

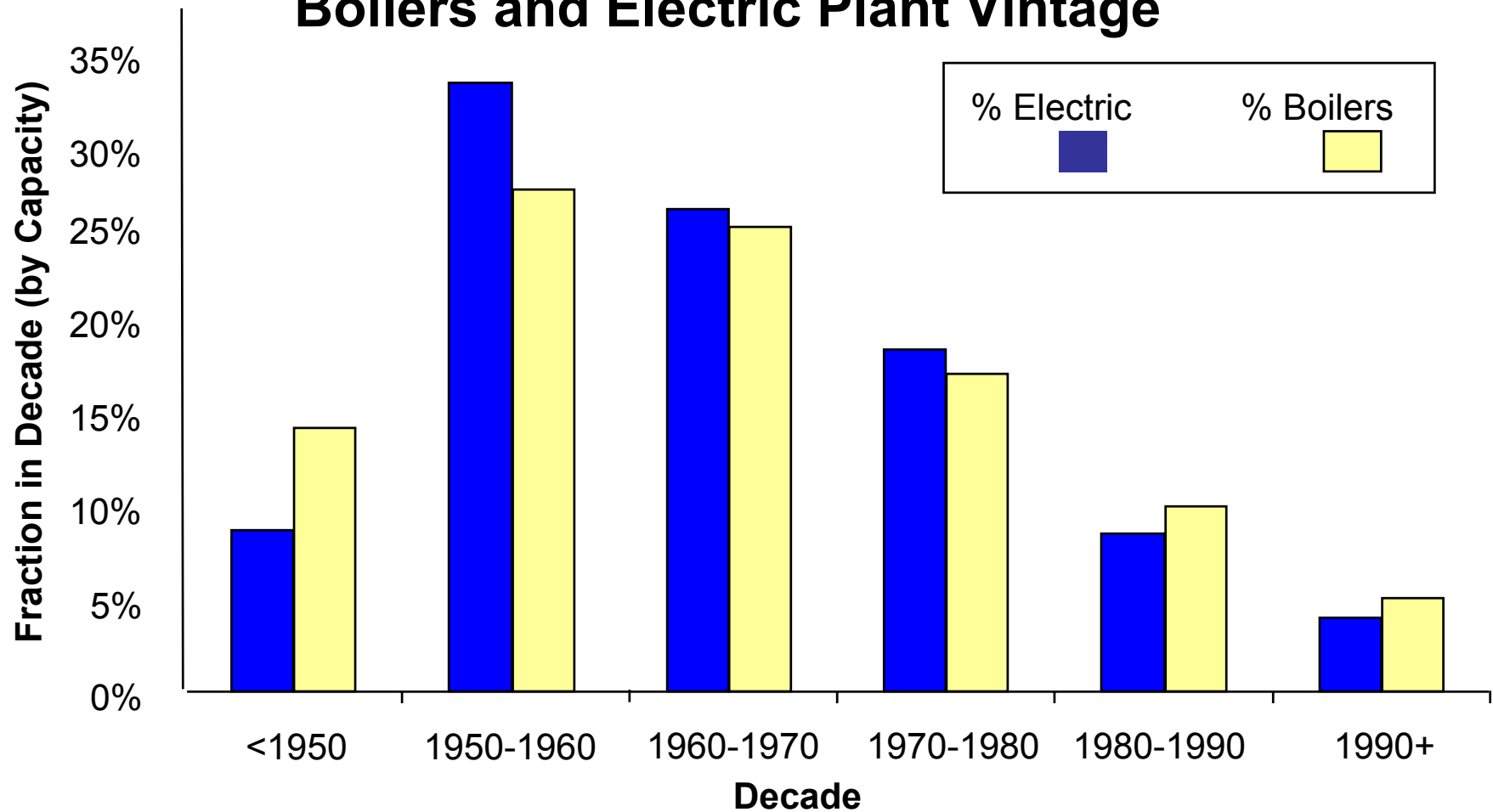
# ***Regulatory Education & Outreach for New Technologies***

*Offices of: Distributed Energy & Electric  
Reliability, Solar/PV, Fuel Cells &  
Hydrogen, Building Technologies*

**Anne-Marie Borbely-Bartis  
Battelle at the U.S. Department of Energy**

# Aging Heat & Power Generation

## Boilers and Electric Plant Vintage



Sources: Energy Information Administration, Gas Research Institute

**The current energy delivery system is up to 97% inefficient; this (1) impacts the cost of business in the U.S., (2) affects the price of electricity, heating and air conditioning to you, and (3) plays a role in domestic security**

**Losses**

**67%**

**100%**

**Fuel in**

**33%**

**4%**

**(7-11% of electricity)**

**29%**

**29%**

**29%**

**29%**

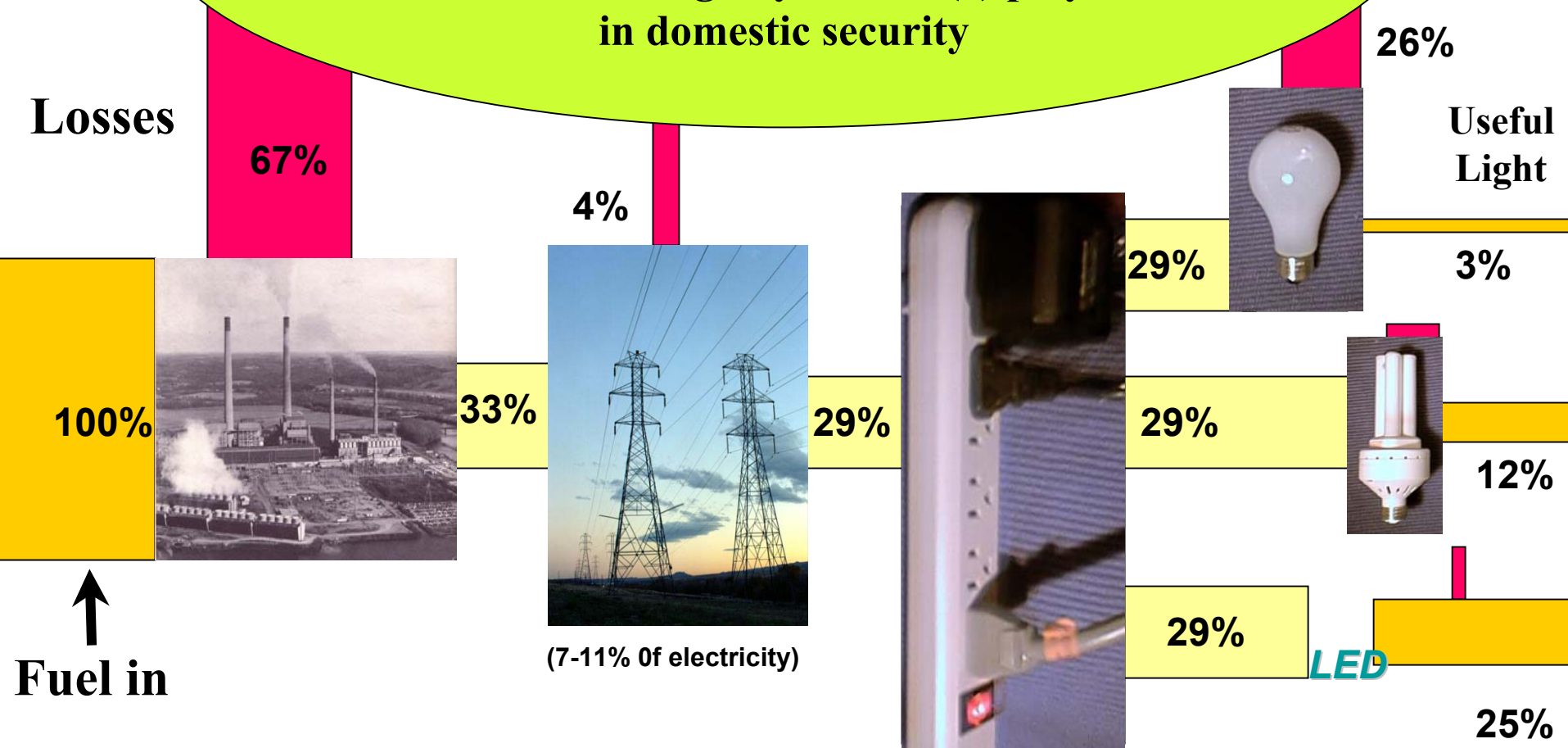
**26%**

**Useful Light**

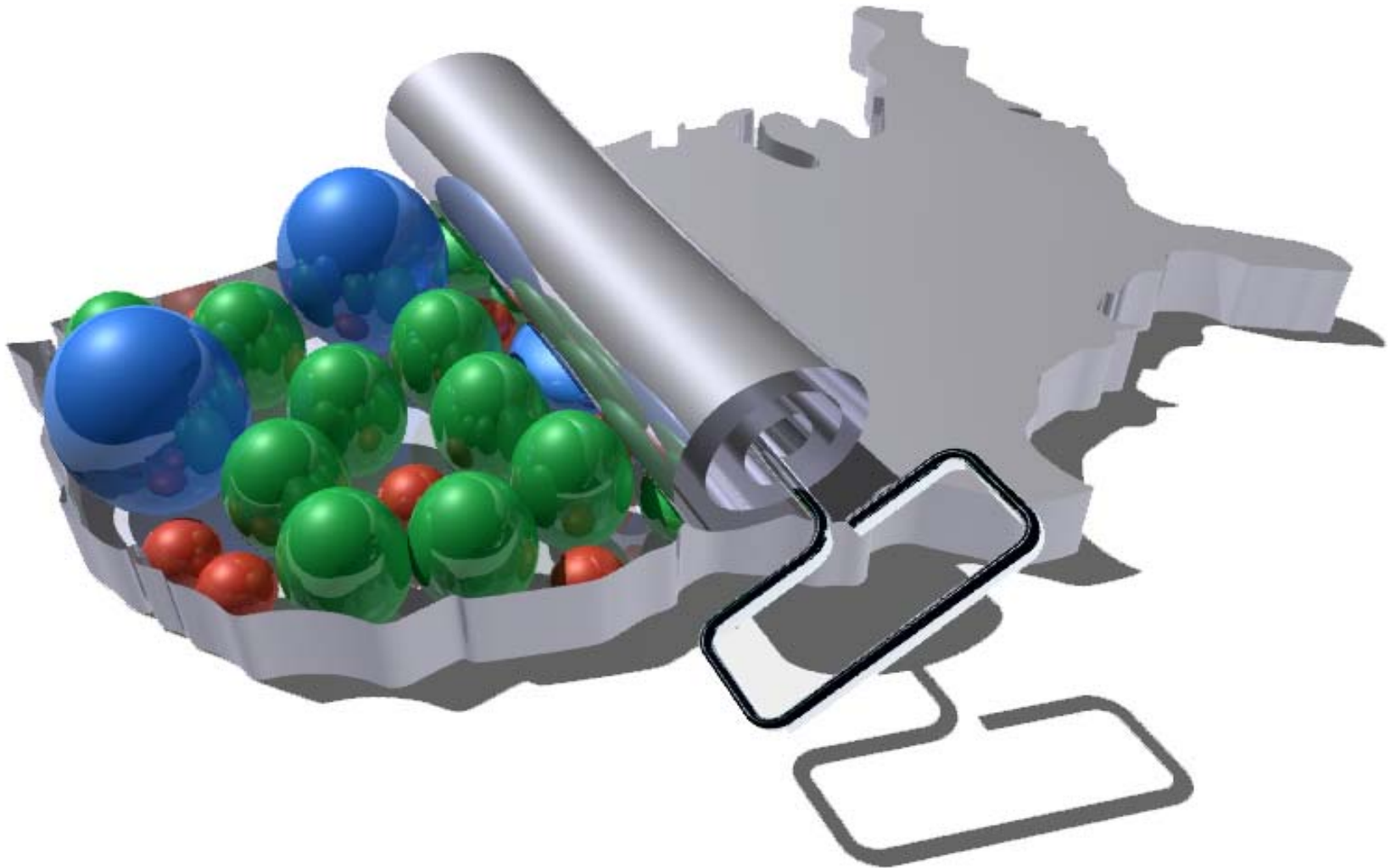
**3%**

**12%**

**25%**



***U.S. consumers are getting smarter.....***



# *The Federal Role*

The DOE does not REGULATE energy (your state utility commission does that); it furthers the Administration's goals by:

- ✓ long-term R&D programs
- ✓ Technical and economic analyses, public and regulatory education programs

# ***Offices of: Distributed Energy Resources; Fuel Cells & Hydrogen Infrastructure; Solar Technologies; Building Technologies.....***

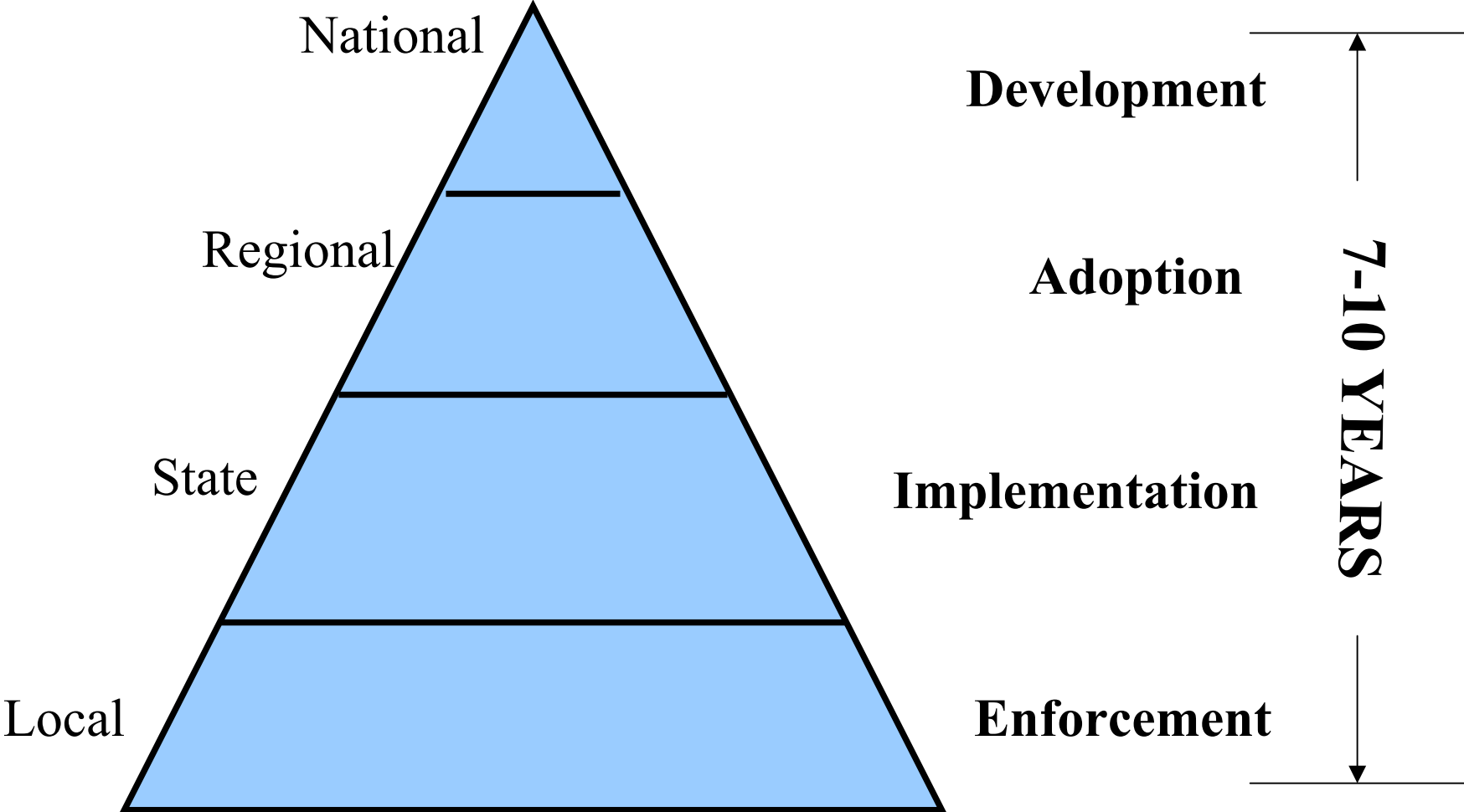
- Microturbines, reciprocating engine generator sets, fuel cells, solar heaters & photovoltaic systems
- Materials, energy storage, power electronics
- Fuel production systems, transmission & storage
- Combined heat and power (CHP), “power parks,” building cooling, heating & power (BCHP, thermally-activated technologies)
- Equipment, bldg. and electrical interconnection standards; communications & control

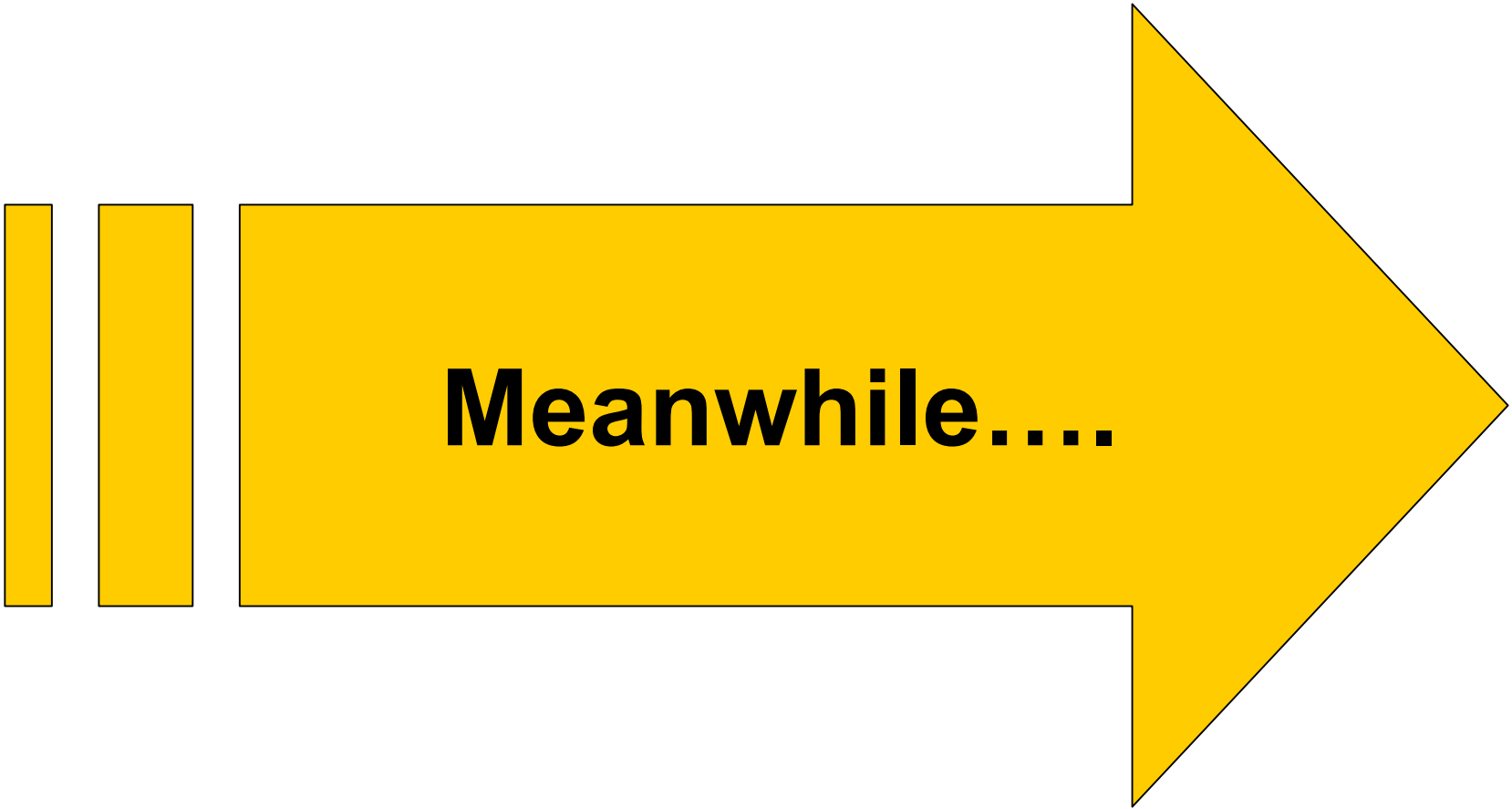
# ***DE Codes & Standards***

## ***U.S. DOE Program Support***

- Fuel Cells/Hydrogen, Neil Rossmeissel, Tel: 202-586-8668 [neil.rossmeissel@ee.doe.gov](mailto:neil.rossmeissel@ee.doe.gov)
- Microturbines, Debbie Haught, Tel: 202-586-2211 [debbie.haught@ee.doe.gov](mailto:debbie.haught@ee.doe.gov)
- BCHP, Ronald Fiskum, Tel: 202-586-9154, [ronald.fiskum@ee.doe.gov](mailto:ronald.fiskum@ee.doe.gov)
- Electrical Interconnection, Richard DeBlasio (NREL), 303-275-4333, [deblasid@tcplink.nrel.gov](mailto:deblasid@tcplink.nrel.gov)
- State & Local Education/Outreach, Anne-Marie Borbely-Bartis (Battelle), Tel: 202-586-5196, [anne-marie.borbely-bartis@ee.doe.gov](mailto:anne-marie.borbely-bartis@ee.doe.gov)

# *From National Standards to Local Building Codes:*

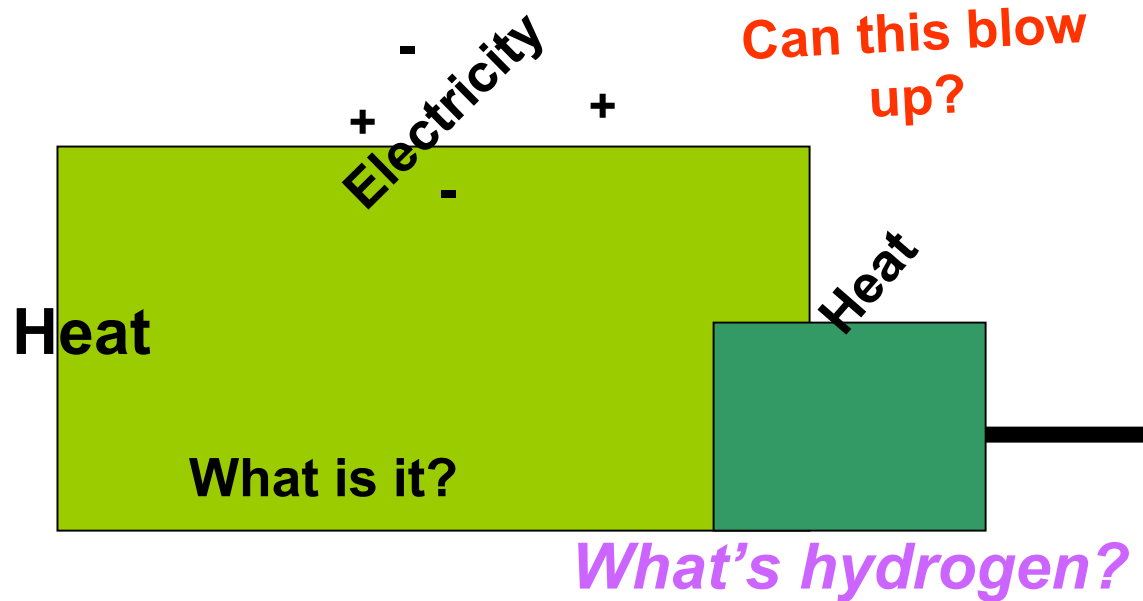
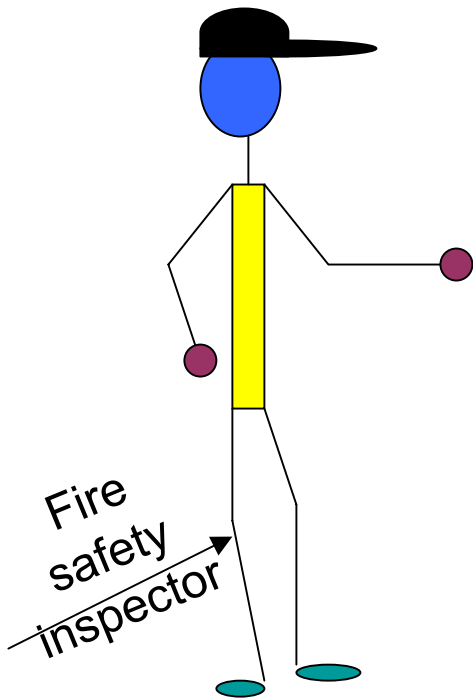




**Meanwhile....**

“Am I on camera?.... Is this one of those hidden camera shows?”

# Actual fuel cell permitting experience (location omitted)



# *Case Study: Microturbine*

- 30-kW Microturbine (natural gas fired)
- “Benign” emissions signature (low NO<sub>x</sub>)
- Grid-parallel, grid-independent
- UL2200 Certification
- Certified under NY State Interconnection Guidelines

# *Case Study – Microturbine, cont.*

- Fargo, ND – Holiday Inn & Conference Center
  - 1 30-kW unit (M330-SA) with Unifin heat recovery system
  - Installed inside bldg., in mechanical room
  - Utilizes “low pressure” natural gas (11 lbs.)
  - No electrical interconnection with grid
  - Feeding all electrical and thermal output directly into boiler

# Case Study – Microturbine, cont.

<b>Action</b>	<b>Cost (\$000s)</b>
• Upgrade 50 yds. Natural gas pipeline (1 lb. To 11 lbs.)	4.0
• Mechanical inspector required: all pipeline connections to be welded	3.0
VF drive for additional combustion air into room	6.0
new chimney to outside	3.0
• Electrical inspector required: Grounding only	n/a
• Additional modem phone line	n.a
• Engineering labor and materials	14.0
<b>Total Installation estimate:</b>	<b>30.0</b>

# *Case Study – Fuel Cell*

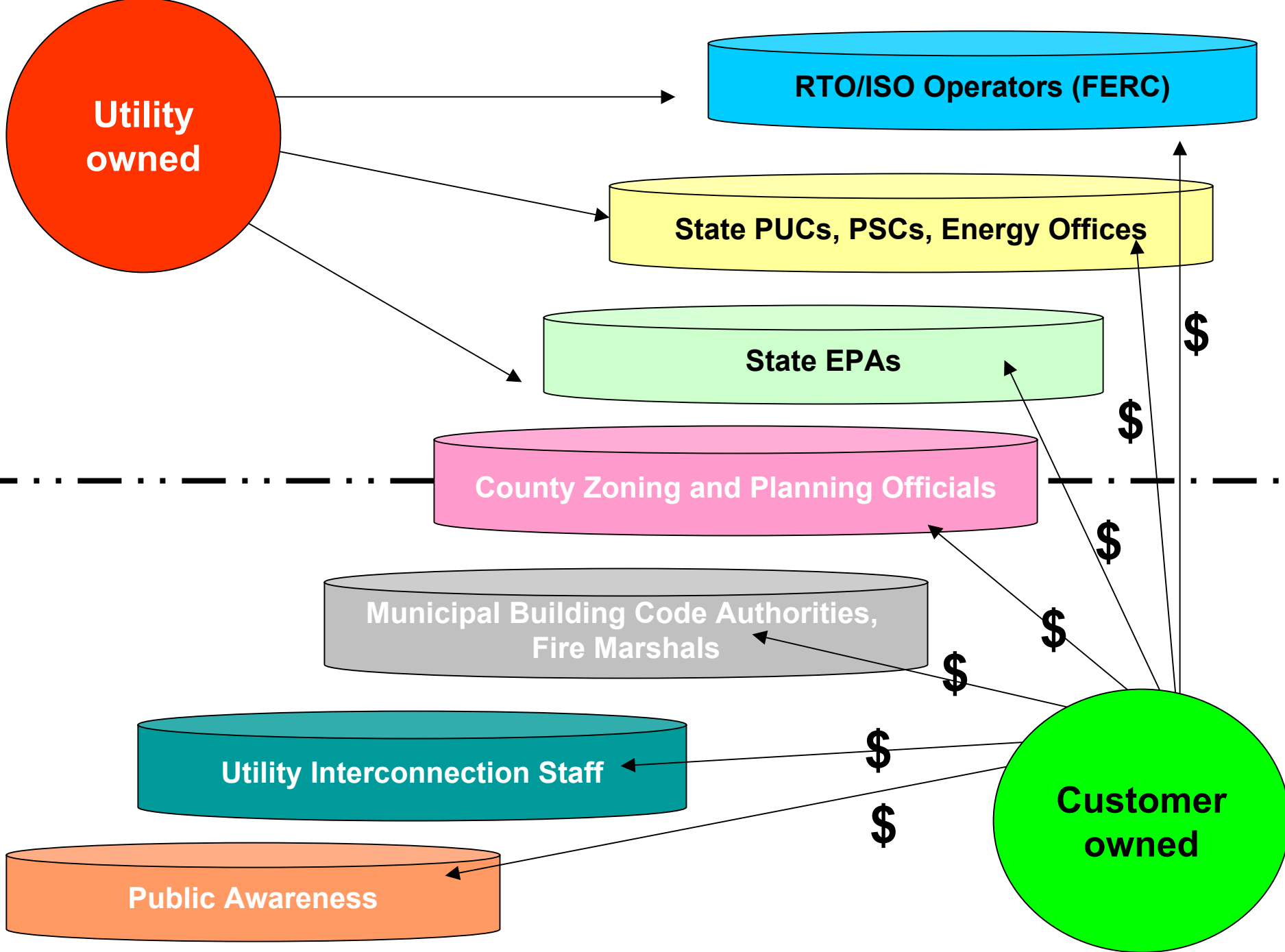
- 2-5kW PEM fuel cell system and fuel reformer
- Utilizing methanol as feedstock on first units
- 300-gallon “tote” retrofitted as onsite storage tank, piping system
- Relevant code: NFPA 30 and 30A, Combustible Liquid Fuels
- BPA has funded 110 alpha and beta units, currently installing first 10 units across Pacific Northwest

# *Case Study -- Fuel Cell, cont.*

- Fire Marshals in urban areas requiring the following on methanol systems:
  - Additional setbacks from walls, doors, windows, public access
  - Automatic shut-off valve during periods of no demand
  - Signage, fire extinguisher
  - Tank must be fenced, protected from vehicular impact
  - All pipes that enter building must be welded; all invisible joints must be welded

# *Case Study – Fuel Cell, cont.*

- Methanol fuel system requirements, cont:
  - 12-ft. ventilation stack
  - Emergency relief venting system – 18-in. manhole w/loose bolts
  - Seismic calculations
  - Secondary containment system
  - Sight glass on storage container
  - Static electricity management system – grounded tank, toad, etc.
  - Pressure test on all pipes and tanks, with Fire Marshall observing
  - Road uneven – must be re-graded



**So.....**

***Welcome to the U.S. DOE  
Road Show!***

***ASK QUESTIONS***

***Ask questions ask questions ask questions ask questions ask***

***For more information on Distributed Energy Road Shows:***

***<http://www.eere.energy.gov/der/roadshow.html>***