

Conversions: Rural Alaska Energy Supply Chains

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Electricity in PCE Communities

- Serves about 78,000 people
- with 5,400 kWh per person per year

Source: PCE FY00 statistics



Three Questions

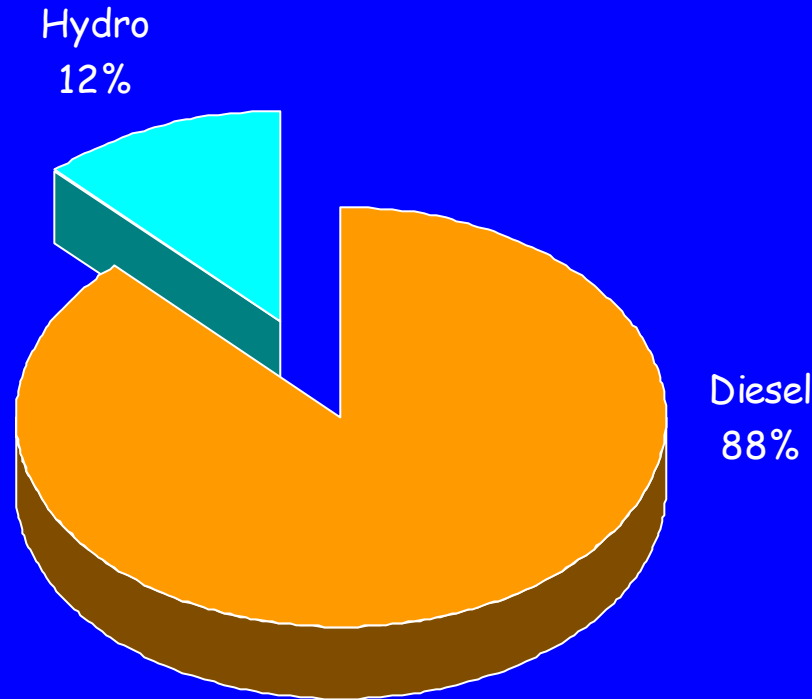
- Where does rural Alaska electricity come from?
- Why does it cost so much?
- What can we do about it?



- **Urban Alaska electricity comes from**
 - natural gas
 - hydro
 - (and coal)
- **Rural Alaska electricity comes from**
 - **Diesel !** (and hydro)



Generation in PCE Communities by Source -



Total = 425 million kWh/year
or 48 MW average output

Source: PCE FY00 statistics



Three Questions

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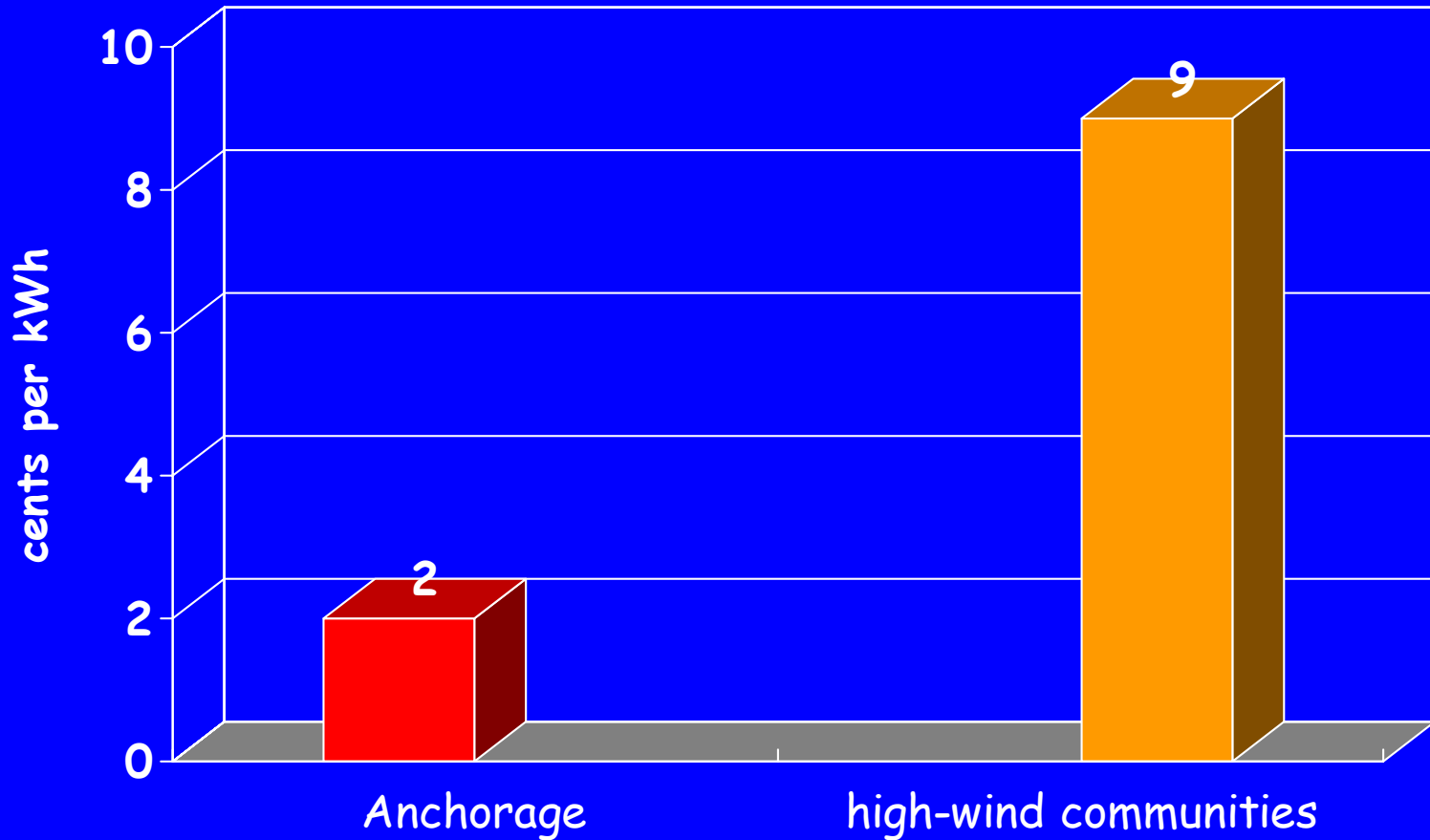


Electricity in PCE Communities

- Serves 78,000 people
- with 5,400 kWh per person per year
- using 360 gallons diesel per person per yr
- that costs about \$390 per person per year



Fuel Cost per kWh: Anchorage vs. Rural Alaska



Rural diesel electricity comes from:

- Fossils
- Crude Oil
- Diesel at Refinery Gate (Anacortes WA, Richmond WA, Nikiski AK)
- Diesel at Barge Dock
- Diesel in Tank Farm
- Electricity at Powerhouse
- Electricity in home

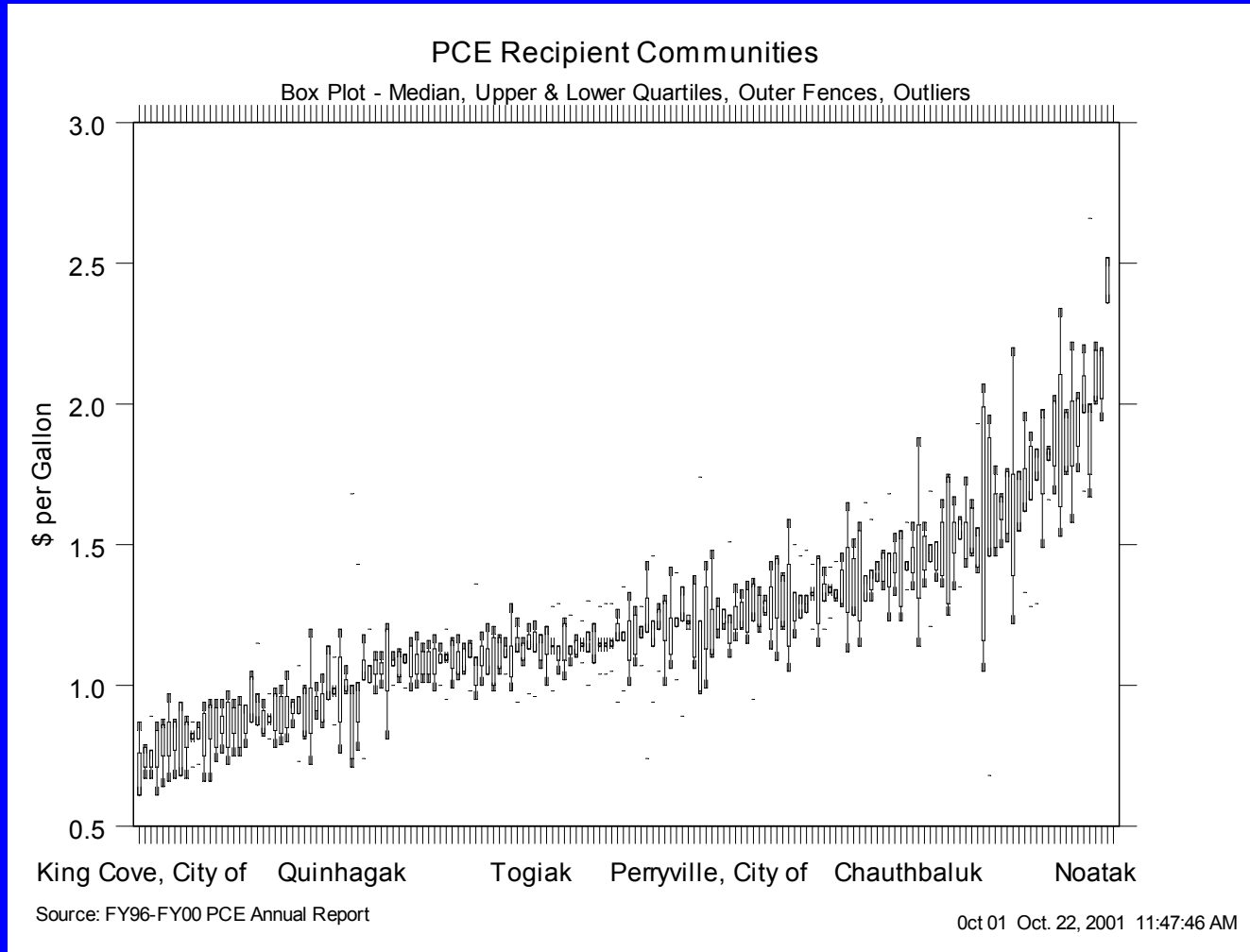


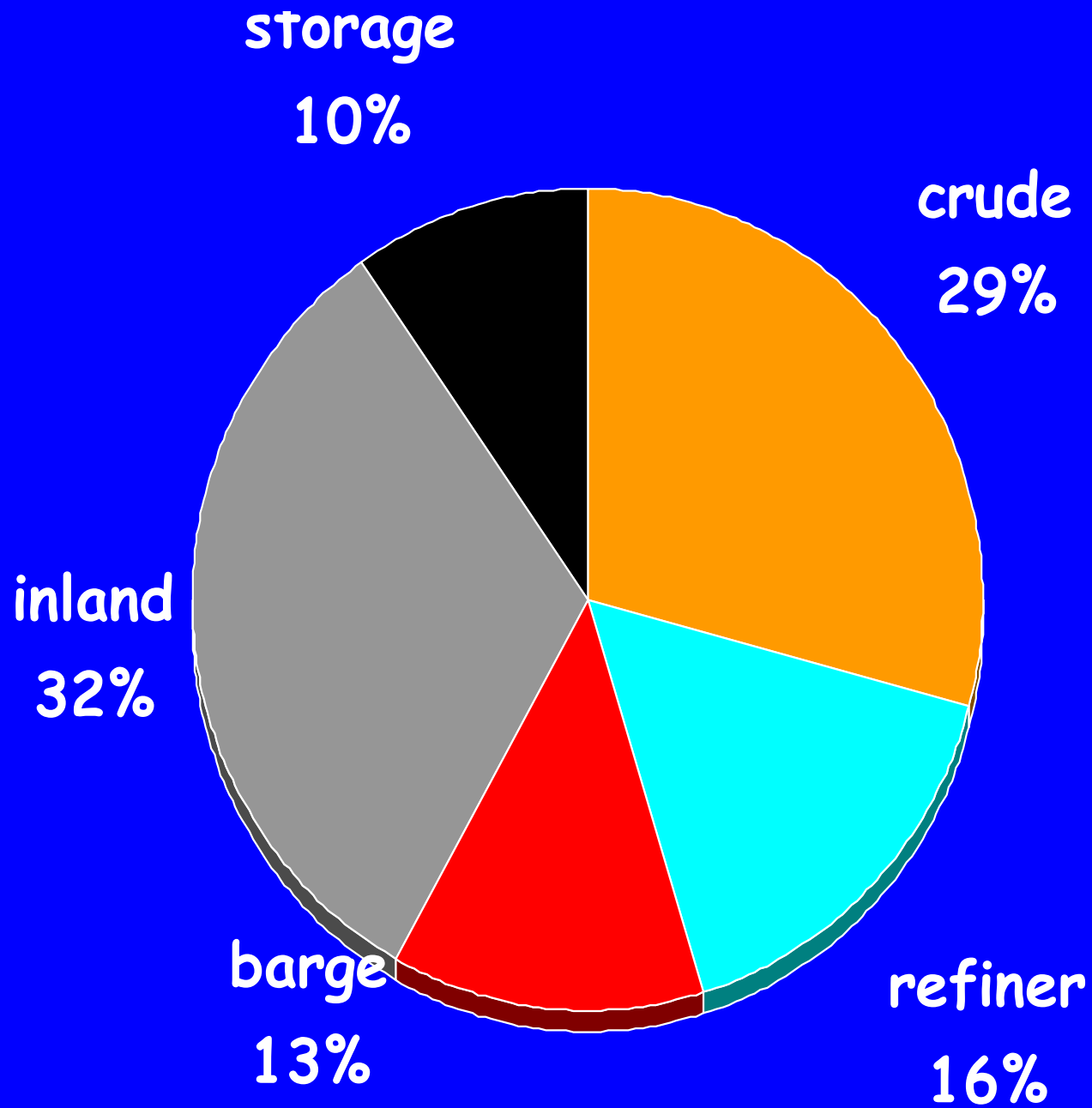
Components of Utility Diesel Cost

- Crude oil = \$.35-.55
 - Refining = \$.25
 - Bulk Barge = \$.10-.30
 - Inland Transport = \$.00 - \$1.00
 - Bulk Storage = \$.10-.20
-
- Total = \$.80 - \$2.30

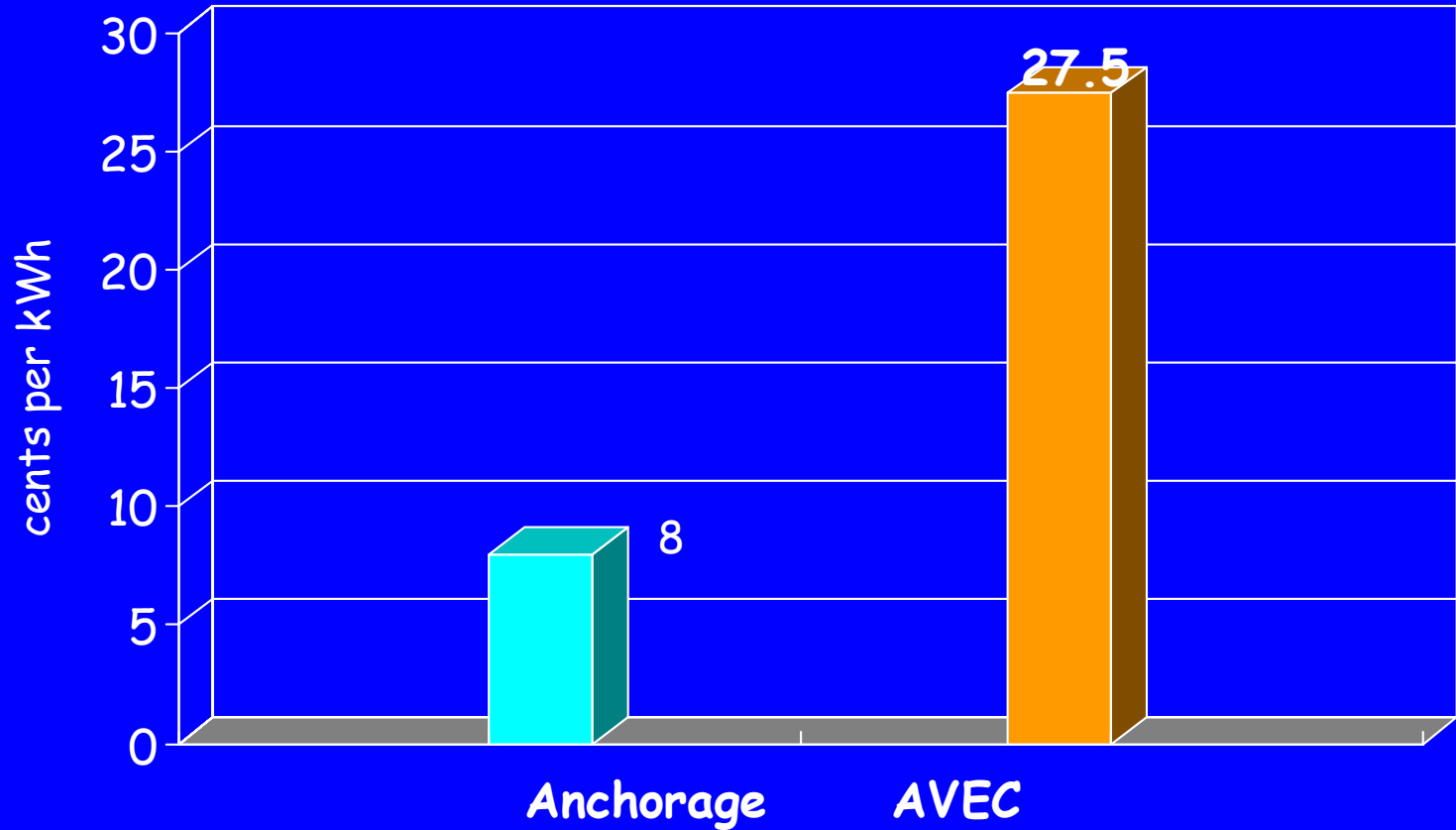


Actual Range of Fuel Costs





NonFuel Cost per kWh

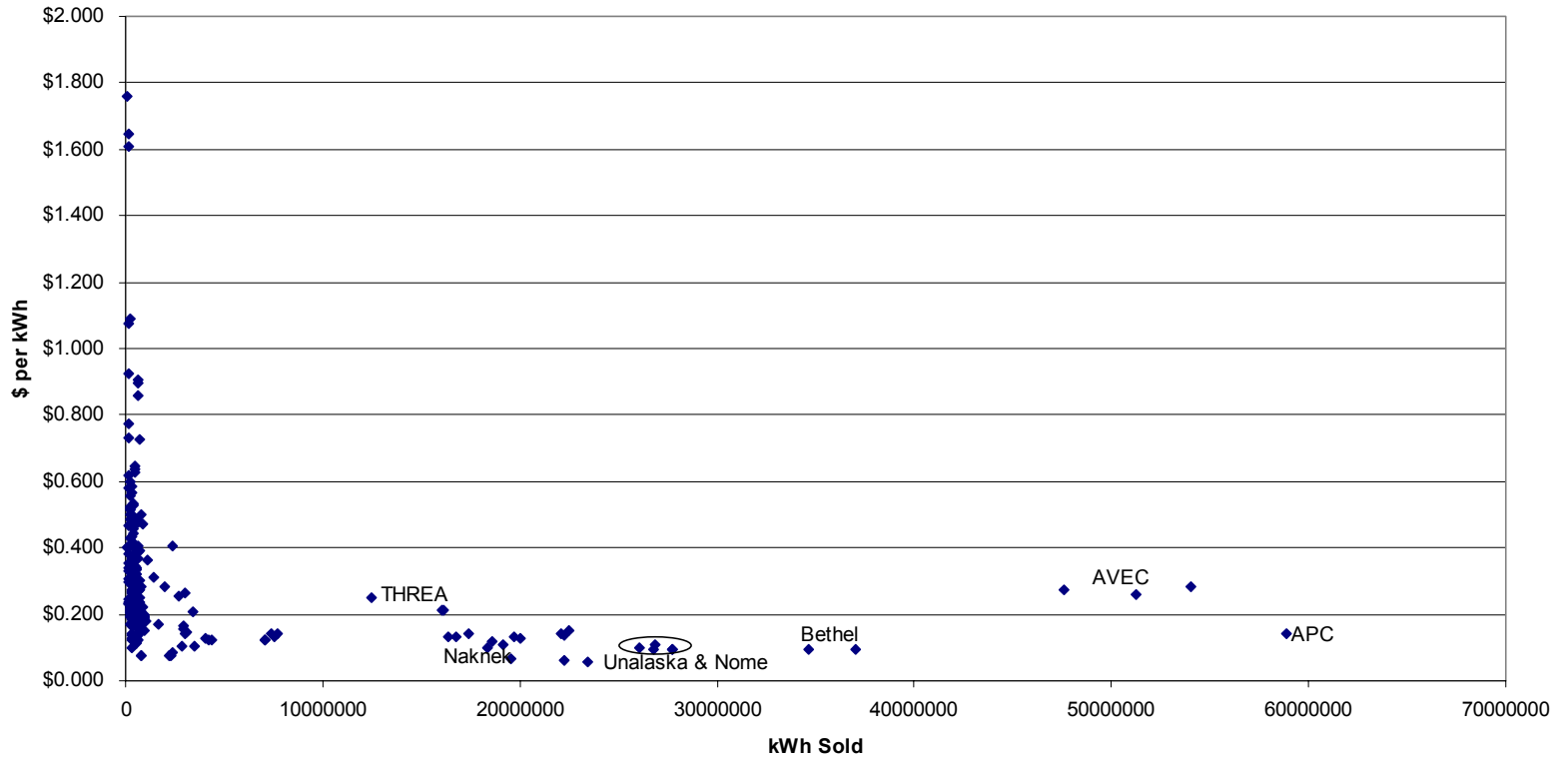


Nonfuel cost includes

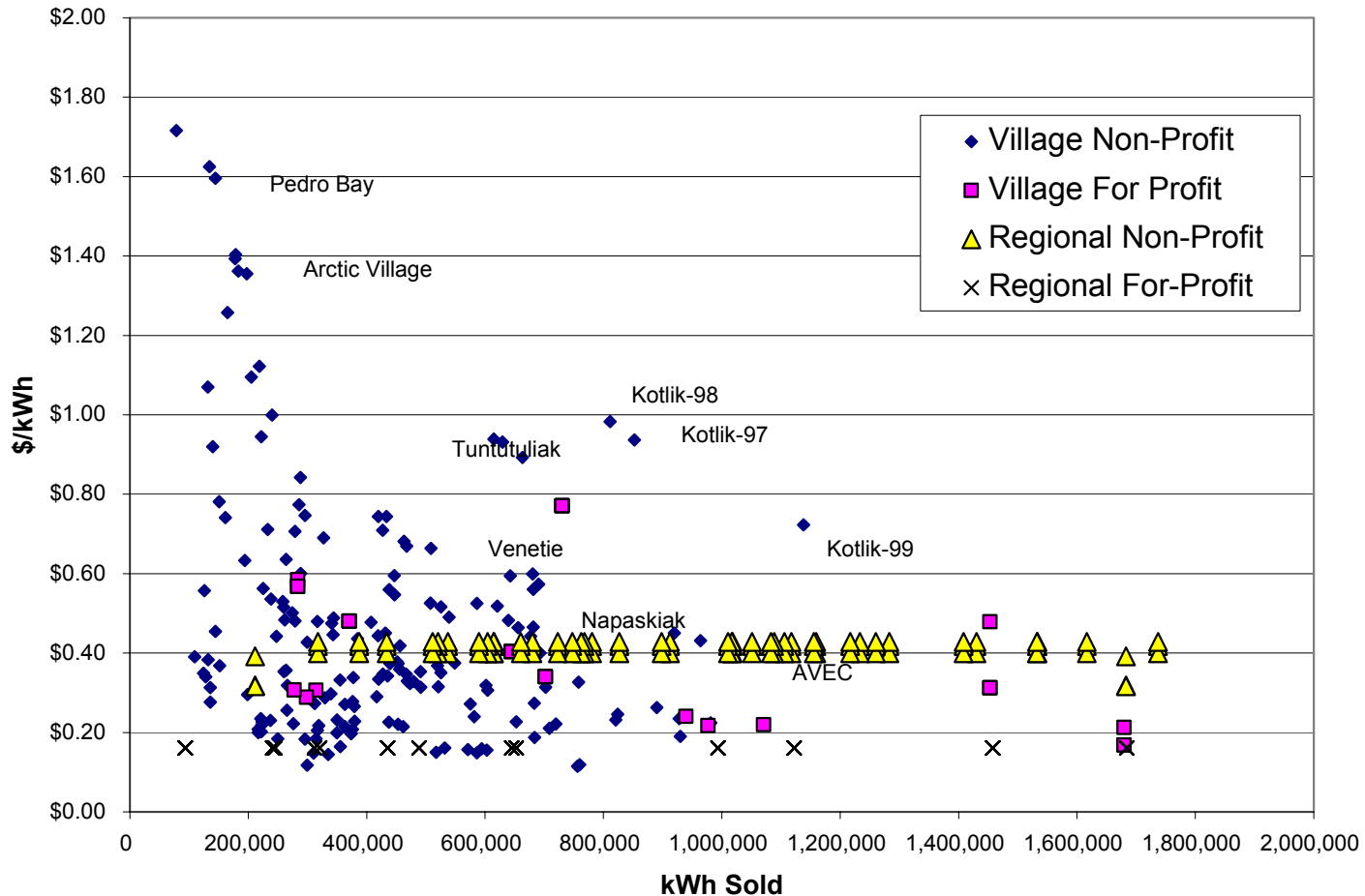
- Generators (machines)
- Distribution lines and meters (equipment)
- Operations, Maintenance and Management (people)



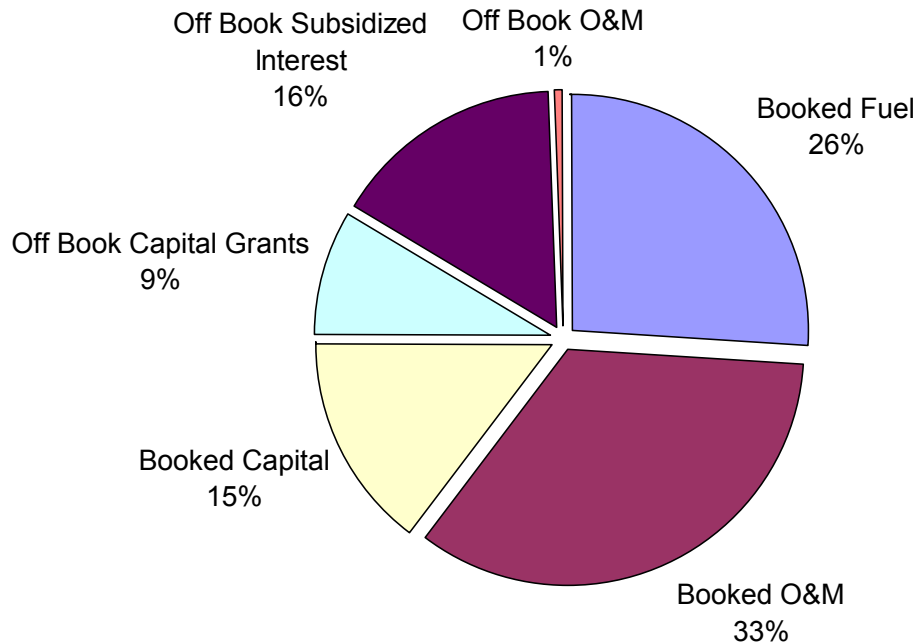
Total Non-Fuel Cost per kWh Sold vs. kWh Sold
Firm Level Data - Unfilled Panel



Nonfuel cost per kWh for small rural utilities



True Cost of Electric Service to PCE Communities: \$116 million/yr



Three Questions

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What can we do?

- **Reduce fuel use?**
 - Yes! Save 9-18 cents per kWh
- **Eliminate generators?**
 - Maybe....Save 0-5 cents per kWh
- **Reduce Distribution Equipment?**
 - No. (at least not now...) 5-10 cents per kWh
- **Save OM&M Expense (people)?**
 - Probably not...5-20 cents per kWh



Electricity Goes to:

- Light, sound, heat, appliances, TV, computer
 - Efficiency of conversion matters!



How do We Do It?

- Invest -
- in 3 kinds of capital



Three Kinds of Capital

- Physical Capital - generators, wind turbines, distribution lines
- Human Capital - people with the right skills in the right place at the right time
- Social Capital - communities and utilities that work together to sustain the electric system



Rural Energy and Jobs

- The conventional energy system supports significant employment.
- Little of the total cost goes out-of-state
- About 75% of rural energy project dollars flow to urban areas. (weatherization)



We're all in this together.



~The End

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