

# Turning HELCO into HELPCO

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Regulatory Assistance Project

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*The Regulatory Assistance Project*

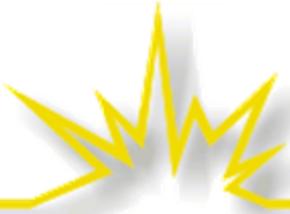


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# The Role of the Utility Must Change

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- For 100 years, local electric utilities have provided all of the electricity people want, need, and are willing to pay for.
- \$100+ oil changes that in Hawaii.  
Alternatives are cheaper. Much cheaper.
- The role of the utility needs to change to help consumers get the service you need, even if it does not come from them.
- That requires a new regulatory era.

# Hawaii's Unique Electric History

- Hawaii's electricity history is unique to the United States.
  - Originated as a hydro turbine on the Hilo ditch, serving the Hilo Boarding School in 1890
  - Hilo Electric Light formed in 1894
  - Kona Light and Power: 1934
  - Gradually expanded into a grid, under Hilo Electric, by 1956
  - Eventually acquired by HECO in 1970



# Big Island Has Been Home To Many Energy Innovations

- Early wind farms at South Point, Hawi, and Lalamilo.
- Geothermal at Puna
- Solar installation at Mauna Lani Hotel





# HELCO Has Struggled As A Utility

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- Integrating a very large island with very small electricity demand is very challenging.
  - 1995-era reliability problems;
  - Early wind power turbines difficult to integrate;
  - Early failure of geothermal
- Long battle over construction of new power plants: 1995 – 2005
- High fuel costs today – rates at record levels.



# **Everything is Now Cheaper Than Oil-Fired Electricity**

<b>Oil-generated Electricity @ \$120/bbl oil</b>	<b>\$.35/kWh +</b>
<b>Solar - electric</b>	<b>\$.30/kWh</b>
<b>Combined Heat and Power (CHP) <u>If</u> we have a use for the waste heat</b>	<b>\$.30/kWh</b>
<b>Wind Generation</b>	<b>\$.12/kWh</b>
<b>Solar Water Heater</b>	<b>\$.08/kWh</b>
<b>Energy Efficiency</b>	<b>&lt;\$.08/kWh</b>



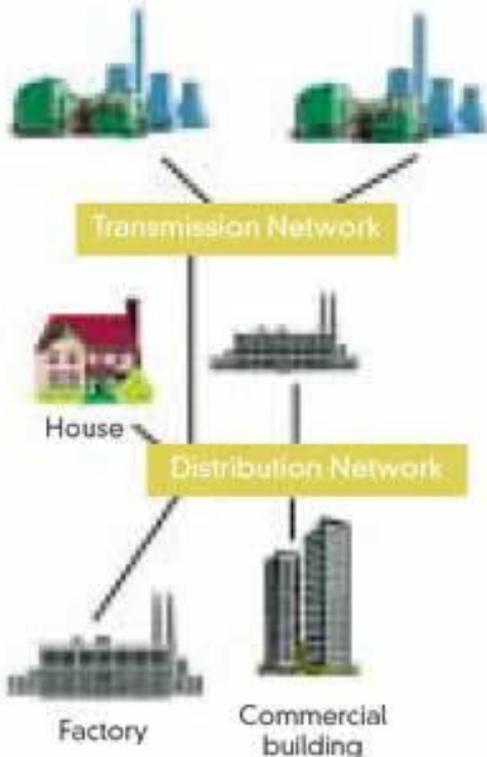
# Can HELCO's Current Role Continue?

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- **Resource Options Available Today:**
  - State-of-the-art energy efficiency
  - Solar systems at homes and businesses
  - Additional wind systems to displace oil
  - CHP systems at hotels and large buildings.
- **All of these can save money, energy, and environmental impacts.**
- **All are threats to HELCO's economic viability under current regulation.**

# Going from a Centralized Grid to a Distributed Grid

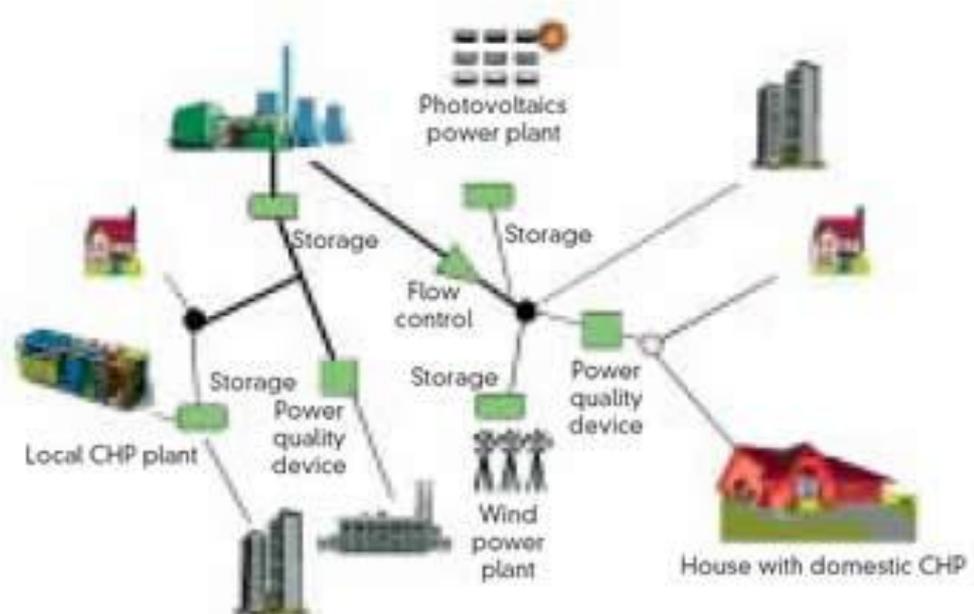
Central power station



**Traditional system: 40% efficiency using fuel. High risk of interruptions.**

Tomorrow

distributed/on-site generation with fully integrated network management



**Future system: many small power plants, all supporting each other. High fuel efficiency. Low risk of outages.**



# What Do We Need For the Grid Of Tomorrow?

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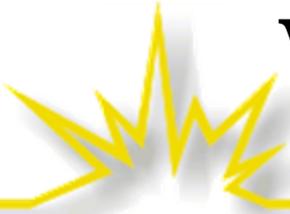
- Massive investment in distribution system management hardware and software.
- Sophisticated computer systems, called Supervisory Control and Data Acquisition (SCADA) to maintain reliability.
- Complex and expensive two-way metering that tracks by time of day and day of week.
- Complex and expensive billing system.

# What Do We Want HELCO To Do?



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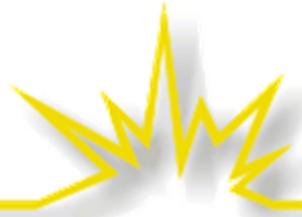
- Maintain a **reliable** system for all.
- **Welcome** CHP, solar PV, solar water heat, wind, and other non-oil energy onto the grid from **any** producer.
- Assist in determining what is the **right** choice.
- Charge **reasonable prices** for integration, balancing, storage, standby, and supplemental service.
- Invest in a **smart grid** that can deliver what is needed.
- Fully fund **energy efficiency** services through the third-party provider now being selected.



# What Does HELCO Need?

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- Access to capital to invest in smart grid improvements and other technology.
- A rate system that makes them care less about sales, and more about service and total cost.
- Technical expertise and funding to operate a much MORE complex and sophisticated system – that will sell much LESS electricity.



# Utility Ratemaking 101

- Under traditional regulations, utilities are allowed to collect:

	<b>Actual capital invested in facilities</b>	<b>\$100,000,000</b>
<b>X</b>	<b>Fair Rate of Return</b>	<b>10%</b>
<b>+</b>	<b>Estimated Operating Expenses and fuel costs.</b>	<b>\$25,000,000</b>
<b>=</b>	<b>Revenue Requirement</b>	<b>\$35,000,000</b>
	<b>Sales in kWh</b>	<b>100,000,000</b>
<b>=</b>	<b>Rate per kWh</b>	<b>\$.35</b>



# Electricity Rate Design 101

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## ➤ Residential

- Customer Charge **\$10.00**
- Energy Charge **\$.10/kWh**
- Fuel Charge **\$.30/kWh**

## ➤ Large User

- Customer Charge **\$100.00**
- Demand Charge **\$20.00/kW**
- Energy Charge **\$.03/kWh**
- Fuel Charge **\$.30/kWh**

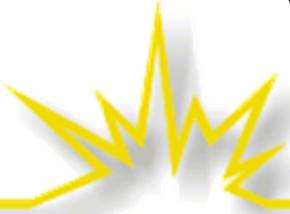
- HELCO's rates are a bit more complicated, but the bottom line is the same; most of the cost varies with sales volume.



# What's Wrong With This?

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- Provides incentive to invest in capital, not in efficiency.
- If sales increase between rate cases, profits go up.
- Utility is made resistant to both energy efficiency and customer self-supply, whether a solar water heater or CHP.
- We need HELCO to be a willing partner in the transformation of Hawaii's energy supply.



# What's Wrong With Conventional Regulation and Rate Making?

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- **Puts utility and consumers at conflict:**
  - Utility has strong incentive to encourage usage, as profits increase when sales do.
  - Alternatives likely to have lower costs for consumers.
- **The least-cost strategy is not the most profitable strategy**
  - If consumers conserve, profits go down.
  - If hotels install CHP, profits go down.
  - If new homes include solar water heat, profits go down.



# The Utility's Traditional Solution

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- Collect more of the revenue requirement in the fixed charge.
  - **Customer charge**
  - **Demand charge and demand ratchet**
- Problem with the traditional solution
  - **Penalizes low-income households (most of whom are low-use households).**
  - **Discourages CHP and efficiency**

# A Three-Part Proposal for a Better Solution



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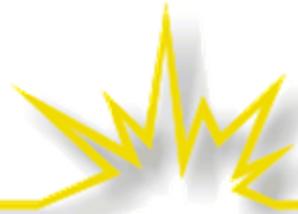
- **Connection charges** for new buildings, to ensure that new loads are energy-efficient and help pay for grid improvements.
- A **decoupling** mechanism, so that the allowed revenue requirement is recovered, regardless of sales volumes.
  - Variations in cost recovery added to the monthly fuel adjustment.
- **Rate design** that encourages CHP, solar, and other alternatives.
  - Reasonable standby rates
  - Two-way energy charges.



# Connection Charges For the New Millennium

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- New buildings are likely to use MUCH less electricity, due to expected energy costs, new codes and standards, on-site renewable energy, and CHP.
- Grid investment needed for reliability is still significant, and additional power storage, transmission, and management are needed.
- \$/kW connection charge for new and enlarged loads
  - On order of \$1,000 - \$2,000/kW of connected load.
  - Will encourage more efficient and self-reliant new construction.
  - Will mitigate rate increases for grid improvements to all existing customers.



# Decoupling Mechanisms

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- In place in California, Oregon, Washington, Idaho, and many other states for gas and electric utilities.
- Set the allowed distribution revenue
  - If sales volumes go up, rates go down.
  - If sales volumes go down, rates go up.
- Individual customers still see a rate that encourages conservation, but utility net revenue does not swing up and down.
- Enhances access to capital, because earnings are more stable
- New full rate case every 3 years.



# Rate Design for the New Millennium

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## ➤ **Customer Charge**

- Meter reading and billing costs only **\$5/month**

## ➤ **Distribution Connection Charge**

- Based on kW of connected load **\$5/kW/month**
- Covers distribution system costs

## ➤ **TOU Energy Charge**

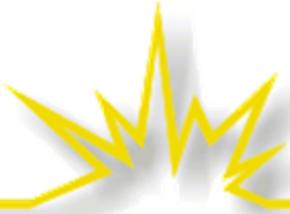
- Varies by time of day **\$.20 - \$.40/kWh**
- Covers all power supply costs

## ➤ **Reverse Metering**

- Unrestricted, based on TOU rates **(\$.20) – (\$.40)/kWh**

## ➤ **Energy Service Charge**

- Based on all power flowing through the meter – either direction
- Covers energy management system costs. **\$.05/kWh**



# Where Does This Get Us?

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- New buildings will be more efficient, and rely heavily on solar; grid needs will be small.
- Existing buildings will be converted for efficiency, and grid needs will decline.
- Sophisticated SCADA will be needed to manage power flows to and from buildings.
- **HELPCO** will have the cash flow needed to keep everything running smoothly.