Tribal IPP Development in Alaska – Opportunities, Challenges & Community Benefits

US Department of Energy – Office of Indian Energy: "Leveraging Opportunities to Bring Tribal Clean Energy Projects Online" Webinar

June 26, 2024

Brian Hirsch, PhD
CEO & Founder
DeerStone Consulting
907-299-0268
brian@deerstoneconsulting.com
www.deerstoneconsulting.com

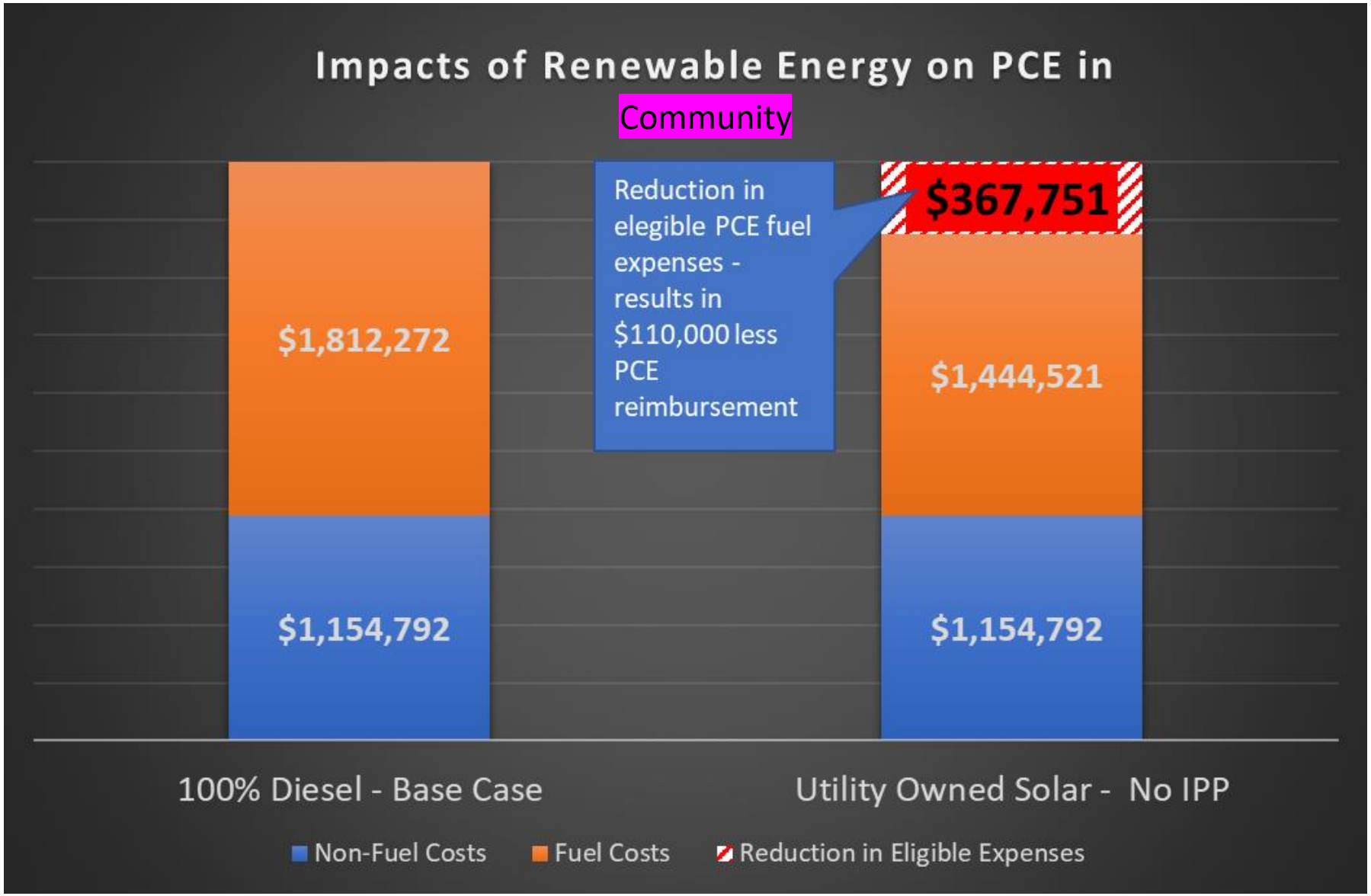
Deerstone Consulting

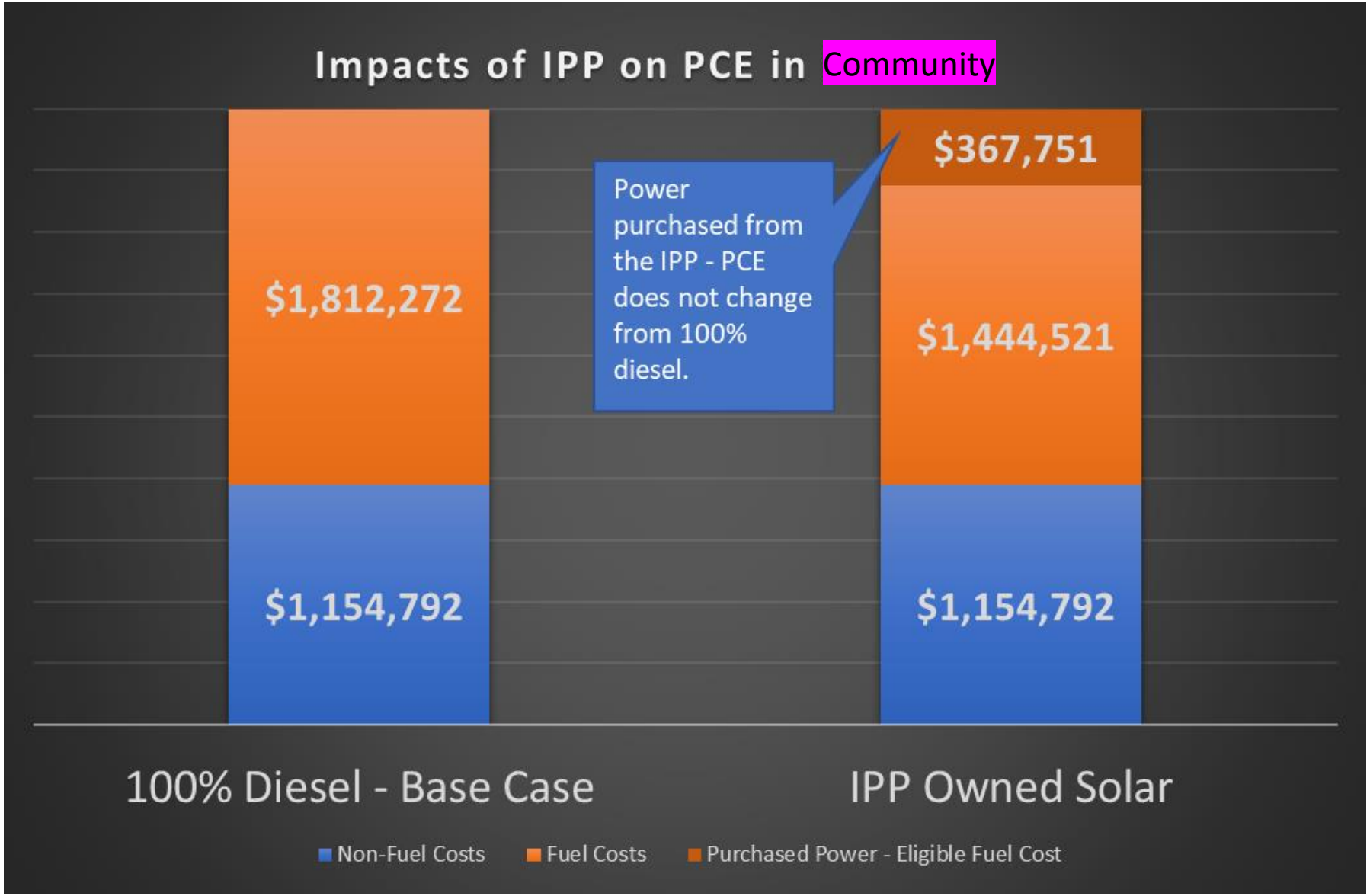
What is Power Cost Equalization (PCE)?

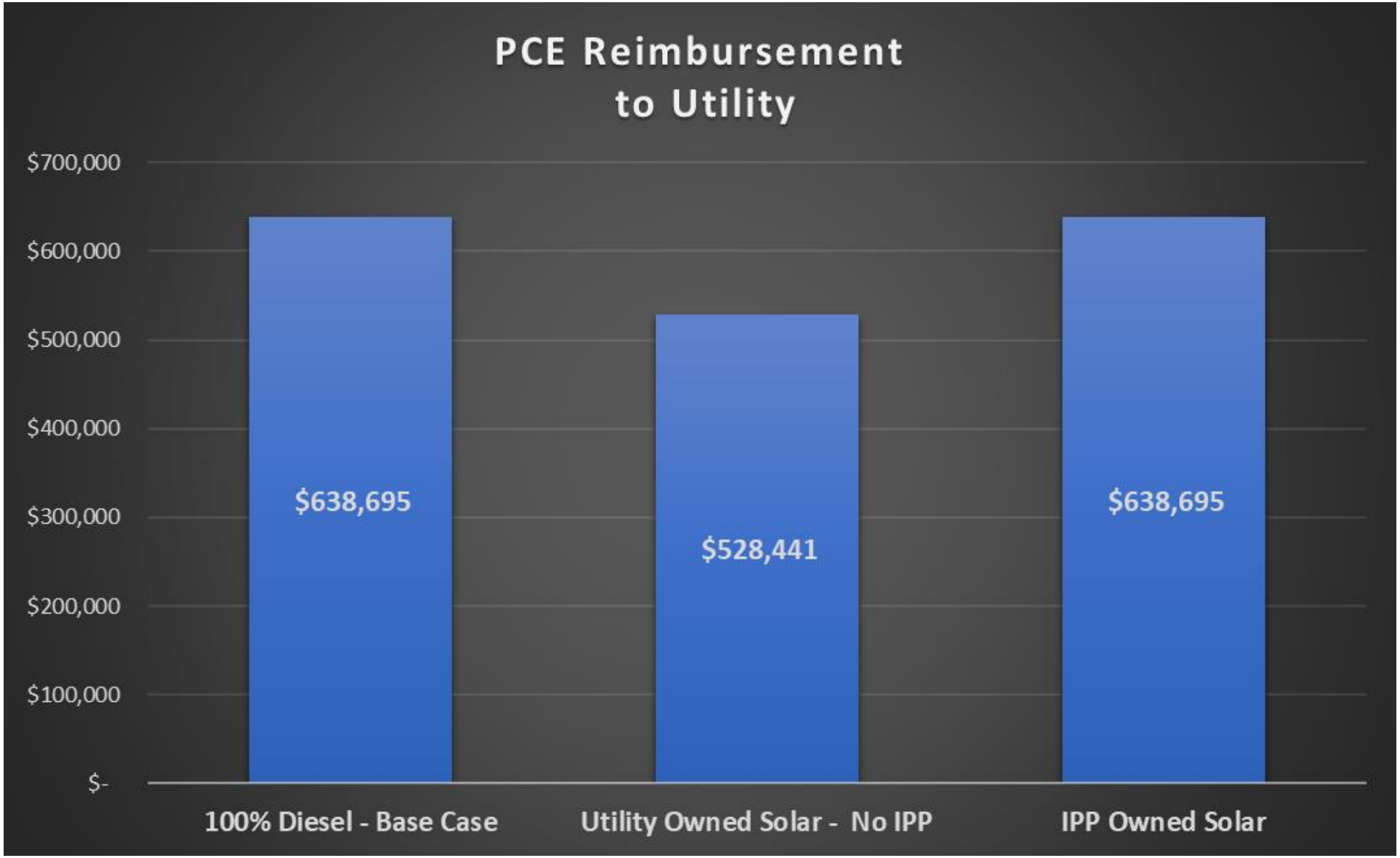
- Electricity is 2 – 5 times MORE EXPENSIVE in rural Alaska (i.e., Tribal communities) than in urban Alaska (i.e., Anchorage, Fairbanks, Juneau)
- PCE is a State of Alaska program that aims to Equalize the cost of electricity across rural & urban Alaska
- PCE was established because urban legislators needed support from rural legislators to provide funding for urban energy projects, like natural gas development in Cook Inlet, that resulted in low cost power for urban Alaska
- The PCE program established an endowment fund that yields interest (like a savings account) to "buy down" the cost of diesel fuel for rural AK villages, where natural gas is not available.
- Less diesel fuel = less PCE $$ from the state, until…

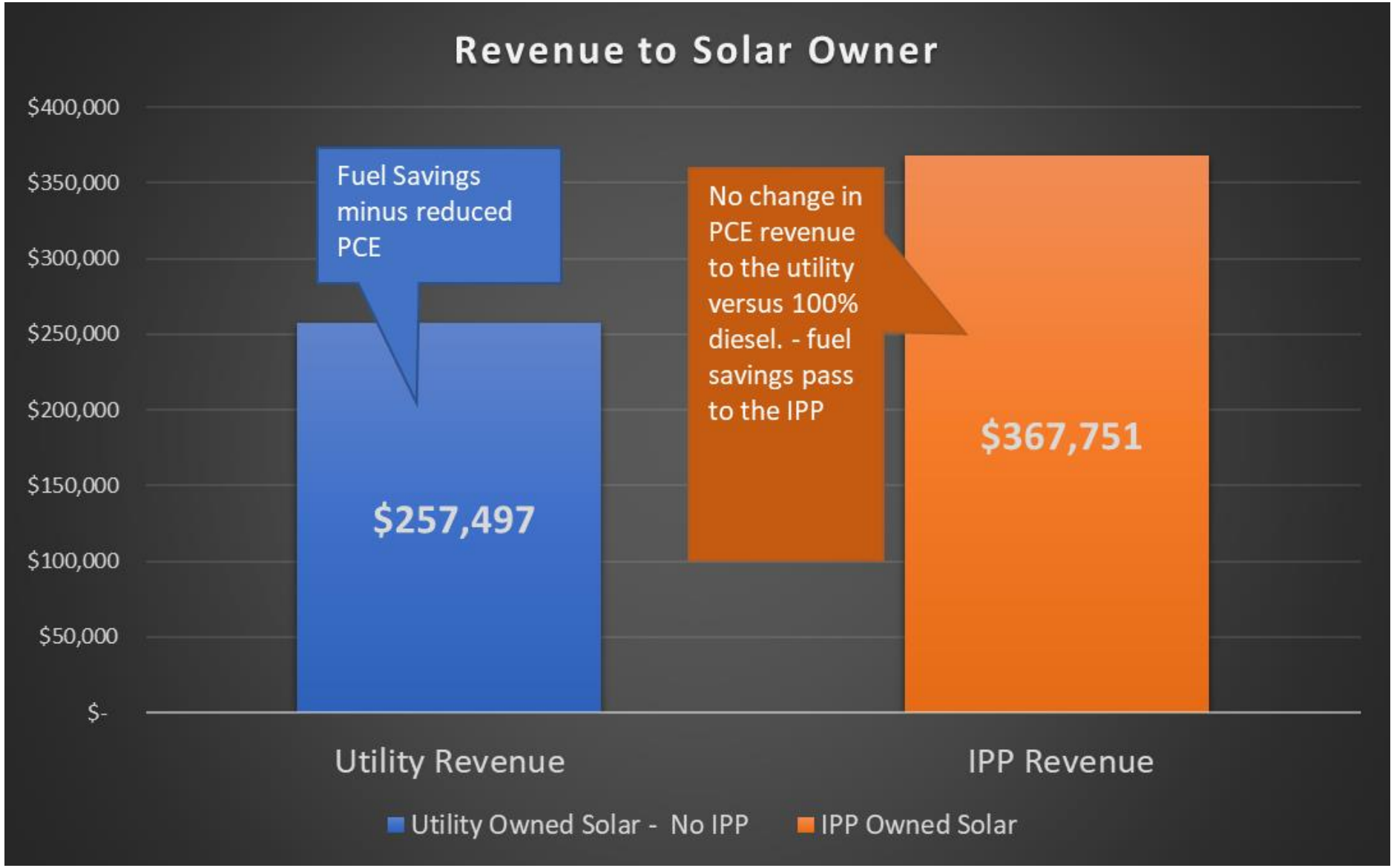
Tribal Independent Power Producer Opportunity

- A Tribal Independent Power Producer (IPP) develops & owns renewable energy assets – often with DOE OIE support
- Local Utility buys the renewable energy power from the Tribal IPP
- Cost of the power becomes a fuel cost that is an eligible PCE expense
- PCE is recouped by Utility and the Tribal IPP focus on renewable energy production, O&M, eventual replacement of renewable assets


Impacts of Renewable Energy on PCE in
Community
$1,812,272
$1,154,792
Reduction in elegible PCE fuel expenses - results in $110,000 less PCE reimbursement
$367,751
$1,444,521
$1,154,792
100% Diesel - Base Case
Utility Owned Solar - No IPP
Non-Fuel Costs
Fuel Costs
Reduction in Eligible Expenses


Impacts of IPP on PCE in Community
$1,812,272
$1,154,792
Power purchased from the IPP - PCE does not change from 100% diesel.
$367,751
$1,444,521
$1,154,792
100% Diesel - Base Case
IPP Owned Solar
Non-Fuel Costs
Fuel Costs
Purchased Power - Eligible Fuel Cost


PCE Reimbursement to Utility
$700,000
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$-
$638,695
$528,441
$638,695
100% Diesel - Base Case
Utility Owned Solar - No IPP
IPP Owned Solar


Revenue to Solar Owner
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$-
Fuel Savings minus reduced PCE
$257,497
No change in PCE revenue to the utility versus 100% diesel. - fuel savings pass to the IPP
$367,751
Utility Revenue
IPP Revenue
Utility Owned Solar - No IPP
IPP Owned Solar

Solar PV & Battery Ownership Comparison

Utility Ownership

Pros

- Battery Benefits in grid stability and reduced spinning reserve requirements
- Non-PCE Customers will see a rate reduction
- Less Complicated Administratively
- Direct Fuel Savings

Cons

- Utility is responsible for O&M
- Residential Customers will see minimal rate reduction
- Loss in PCE revenue to Utility
- Utility would require additional technical expertise on staff (Battery)

IPP Ownership

Pros

- Battery Benefits in grid stability and reduced spinning reserve requirements
- Additional $110,000 revenue to community (fuel savings and PCE)
- IPP handles O&M, insurance, etc.
- Part-time job created
- IPP can invest revenue to renewable energy expansion and related community improvements

Cons

- Energy System is not under Utility control
- Additional revenue cannot go directly to the utility to offset rates, but can be used for community benefits
- Administratively more complex, especially to convert benefits toward rate reduction

Solar PV and Battery Storage – Momentum in the Northwest Arctic

Completed Projects

120 kW (total)

29 kW

330 kWh (total)

100 kW (total)

550 kWh

224 kW

495 kWh

375 kW

1,000 kWh

710 kW

284 kWh

234 kW

3,155 kWh (total)

7,072 kW (total)

Water Plant Solar PV All Villages

Noorvik

Deering & Buckland

Shungnak

Noatak

Selawik

Ambler

OCED All Villages

~2013

2023

Size

Data source:
PCE Summaries

Naknek and Nushagak are

30x larger

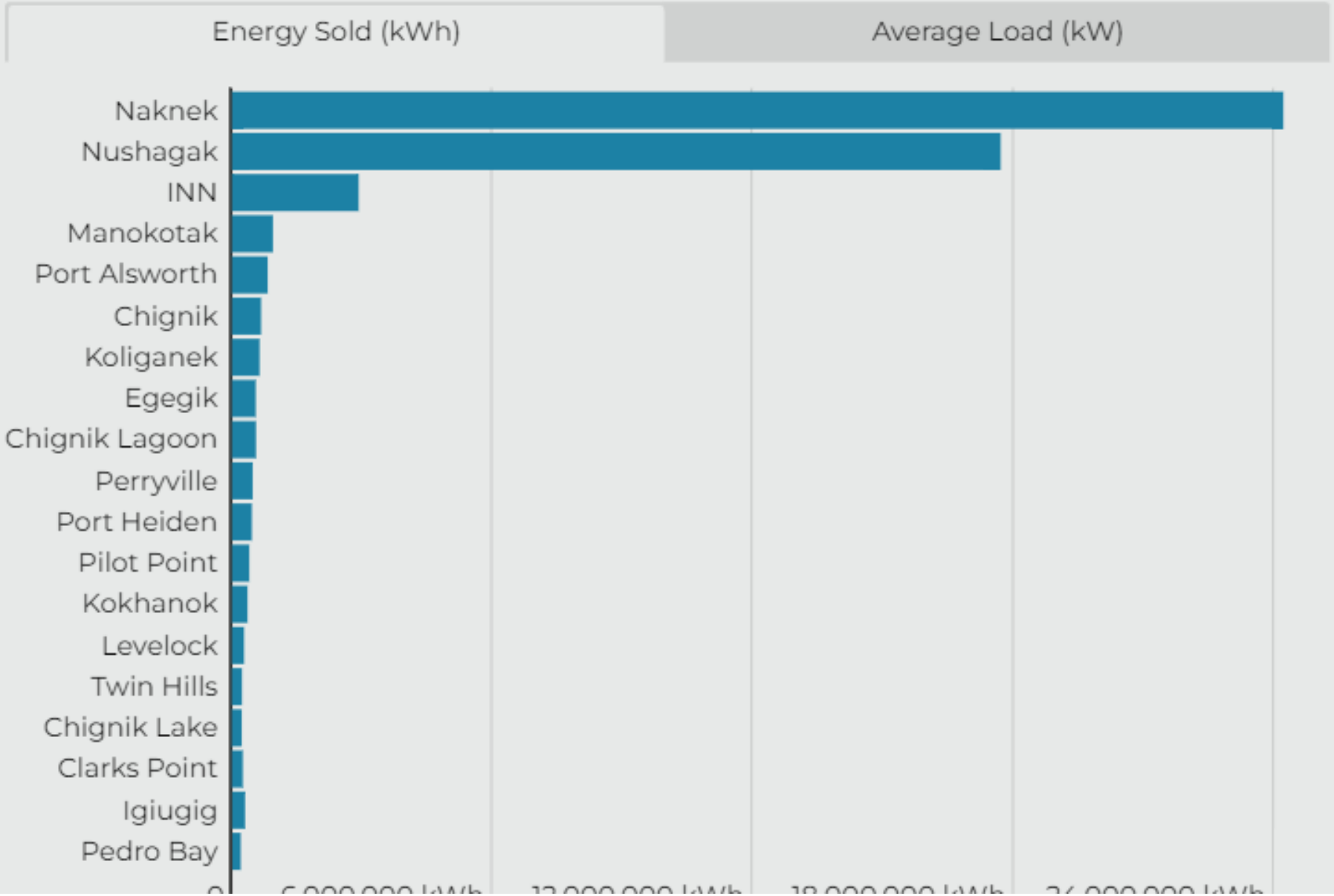
than other electric utilities in the Bristol Bay region

Naknek and Nushagak avg. load

2.4 MW

Other utilities

70 kW



Seasonal Variation

Data source:
Annual Reports

Naknek's July energy usage is

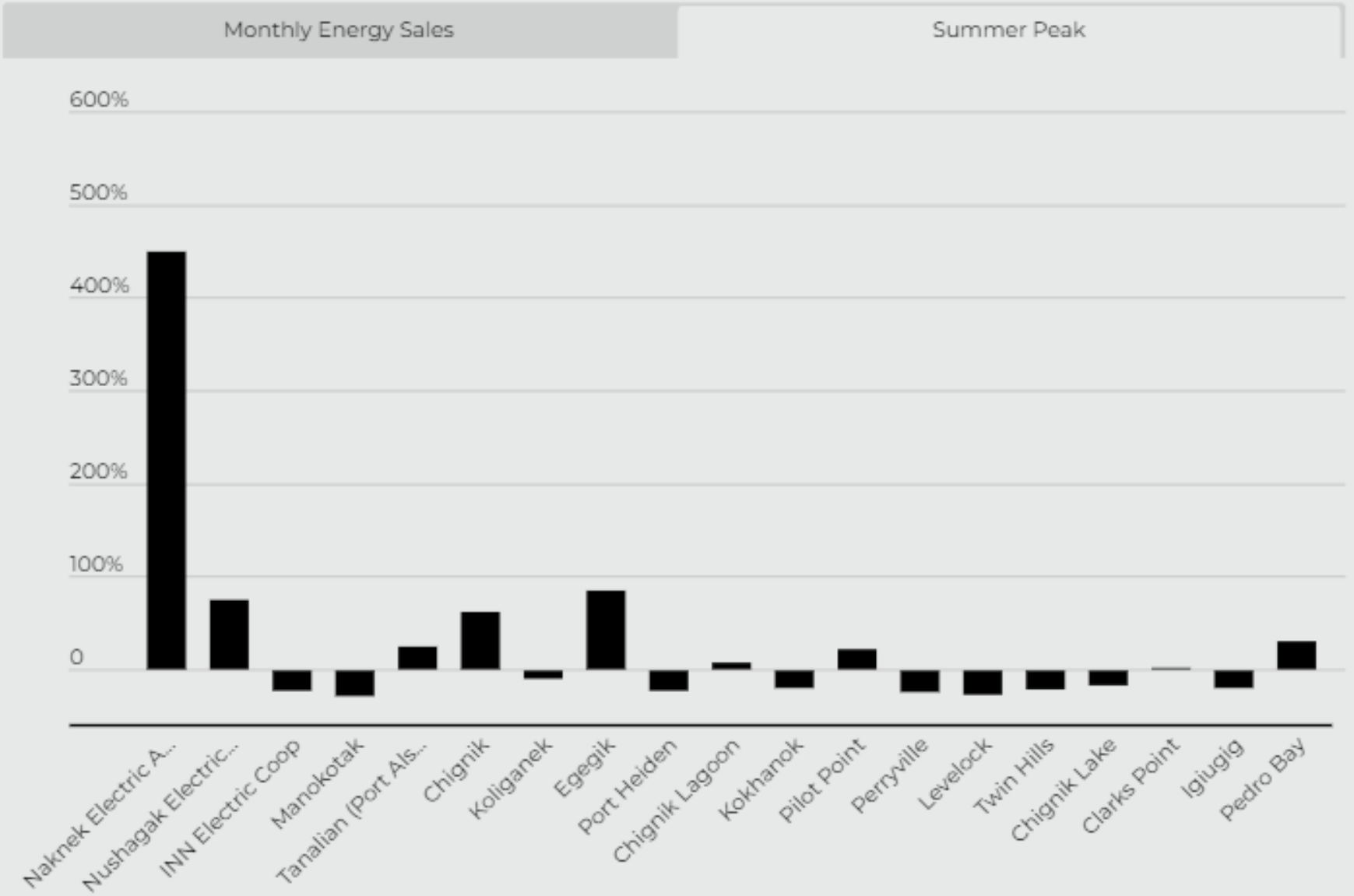
450% greater

than other months

Nushagak, Chignik, and Egegik also have a July spike in usage

>50% greater

than other months



Costs

Data source:
Annual Reports

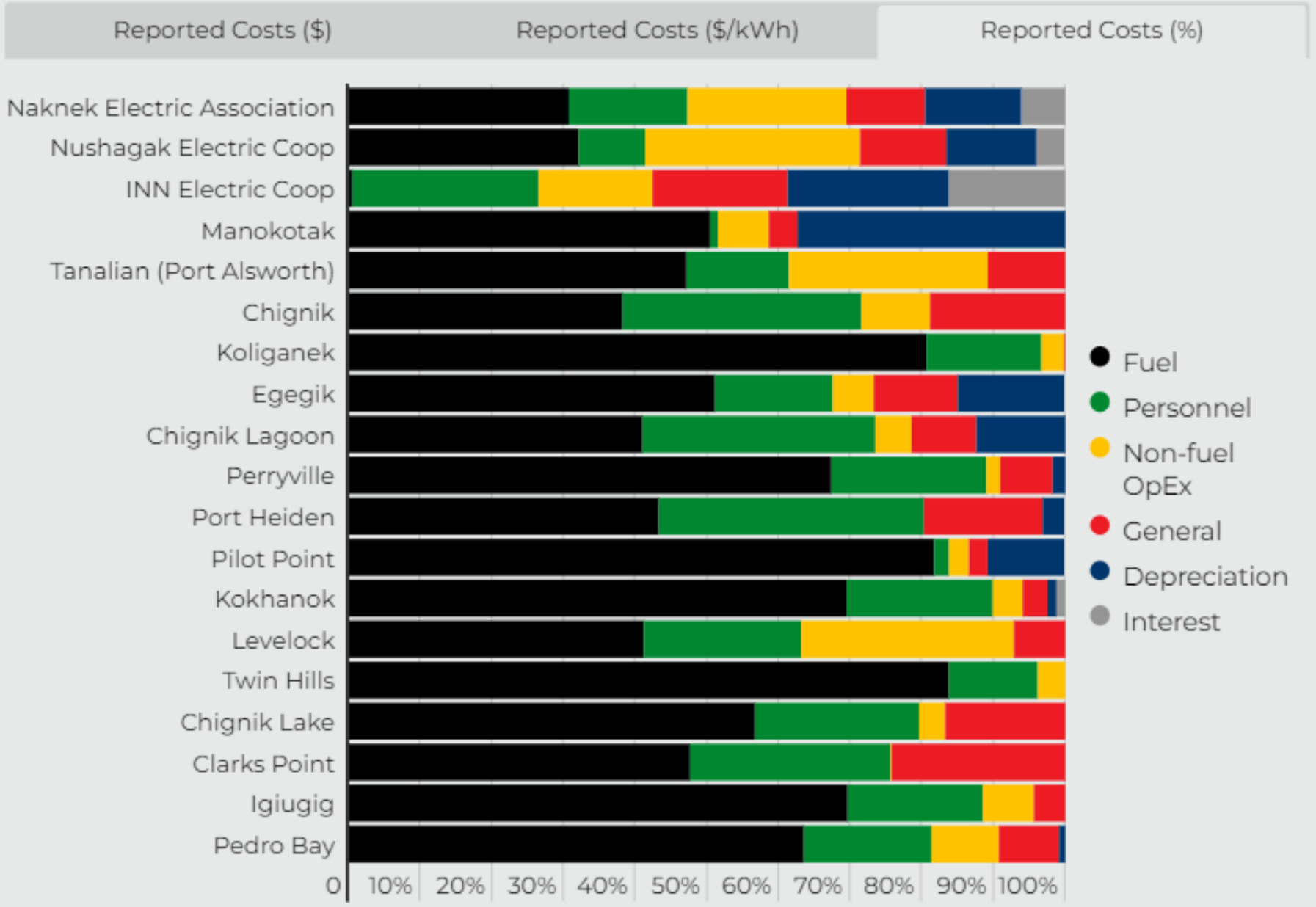
Naknek and Nushagak have

Accurate & Complete Cost Reporting

Furthermore, fuel costs per kWh are about

59% lower

than the other utilities in the Bristol Bay region (16 cents per kWh vs. 38 cents per kWh)

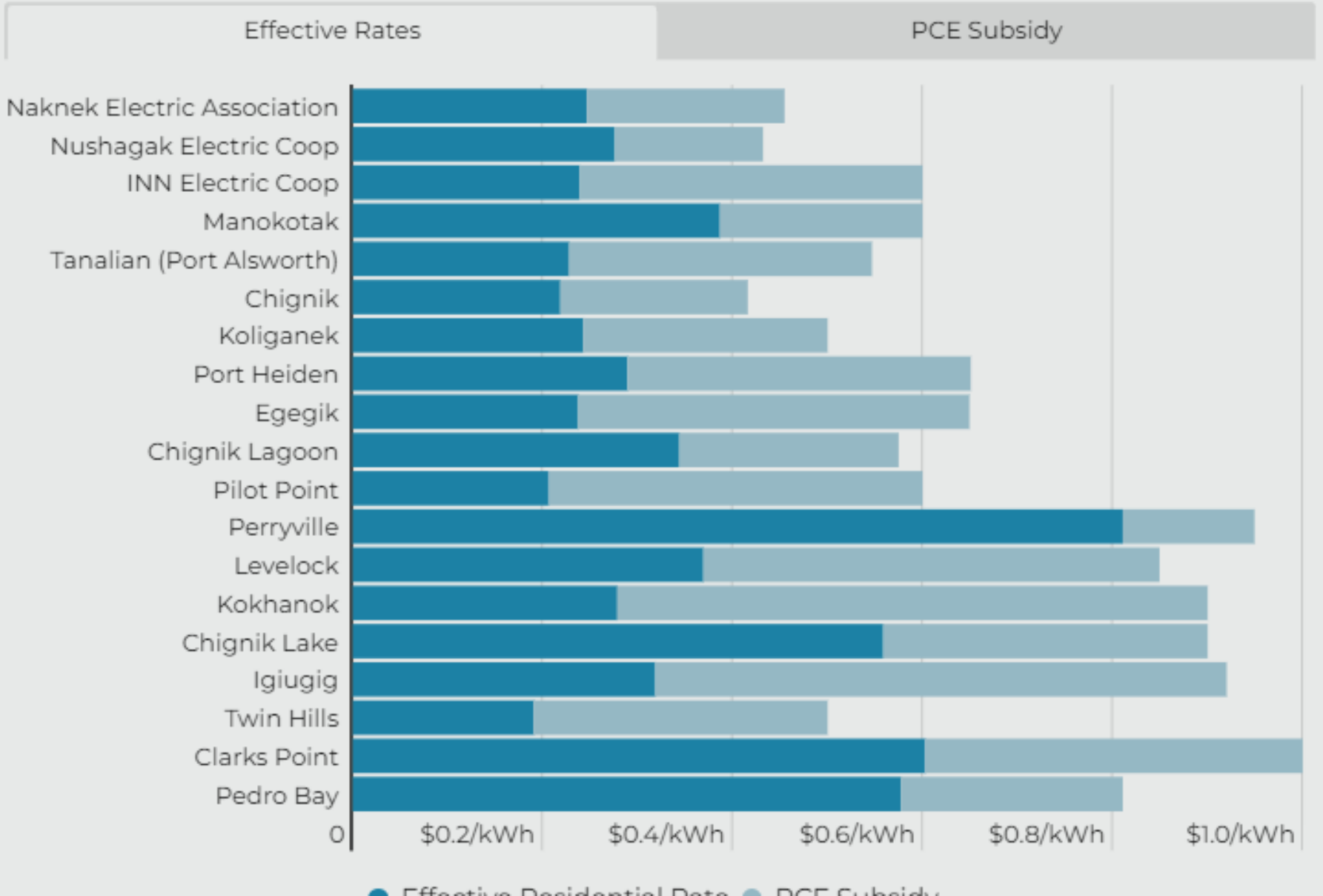


Rates

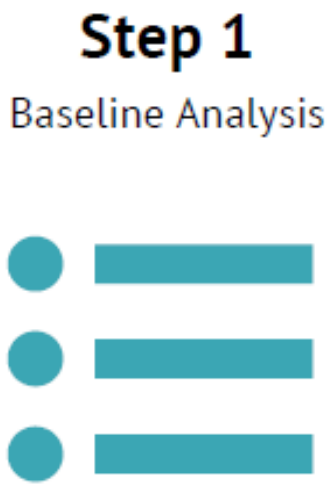
Data source:
Annual Reports

Naknek and Nushagak have residential rates **38% lower** and effective rates **27% lower** than other electric utilities in the Bristol Bay region

	Avg. Res. Rate ($/kWh)	Avg. Eff. Res. Rate ($/kWh)
Naknek & Nushagak	44	26
Others	71	36



Step 1 - Baseline Analysis Indications



- ✓Several small utilities could use immediate support (finance & accounting, PCE Reporting, operations, maintenance)
- ✓Trained personnel in the larger utilities could be used to alleviate O&M and training needs in smaller utilities
- ✓Most utilities would benefit from planned infrastructure improvements
- ✓High reliance on diesel across the board could be alleviated by integration of renewables (volatility in prices being realized now)
- ✓Economies of scale if banded together: fuel purchase, installing new equipment/infrastructure, generator overhauls

Step 2 – Prioritize Services

- ✓PCE Reporting and Bookkeeping Training/Support*
- ✓Infrastructure Engineering Assessment – to plan for infrastructure improvements**
- ✓Powerplant Operator – Operations & Preventative Maintenance Training Support***
- ✓Bulk Fuel Purchasing

*To include rate setting, billing/collections support, replacement and reserve account targets and savings plan.
**Incremental improvement working towards potential renewable integration. Will include upgrades to target line losses and generator efficiencies to improve PCE benefit.
***Trained personnel in the larger utilities could be used to alleviate O&M and training needs in smaller utilities. Focus on generator maintenance.

Shared Services Approach to Managing Rural Power Utilities

- Utilities share certain services to maximize performance, save money, and improve reliability of power. This can remove burden from independent utilities while reducing costs.
- The utility ownership DOES NOT change.
- The ***"Collaborative"*** is the shared pool of resources that utilities will tap into. It's basically outsourcing defined roles and responsibilities to the shared pool of resources.
- ***"Members"*** are the utilities that decide to participate and outsource some of their roles and responsibilities to the Collaborative.

Activities the Organization Could Perform

Main theme: share resources, personnel, training, inventory, best practices, etc.

General & Admin

Governance

- Provide independent oversight
- Institute strong policies & procedures
- Increase accountability
- Insulate decision-making from local politics

Management

- Motivate and advise utility staff
- Plan staffing needs & training
- Coordinate & prioritize activities
- Manage contractors
- Provide continuity

Administrative

- Perform central office tasks
- Support village utility clerks
- Manage website & communications

Finance & Other

PCE Optimization

- Support PCE regulatory reporting
- Advise on PCE maximization

Financial Planning and Accounting

- Lead budgeting activities
- Manage R&R fund for each village
- Support accounting and bookkeeping
- Perform rate studies and support rate setting
- Support billing and collections

Funding/Grants

- Identify funding for programs & projects
- Secure capital for projects
- Monitor, manage, and write grants

O&M

Routine Ops & Maintenance

- Develop and maintain SOPs
- Monitor systems / SCADA integration
- Advise PPOs remotely
- Support PPOs in-person
- Standardize equipment and parts
- Support inventory management
- Support daily routines

Emergency Outage Response

- Coordinate with regional partners
- Maintain inventory for emergencies
- Develop emergency response plans
- Provide personnel and equipment in emergencies

Power Supply

Transition to Renewables

- Develop village-specific integrated resource plans
- Develop regional integrated resource plans
- Plan PCE-optimized renewable projects
- Finance, install, and commission PCE-optimized renewable projects (IPP-model)

Powerhouse/Generators

- Extend life of generators by instituting best practices
- Plan, finance, and install new generators

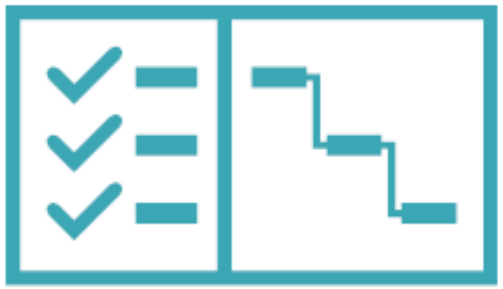
Fuel Procurement

- Purchase fuel in bulk
- Optimize fuel delivery logistics

Step 3 – (Recap) Define Pilot and Plan

Step 3

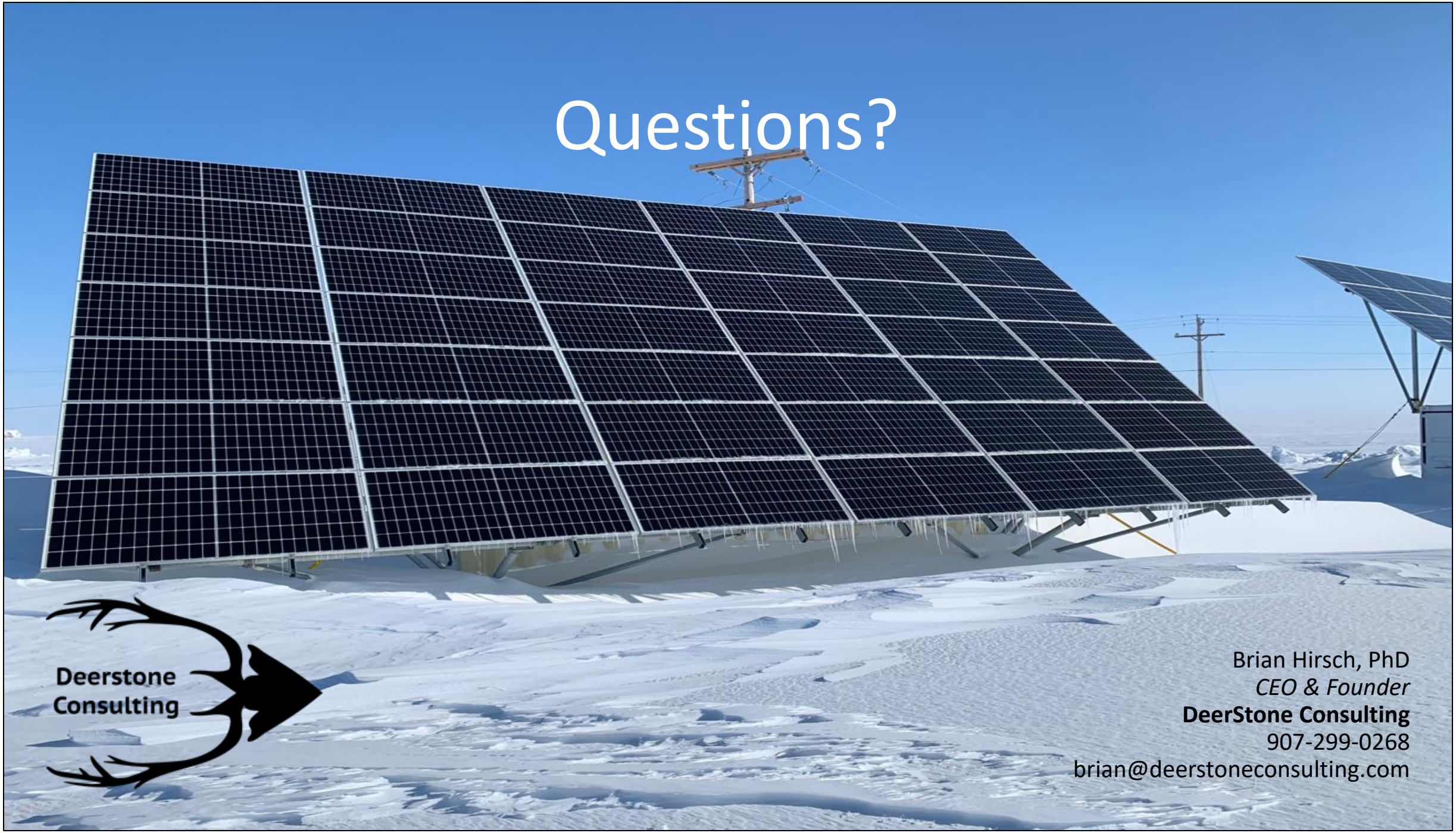
Define pilot project concept and implementation plan



<u>BIA Funding Round 2</u> (<u>$300k</u>)

- **MOAs** – BBNC/Participant Utilities
- **Project Manager, Electric/Mechanical Contractor, PCE/Accounting Contractor** – Hire or Contract Out
- **Accounting & PCE T.A.** – Maximize PCE, Rate Setting, Reserves Goal
- **O&M: Preventative Maintenance T.A.** – Training PPOs, Develop & Implement PMPs

Questions?



Deerstone Consulting

Brian Hirsch, PhD
CEO & Founder
DeerStone Consulting
907-299-0268
brian@deerstoneconsulting.com