 have two spheres – one in red representing actual performance and the other in blue for the originally estimated performance. Projects in construction phase have a single sphere representing their estimated performance. The scale of the individual projects in the figure below is relative to the total geothermal energy sector annual energy generation.

The Juneau Airport Ground Source Heat Pump project was the only reported operational system in 2011[55], with a projected cost-effectiveness of 1.03. The Alaska Sealife Center is being completed in two phases, with the capital costs for the first phase only included in this analysis. It is expected that if all costs associated with the project were included in this analysis the actual project Benefit-Cost ratio would be similar to the one reported for the Japonski Island project in Sitka.

[55] Reported performance was based on the Alaska Renewable Energy Fund 2011 Status Report. Although the Juneau Aquatic Center was operational in 2011, no performance data was available for the 2012 annual report.

Figure 5.11 Geothermal REGRP Projects Cost-Benefit Analysis[56]



* Note a logarithmic scale was used for the Project Cost due to the wide spread in scale of the projects.

[56] The scale of the individual projects in the figure is relative to the total biomass sector annual energy generation.

Table 5.9 Costs and Benefits of REGRP Geothermal and Solar Projects (combined) in Construction Portfolio

Project Name	Total Project Cost_est	Electricity Act/Proj%	Diesel Act/Proj%	Annual Electricity (kWh)	Annual Diesel Displaced (gal)	Annual Natural Gas (Mmbtu)	NPV Costs	NPV Benefits	NPV BCR_TRC
Seward Alaska Sealife Center Ph II Seawater Heat Pump Project	$ 286,580				51,888		($1,197,804)	$3,189,232	2.68
Japonski Island Boathouse Heat Pump in Sitka	$ 165,000				2,700		($212,427)	$224,369	1.08
Juneau Airport Ground Source Heat Pump Constr	$ 1,026,000		34%		37,082		($3,140,700)	$3,226,815	1.03
Geothermal Program Summary	**$ 1,477,580**		**34%**		**91,670**		**($4,550,931)**	**$6,640,416**	**1.46**
Kaltag Solar Construction	$ 100,000			10,096	777		($98,503)	$68,315	0.69
McKinley Village Solar Thermal Construction	$ 193,600		38%	32,000	2,462		($187,961)	$214,560	1.14
Solar Program Summary	**$ 293,600**		**38%**	**42,096**	**3,238**		**($286,464)**	**$282,875**	**0.99**

Geothermal Costs, Performance and Lessons Learned

Absent the addition of additional operational projects in the geothermal sector, limited cost and performance information is available.

Feasibility and reconnaissance projects funded through the REGRP for geothermal projects include Mount Spurr, Akutan, Pilgrim Hot Springs, Manley Hot Springs, and Tenakee Inlet. The fact that none of these projects have progressed beyond the exploration phase highlights the challenges associated with geothermal development anywhere, but especially in remote regions of the state. Resource assessment is often a multi-year undertaking, and results are slow to become available. When compared to all other renewable resources, geothermal energy has the highest risk and costs associated with the exploration phase. However, where economic to develop, geothermal energy is highly desirable because it can supply base load heat and power whereas most renewable resources are intermittent.

Barriers

- Heat pumps require low cost electricity to be cost-effective, which limits their usefulness in rural Alaska. In addition, the cold average ground temperatures in most regions of the state reduce the efficiency of traditional ground source heat pumps compared to other, more temperate regions. Nonetheless, in regions and where low cost electricity is available and ground temperatures are moderate, heat pumps can be used to decrease local heating costs. The challenge for the REGRP is that the areas where heat pumps are generally most economical to install are in areas that have relatively low overall electricity costs, but high heating fuel costs. This situation describes certain areas of the state, such as Kodiak and parts of Southeast Alaska, but much of the state with high heating fuel costs also derive their electrical energy from diesel power systems, thereby making the electrical costs too high for heat pumps to be cost-effective.

- Costs associated with geothermal exploration are very high compared to exploration costs for other renewable resources. This makes geothermal energy a risky proposition for private investment at the exploration phase. For this reason, funding the evaluation of these resources through the REGRP increases the chances that any economically developable projects will move forward.

Heat Recovery

Space heating is a significant energy load for many Alaskan communities, residences, and businesses. For this reason, offsetting a portion of the heat energy 'wasted' as a byproduct of diesel electric power generation can result in significant savings. Heat recovery has long been a priority of AEA's Rural Power Systems Upgrade program and as a result many powerhouses in Alaska have some type of installed heat recovery system, although not all are fully functional. The most efficient use of waste heat is to use it directly as heat. This avoids efficiency losses that occur when heat is transformed to another kind of energy, such as electricity. Typical uses for the recovered heat in rural communities include space heating, domestic hot water, and tempering municipal water supplies to prevent freezing and facilitate treatment.

Figure 5.12 Alaska Fuel Distribution Map

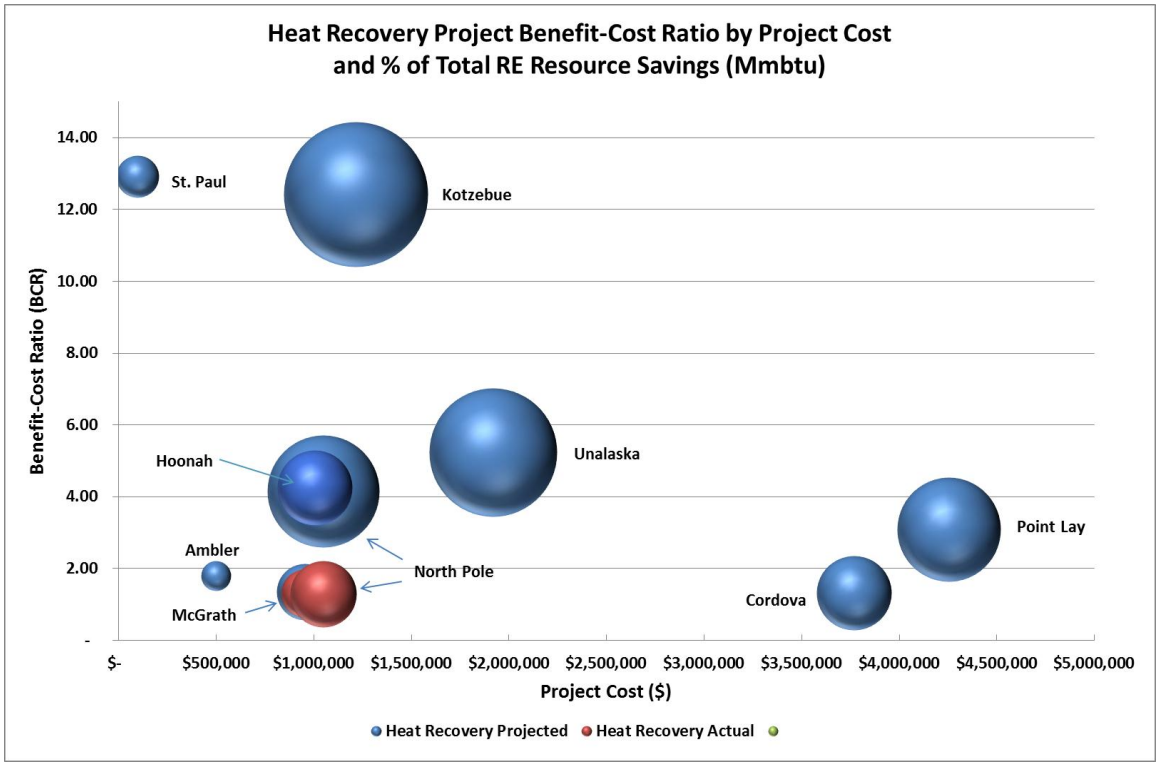
The limited and high-cost modes of transport for delivering fuel to rural Alaskan communities places a premium on the efficient use of diesel fuel for electrical generation, as well as space heating and highlights the needs for well organized community planning. With over a quarter of rural village diesel generators already equipped with jacket water heat recovery systems, the value of the efficiency gains and reduction in fuel costs is widely recognized.

The efficiency of recovering waste heat for augmenting electrical power production is lower than that for heating; however, it can be attractive and economical in some places since electrical power is needed year round as opposed to space heating, which is required at varying levels throughout the year.

The REGRP has appropriated over of $7.8 million through Round 4 for 12 heat recovery projects. Of the total funding for this sector, approximately $6.9 million is for the 9 REGRP projects in the 2011 construction portfolio, 3 of which were operational as of that time. These projects leverage over $7.8 million of external federal, state, local match and utility debt and equity sources.

The graph represents the cost-effectiveness of the REGRP funded heat recovery projects that were either operational or in construction in 2011. Projects operational in 2011 have two spheres – one in red representing actual performance and the other in blue for the originally estimated performance. Projects in construction phase have a single sphere representing their estimated performance. The scale of the individual projects in the figure below is relative to the total heat recovery energy sector annual energy generation.

Figure 5.13 Heat Recovery REGRP Projects Cost-Benefit Analysis[57]



In the program documentation, the Cordova Heat Recovery project was noted to not have any electrical savings estimated for the project despite being a CHP application with an organic Rankine cycle similar to Kotzebue. This would affect both the magnitude of the savings, as well as the cost-effectiveness of the overall project for Cordova.

[57] The scale of the individual projects in the figure is relative to the total biomass sector annual energy generation.

Table 5.10 Costs and Benefits of REGRP Heat Recovery Projects in the Construction Portfolio

Project Name	Total Project Cost_est	Electricity Act/Proj%	Diesel Act/Proj%	Annual Electricity (kWh)	Annual Diesel Displaced (gal)	Annual Natural Gas (Mmbtu)	NPV Costs	NPV Benefits	NPV BCR_TRC
Ambler Heat Recovery Construction	$500,000				8,864		($513,250)	$945,824	1.84
Cordova Heat Recovery Construction	$3,770,000				56,773		($3,660,194)	$4,964,185	1.36
Hoonah Heat Recovery Project	$1,005,000				57,000		($975,728)	$4,273,896	4.38
Kotzebue Electric Heat Recovery Construction	$1,215,627			1,213,348	184,537		($1,520,527)	$19,332,088	12.71
McGrath Heat Recovery Construction	$954,225		72%		22,975		($6,047,269)	$7,941,943	1.31
North Pole Heat Recovery Construction	$1,050,000	30%	37%	442,117	27,632		($1,019,417)	$1,303,351	1.28
Point Lay Heat Recovery Construction	$4,257,116				109,588		($4,295,172)	$13,634,081	3.17
Saint Paul Fuel Economy Upgrade	$98,149				18,030		($152,169)	$2,001,880	13.16
Unalaska Heat Recovery Construction	$1,919,807			1,662,400	127,877		($1,977,591)	$10,629,471	5.37
Heat Recovery Program Summary	$14,769,924	**30%**	**54%**	**3,317,865**	**613,277**		**($20,161,319)**	**$65,026,720**	**3.23**

As noted earlier, the costs and the resulting cost-effectiveness highlighted in the graph can range widely based on the application. The REGRP funded heat recovery projects include both additions to new diesel powerhouses as well as retrofits of existing generators and expansions to existing heat recovery systems. Based on our analysis, expansion of existing systems results in the best opportunity for communities and the REGRP to lower energy costs.

Heat Recovery Costs, Performance and Lessons Learned

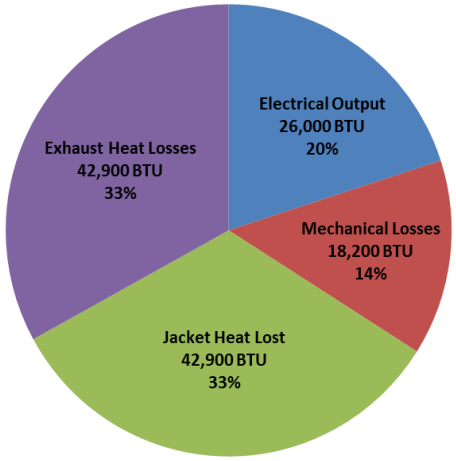
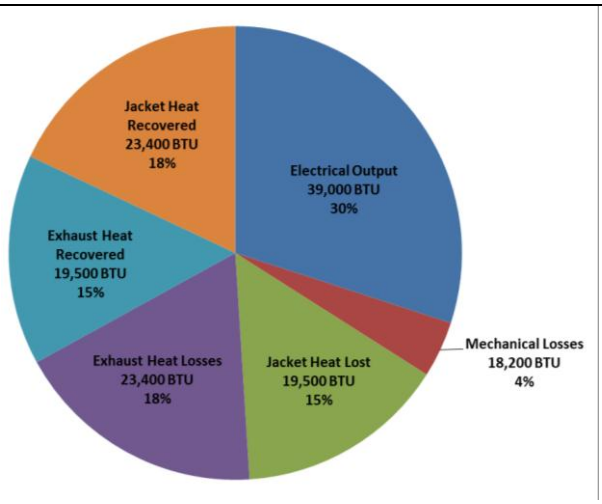
It is difficult to compare the economics of the heat recovery systems installed under the REGRP program because each project is unique to an individual community and very local conditions and circumstances. Most involve the direct use of recovered heat, although the size of the project varies considerably. Two projects, including the Cordova and Kotzebue heat recovery construction projects involve the installation of heat to electric power systems. Cordova is in the final stages of commissioning a Pratt and Whitney organic Rankine cycle 280 kW system, while Kotzebue has proposed the installation of a smaller ammonia-cycle system designed by Energy Concepts.

Because few of these systems have operated long enough to provide quantitative data, the true impact is difficult to assess through projects funded under the REGRP alone. However, through both pre-construction cost-benefit ratio estimates as well as data from operational systems funded outside the REGRP, the potential positive impact per dollar spent is quite high. This is because heat recovery is in essence an efficiency improvement, taking maximum advantage of fuel already shipped into a community for the purpose of generating electric power.

Both through in field performance monitoring by AVEC, as well as a research project conducted by the University of Alaska Fairbanks, significant efficiency gains were reported as the graphic below highlighting the performance of older diesel gensets against newer equipment with installed heat recovery.[58]

[58] Alaska Energy Wiki, Alaska Center for Energy and Power

Figure 5.14 Efficiency Gains from New Diesel Gensets with Heat Recovery

Old Technology	New Technology
	
80% Wasted, 20% Utilized	37% Wasted, 63% Utilized

Barriers

- Standardization of system design for both diesel generators and heat recovery systems has been a priority for the PowerHouse Upgrade Program at AEA. This is an important factor for both reducing cost and fostering consistency in the performance of systems.

- Operation and maintenance of the heat recovery system is also a critical factor as the particulate emissions from the generator exhaust can have significantly reduce the heat recovery system performance if not well maintained. It has been reported that some systems installed in communities are not operational.

6. Market Development

Overview

In this section we review the Alaska renewable energy market development from the REGRP inception in 2008 to the end of 2011, drawing upon input from state energy data, resource working group reports, a subset of individual interviews with industry stakeholders and other existing reports on renewable energy in Alaska.

Although the direct costs and savings of the program are critical for understanding the impact of a renewable energy program, longer term goals for developing a sustainable industry for renewable energy projects is equally important. In this section we will review:

- *A high level overview of the REGRP performance within the overall context of energy in Alaska*
- *Job statistics for RE in Alaska from 2008-2012, including training for renewable energy jobs.*
- *Impacts of the renewable energy projects on PCE communities and the funding for the state program.*
- *Development of conferences, organizations, reports and resources developed around the REGRP*

Alaska boasts an abundance of fossil and renewable resources that rival many countries, but Alaskan consumers pay among the highest rates for heating and electricity in the country—50% higher than the U.S. average[59]. According to the Energy Information Administration, in 2012, Alaska ranked second in 2012 for high residential electricity costs with an average price of $17.91 cents/kWh as compared to the national average of 11.52 cents/kWh. However many of Alaska's rural villages mirror 1st ranked Hawaii's $37.05 cents/kWh.

The most recent numbers published in 2009 indicate that Alaska receives the majority of its electrical generation from natural gas (39.5%), petroleum (15%), hydroelectric (14.6%) and coal (6.1%) with no discernible generation coming from non-hydro renewables.[60] Alaska ranks 48th of all states in non-hydro renewables, largely due to the absence of a transmission system capable of transporting the remote renewable energy resources to population centers.[61]

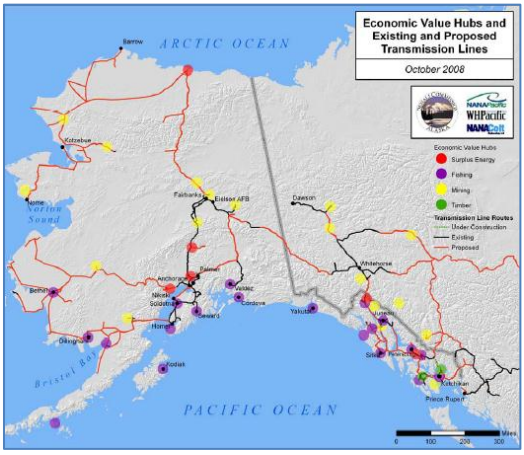
[59] EIA SEDS Database
[60] Based on 2010 Alaska Power Statistics Tables wind power has increased its share of the generation to 0.3% and projected by AEA to represent 2% of Alaska's electrical generation by 2012.
[61] EIA SEDS Database

Forces at work for Alaska's energy challenges:

- Harsh climate, including long, dark and cold winters and corresponding high energy needs.
- High and volatile cost of fuel for generation, due to export of the majority of crude and import of almost all refined fuels aside from some transportation fuel refined at two local refineries. In addition, due to limited interconnections of transmission and distribution systems between rural communities in Alaska, the majority of the fuel is transported significant distances.
- Lack of economies of scale due to fewer ratepayers. Nevertheless, electricity consumption is growing much faster in Alaska than in the rest of the US with an estimated consumption of 55 barrels of oil per year per person (25 barrels per year in rural AK) .[62] Alaska ranks 2nd nationally in energy consumption per capita[63], though this may be attributed largely to increased commercial and industrial activity and jet fuel usage associated with travel within the state.[64]
- Most electricity consumers outside of the major cities are not linked to utility scale electric power grid via transmission and distribution lines. Rural communities rely primarily on mini-grids supplied by diesel-electric generators.

In rural Alaska nearly 80% of communities are dependent on imported diesel for their primary energy needs[65] to run generators and heat their homes with fuel oil, leaving them vulnerable to fluctuating prices and victim to significant delivery surcharges. Since 2006, the percentage of individual household income the average rural Alaskan spends on energy shifted from 20% to 50% due to increasing costs.[66]

Figure 6.1 2008 Denali Commission Transmission Study



One additional struggle facing Alaska despite impressive renewable resources is that many of these resources are stranded away from customers, rendering them uneconomic to develop due to high transmission costs and/or a low customer base. In 2008, the Denali Commission funded a study of potential transmission line extensions and interties to build out the electrical infrastructure enjoyed by the rest of the developed world. With recent innovations in technology and connecting with these stranded resources through

[62] Energy for a Sustainable Alaska: The Rural Conundrum. Commonwealth North, February 2012.
[63] EIA Database.
[64] Reporting from Railbelt utilities suggests a downward trend of 5-9% of residential electricity usage during the period from 2000 to 2011. Source: AEA September 2012.
[65] Energy for a Sustainable Alaska: The Rural Conundrum. Commonwealth North, February 2012.
[66] Energy for a Sustainable Alaska: The Rural Conundrum. Commonwealth North, February 2012.

transmission or potentially co-locating processing industries in the vicinity of resources has been investigated as an opportunity for Alaska. Striking this balance of investing in transmission infrastructure will be important to further support development of RE resources in both rural and Railbelt areas of the state.

In addition to economic challenges, integrating renewables on small village microgrids presents integration and power quality issues that limit the level of penetration the renewable system can achieve, resulting in lower displaced fuel. Even Alaska's road system-based 'Railbelt grid', is considered a micro-grid in relation to the large integrated grid systems in the lower 48 and Europe. This infrastructure presents interesting and unique challenges for implementing energy solutions to maximize the penetration of renewables.

One silver lining of high energy prices is that products and technologies not considered economically viable options elsewhere in the country, pencil out in Alaska, making it an excellent place to demonstrate new technologies and a potential launching place for global solutions to other remote or rural villages and industrial locations.

Framing the Renewable Energy Fund

The Renewable Energy Fund was identified by Chris Rose, Executive Director of the Renewable Energy Alaska Project (REAP), as one of his fledgling organization's top priorities in 2006. Renewable energy in the form of conventional hydropower plants had been a mainstay of southeast Alaska and as a percentage of the Railbelt generation with the state-owned Bradley Lake hydro project for decades, however, other renewable energy solutions - most visibly wind - were just being reintroduced with mixed success after a series of failures in the 1980's. According to EIS database, in 2006, the energy mix for Alaska was 18% renewable (99% hydro) with the remainder as fossil fuels. Fossil fuel generation had seen a slight decline, primarily due to a reduction in natural gas usage with oil and coal remaining fairly stable.

At that point in Alaskan energy history, prices were climbing and in 2006/2007, the worldwide oil price spike hit Alaska at an exponential level. Although the higher per barrel price resulted in increased oil revenues for the state operating fund, energy prices, specifically in rural Alaska, hit unsustainable levels, compounding the already high prices with additional costs associated with transporting the fuel across the rural landscape by barge and air freight. The impact was felt in urban communities as well, especially Fairbanks which utilizes heating oil as its primary heating source, instead of the locally extracted/natural gas infrastructure surrounding Anchorage.

This crises combined with the budget surplus from higher oil prices provided the political capital necessary to enact change. In 2008, Governor Sarah Palin announced a state goal of 50% electrical generation from renewable energy sources by 2025. This target mapped closely with the passage HB 152 in 2008 which created the Renewable Energy Grant Fund and positioned Alaska as a national leader in funding for renewable energy.

The RE Fund was created with the goal of funding projects to install commercialized technology that could make an immediate difference for Alaskans.

While the RE Fund was approved by the legislature over 4 years ago, the state is just starting to see the first years of actual production data due to the application, contracting processes, permitting and construction. The exact impact of the RE Fund on the Alaska Renewables market is difficult to empirically discern due to a lack of granularity in the data reported at the state level on organizations specifically focused on renewable energy.

A look at the evolution of renewables development in Alaska can identify correlative examples of growth since the inception of the program, but not necessarily causation.

State Leadership and Policy Action

Affirming the Goal:

- Former Governor Sarah Palin's initial energy production goal was reaffirmed by Governor Sean Parnell in the July 2010, *Alaska Energy Pathway Toward Energy Independence.* The document also added an increase in energy efficiency by 20% by 2020.[67]
- This pledge was adopted by the legislature in 2010 through House Bill 306 which established a 50% by 2025 renewable electricity goal for the state through legislative intent. One of the most aggressive in the country, it is not currently backed up with any codified policies or interim performance metrics to gauge progress and also sets a goal to reduce per capita electricity use in the state by 15% by 2020.

Setting a State Energy Policy:

- SB220 was designed as an 'omnibus energy bill', and declared the need for a statewide energy policy. It included a number of components including providing the Alaska Housing Finance Corporation bonding power to create a $250 million revolving loan fund to help finance energy-efficiency retrofits in public buildings across the state.

Program Creation:

- **Emerging Energy Technology Fund** – Once the RE Fund was passed and the $100M authorized under Round 1, it rendered $5M set aside by the Denali Commission to support of renewable energy projects in 2006 unnecessary. The Denali Commission chose to invest the funding in a pilot program called the

[67] Alaska Energy Pathway Towards Energy Independence. Alaska Energy Authority, July 2010.

Emerging Energy Technology Fund to provide a funding mechanism for demonstration projects not eligible for the RE Fund. Based on the success of that program, in 2011, the State of Alaska created the Emerging Energy Technology program under SB220, and provided funding in the amount of $4.8M which was matched by the Denali Commission with $4.1M for a total of $8.9M.

- **Weatherization** - Since 2008, the State of Alaska has authorized $511M in expenditures to support weatherization efforts. This program was developed in tandem with the RE Fund, as it was recognized that energy efficiency improvements were critical to an effective overall management strategy to stabilize energy costs, particularly for rural Alaska where weatherization is the clearest path to reducing energy costs for an individual home owner.
- **RE Fund -** HB250, signed by Governor Parnell on May 2nd, 2012, reauthorized the Renewable Energy Grant Fund Program through 2023 with the intent of continued funding at a level of $50M per year.

Other Financing Mechanisms:

- **SB 25 - Alaska's Sustainable Energy Transmission and Supply Development Fund (SETS):** It has been recognized that the RE Fund is a grant only program and is not an adequate funding vehicle to fund very large projects appropriate to applications such as the Railbelt. Therefore, SB25, passed in 2012, authorizes the fund to be capitalized in the amount of $125M in FY13 with the goal of enabling a revolving loan program through the Alaska Industrial Development and Export Authority for energy projects (renewable and non-renewable).

Resource Specific Policy:

- **Geothermal Regulatory Changes** - One of the consequences of increased interest in geothermal energy spurred in part by the RE Fund is a change in regulatory statutes for geothermal energy. Prior to 2009, geothermal resources under 150°C were regulated by DNR as water resources. This was primarily because resources below this temperature were not considered to be developable for power generation purposes. With the development of the Chena Hot Springs 400 kW geothermal plant using geothermal fluid under 75°C and the subsequent submission of several RE Fund applications for additional low temerature resource exploration and development projects, it was apparent that the threshold of 150°C was not necessarily a barrier to power generation given modern equipment. For this reason, jurisdiction over geothermal exploration and development was moved to the Alaska Oil and Gas Conservation Commission for all geothermal exploration and development projects over 150°C, or for projects below 150°C intended for commercial power or heat sales.

Regional Planning

In July of 2010, the Alaska Energy Authority created the Alaska Energy Pathway Toward Energy Independence which provided Alaskans with a road map that each community could use to make energy decisions to help the state reach the 50% by 2025 goal.

Utilizing a regional approach, it provided detailed data for each community including generation capacity, costs of energy, potential resources, etc and utilized them in case scenarios that could be used as guidelines for action.

The Pathway estimated that Alaska would spend approximately $5B in diesel fuel over the next 20 years in rural Alaska and $60B along the Railbelt.[68] When compared against their total estimated investment statewide to develop all renewable projects that were economically viable ($7.3B for Railbelt) it made the case that investment in these technologies now may make economic sense in the long run.

A key priority of the Energy Pathway to achieve these goals was to continue to fund the Renewable Energy Fund. However, it also recognized the limitation of the grant fund in the long term and recommend adding loans to the project financing options available from the state. [69]

Motivated by energy security, economic development, and AEA's mission to lower the cost of energy in Alaska, the Pathway also detailed plans to decrease electric non-Railbelt renewables from the current 63% (primarily hydro) to 91% at an approximate cost of $2.8B following a regional planning model.

Since 2008, AEA has used this model to create two large scale regional plans starting with the Integrated Railbelt Resources Plan in 2009 and Southeast Integrated Resources Plan which was completed in 2011 as a direct outcome of the Pathway's focus.

In addition, AEA has started to further develop a regional planning model around these goals. In the past year, they have funded Regional Planning efforts throughout the state and hired a Regional Planning Coordinator and two technical advisors to assist with this effort.

Business Indicators of Market Development

Business Licenses

A review of business licenses reveals a marked increase in the number of construction and engineering organizations in the state over the past 5 years, it is unclear what part of that growth can be linked to the influx of renewable energy spending by the state. This lack of detail is compounded by the fact that the fossil energy extraction industry is significantly larger and likely obscures any clarity in shared job sectors like engineering and construction.

[68] Alaska Energy Pathway July 2010 Alaska Energy Authority
[69] Alaska Energy Pathway Toward Energy Independence. Alaska Energy Authority, July 2010.

Cost Stabilization

The RE Fund insulates small Alaska communities from potential future price increases in diesel fuel. In others words, the Renewable Energy fund, can be viewed as a hedge against future price increases, rather than a significant reduction in energy costs to the individual home owner. This is in contrast to the Weatherization and Efficiency programs, also managed by the state, which can and often do show an immediate savings for residents who participate in those programs.

There is anecdotal information that in some cases local energy costs can actually increase certain segments of a community if a renewable energy system is installed. For example, if a biomass project that uses cordwood sets a going rate for delivered wood at $250/ton in the interest of providing well-paying employment opportunities during the winter months when most harvesting is completed, that rate will drive rates for delivered wood throughout the community. If the previously established rate was much lower, it could force an increase in heating costs for community members dependent on the purchase of delivered cord wood.

Local Business Support

There are examples where energy projects funded through state or other funding sources have had a substantial positive impact on a small, niche market within a community often centered upon a single business enterprise or cluster or businesses that benefit the community through an increase in revenue, or reduced costs for operation.

One example is a 20-Ton absorption chiller installed in Kotzebue, Alaska. This unit, custom designed for Kotzebue Electric Association, was originally funded by AEA in 1995, prior to the development of the REF. However, KEA was awarded REF funds to repair and upgrade the unit under Round 2. The system uses recovered heat from the diesel power plant to produce 10 tons of flake ice per day during the fishing season.

By making low-cost ice available to local fisherman, commercially caught salmon can be placed on ice shortly after they are caught, increasing both the quality of the product and the corresponding market value. The increase in market value will provide increased revenue to the local fisherman over the 17 year operating lifetime of the project.

Impact on Jobs

One key indicator of economic impact is job growth. The Alaska Green Jobs Report, published in June 2011 by the Department of Labor estimated that during 2010, there were 145 green occupations or 4973 green jobs in Alaska, representing 1.7% of the state's private and local government employment. Of this number, renewable energy accounted for 13% of those jobs, and primarily existed among utilities and local government.

These numbers are influenced by a somewhat subjective scoring multiplier according to the percentage of time an employee spends doing renewable focused tasks. With very few jobs receiving scores over 6 or 7 one could assume that many of these jobs were not

necessarily created by the RE industry, but instead indicates that much of this work was added on to existing positions to support a broader energy industry focused on fossil extraction and generation as well as renewables. The level of data we found did not support this second level of analysis.

The report did uncover some growth trends based on direct employer questioning. Around 22% of the green employers surveyed reported they had added additional jobs due to increased demand for green goods and services and 14% of firms across industries said they were adding jobs in response to green demand. In addition, 36% indicated sending workers for additional green jobs training, however as with all of these figures, it is not reported how renewable-specific jobs. With this baseline data available in the future, this may be a more worthwhile exercise to conduct every few years, perhaps with an increased level of granularity for renewables.

RE Fund Job Analysis

While the greater renewable energy industry job determination was somewhat incomplete, we utilized a basic economic model with common multipliers to gain information about the projects the RE Fund supports.

For the RE Fund, we used a standard economic model which utilizes job data to average employment per unit energy produced over a project's lifetime. While the model is based on plant operations, it can be tailored to fit any position involving fuel offsets.

Based on performance data or, if not available, proposal projections, the model allows for the estimation of specific factors (here Mmbtu's displaced) that then interact with standard multiplier assumptions to estimate the average number of jobs that will be produced by the project over its lifetime (see Appendix A).

One time employment factors such as construction and installation can be averaged over plant lifetime to obtain an average employment number that can be directly added to ongoing employment factors such as operations and maintenance. Key variables include capacity factor, type of resource/technology. One job is full time employment for one person for a duration of 1 year.

Employing this model for the REGRP 2011 Construction Portfolio estimated the creation of 37 jobs based on the amount of energy being displaced (or projected displacement).

Organizational Growth in the Energy Sector

While there was a lack of statewide data reflecting the growth of the renewable energy related organizations, anecdotal evidence provided by individual companies highlights the evolution of the industry.

Renewable Energy Alaska Project (REAP)[70]

REAP was formed in 2004 by Executive Director Chris Rose with the goal of promoting the use of renewable energy in Alaska. It has since grown to include more than 70 organizational and contributing members representing a diverse coalition of small and large Alaska electric utilities, environmental groups, consumer groups, businesses, Alaska Native organizations, and municipal, state and federal entities. REAP was Alaska's first and remains its only education and advocacy group focused solely on renewable energy.

Director Chris Rose and the Board of Directors of REAP representing a variety of key energy stakeholders are credited for laying much of the groundwork to draft and pass the legislation which enabled the creation of the RE Fund

Since 2004 REAP has grown from a $110,000 budget with one staff member to an $800,000 organization with 5 staff. In 2007, REAP reported 48 members. By 2012, REAP membership had grown to 83. The largest growth was in their Business and Consumer Organization categories.

Table 6.1 Renewable Energy Alaska Project Membership Categories

Category	2007	2012
Total Members	**48**	**83**
Large Utilities	5	6
Small Utilities	11	10
Businesses	13	36
Conservation	4	7
Consumer Groups	5	14
Native Organizations	4	6
Advisory Members	6	7

Director Chris Rose reports that they have seen an increase in out of state players and local consulting firms focused on energy projects. While he does not link this growth directly to the RE Fund, he does believe it reflects the strength of the industry and believes the RE Fund reinforces that. He points to Alaska's recognized global leadership in Wind-diesel technologies as a direct result of the RE Fund investment.

[70] Interview Chris Rose 7.13.12, Interview Stephanie Nowers 7.10.12, email Erin Jones 7.10.12

Alaska Village Electric Cooperative[71]

AVEC began integrating renewable energy into their 52 rural power systems in 2003 as part of an ambitious goal of displacing 25% of their diesel fuel Since these projects were constructed before the Renewable Energy Fund, they were financed through a variety of other means including the Denali Commission, Rural Utility Services and other state support, some bond sales, AVEC cash match through long term loan. Through this process, AVEC installed renewable-diesel hybrid systems (all wind) in 5 of their 52 villages.

Since the inception of the Renewable Energy Fund, AVEC has used this opportunity to finance an additional 7 wind systems with others in the planning stages. AVEC credits the RE Fund with supporting the development of their renewable projects more quickly than in absence of the program. This reflects the barrier communities face in justifying the capital investment required for financing projects.

AVEC has not added any additional permanent jobs due to the RE Fund, instead they have trained their existing village technicians to handle O&M needs of the turbines, although they have created additional temporary jobs for the construction of the wind turbines including temporary project managers and construction technicians.

Impact to the State

They do feel that the RE Fund has benefited the state by creating enough of a market to produce in-state experts on design, engineering and construction of wind projects. Before the fund was in place, they had to bring in experts from the lower 48 to assist with those tasks. Now, they can turn to in state companies like STG, V3, BBFM, Golder, etc. It has also resulted in more in-house expertise within AVEC employees.

In order to increase the impact to their organization and the 52 communities they serve, AVEC believes more projects need to become operational. They believe the RE Fund can improve its impact by increasing the dollars available for construction projects which would provide bigger paybacks for state investment.

WHPacific[72]

WHPacific is an engineering services company wholly owned and operated by the NANA Regional Corporation, the regional corporation for northwest arctic Alaska, including Kotzebue. The majority of their $65-70M in sales are based in the lower 48, however, they do offer quite a few services to the resource extraction industry in Alaska. In 2008, WHPacific initiated an energy strategic plan to gain involvement in the state of Alaska's energy solutions focused on remote power solutions in the NANA region and beyond, including distributed generation, O&M, energy audits, and some additional

[71] Interview Meera Kohler and Brent Petrie, AVEC. 6.29.12
[72] Interview Jay Hermanson and Kat Keith, WH Pacific 7.3.12

North Slope services. They indicated that this new focus was due to the Renewable Energy Fund.

Impact to the Organization

The energy group was approximately $300K in revenues in 2009 and it has grown to over $6.7M for FY12 with an estimated $9M for FY13. WHPacific attributes a significant amount of that growth to the RE Fund. Due to this growth, WHPacific believes they have added approximately 15-20 jobs.

In addition to direct revenue to the bottom line, WHPacific indicates their involvement in RE Fund projects has strengthened their resume with customers outside of Alaska. It has served as a springboard, further building their business due to their credible experience gain through the RE Fund.

Similar to AVEC, WHPacific credits the RE Fund for building key capacity within the organization and throughout the state. "Four years ago, we didn't know a lot, but through these projects we have built capacity and better understand the resources as well as understanding how to manage a successful project to completion.' He also listed the value of understanding how AEA manages a project as a positive area of growth thanks to the fund.

Impact to the State

From a statewide perspective, they too pointed at the growth in installed capacity of wind to make the point that the RE Fund has had significant impact on Alaska. In 2012, the state went from 15.3MW to an anticipated 63.8MW[73] by the end of this year in rural Alaska and throughout the Railbelt.

WHPacific believes that Alaska should be doing what we can to foster this potential market by rewarding and fostering collaboration between potential applicants to make their funding go much farther. Alaska will be left with expertise project developers in state and can then step up as a global leader.

Alaska Center for Energy and Power[74]

ACEP is an applied energy research group at the University of Alaska Fairbanks under the Institute of Northern Engineering. It was formed in 2008 by INE Director Dan White and Gwen Holdmann as a vehicle to provide critical data and analysis to make informed decisions on energy.

ACEP started in Jan 2008 with a small amount of start up support from the university to fund the director's salary and their funding was vetoed by Governor Palin during the 2008 legislative session for FY09. From $0 general fund dollars and a few limited projects in 2008, ACEP has grown to a $750,000 annual general fund budget with over

[73] AEA projection based on RE Fund project status reporting.
[74] Gwen Holdmann, ACEP 6.12

$16M currently in competitively-awarded projects and has grown from a 3 person organization to 12 full time staff and 30+ affiliated faculty.

RE Fund Support and Communication: conferences, workshops, working groups and publications

Alaska has several mechanisms to bring experts, practitioners and interested stakeholders together to support renewable energy projects in the state. While many of these resources existed before the Renewable Energy Fund, many have experienced significant growth and relevance since 2008.

Rural Energy Conference

The largest conference that addresses renewable energy projects in Alaska is the Rural Energy Conference which is run by the Alaska Energy Authority and the Alaska Center for Energy and Power. This conference is scheduled every 18 months and while the primary purpose of the Rural Energy Conference was - and remains - to discuss ways to optimize diesel power houses, through the years, this conference has also become the primary vehicle to discuss the integration of renewables onto small grid systems and provide updates on performance data.

The first conference was in 2002 in Fairbanks with an attendance of 250[75]. Since the inception of the RE Fund, this conference has grown significantly larger. By 2007 the conference had grown to 362 then saw a major jump to over 500 participants in 2008, 2009 and 2010 with over 600 expected in 2013. [76]

This conference also provides an opportunity for vendors to connect with rural Alaskans, project managers and funders. The 2012 conference saw over 30 vendor tables and since 2008, the conference has run out of space for vendor (non-sponsor) tables.

During interviews for the RE Fund process evaluation, many interviewees listed this conference as one of the primary means to hear information about the RE Fund projects and their performance. Ike Towerak, General Manager of Unalakleet Village Electric Cooperative, indicated that his RE Fund project would not have happened without the opportunity to meet with project developers at the Rural Energy Conference.[77]

Business of Clean Energy Alaska Conference[78]

Since the inception of the RE Fund, a new conference called the Business of Clean Energy was created and is now in its 4th year. It is an annual conference focused on building and supporting a clean energy economy in the state around renewables and energy efficiency. This conference typically focuses on teaming in state and out of state

[75] Rebecca Garrett, AEA.
[76] Rural Energy Conference Registration Statistics
[77] Interview Ike Towerak, UVEC 1.24.12
[78] Chris Rose, Stephanie Nowers, Erin Jones, REAP interviews and emails July 2012.

experts on panels to discuss success stories from the lower 48 and around the world and the potential here in Alaska. When the conference cycles dictate that BCEA and the REC occur 6 months away from each other, BCEA add project updates, typically from the RE Fund projects.

It has enjoyed a relatively stable attendance of around 300 with an increasing number of vendors, maxing out at 48 this year.

Workshops

In addition to these major conferences covering broad range of topics, over the past 3 years there have been a variety of technology specific workshops focused on renewable topics, many led by either AEA and/or ACEP. The first of these conferences took place in the summer of 2009 around geothermal energy. Since then Alaska hosted the International Wind Diesel Workshop in Spring 2011, the Biomass conference later that year, a hydrokinetic workshop in the fall of 2011, the Energy Storage workshop June 2012 and a second Biomass workshop summer 2012. These workshops typically allow for deeper investigations into Alaska specific applications than the major conferences can provide. These focused sessions bring together 75-100 people in the single day conferences to 200-300 at some of the more popular technologies like wind and biomass.

Working Groups

In addition to conferences, there are six working groups focused on renewable resources or related topics that support the energy industry in Alaska. Program managers from AEA manage the majority of the working groups (hydropower, biomass, geothermal, hydrokinetics, and energy efficiency). The Wind working group is run by Renewable Energy Alaska Project through a national grant from Wind Powering America and advised by wind program staff from AEA, NREL and ACEP.

While these working groups were in existence before the Renewable Energy Fund, the number of participants and activity level of meeting groups has increased in almost all cases aside from the geothermal working group, which has seen a decline in successful projects. The majority of working groups now meet at least 3 times each year with active members ranging from 20-40 participants and total group sizes between 100-200 names. Wind Working Group manager, Stephanie Nowers indicates that their last remote meeting in Kotzebue saw over 70 people attend in person with 8 additional over the phone. She also noted an increasing number of participants from outside of Alaska.[79]

Renewable Energy Atlas

AEA published an inventory of energy infrastructure and resources called the Renewable Energy Atlas in 2007, one year before the RE Fund was created. The Atlas was later revised in 2009 and again in 2011 as new resource information became available. While the versions are similar, revisions to the narrative adding project examples from every

[79] Stephanie Nowers, REAP emails July 2012

renewable energy subsector, reflecting the diversity and reach of the RE Fund by that stage. In the 2011 Atlas, a specific section summarizing the RE Fund and its performance in supporting the development of renewable energy resources in the state. An appreciable change to the wind resource maps in 2011 reflects the addition of statewide high-resolution wind data, especially in regards to the resolution of the data over Kodiak, the North Slope, and through the Aleutians. The impact of the RE Fund is highlighted by the significant increase in the number of wind projects either under construction or operational in 2009 and 2011. The 2007 Atlas registered 2 MW of wind energy and by 2009, the map was adjusted to show that the wind capacity had doubled to 4MW. At the end of the 5th year, if all goes according to plan, that number will increase to potentially 57MW largely due to two Railbelt wind projects – Eva Creek (24.6MW) and Fire Island (17.6MW)[80] which should be online by the fall of 2012 thanks, in part, to grants from the RE Fund.[81]

Alaska Energy Wiki

The Alaska Energy Wiki is designed to make information about energy in Alaska accessible for a wide audience to quickly find relevant information. It includes information about energy resources and the technology developed to utilize those resources as well as some of the challenges that these resources and technologies present. In addition, the Alaska Energy Wiki contains information about many of the energy related projects across the state and their current status. Additionally, the Alaska Energy Wiki provides information and links to energy events in Alaska, as well as state, local, and federal organizations that focus on energy related issues.

Wind Community Toolkit

This hands-on, action-oriented booklet was published in 2011 by REAP to help communities identify tangible next steps, questions and resources if they were interested in bringing a wind project to their community.

Wind Best-Practices Guide

Currently in peer review, the guide acts as a technical textbook for best practices in implementing wind with diesel-hybrid systems.

Many other reports, presentations and general information brochures exist to provide additional information to organizations or communities interested in renewable energy. Links can be generally be found through REAP's website or ACEP's publication database.

[80] Fire Island is currently being developed to 17.6MW, but has the ability to be expanded to 52.8MW in supplemental phases.
[81] Renewable Energy Atlas 2007 and 2009.

7. Conclusions

The REGRP has played an important role in supporting the development of renewable energy systems in Alaska, serving both remote and Railbelt communities with significant financial assistance. There is great potential for continued REGRP support to help reduce energy costs in rural Alaska and to help the state tap more of its substantial renewable energy resources. Looking forward, the REGRP has already created a solid foundation for accelerating the development of renewable energy markets and infrastructure in Alaska – and created a robust pipeline for near term project development.

This evaluation has two primary areas of focus: 1) To characterize the economic benefits as estimated by the applicants for projects in the REGRP construction portfolio in 2011 and compare against the actual performance reported in 2011 and 2) Assess the REGRP's progress in meeting the stated priorities of the legislature in supporting cost-effective projects on an equitable geographic basis and prioritizing projects in the communities experiencing the highest energy costs.

In conclusion, despite the high costs and challenges associated with developing renewable energy across the state, the REGRP is found to be cost-effective at both the program and individual renewable resource sector level providing a significant net benefit to the state. Underperformance, or alternatively, overestimation of the energy savings in the application process, is relatively broad based. Although this can be attributed in part to the early startup performance of many projects in 2010 and 2011, it is a recommended area of continued focus for AEA. Improving the tracking of total system costs and performance will contribute to future evaluation efforts, as well as assisting in ongoing communications by program staff with industry stakeholders in establishing best practices for project development.

The benefits of the renewable energy development in the state were characterized as having primary economic benefits – avoided fuel, operation and maintenance costs, as well as reducing expenditures through the Power Cost Equalization program – and secondary benefits including avoided carbon emissions and increased employment in the state. As the secondary benefits have direct implications to the state in creating jobs, as well as improving air quality in Alaskan communities, creating discrete metrics for capturing these benefits going forward will increase the value of the REGRP to the state and the cost-effectiveness of individual projects.

The wide array of renewable resources, applicant types and geographic regions supported by the REGRP represents an ongoing challenge to AEA in appropriately balancing equitable distribution of funds and prioritizing projects in the communities experiencing the highest energy costs. However, in this area as well, the REGRP is found to be successful with two-thirds of funding being appropriated to communities with higher

costs of energy and a generally consistent funding success rate across different regions in the state.

The AEA is well positioned to continue providing support through the REGRP and to serve as an increasing knowledge base for lessons learned that will help improve future project development and operations.

Appendix A: RE Jobs in Alaska

In order to develop a high level assessment of job impacts from the REGRP, estimates for individual renewable energy resource sectors were utilized from an evaluation from the University of California – Berkeley, which compiled averages from previous RE job impact evaluations. The averages are applied against REGRP projects currently in operation or in the construction phase (post-grant) to develop an estimate for an aggregate of total employment in person-years, as well as job estimates based on the estimated project lifetime. As noted in the table below the average for job impacts is based on both the shorter term employment in construction, installation and maintenance (CIM) and the longer term employment in operation and maintenance (O&M).

Work-hrs per year	2000	Capacity Factor	Equipment lifetime (years)	Employment Components			Average Employment Over Life of Facility							
							Total jobs/MWp		Total jobs/MWa		Total person-yrs/GWh			
Energy Technology	Source of Numbers			CIM (person-years/ MWp)	O&M (jobs/ MWp)	Fuel extraction & processing (person-yrs/GWh)	CIM	O&M and fuel process-ing	CIM	O&M and fuel process-ing	CIM	O&M and fuel process-ing	Total	Avg
Biomass 1	EPRI 2001	85%	40	4.29	1.53	0.00	0.11	1.53	0.13	1.80	0.01	0.21	0.22	0.21
Biomass 2	REPP2001	85%	40	8.50	0.24	0.13	0.21	1.21	0.25	1.42	0.03	0.16	0.19	
Geothermal 1	WGA 2005	90%	40	6.43	1.79	0.00	0.16	1.79	0.18	1.98	0.02	0.23	0.25	0.25
Geothermal 2	CALPIRG 2002	90%	40	17.50	1.70	0.00	0.44	1.70	0.49	1.89	0.06	0.22	0.27	
Geothermal 3	EPRI 2001	90%	40	4.00	1.67	0.00	0.10	1.67	0.11	1.86	0.01	0.21	0.22	
Landfill Gas 1	CALPIRG 2002	85%	40	21.30	7.80	0.00	0.53	7.80	0.63	9.18	0.07	1.05	1.12	0.72
Landfill Gas 2	EPRI 2001	85%	40	3.71	2.28	0.00	0.09	2.28	0.11	2.68	0.01	0.31	0.32	
Small Hydro	EPRI 2001	55%	40	5.71	1.14	0.00	0.14	1.14	0.26	2.07	0.03	0.24	0.27	0.27
Solar PV 1	EPIA 2006	20%	25	37.00	1.00	0.00	1.48	1.00	7.40	5.00	0.84	0.57	1.42	0.87
Solar PV 2	REPP 2006	20%	25	32.34	0.37	0.00	1.29	0.37	6.47	1.85	0.74	0.21	0.95	
Solar PV 3	EPRI 2001	20%	25	7.14	0.12	0.00	0.29	0.12	1.43	0.60	0.16	0.07	0.23	
Solar Thermal 1	NREL 2008	40%	25	10.31	1.00	0.00	0.41	1.00	1.03	2.50	0.12	0.29	0.40	0.23
Solar Thermal 2	NREL 2006	40%	25	4.50	0.38	0.00	0.18	0.38	0.45	0.95	0.05	0.11	0.16	
Solar Thermal 3	EPRI 2001	40%	25	5.71	0.22	0.00	0.23	0.22	0.57	0.55	0.07	0.06	0.13	
Wind 1	EWEA 2008	35%	25	10.10	0.40	0.00	0.40	0.40	1.15	1.14	0.13	0.13	0.26	0.17
Wind 2	REPP 2006	35%	25	3.80	0.14	0.00	0.15	0.14	0.43	0.41	0.05	0.05	0.10	
Wind 3	McKinsey 2006	35%	25	10.96	0.18	0.00	0.44	0.18	1.25	0.50	0.14	0.06	0.20	
Wind 4	CALPIRG 2002	35%	25	7.40	0.20	0.00	0.30	0.20	0.85	0.57	0.10	0.07	0.16	
Wind 5	EPRI 2001	35%	25	2.57	0.29	0.00	0.10	0.29	0.29	0.83	0.03	0.09	0.13	
Carbon Capture & Storage	J. Friedmann, 2009	80%	40	20.48	0.31	0.06	0.51	0.73	0.64	0.91	0.07	0.10	0.18	0.18
Nuclear	INEEL 2004	90%	40	15.20	0.70	0.00	0.38	0.70	0.42	0.78	0.05	0.09	0.14	0.14
Coal	REPP, 2001	80%	40	8.50	0.18	0.06	0.21	0.59	0.27	0.74	0.03	0.08	0.11	0.11
Natural Gas	CALPIRG 2002	85%	40	1.02	0.10	0.09	0.03	0.77	0.03	0.91	0.00	0.10	0.11	0.11
Energy Efficiency 1	ACEEE 2008	100%	20										0.17	0.38
Energy Efficiency 2	J. Goldemberg 2009	100%	20										0.59	

Source: Max Wei, Shana Patadia, Daniel Kammen, *"Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the US?"*, Energy Policy, November 14, 2009.

Appendix B: List of Impact Evaluation Interviewees

The list of phone interviews, both in-person and phone, were chosen to reflect the breadth of stakeholders affiliated with the REGRP and the diversity of perspectives and input that they could provide a balanced evaluation of the program.

LAST	FIRST	TITLE	ORGANIZATION	TYPE	REGION
Crimp	Peter	Deputy Director - AEEE	AEA	Current AEA	ANC
Fay	Ginny	Project Manager, Economic Analysis	ISER	ISER	ANC
Hermanson	Jay	Program Manager – Energy	WH Pacific/NANA	Advocate	ANC/NW
Keith	Kat	Engineer – Distributed Generation	WH Pacific/NANA, Former WiDAC Coordinator	Advocate	ANC/NW
Kohler	Meera	CEO	Alaska Village Electric Cooperative	Applicant	ANC/Rural
Ott	Douglas	Hydro Program Manager	AEA	Current AEA	ANC
Petrie	Brent	VP community Development	Alaska Village Electric Cooperative	Applicant	ANC/Rural
Plentovich	Devany	Biomass Program Manager	AEA	Current AEA	ANC
Rose	Chris	Executive Director, Business/Organization involved in renewable energy	Renewable Energy Alaska Project	REFAC	ANC
Stromberg	Rich	Wind Program Manager	AEA	Current AEA	ANC
White	Clinton		STG	Project Developer	ANC

Appendix C: Operational, Construction and Pre-Construction Projects

Project ID	Project Name	RE Resource Type	Portfolio
68	Anchorage Landfill	Biomass	Construction
605	Biomass Fuel Dryer Project	Biomass	Construction
53	Biomass-fired Organic Rankine Cycle System	Biomass	Construction
15	Chistochina Central Wood Heating Construction	Biomass	Construction
476	City-Tribe Biomass Energy Conservation	Biomass	Construction
26	Cordova Wood Processing Plant-Purchase and setup	Biomass	Operational
112	Delta Junction Wood Chip Heating	Biomass	Construction
445	District Wood Heating in Fort Yukon	Biomass	Construction
2	Gulkana Central Wood Heating Construction	Biomass	Operational
33	Haines Central Wood Heating Construction	Biomass	Construction
649	Kenny Lake School Wood Fired Boiler	Biomass	Construction
681	Lake and Peninsula Wood Boilers	Biomass	Construction
623	Susitna Valley High School Wood Heat	Biomass	Construction
211-636	Thorne Bay Wood Boiler	Biomass	Construction
49	Tok Wood Heating Construction	Biomass	Operational
453	Alaska Sealife Center Ph II Seawater Heat Pump Project	Geothermal	Construction
705	Japonski Island Boathouse Heat Pump	Geothermal	Construction
999	Juneau Airport Ground Source Heat Pump Constr	Geothermal	Operational
307	Ambler Heat Recovery Construction	Heat Recovery	Construction
22	Cordova Heat Recovery Construction	Heat Recovery	Construction
687	Hoonah Heat Recovery Project	Heat Recovery	Construction

235	Kotzebue Electric Heat Recovery Construction	Heat Recovery	Construction
61	McGrath Heat Recovery Construction	Heat Recovery	Operational
105	North Pole Heat Recovery Construction	Heat Recovery	Operational
244	Point Lay Heat Recovery Construction	Heat Recovery	Construction
448	Saint Paul Fuel Economy Upgrade	Heat Recovery	Construction
271	Unalaska Heat Recovery Construction	Heat Recovery	Construction
469	Akutan Hydroelectric System Repair and Upgrade	Hydro	Construction
58	Chuniisax Creek Hydroelectric Construction	Hydro	Construction
10	Falls Creek Hydroelectric Construction	Hydro	Operational
21-407	Humpback Creek Hydroelectric Construction	Hydro	Operational
23	North Prince of Wales Island Intertie Project	Hydro	Operational
688	Pelican Hydroelectric Upgrade Project	Hydro	Construction
629	Reynolds Creek Hydroelectric Project	Hydro	Construction
672	Snettisham Transmission Line Avalanche Mitigation	Hydro	Construction
653	Terror Lake Unit 3 Hydroelectric Project	Hydro	Construction
37-620	Whitman Lake Project	Hydro	Construction
9	Wrangell Hydro Based Electric Boilers Construction	Hydro	Construction
660	Cook Inlet TidGen Project	Hydrokinetic	Construction
641	Kaltag Solar Construction	Solar	Construction
108	McKinley Village Solar Thermal Construction	Solar	Operational
122-604	Bethel Wind Power Project Times Four	Wind	Construction
102	Delta Area Wind Turbines-Construction	Wind	Operational
302	Emmonak/Alakanuk Wind Design and Construction	Wind	Operational
616	GVEA Eva Creek Wind Turbine Purchase	Wind	Construction
85-518	High Penetration Wind-Battery-Diesel Hybrid	Wind	Construction

110	Kongiganak High Penetration Wind-Diesel Smart Grid	Wind	Construction
107	Kwigillingok High Penetration Wind-Diesel Smart Grid	Wind	Construction
72	Mekoryuk Wind Farm Construction	Wind	Operational
52	Newton Peak Wind Farm	Wind	Construction
89	Nikolski Wind Integration Construction	Wind	Construction
47	Nome Banner Peak Wind Farm Transmission Construction	Wind	Operational
103	Pillar Mountain Wind Project - Construction	Wind	Operational
486	Pilot Point Wind Power & Heat	Wind	Construction
70	Quinhagak Wind Farm Construction	Wind	Operational
317	Sand Point Wind Construction	Wind	Operational
303	Shaktoolik Wind Construction	Wind	Construction
90	St. George Wind Farm Construction	Wind	Construction
503	St. Paul Wind Diesel Project	Wind	Construction
71	Toksook Wind Farm Construction	Wind	Operational
273	Tuntutuliak High Penetration Wind-Diesel Smart Grid	Wind	Construction
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