

Village Wind Technology Update

Dennis Meiners
Intelligent Energy Systems



Alaska Native Village Energy Development
Workshop
Anchorage, Alaska
April 29, 2014

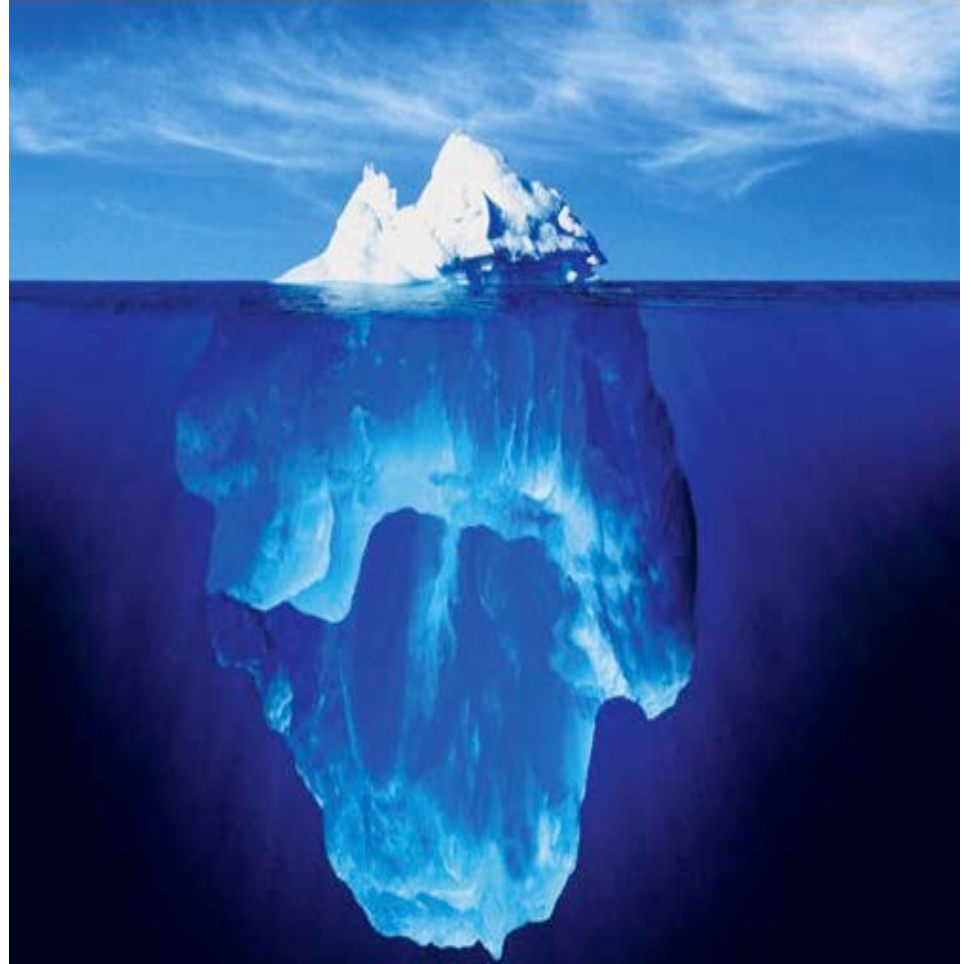
Ideas from the Past

- *Much more of the prosperity of a winter country depends on the **plenty and cheapness of fuel** than is generally imagined. In traveling, I have observed, that in those parts where the inhabitants can have neither wood, nor coal nor turf, but at excessive prices, the working people live in miserable hovels, are ragged, and have nothing comfortable about them. But **when fuel is cheap (or when they have the art of managing it to advantage) they are well furnished with necessities, and have decent habitations.***
- *Benjamin Franklin
writing at sea, 1785*

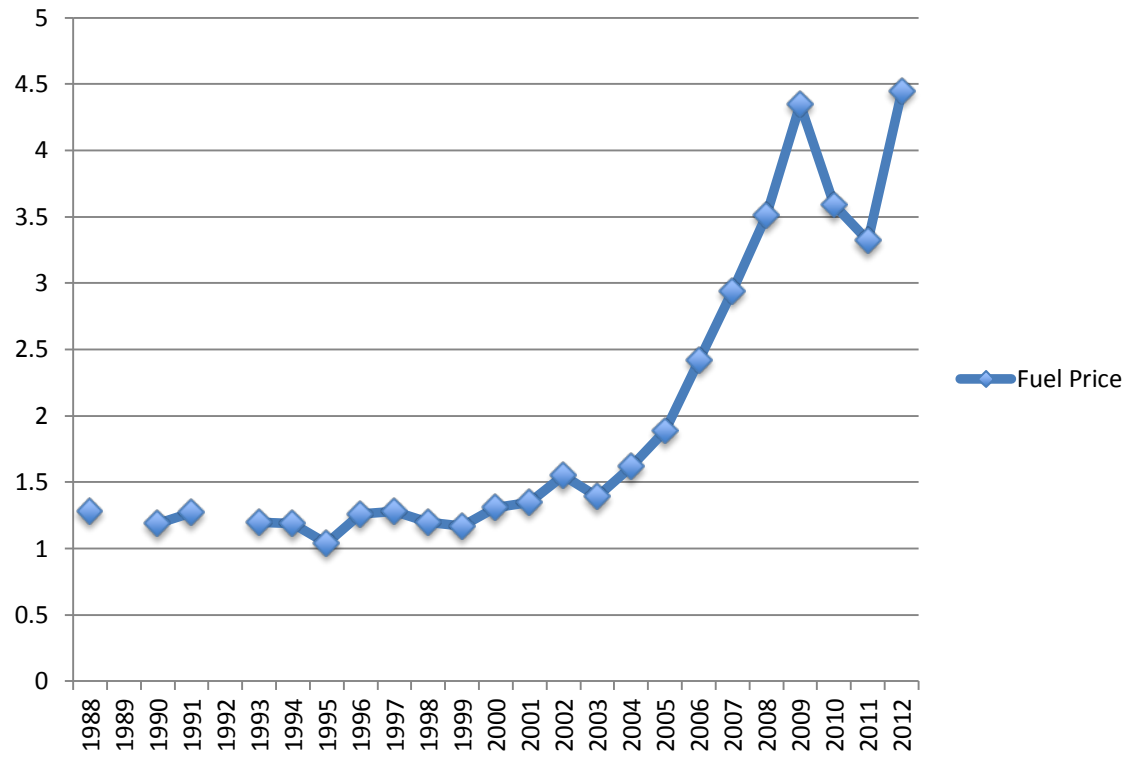
It's Alaska's problem.....

- \$250m ???/yr fuel
- \$90 million in wind
- 25-30% of all rural budgets

- On the cusp of a solution!



Fuel Price

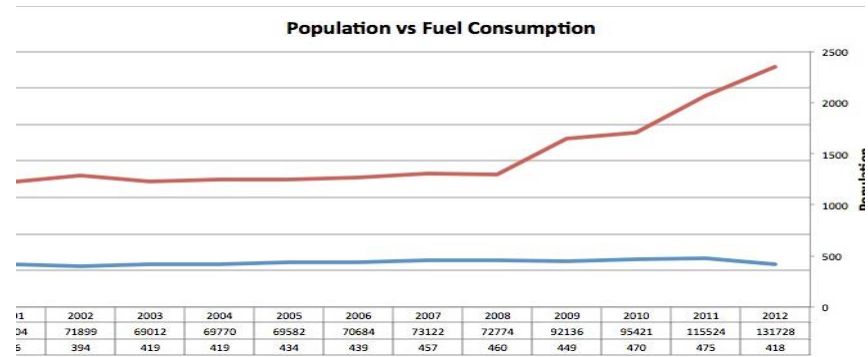


Historical Perspective

Going to hover in \$4 to \$5 dollar range, then go up!

How did we get here?

- Natural Attributes
- Invested in infrastructure to improve quality of life
- **MUST INNOVATE TO MAINTAIN!**



What's so difficult?

- Meaningful assessment
- Multidimensional objectives
- Context-Engagement tension





Two Perspectives on Innovation!

Customer (clean low cost energy)

Utility (keeping lights on)

All progress is precarious, and the solution of one problem brings us face to face with another.

-Martin Luther King 1963

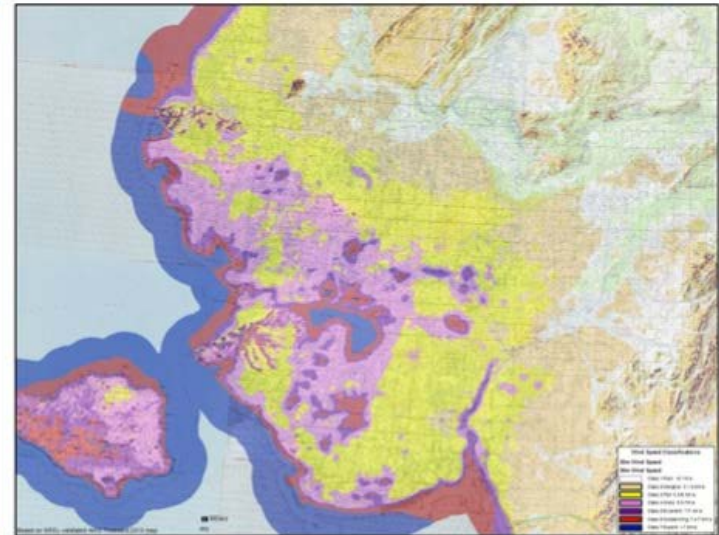
If once a man indulges himself in murder,
Very soon he comes to think little of robbing,
And from robbing he comes next to drinking,
And sabbath-breaking, and from that to incivility and procrastination

-Thomas de Quincey, english essayist and author

Resources and Technology Match?



Western
Alaska
AEA - Alaska Wind Speed Map











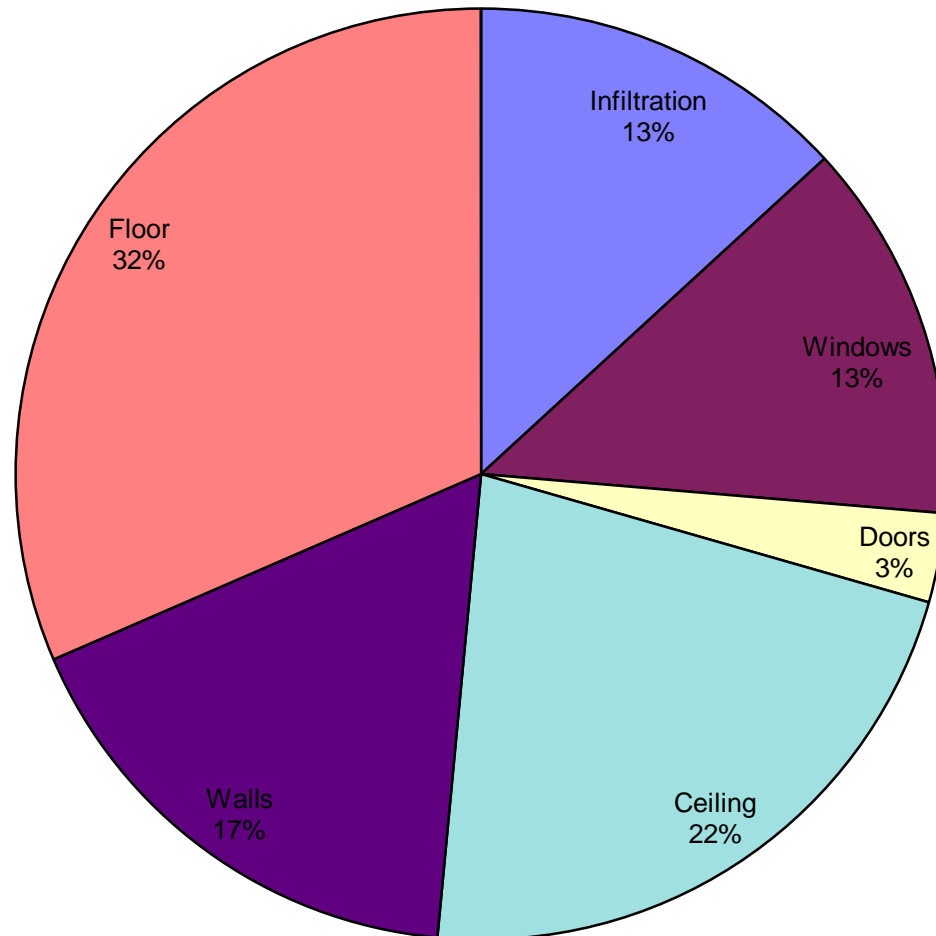






Heat Loss Summary

Average Home in Kongiganak



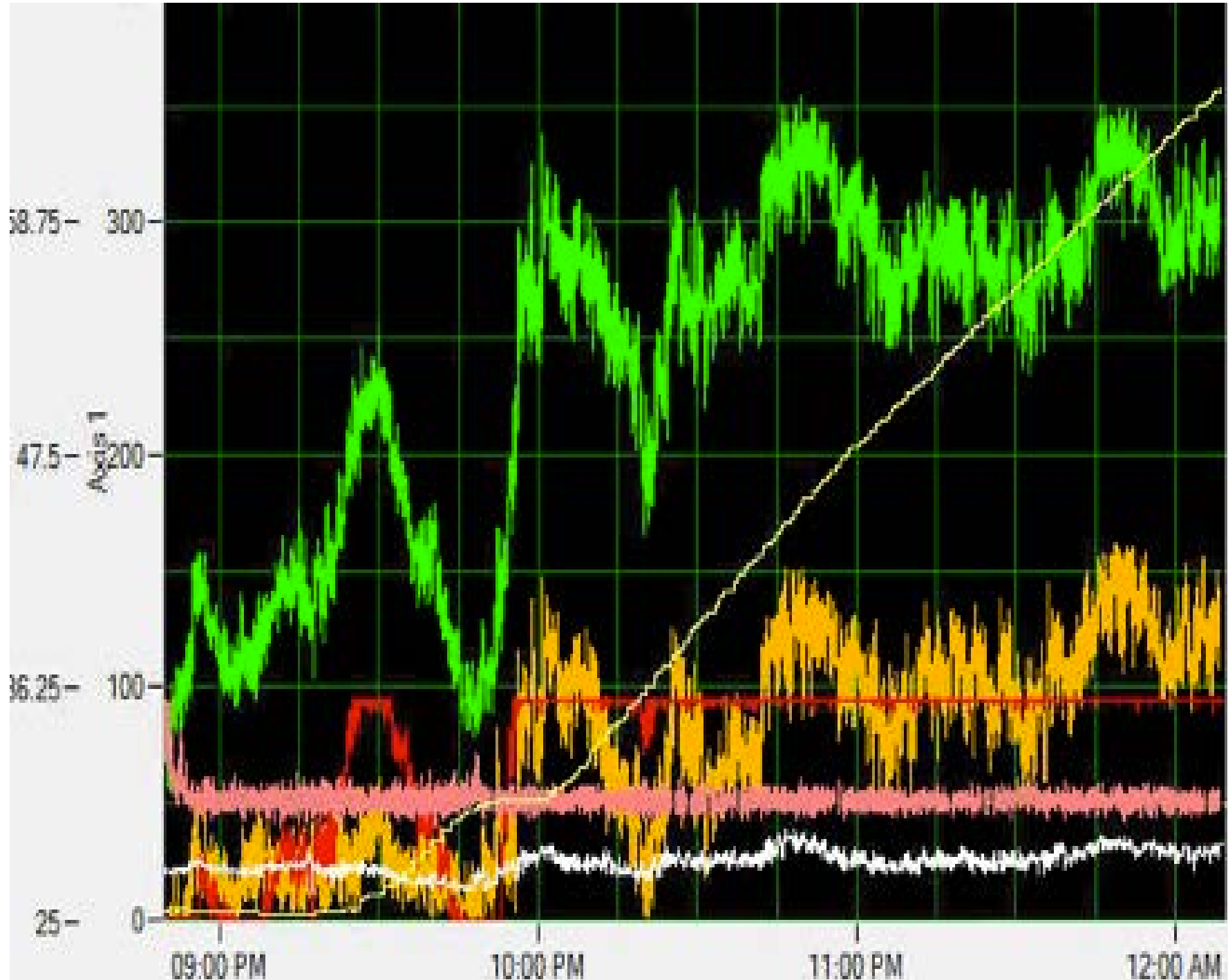
Wind Heat for Homes



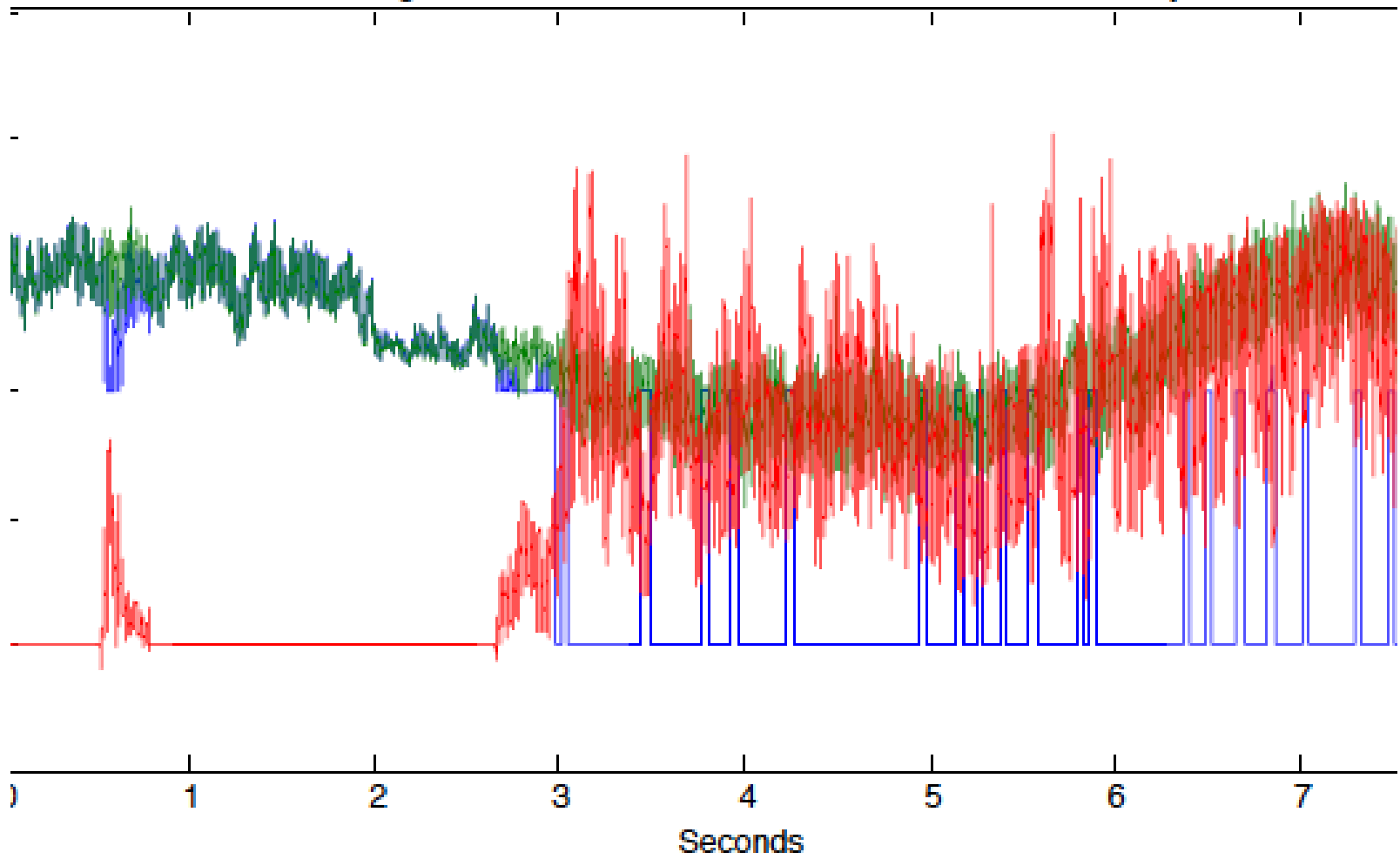
Benefits:

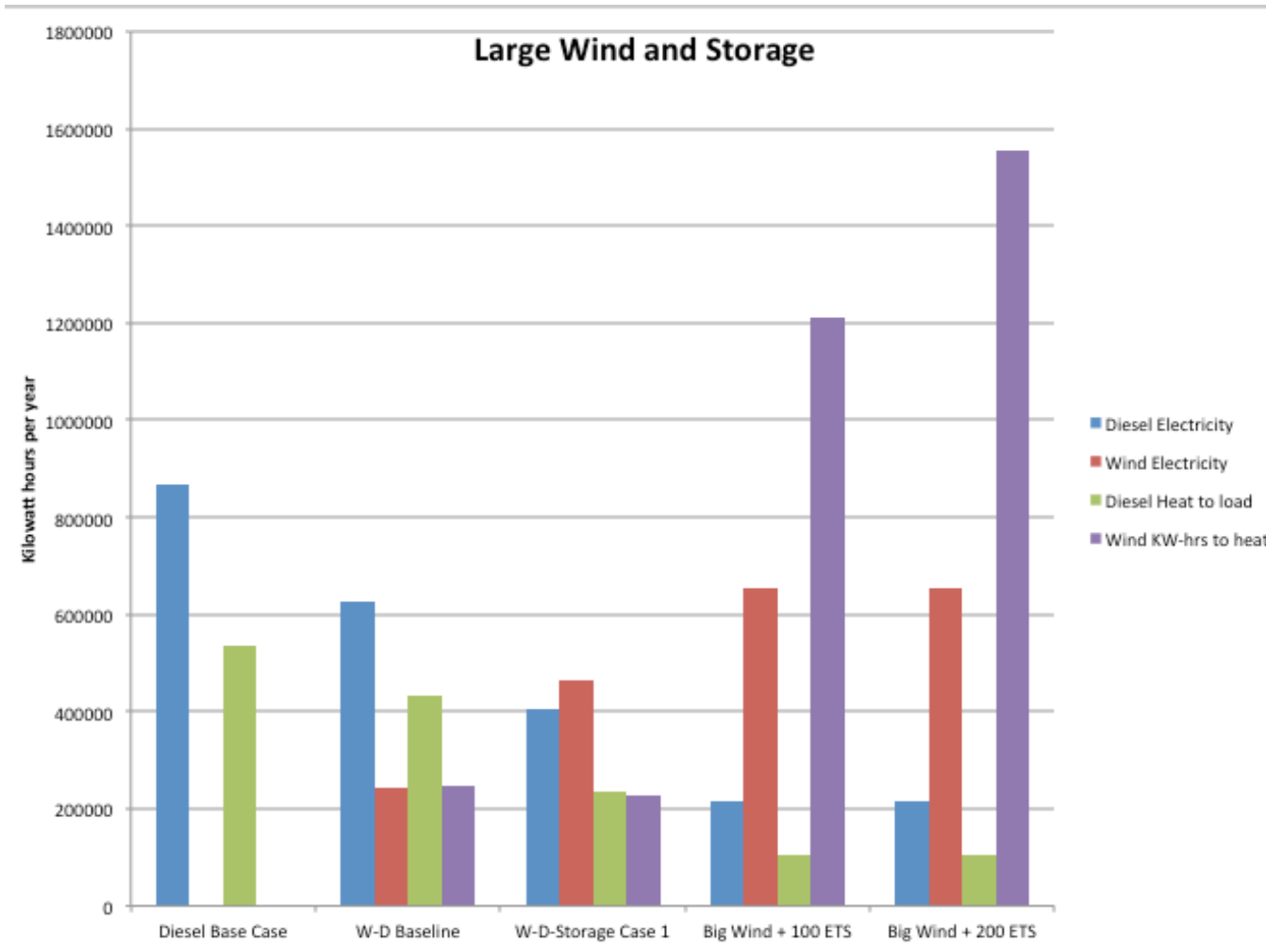
- Lower heating costs
- Scale
- Increase revenues



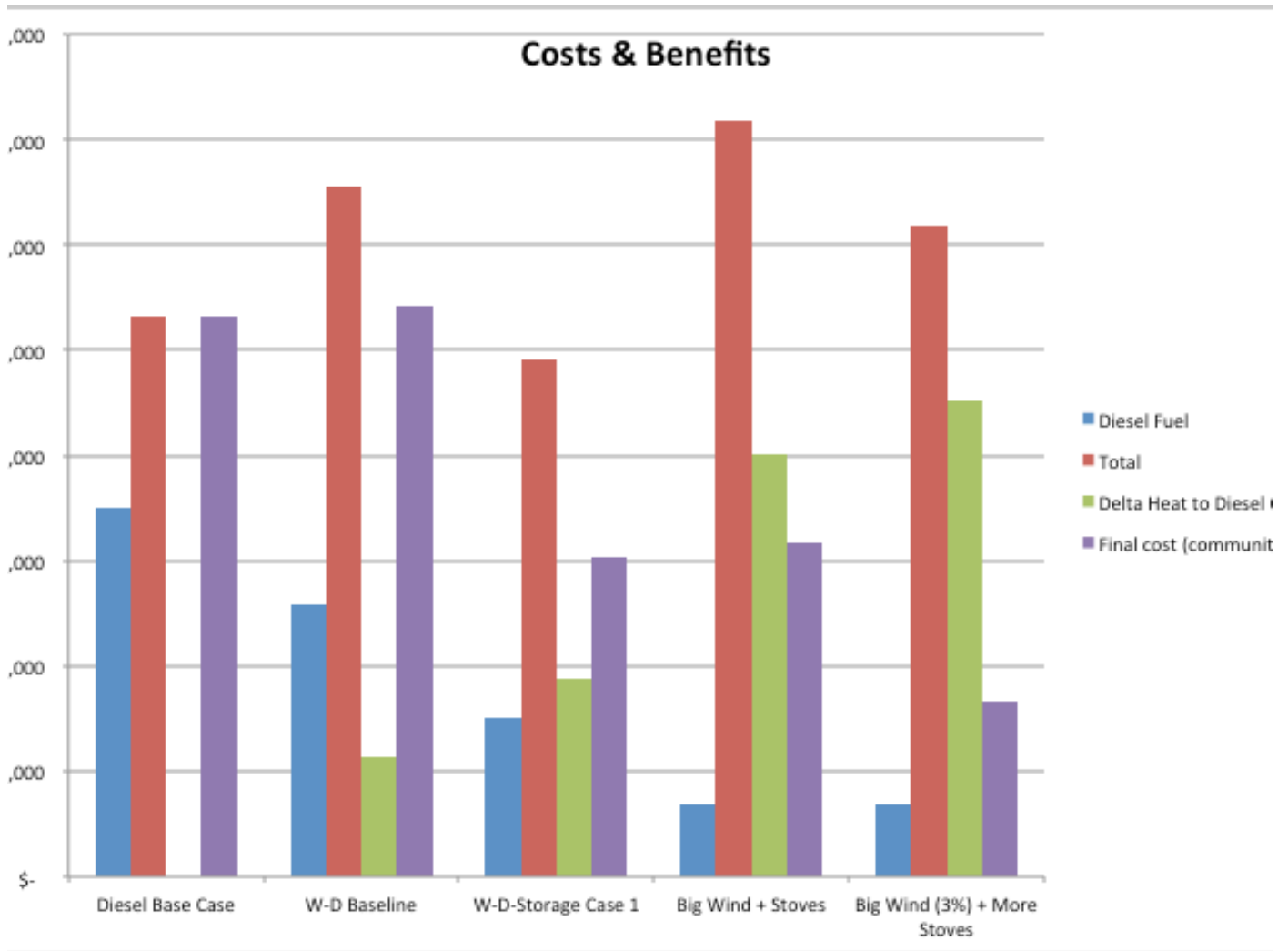


Load (green) Diesel (Blue) Wind (Red) with 48 kW-hr battery





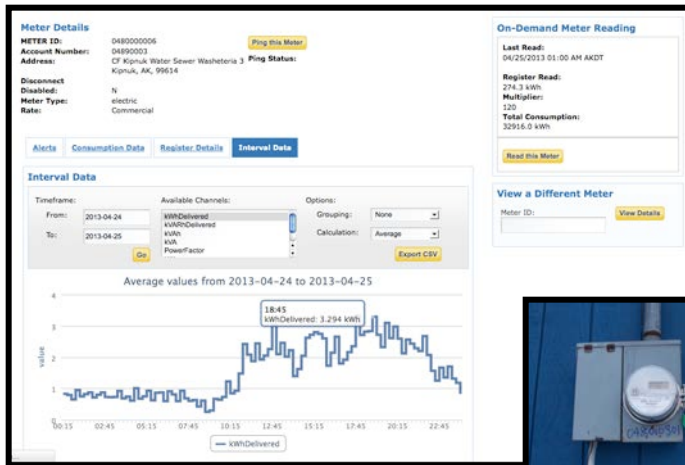
How much of What? Energy Storage/diesel/wind



How do the costs and benefits add up?

Trade offs?

Wind Heat Smart Grids Components



- Wind turbines (400% penetration)

- Electric Thermal Storage (distributed) (Steffes)

- Controls and integration

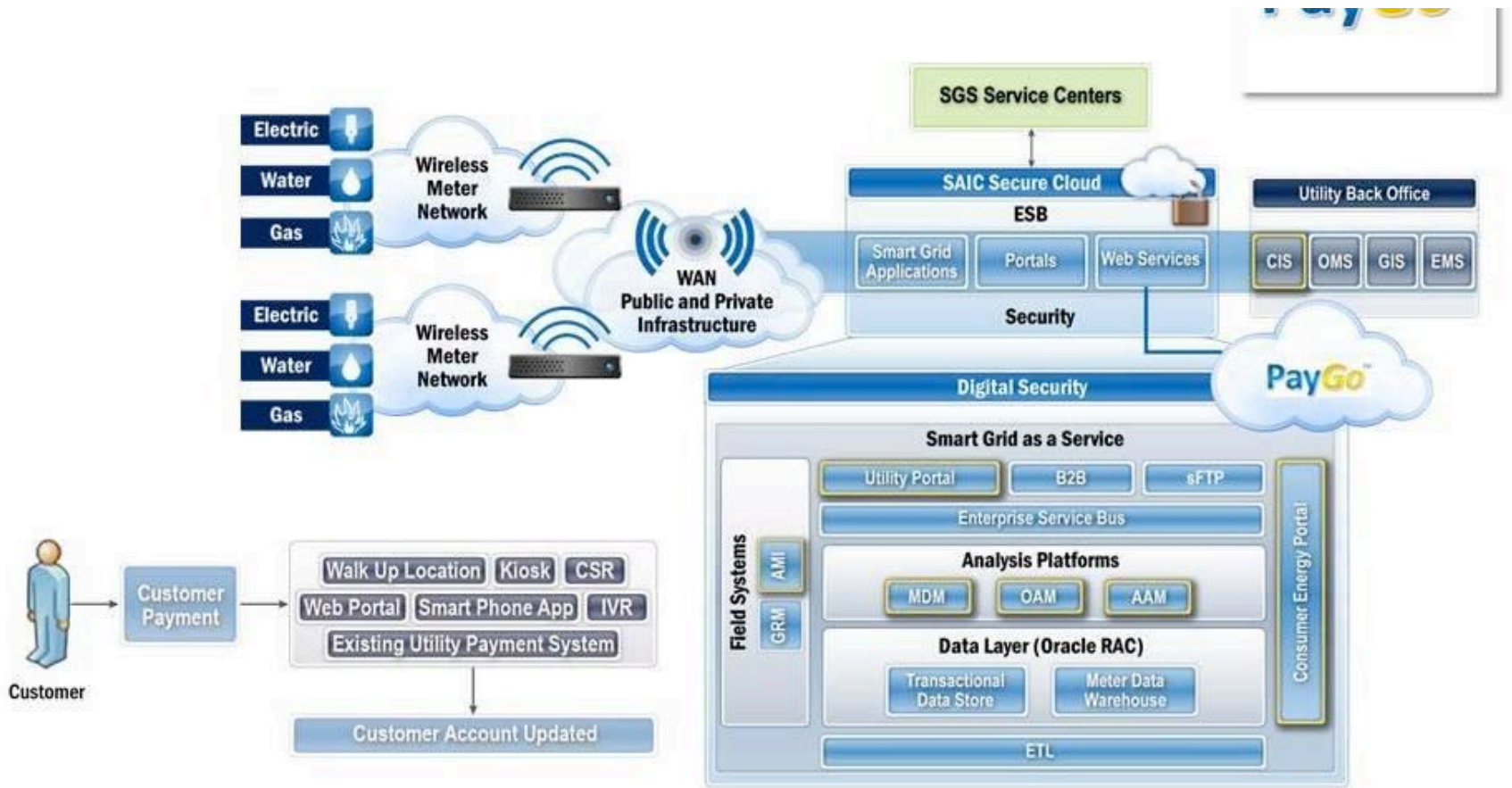
- Energy Storage for wind only/diesel off operations





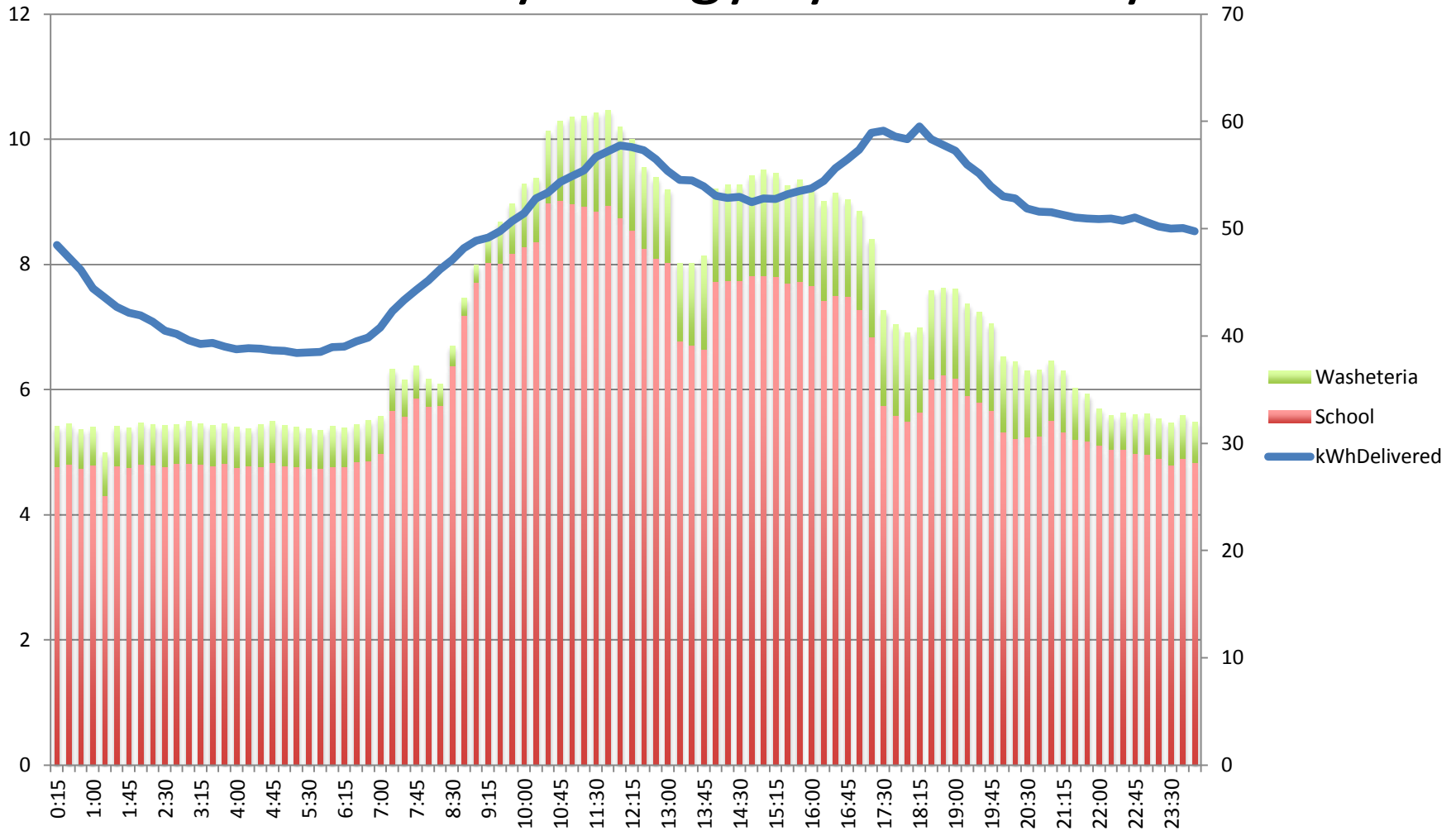


Smart metering/grid solutions

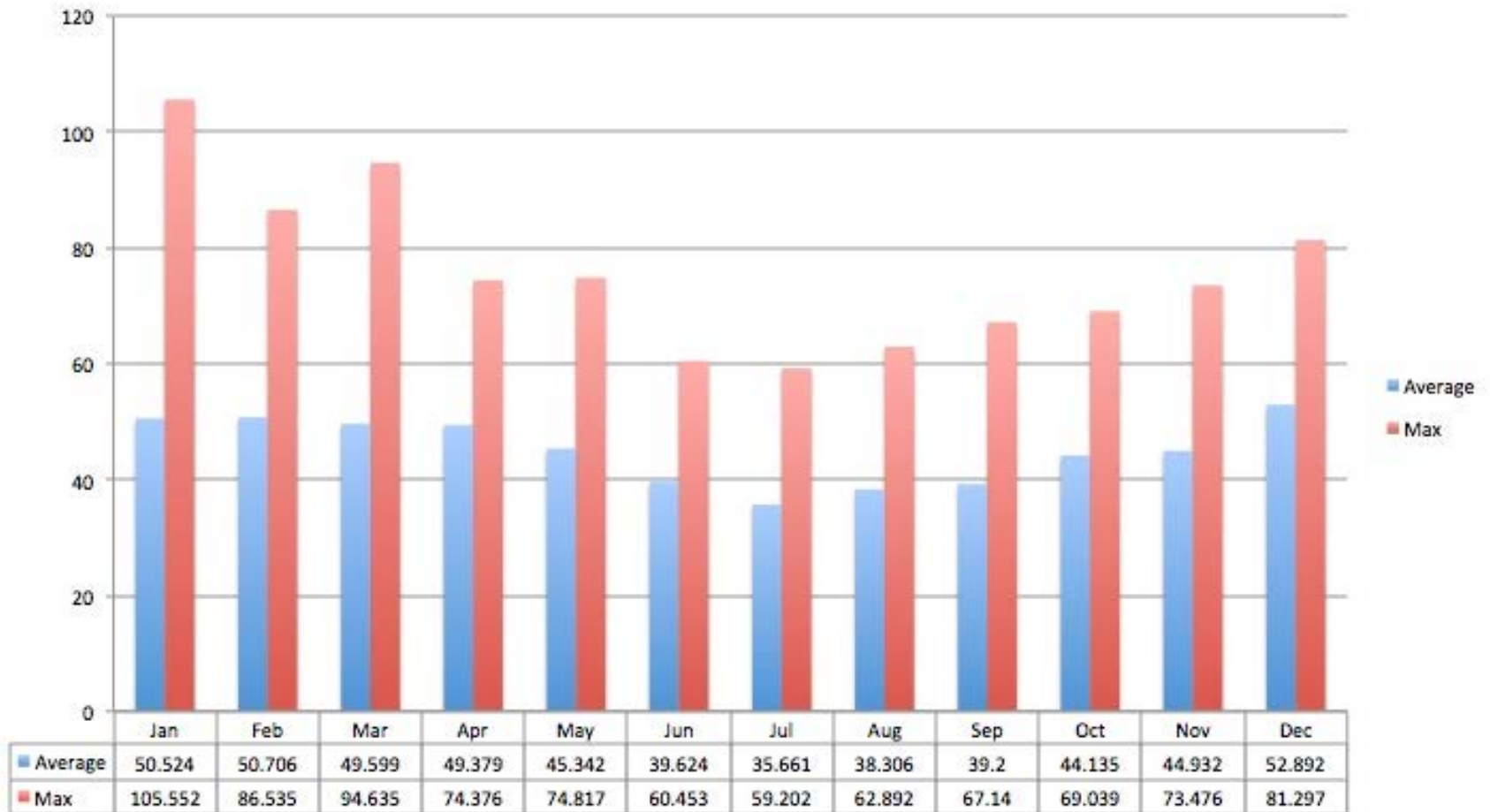


WAN = Wide Area Network SGS = Smart Grid as a Service ESB = Enterprise Service Bus CIS = Customer Information System OMS = Outage Management System GIS = Geographic Information System EMS = Energy Management System B2B = Business 2 Business sFTP = File Transfer




Community Energy System Analytics






















Facility Analytics



Technology Status

 Implementation
 Launch
 Support period

Area	Status	Progress	Details	Q1	Q2	Q3	Q4
Wind Turbines			<ul style="list-style-type: none"> • Lower cost • Increase productivity 				
Smart Grid			<ul style="list-style-type: none"> • Subscription service • Prepay, analytics 				
Controls			<ul style="list-style-type: none"> • Done • Add functionality 				
Energy Storage			<ul style="list-style-type: none"> • Assessment, testing 				

Risk: Funding lost

- Mitigation plan:
Metering/control/assessment



Chaninik Wind Group Leaders



Quyana caknek!

Thank you very much!

**Special thanks to US DOE Tribal Energy Program, AEA Renewable Energy Fund, Calista Corporation, Denali Commission, Denali Training Fund, NREL, the Alaska Legislature and Senator Lyman Hoffman.
This work is possible because of your support.**



Alaska Native Village Energy
Development Workshop
Anchorage, Alaska
April 29, 2014