

DOE OFFICE OF INDIAN ENERGY

Alaska Energy Basics

STRATEGIC ENERGY PLANNING

2015 Bethel, Dillingham and Juneau

Presented by the National Renewable Energy Laboratory



U.S. DEPARTMENT OF
ENERGY

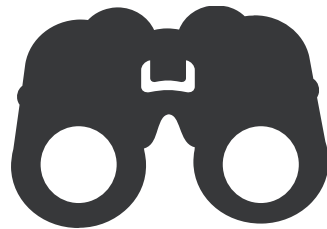
Office of
Indian Energy

What is Strategic Energy Planning

- Stakeholder Inclusivity
- Leadership Team
- A Strategic Energy Plan
 - Convene Stakeholders
 - Form Leadership Team
 - Develop Energy Vision
 - Assess Energy Needs and Resources
 - Develop Specific Goals
 - Prioritize Projects and Programs
 - Identify Financing Options
 - Compile Energy Plan
 - Measurement and Verification (M&V) and Plan Alterations

Why a SEP?

And what does it do for you?



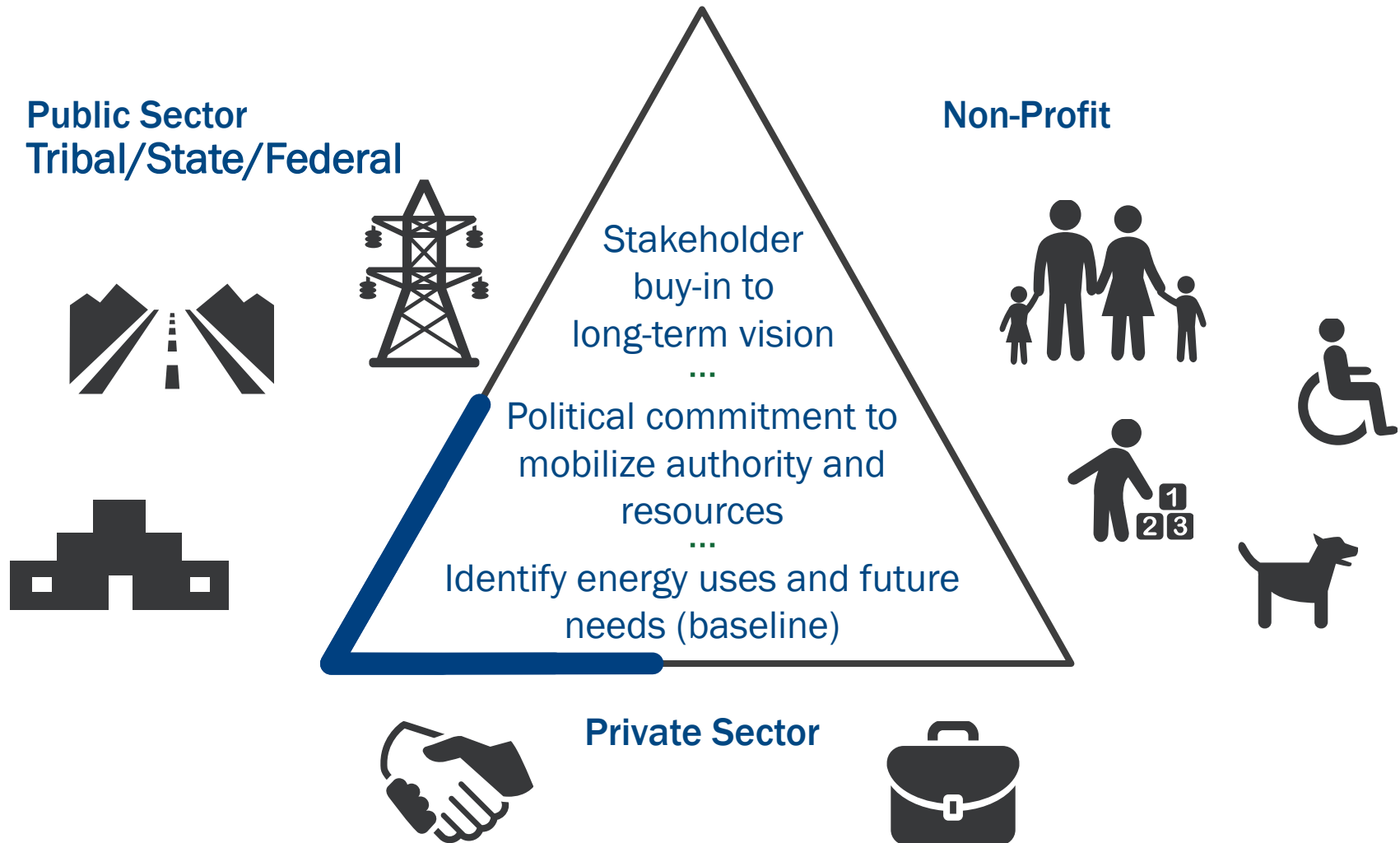
vs.



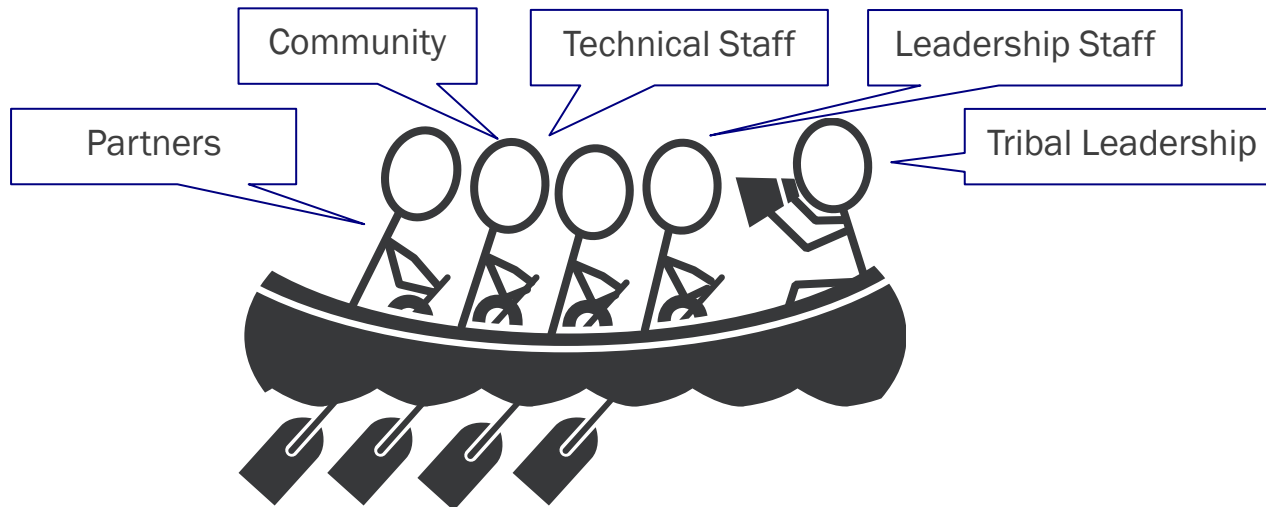
- Brings desired energy future into clear focus
- Considers current reality and leverages local resources
- Considers hurdles/challenges before you reach them
- Maps out efficient path to achieve your desired energy future
- Clarifies progress indicators
- Documents the game plan for short- and long-term success

What Makes Energy Planning “Strategic”?

Inclusive Energy Planning Process



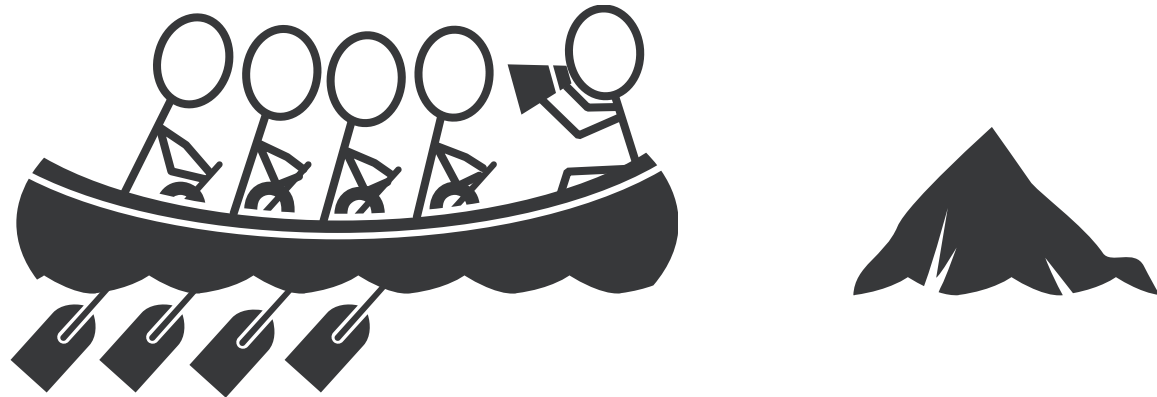
Planning is Coordinated & Collective Action



Proper Planning and Strategic Energy Plan Development Helps:

- Direct action
- Sustain momentum
- Motivate involvement
- Reduce/minimize reactive decision-making
- Go the distance

Why does Strategic Energy Planning Fail?



- Short-sighted predictions of the situation, timeline
- Unrealistic predictions of resources
- Uncoordinated implementation
- Narrow ownership
- Failure to follow the plan
- Poor, or casual, communication

Steps in Strategic Energy Planning



Strategic Energy Planning: First Steps

Stakeholders

- Tribal Members
- Tribal Council
- Tribal Government
- Tribal Utilities
- Tribal Enterprise Leaders
- Large Energy Users
- Local Utilities
- Regional Partners

Identify and Convene Stakeholders

Form a Leadership Team

Develop An Energy Vision

Key Success Component:
Identify and select an energy “champion” to shepherd the process

First Steps: Form a Leadership Team

Draw from the stakeholders:

- Tribal council member(s)
- Tribal government executives
- Tribal member representative(s)
- Tribal enterprise leader(s)

Include
Regional Energy
Planners



Regional Energy Planning

- Collaborate with existing Regional Energy Organization plans.
- Link to the Alaska Energy Authority to partner resources.
- Shift perspective to ownership between the leadership and the community

Strategic Energy Planning: Leadership Team

Not just people with the “right” idea, but those committed to the long-term task with personal and political influence

✓ Include

- Individuals with authority to direct resources
- Individuals with a passion for the “destination”
- Individuals with influence in the community and administrative abilities to keep the project alive
- Individuals with the technical ability
- Individuals who can “tell the story”

✗ Avoid

- Exclusively political appointees
- Exclusively technical staff
- Exclusively implementers

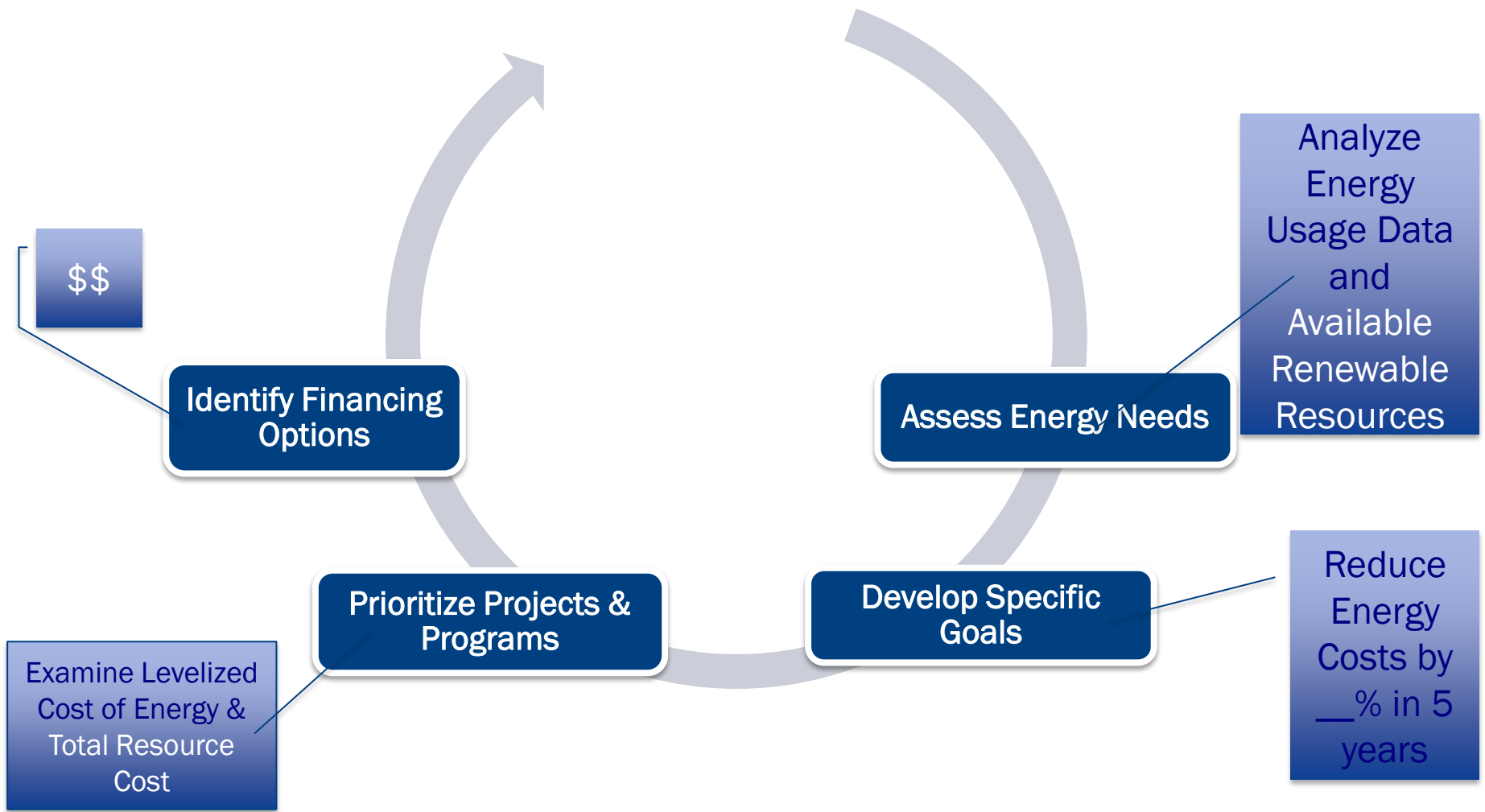
First Steps: Develop an Energy Vision

Common objectives, such as:

- Increase and ensure energy reliability
- Minimize environmental impacts
- Diversify energy supply
- Use local, renewable resources
- Strengthen, support economic development
- Build workforce/jobs
- Ensure energy affordability
- Generate revenue for Tribe
- Energy security/self-sufficiency
- Off-grid electrification
- Save money (offset energy costs)
- Keep money in Tribe
- Stabilize energy costs for Tribe and tribal members



Strategic Energy Planning: Priorities & Decisions



Priorities & Decisions: Assess Energy Needs

Document the community baseline:

- Determine energy use by “sector” including government, residential, school, commercial
- Use available tools:
 - Energy audits
 - EPA Portfolio Manager (non-residential buildings)
- Forecast future load
 - New housing
 - New government facilities
 - New/expanded enterprises
- Verify current service providers and rates for electricity, gas, propane, wood, and others



Priorities & Decisions: Develop Specific Goals

Examples:

- Reduce electricity use by ___% by 2022
- Obtain ___% of electricity from renewable sources within 10 years (similar to a renewable portfolio standard or RPS)
- Reduce energy costs by ___% within 5 years



Priorities & Decisions: Prioritize Projects & Programs

- Develop a ranking system to understand cost-effectiveness of different projects
- Best practice models:
 - Total Resource Cost
 - Model considers life-cycle benefits for projects
 - Levelized Cost of Energy
 - Allows comparison across different technologies
- Tribal energy policy/program examples:
 - Incentives to reduce energy use
 - Incentives to promote renewable energy
 - Sustainable/green building codes, standards, or other requirements or guidelines



Priorities & Decisions: Identify Financing Options

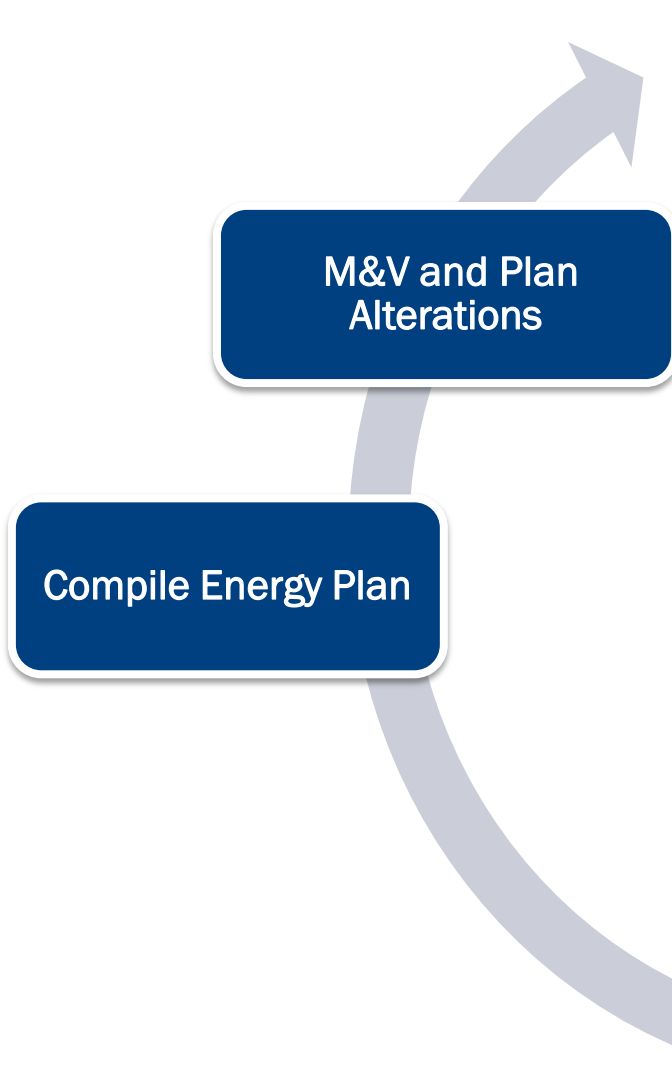
Secure planning and project funding sources:

- Tribal funding
- DOE Technical Assistance (TA) Program
- Other federal agency TA and grant programs
- State programs
- Non-governmental organizations (NGOs)



2013 September finance workshop attendee Barney Enos Jr. of the Gila River Indian Community.

Strategic Energy Planning: Energy Plan



Speaker David Lewis presents during the September 2013 finance workshop. (NREL Photo #28051)

Energy Plan: Purpose & Functions

Purpose

- Document near-term goals
- Sustain momentum
- Achieve long-term goals

Functions

- Creates “road map” to hold accountability to the destination
- Provides the means to consistently share the story with others
- Creates resources to help guide and filter priorities, providers, and decisions

Energy Plan: Components

Include:

- Vision
- Objectives
- Goals
- Baseline
- Barriers
- Program/project options
 - Demand side
 - Generation
- Recommendations
- Adoption by Tribal Council



Wind anemometer measures wind speed for resource assessment.

Energy Plan: M&V and Plan Alterations

- M&V
- Evaluate
- Fine tune



A photograph of three wind turbines on a mountain ridge. The turbines are silhouetted against a bright, hazy sky. The foreground is a misty, green mountain slope. The text is overlaid on a dark blue rectangular background.

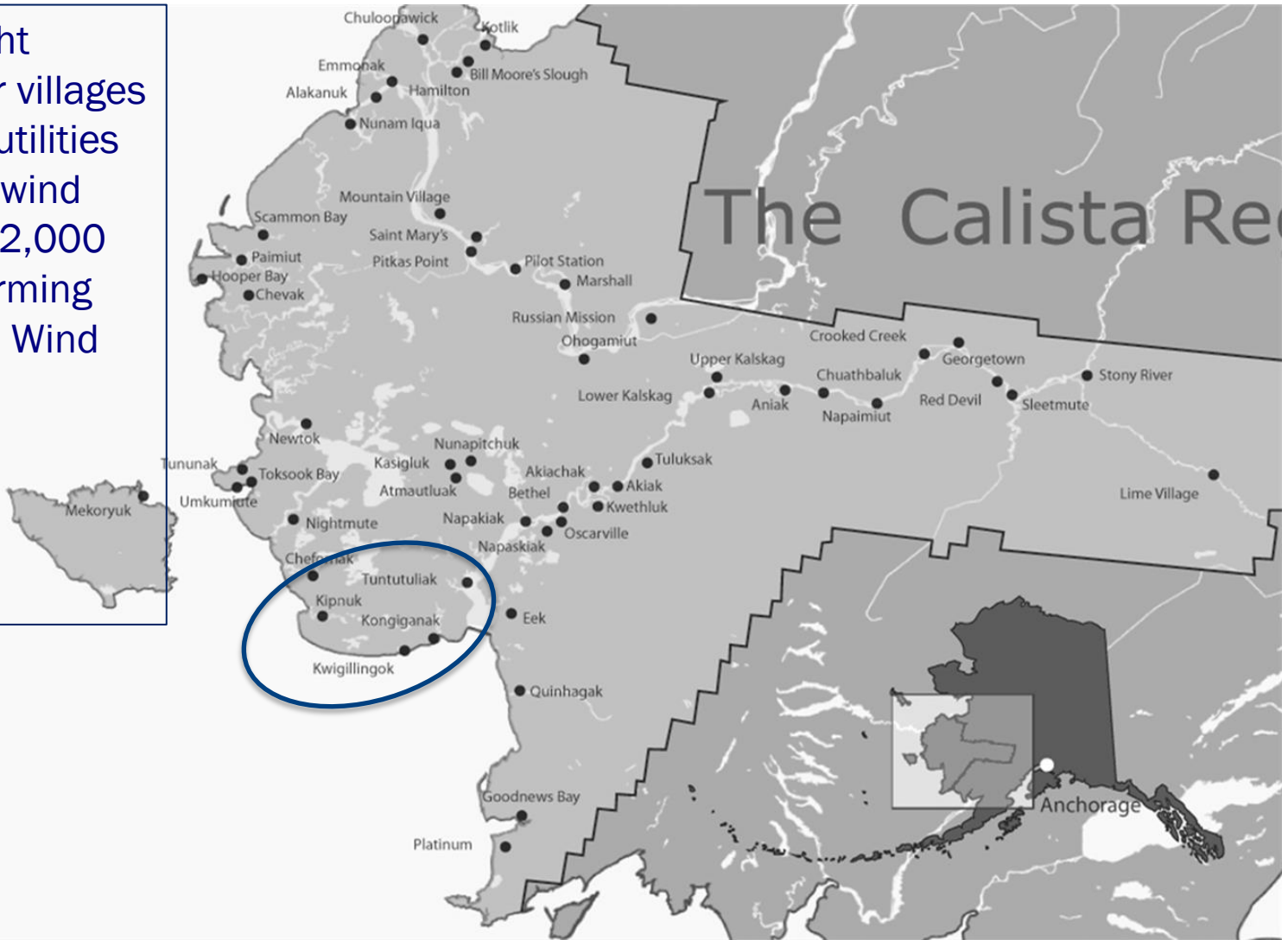
CASE STUDY STRATEGIC ENERGY PLANNING CHANINIK WIND GROUP



Chaninik Wind Group

Tribes brought together four villages and several utilities to introduce wind heat to over 2,000 people by forming the Chaninik Wind Group.

Kipnuk
Dongiganak
Kwigillingok
Tntutuliak



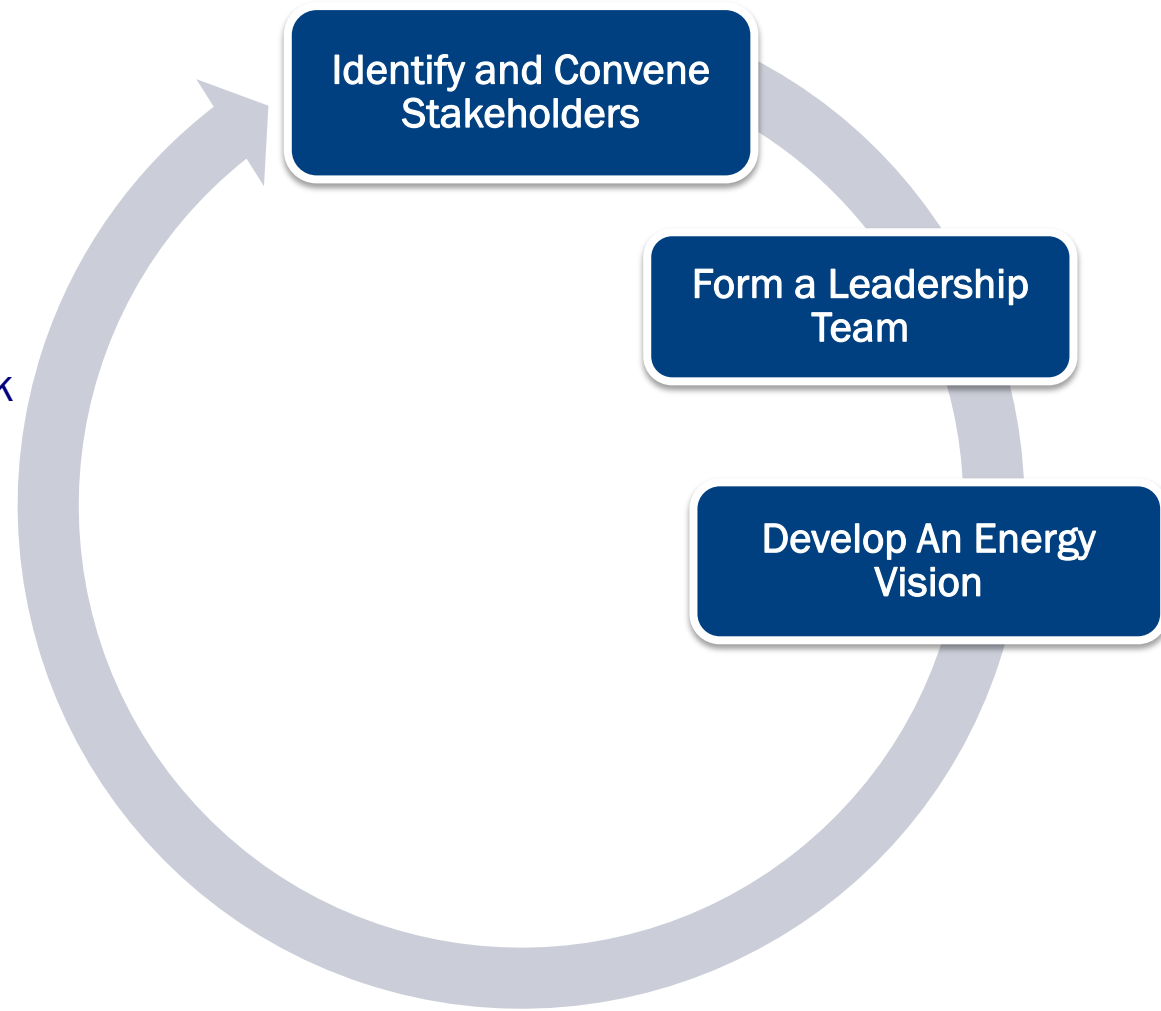
Chaninik Wind Group

- Wind Heat Smart Grid
- \$3.7 million dollar Project
- Five Wind Turbines (each 95 kW)
- 450 Kilowatt wind-diesel system serving the 4-village community of Kongiganak

■ Benefits of Chaninik Wind Group

- Installed wind turbines to lower cost of heat and electricity energy
- Reduced dependency on diesel fuel
- Created local jobs
- Trained and Certified employees
- Became a sustainable community

Strategic Energy Planning: First Steps



The tribal villages of Kipnuk, Kongiganak, Kwigillingok and Tuntutuliak built capacity to develop a lasting economic foundation to serve 1,807 with sustainable energy.

■ Collaboration is key to SEP

A strong strategic Energy Plan will have many collaborators:

- Intelligent Energy Systems (IES)
- AEA Renewable Energy Fund
- U.S. DOE Tribal Energy Program (Guided the SEP process)
- Calista Corporation
- Denali commission
- Denali Training Fund
- NREL
- Alaska Legislature
- Senator Lyman Hoffman
- Representative Bob Herron
- CSWG Community Members and Utilities

Chaninik Formed a Leadership Team



Chaninik Stakeholders Developed an Energy Vision



Strategic Energy Planning: Priorities & Decisions



Chaninik Assesses Energy Needs



CWG identified their goals in 2005

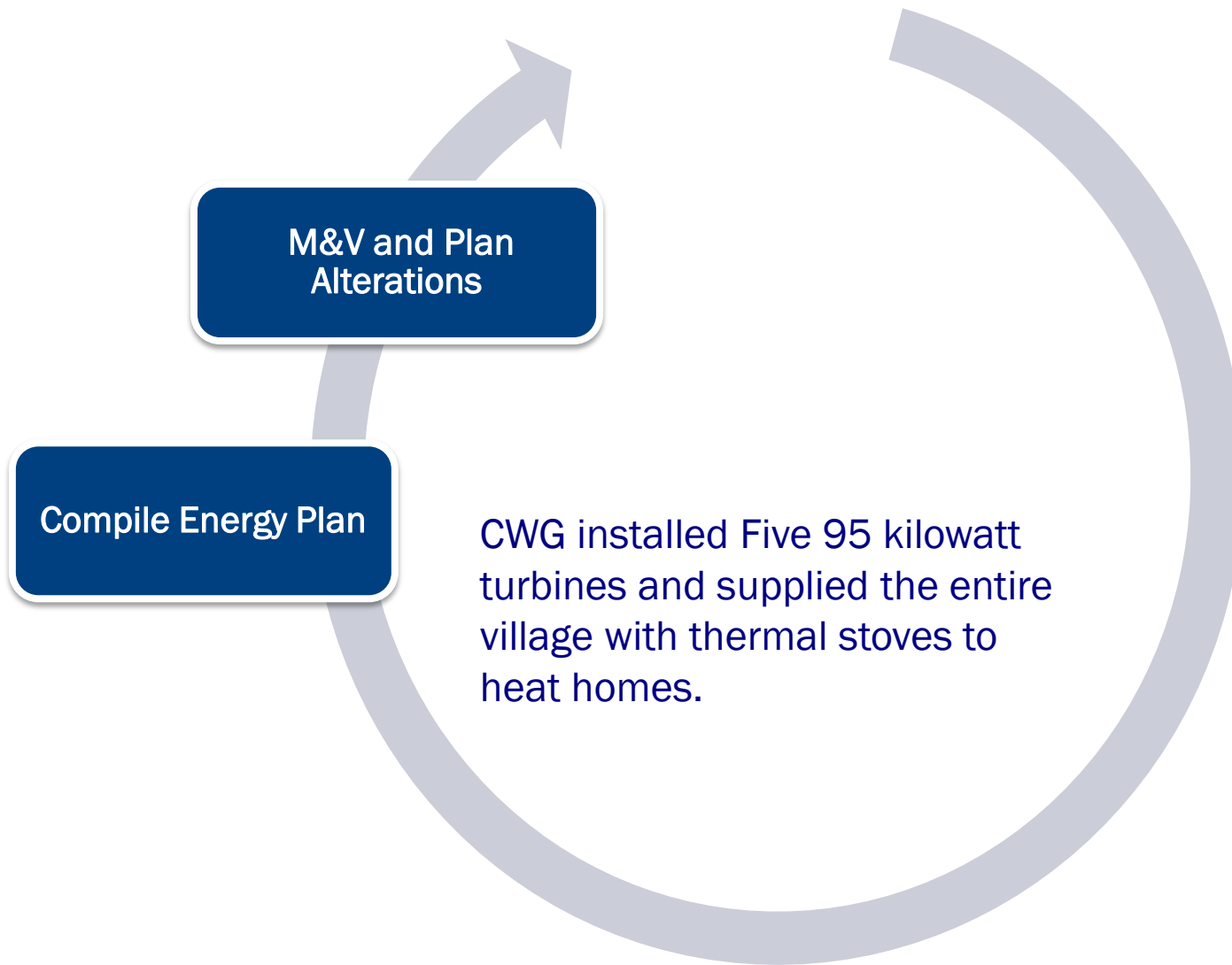
- Lower the cost of home heating and electricity
- Reduce dependency on diesel fuel by 40%
- Train and certify local employees
- Become a sustainable community



■ CWG Identifies Financing and Partners

- Alaska Renewable Energy Fund
 - CWG approached AK State Legislature with their strategic energy plan to request funding.
- Requested technical assistance from the D.O.E. Tribal Energy Program
- Collaborated with the Denali Training Fund, the Denali Commission, and the Calista Corporation.

Strategic Energy Planning: Energy Plan



Identified a Unique Technology

- Electric Thermal Storage (ETS) home heating units.



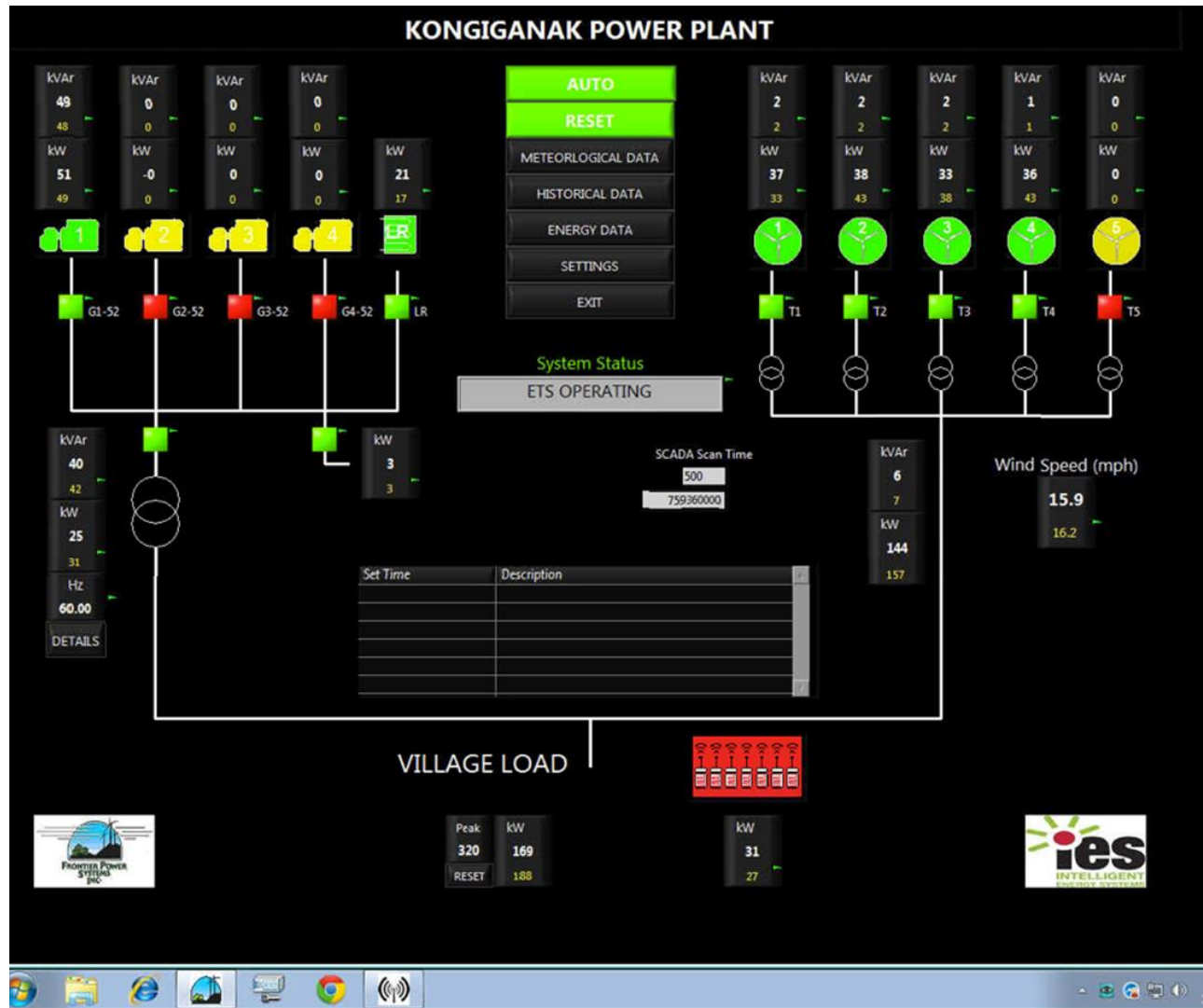
The ETS
devises are
saving
\$1,500 to
\$2,000
annually per
home.

Electronic Thermal Stoves (ETS)

- ETS heat output at high is equivalent to a Toyostove Laser 56
- \$.10 per kwh is equivalent to buying diesel at \$3 per gallon
- Current diesel price in Kongiganak: \$6.95 per gallon

Measurement & Verification and Plan Alterations

- Community-wide smart metering
- Smart grid control was added to the plan to capture their success in numbers.



Kongiganak Energy Summary 2013

KONGIGANAK POWER PLANT Energy Summary (kWh)

2013 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Total

Summary of Generation

Diesel 1	42,370	320	1,100	22,020	17,640	380	29,830	62,540	2,730	23,000	90,000	88,000	83,240
Diesel 2	25,260	71,690	73,620	47,320	53,320	63,860	38,850	-	-	-	-	-	73,920
Diesel 3	-	-	-	780	-	-	-	20,810	75,720	59,000	-	-	57,140
Diesel 4	200	-	-	-	-	-	120	240	-	-	-	-	2,420
Total Diesel Generation	67,830	72,010	74,720	70,120	70,960	64,240	68,800	83,590	78,450	83,010	90,000	88,000	916,720
Wind Turbine 1	15,618	15,234	15,575	21,588	11,740	7,867	8,301	7,078	10,000	10,000	10,000	10,000	139,512
Wind Turbine 2	11,764	4,789	8,160	-10	-	1,396	736	2,919	-	-	-	-	79,588
Wind Turbine 3	26,130	18,936	22,211	20,113	15,733	12,018	9,678	8,921	-	-	-	-	80,584
Wind Turbine 4	23,363	5,139	-61	13,437	14,968	3,886	2,603	5,316	-	-	-	-	92,571
Wind Turbine 5	-	-	-	-	-	-	-	1,672	10,926	-	-	-31	14,816
Total Wind Generation	76,876	44,099	45,885	55,128	42,441	25,167	21,318	25,905	46,923	48,539	36,245	38,546	507,071
Total Generation	144,706	116,109	120,605	125,248	113,401	89,407	90,118	109,495	125,373	131,549	126,315	131,466	1,423,791

Diesel
Generation is
916,720kWh

Wind Gen. is
507,071kWh

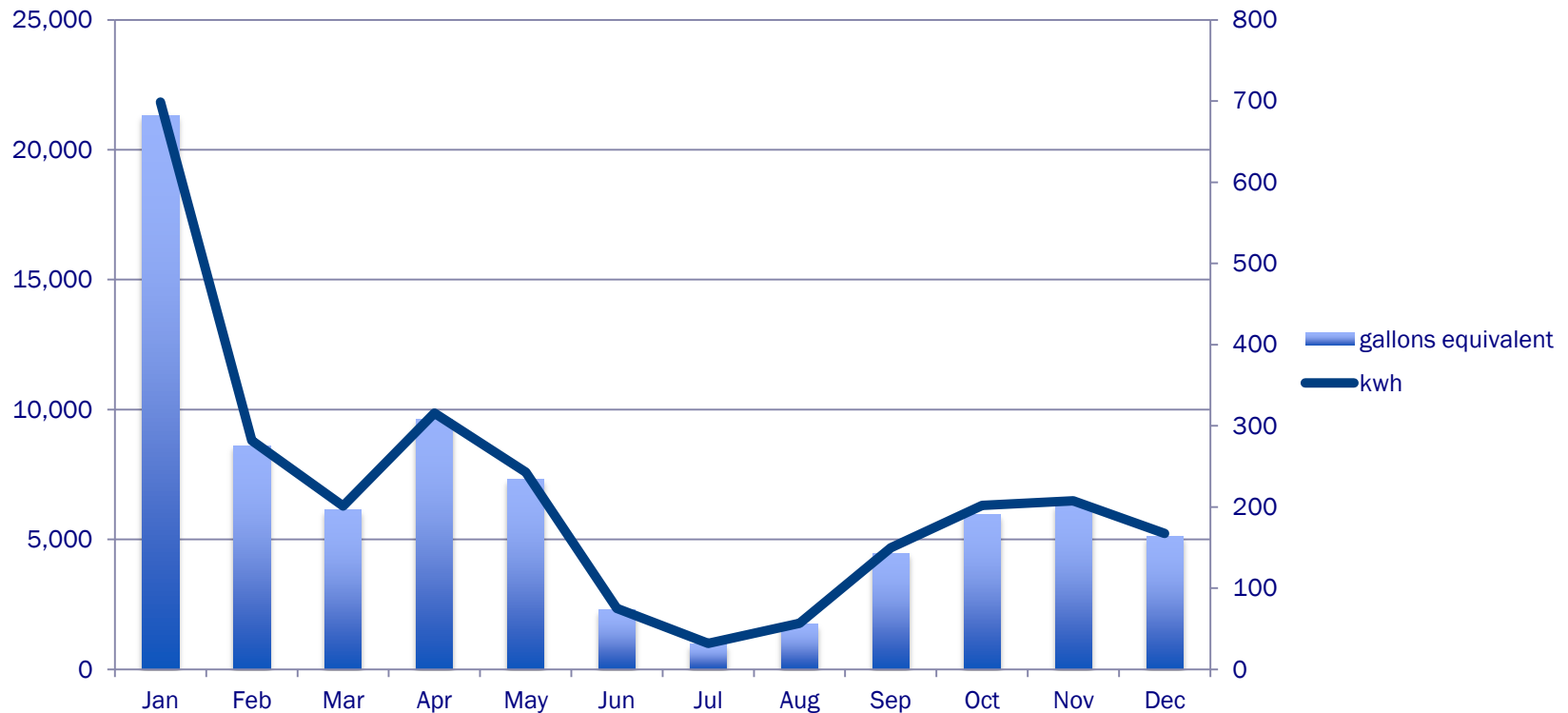
Summary of Consumption

Station Service	2,742	2,387	2,757	2,455	2,627	2,974	2,819	2,549	2,897	2,881	2,338	2,524	31,950
Wind to Village	40,487	28,254	31,072	33,362	23,518	14,383	14,593	16,640	29,355	33,375	23,380	25,480	313,899
Wind to Load Regulator	14,556	7,032	8,527	11,898	11,335	8,442	5,723	7,489	12,892	8,859	6,384	7,832	110,969
Wind to ETS	21,833	8,813	6,285	9,868	7,588	2,342	1,002	1,776	4,676	6,305	6,481	5,233	82,203
Total Village	108,317	100,264	105,792	103,482	94,478	78,623	83,393	100,230	107,805	116,385	113,450	118,400	1,230,619
Total Consumption	144,706	116,109	120,605	125,248	113,401	89,407	90,118	109,495	125,373	131,549	126,315	131,466	1,423,791

% Diesel kWh Displaced by Wind	37.4%	28.2%	29.4%	32.2%	24.9%	18.3%	17.5%	16.6%	27.2%	28.7%	20.6%	21.5%	25.5%
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Example – Kongiganak ETS Fuel Displacement 2013



Annually, community homes with ETS stoves installed saw an average of \$800 - \$1250 in stove oil displacement.

Strategic Planning Leads to Successful Results



Lessons Learned

- Energy issues must be addressed on all levels.
- More resources are needed to build capacity
- New opportunities reveal themselves everyday
- Risks are necessary and will allow you to expect the unexpected.
- Stay positive and focus on the project goals!



Useful Resources

Resource

- The DOE Tribal Energy Program
<http://apps1.eere.energy.gov/tribalenergy/>
- U.S. Department of Energy Office of Indian Energy Resource Library
<http://energy.gov/indianenergy/resources/energy-resource-library>
- Webinars for Tribal Energy:
<http://ww2.wapa.gov/sites/western/renewables/Pages/Webcasts.aspx>

Technology

- “Community Greening: How to Develop a Community Energy Plan,” National Renewable Energy Laboratory
<http://www.nrel.gov/docs/fy10osti/45652.pdf>

Policy

- “Guide to Tribal Energy Development,” U.S. Department of Energy Office of Energy Efficiency and Renewable Energy Tribal Energy Program
<http://www1.eere.energy.gov/tribalenergy/guide/>

Thank You & Contact Information

Tribal Energy Program Contacts

http://apps1.eere.energy.gov/tribalenergy/program_contacts.cfm

For Technical Assistance:

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DOE Office of Indian Energy Website:

www.energy.gov/indianenergy

NREL Renewable Energy Technology Basics Website:

www.nrel.gov/learning/re_basics.html