Conversions:
Rural Alaska Energy Supply Chains

presented to
Rural Alaska Energy Conference
September 2002

Steve Colt
Institute of Social and Economic Research
University of Alaska Anchorage
email steve_colt@uaa.alaska.edu
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 -

Hydro 12%
Diesel 88%

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

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?
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

- Anchorage: 2 cents per kWh
- High-wind communities: 9 cents per kWh
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 = $0.35 - $0.55
- Refining = $0.25
- Bulk Barge = $0.10 - $0.30
- Inland Transport = $0.00 - $1.00
- Bulk Storage = $0.10 - $0.20

• Total = $0.80 - $2.30
Actual Range of Fuel Costs

PCE Recipient Communities

$ per Gallon

Source: FY96-FY00 PCE Annual Report

0ct 01 Oct. 22, 2001 11:47:46 AM
Crude: 29%
Refiner: 16%
Inland: 32%
Barge: 13%
Storage: 10%
NonFuel Cost per kWh

- Anchorage: 8 cents per kWh
- AVEC: 27.5 cents per kWh
Nonfuel cost includes

- Generators (machines)
- Distribution lines and meters (equipment)
- Operations, Maintenance and Management (people)
Nonfuel cost per kWh for small rural utilities

- Pedro Bay
- Arctic Village
- Kotlik-97
- Kotlik-98
- Tuntutuliak
- Kotlik-99
- Venetie
- Napaskiak
- AVEC
- Village Non-Profit
- Village For Profit
- Regional Non-Profit
- Regional For-Profit
True Cost of Electric Service to PCE Communities: $116 million/yr

- Booked Fuel: 26%
- Booked O&M: 33%
- Booked Capital: 15%
- Off Book Capital Grants: 9%
- Off Book Subsidized Interest: 16%
- Off Book O&M: 1%
Three Questions

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

View this show after Thursday 9/19 at:

www.iser.uaa.alaska.edu