

**A Standard Approach to Industrial Energy Efficiency: E3 (Economy, Energy, Environment)  
Alaska Manufacturing Extension Partnership, Inc.**

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E3 (Economy, Energy, Environment)**

Project Title: A Standard Approach to Industrial Energy Efficiency: E3 (Economy, Energy, Environment)

**Applicant:**

Alaska Manufacturing Extension Partnership, Inc.  
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**Partners:**

Green Star, Inc., Anchorage, AK  
Global Food Collaborative LLC, Anchorage, AK  
UAA Small Business Development Center

**Total project cost:**

\$462,700, including \$300,700 in AEA grant funds requested and \$162,000 in AMEP matching funds and in-kind contributions committed.

AMEP is not a participant in any other AEA Renewable Energy Fund or Denali Commission EETF program.

Previous EETF Submission Title: Alaska E3 Economy, Energy, Environment: A Standard Approach to Industrial Energy Efficiency. This proposal replaces that entry.

## **ABSTRACT**

### **PROJECT SUMMARY -- Project Description**

This project will reduce energy consumption and related costs in 15 of Alaska's food, seafood, industrial and commercial companies through the implementation of Lean manufacturing techniques. Throughout the Lower 48 and internationally, Lean has emerged as the dominant approach to identifying and eliminating waste in production processes. Its systemic focus provides a means of targeting dependant or bound processes that would otherwise stymie energy reduction measures for fear of "breaking" a system, allowing for meaningful energy savings while simultaneously maintaining quality and reducing overall costs.

Some emphasis will also be placed on the use of heat reclamation systems to capture refrigeration waste heat and use it to pre-heat daily clean-up water at food and seafood processing facilities. All over Alaska, companies are throwing away btu's rejected from their refrigeration systems while paying to heat their clean-up water. Supermarkets, fast food restaurants, food processing plants and others in the Lower 48 are using these commercially available heat exchangers to save on energy bills. Alaskan companies have not deployed this technology, or many other EE techniques. This project will conduct and promote demonstrations of energy efficiency technologies and the resulting ROI.

The Governor and Legislature in 2010 set a goal to achieve 15% energy efficiency improvement by 2020. This E3 program is a self-sustaining follow-on to AEA's commercial energy audit program for industry's contributions to this goal.

### **Project Eligibility**

Project eligibility is met by both aspects of this proposal. Lean evaluations typically identify excess energy capacity within systems, stranded both by neglect and overdesign, and provide the framework for reduction. These proven methods are still largely unknown in Alaska, and represent significant potential for energy conservation. Likewise, the well-established heat reclamation system used throughout the rest of the country is far underutilized in our state, and also represents a clear technological and energy-saving improvement to existing refrigeration systems.

### **Project Innovation**

Lean Manufacturing is a production management philosophy having a very simple, yet powerful foundation whose roots were born in the scientific management principles of the early 1900's with Henry Ford and others, and expanded by W. Edwards Deming. Basically, it seeks to identify and reduce waste. It has since been adapted to other disciplines such as distribution, finance, and product development, and is now exercised routinely beyond manufacturing. While adoption is becoming widespread in the US, it has yet to catch on in Alaska, where it has lacked promotion.

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Introducing Lean techniques to production systems can be dramatic. Companies often see significant cost savings quickly. This savings can directly involve their energy use, and other bottom-line cost savings buy them the flexibility to then take on energy-related projects, such as capital upgrades to more energy-efficient equipment.

**Priority**

The Alaska Manufacturing Extension Partnership, based in Alaska, will partner with contractors to conduct energy audits, UAA Small Business Development Center for client loan preparation assistance, and be supported by both matching and in-kind contributions. The technologies introduced by this project are not only easily transportable and applicable to various businesses state-wide, but also represent core competencies of AMEP and express its overall mission. We intend for opportunities provided by this grant to solidify AMEP's role as Alaska's foremost resource for Lean education and implementation, and strengthen our ability to promote energy technology innovation.

**TECHNOLOGY VALIDATION AND RESEARCH METHODOLOGY – Objectives**

The objective is to implement Lean methods and energy audits with 15 companies, and work with those companies to make and measure the ROI from improvements. Demonstration of this E3 program will provide the State of Alaska with a standard method to help achieve its stated goal of achieving a 15% improvement in energy efficiency by 2020. The EPA-published "Lean and Energy Toolkit" and "Lean and the Environment Toolkit" are well adopted and referenced within industry today. The E3 program is a national initiative of the EPA, the Manufacturing Extension Partnership, the Department of Energy, and the Small Business Administration to combine existing resources with local initiative to reduce energy consumption in American industry by applying Lean techniques within individual companies. See [www.E3.gov](http://www.E3.gov) for more.

**Methodology**

The energy reductions will be achieved by working with individual companies in their facilities to implement the following methodology:

- Conduct a value stream mapping process, Green Star Assessment, and energy audit to identify the current state of their energy consumption and other process wastes, as well as the desired future state.
- Apply Lean tools to expose root causes of existing wastes, and identify the most beneficial energy efficiency (EE) improvement opportunities.
- Implement system changes through "kaizen" events, targeted and executed rapidly to create measurable, permanent improvement while preserving operational stability.
- Evaluate results and create metrics to quantify waste reduction and set a new baseline for future efforts.

Clients will participate in three escalating levels of involvement:

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- Level 1 – Create value stream map; conduct Green Star assessment and energy audit, submit energy consumption records to DOE EnergyStar challenge; prepare current state description and analysis of implementation opportunities.
- Level 2 – Implement one or two of the best improvement measures.
- Level 3 – Implement a more robust set of improvements identified in audit and Level 1 analysis, re-assessing current/future states as necessary for multi-step efforts to ensure success.

Project implementation will occur on-site at the client’s facility. Administrative tasks will be conducted at AMEP’s offices. There are no significant resource evaluation considerations or permitting needs required due to the service-oriented nature of the project deliverables.

Client energy consumption records will be loaded into Dept. of Energy databases (EnergyStar and Quick Plant Energy Profiler). These databases will allow local data capture and national benchmarking to ensure that all E3 clients to adhere to a standard data set.

**SUMMARY OF PROJECT SCHEDULE AND SUMMARY OF PROJECT BUDGET**

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Total
Events	1,000	1,000	1,000	1,000	1,000	1,000	1,000	\$7,000
Level 1	-	24,000	24,000	24,000	24,000	24,000	-	\$120,000
Level 2	-	4,200	4,200	4,200	4,200	4,200	4,200	\$25,200
Level 3	-	-	1,000	1,000	1,000	1,000	1,000	\$5,000
Green Star		3,750	3,750	3,750	3,750	3,750	3,750	\$22,500
AMEP-Project	10,000	15,000	15,000	15,000	15,000	15,000	15,000	\$100,000
AMEP-Promo	3,000	3,000	3,000	3,000	3,000	3,000	3,000	\$21,000
Total Grant	14,000	50,950	51,950	51,950	51,950	51,950	27,950	\$300,700
In-Kind Match:								
GFC Events	3,000	3,000	3,000	3,000	3,000	3,000	3,000	\$21,000
Green Star	3,000	3,000	3,000	3,000	3,000	3,000	3,000	\$21,000
AMEP	10,000	10,000	20,000	20,000	20,000	20,000	20,000	\$120,000
Total In-Kind	16,000	16,000	26,000	26,000	26,000	26,000	26,000	\$162,000
Total Project								\$462,700

**In-Kind Match Details**

GFC Events: about 100 hrs/year \* \$100/hr. = \$20,000 over project life.

Green Star: about 100 hrs/year \* \$100/hr. = \$20,000 over project life.

AMEP: about 500 hrs/year \* \$125/hr. = \$125,000 over project life.

Client fees will be charged to cover implementation services by contractors as required.

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**PROJECT TEAM QUALIFICATIONS**

Eric Downey, Interim Executive Director

- Lean & Quality improvement, 6 years of experience
- Extensive experience with Lean & Green training through MEP system
- Proven history of success through direct client work

Brendan Costello, Project Manager

- Certified Lean Expert, R.E.V.V. International, CT
- 7 years process improvement experience in manufacturing
- Alaska Journeyman Electrician license
- 3 years hands-on implementation experience with DDC energy control systems

AMEP has helped over 200 clients realize a combined cumulative \$60 million in cost savings and new investments. We have also researched, designed and delivered two successful workshops on energy efficiency and waste reduction, pioneering the concept of Lean & Green in Alaska.

**Implementation Partners:**

- Green Star Inc. – Site assessments and information materials for Level 1 implementation.
- Global Foods Collaborative –GFC is a member-based industry association of food, beverage, and bio-products. GFC membership includes most of the food processors in Alaska, and many of the major and independent seafood processors. GFC will provide relevant networking, client introductions, and showcasing of results.
- UAA Small Business Development Center – Package loan proposals for clients.
- UAF – In discussions to form partnership to conduct energy audits.

**DISCUSSION OF COMMERCIALIZATION OF FUNDED TECHNOLOGY**

There are over 200 grocery stores, hundreds of seafood and other food processors, and a growing manufacturing and industrial base in Alaska. Both Lean and waste heat reclamation technologies are poised for watershed adoption as knowledge of them, their availability, and ROI potential will soon reach a critical mass. AMEP’s core mission is fully aligned with the goals of this grant program, and through this E3 framework, seeks to accelerate the adoption of these already developed and proven technologies.

**SIGNED APPLICANT CERTIFICATION**

“By signature on this application, I certify that we are complying and will comply with the amount of matching funds being offered.”

Mark Stearns, Chair  
Mark Stearns, AMEP Chairman of the Board

Date: 3/9/2012