



NANA Region Energy Projects

NOVEMBER 3, 2016 • Anchorage, Alaska



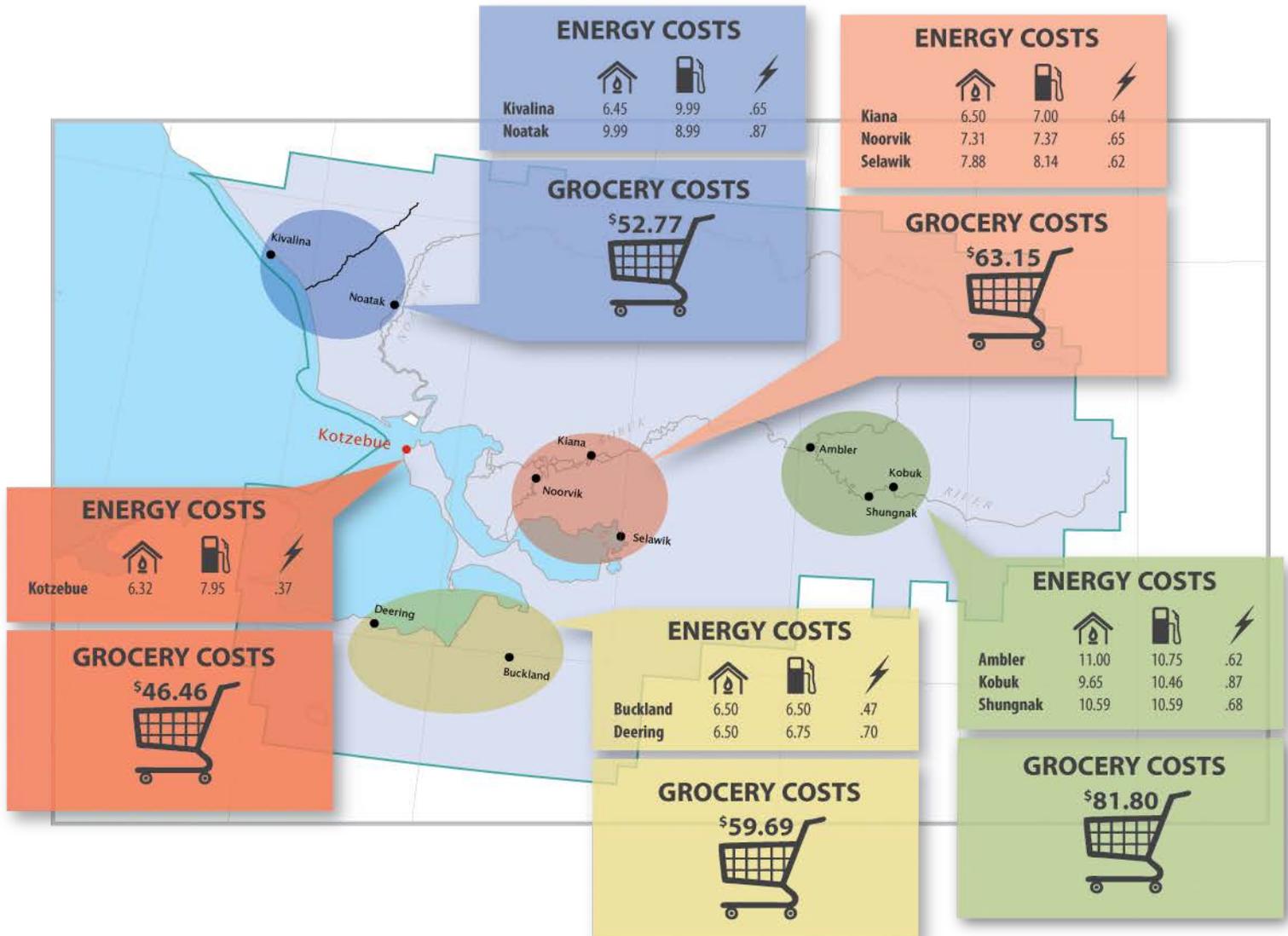


A Remote Region

- No roads and few electrical interties to connect communities
- 61% more expensive than Anchorage
- High cost goods and fuel



-  Stove Oil / Gallons
-  Gasoline / Gallons
-  Electric / Kwh
-  Milk, Bread, Sugar, Flour and Diapers



Updated: November 2013



ALASKA VILLAGE ELECTRIC COOPERATIVE 4831 Eagle Street Anchorage, Alaska 99503-7431 1-800-478-1818 1-907-661-1818

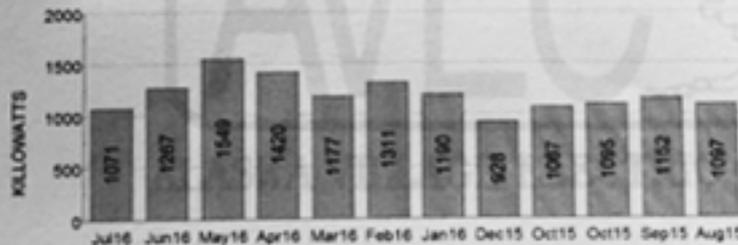
Account Number	Bill Date	Payments Received Through	Due Date	Service Dates From	Days in Cycle
				07/31/16	31
				To 08/31/16	

Customer Name & Village	Service Address
	NOATAK

Billing Description	
PRIOR BALANCE DUE	1295.45
PAYMENT 08/12/16	1295.45
ADJUSTMENTS	0.00
CUSTOMER CHARGE	5.00
ENERGY	210.00
ENERGY	89.20
FUEL COST	573.34
PCE BLOCK1	289.05-
CITY SALES TAX	26.33

Meter Serial #	Previous Reading	Current Reading	Rate Code	kWh Used
	96640	97786	142	1146

Charge Type	kWh Used X Rate	Charge Amount
CUSTOMER CHARGE		5.00
ENERGY	700 KWH X 00.3000	210.00
ENERGY	446 KWH X 00.2000	89.20
FUEL COST	1146 KWH X 00.5003	573.34
PCE BLOCK1	500 KWH X 00.5781-	289.05-
CITY SALES TAX		26.33



ENDING BALANCE	614.82
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** ACCOUNT STATUS **		
Current	Days	614.82
30-60	Days	0.00
60-90	Days	0.00
90-120	Days	0.00
Over 120	Days	0.00

NOTICE-THE UTILITY WILL BE PAID UNDER THE STATE OF ALASKA PCE PROGRAM (AS 42.48.118) TO ASSIST THE UTILITY AND ITS CUSTOMERS IN REDUCING THE HIGH COST OF GENERATION OF ELECTRIC ENERGY.FOR THE MOST RECENT MONTHLY REPORTING PERIOD, THE FUEL EFFICIENCY FOR EACH AVEC LOCATION PER KILOWATT HOURS PER GALLON AND THE FUEL EFFICIENCY STANDARD SET OUT IN THE REGULATIONS FOR THE PCE PROGRAM FOR EACH LOCATION IS PUBLISHED AND SENT TO EVERY MEMBER. THIS INFORMATION IS ALSO POSTED ON OUR WEB SITE WWW.AVEC.ORG

LAST DATE TO PAY before Disconnections is September 26th, 2016.

Vision: To promote energy security in the NANA Region

Three Distinct Projects (2008-09)

- Strategic Energy Plan NANA SEP
- NANA Geothermal Assessment Program NANA GAP
- NANA Wind Resource Assessment Program NANA WRAP

- DOE/NREL Funded
- NANA Pacific Technical Services Contractor
- Execution Partners
 - Kotzebue Electric Association
 - Alaska Village Electric Cooperative
 - NW Arctic Borough
 - Manilaaq
 - Alaska Energy Authority

Selawik, AK - Wind Farm, New Bulk Fuel, Recovered Heat

NANA Energy Security: Strategic Energy Plan (2008-09)

- **SO 1:** Increased collaboration between NANA Region stakeholders on energy policy, program, infrastructure, and increased capacity of tribal entities for the region
- **SO 2:** Increased understanding of energy options available to NANA Region energy stakeholders for improved energy decision making
- **SO 3:** Increased awareness and understanding of NANA Region energy needs on the part of external stakeholders



Northern Lights, Noorvik AK

Energy Plan & Project Development Methodology & Approach

(from 2008-09 Energy Planning)

- Community Outreach, Resolutions, & Surveying
- Energy Options Analysis
- Energy Resource Data Collection and Forecasting
- Regional Energy Plan
- Energy Summit
- Energy Steering Committee
- Project Development
 - Feasibility Studies
 - Modeling
 - Conceptual Designs
 - Secure Funding
 - Detailed Design
 - Construction
 - Commissioning & Operations

Northwest Arctic Borough Solar

1. All regional water/sewer systems use solar-PV by 2016 and run solely on solar in summer
2. NANA co-sponsored solar energy conferences in Anchorage to educate and develop solar energy concepts
 - Participants included DOE, NREL, solar developers, investors, villages, and other stakeholders



23 kW Solar Array in Noorvik

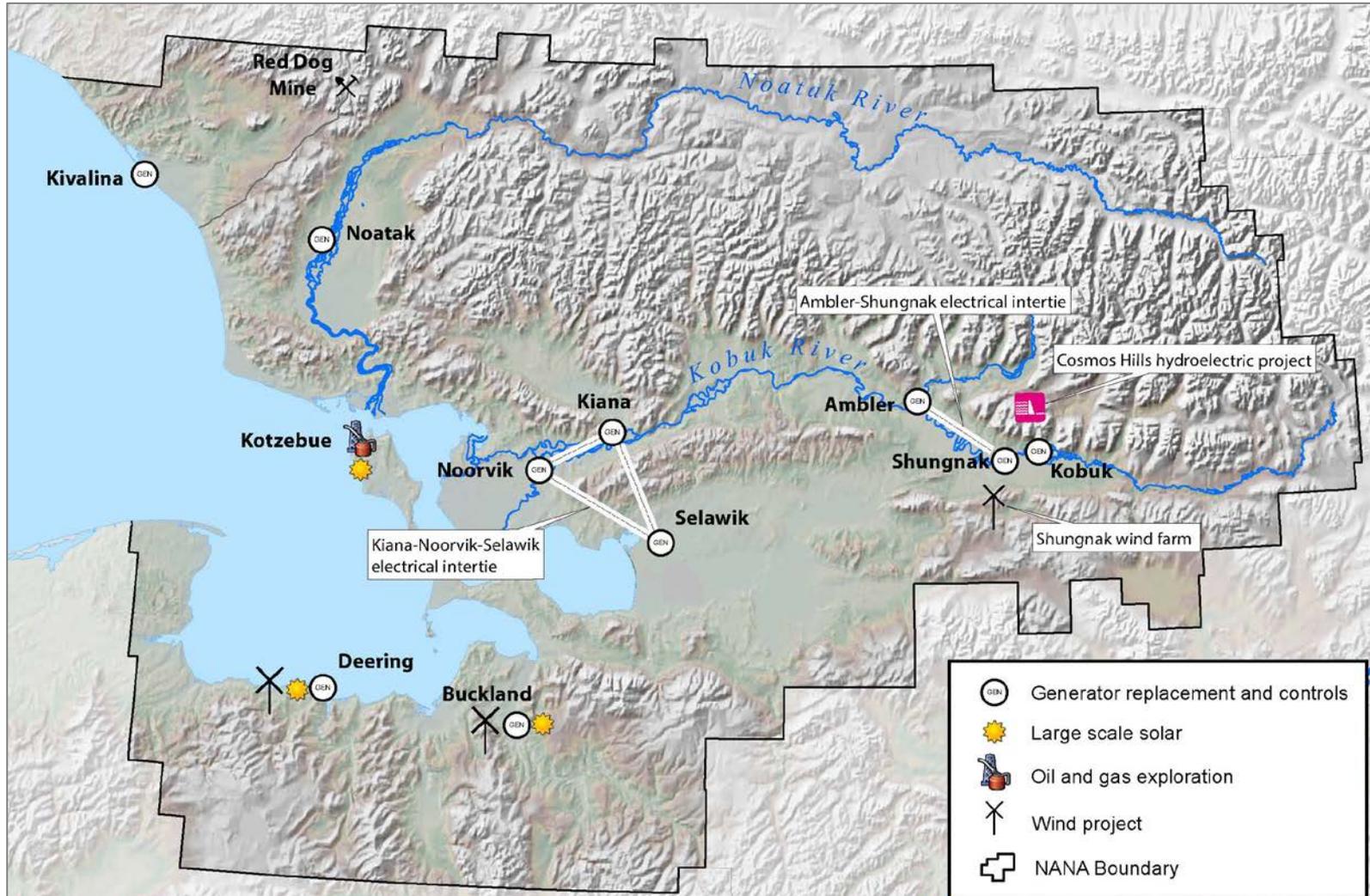
A 23 kW solar array is
being installed in Noorvik
by the NWAB.



Solar PV Performance

Solar PV for NAB Waterplants

5/23/2016		9/5/2016		Average						
Community	installed	installed size Kw	production MWh	Curren t \$/Kwh retail	Value \$	CO 2 offset lb	Disel offset Gallon	Cost \$	Cost/watt installed	Performance Kwh/day
Ambler	3/1/2013	8.4	21.69	0.67	\$14,532.30	63,794	1606.67	75,000	8.928571	18.39694656
Kobuk	5/1/2013	7.38	16.32	0.73	\$11,913.60	48,000	1208.89	75,000	10.1626	14.59749553
Shungnak	10/1/2014	7.5	9.97	0.73	\$7,278.10	29,324	738.52	75,000	10	16.61666667
Noorvik	10/1/2013	12	23.29	0.55	\$12,809.50	68,500	1725.19	75,000	6.25	24.13471503
Noatak	11/1/2013	11.27	23.44	0.78	\$18,283.20	68,941	1736.30	75,000	6.654836	25.09635974
Deering	11/1/2013	11.13	27.56	0.71	\$19,567.60	81,059	2041.48	75,000	6.738544	29.50749465
Kotzebue-1	10/15/2015	10.53	8.69	0.45	\$3,910.50	25,559	643.70	83,000	7.882241	39.32126697
Kotzebue-2	11/10/2015	10.53	8.28	0.45	\$3,726.00	24,353	613.33	83,000	7.882241	42.46153846
Selawik	11/20/2014	9.72	17.45	0.51	\$8,899.50	51,324	1292.59	83,000	8.539095	31.72727273
Kiana	8/13/2015	10.53	11.22	0.56	\$6,283.20	33,000	831.11	83,000	7.882241	39.50704225
Buckland	4/1/2016	10.53	6.22	0.47	\$2,923.40	18,294	460.74	83,000	7.882241	119.6153846
Kivalina	2/15/2016	10.53	6.5	0.55	\$3,575.00	19,118	481.48	83,000	7.882241	66.32653061
Total		120.05	180.63		\$113,701.90	531,265	13380.00	948,000	7.437296	467.3087138



NANA Solar with DOE IE Support

- NANA partnered with KEA and tribes to apply for DOE funding; to install solar energy into Deering, Buckland, and Kotzebue
- Will be largest solar PV project in Alaska Public-Private Partnership – Evaluated, loans, grants, and investment tax credits
- Community & Business Development
Total Project Cost: \$2.0M
- Local/Village commitment of VEDC funds in Buckland & Deering



Goals & Objectives

The Primary goals of the solar energy project are to:

1. Lower energy costs for the communities of Kotzebue, Buckland, and Deering
2. Reduce diesel fuel use and increase renewable energy deployment in these communities
3. Develop clean energy job skills and expertise among residents in the three communities
4. Demonstrate the success of high penetration solar-wind-storage-diesel hybrid systems in remote high latitude locations for broad replication (aiming for “diesel-off” for some period of time)

KEA/NANA Renewable Energy Joint Venture (KEA/NANA JV)

- NANA Regional Corporation
- Kotzebue Electric Association
- Kikiktagruk Inupiat Corporation

Project Advisors & Beneficiaries

- Kotzebue IRA
- Buckland IRA
- Deering IRA
- KIC
- Ipnatchiaq Electric Company

Other Project Participants:

- Adaptive Microgrids
- Deerstone Consulting
- Electric Power Systems

Funders:

- DOE
- Financial Institution

Summary of Funding for Total Installed Cost (Public-Private Partnership)

Grant Award – Solar PV	DOE	\$1,000,000
Senior Debt	Loan	\$1,009,724
Total Installed Costs	\$\$\$	\$2,009,724

Gaps

- Renewable energy projects need smaller generators and battery packs – battery funding has been secured for all 3 communities
- Need operator training/follow up and run measures for power generation
- Power Cost Equalization could be reformed to not penalize integrating renewable energy (reward diesel savings)
- Existing generators are oversized



Opportunities

- Develop solar project for Deering, Buckland, and Kotzebue; promote public/private partnership and local capacity for funding & replication elsewhere
- Advocate for PCE reform
- Change the culture: Grants vs. loans





Taikuu