Distributed Generation and CHP Policy Problems – Benign Neglect or Insidious Protectionism?

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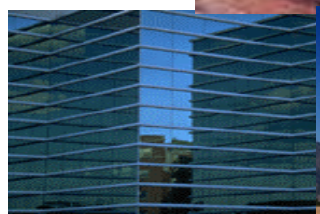



Overview

- Legacy Wisdom, Articles of Faith
- My own best examples from utility economic regulation
- Land mines of environmental regulation
- Common agreement—old approach won't work with DER
- ***The Impact of Air Quality Regulations on Distributed Generation***
- ***Greatest Hits CD…***

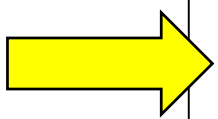
Overview (continued)

- IEEE P1547
- FERC Small Generation NOPR
- DOE NREL Tariff Project
- Summer Possibilities
- Future NARUC projects
  - Distribution engineering
  - Distribution costing
  - Development of innovative regulatory theory and practices

The World Has Changed Technologically
The Structure of the Electric Utility Industry Is Over a Century Old

Old Paradigm

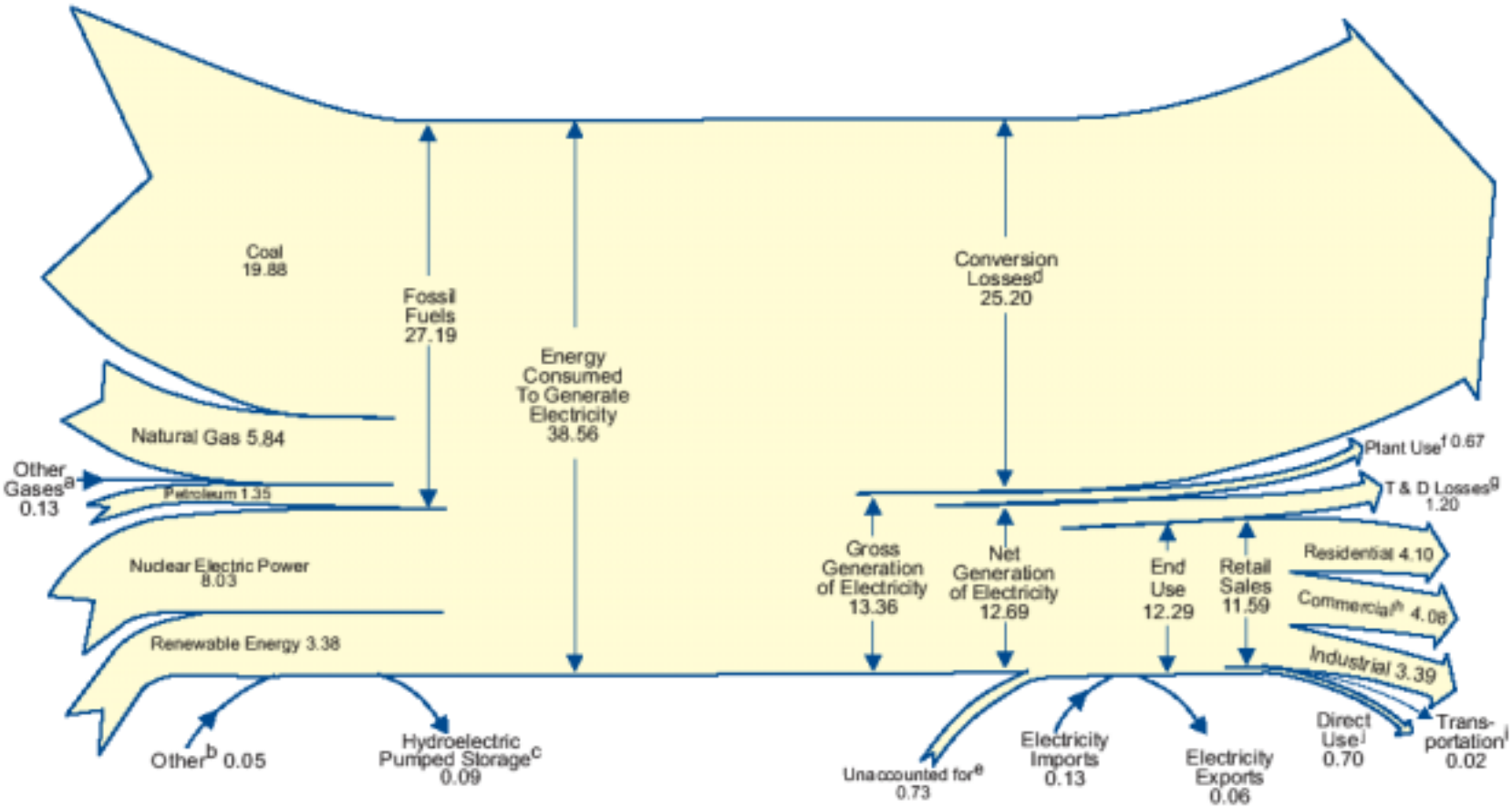
- Information Expensive
- Communication Expensive
- Monopoly: Customers Assumed
- Computation Expensive
- Labor Cost Low
- Fuel Cost Low
- Waste Disposal No Cost
- Materials Low Cost
- Centralized Model Based on Economies of Scale



New Paradigm

- Information Low Cost
- Communication Low Cost
- Customer Satisfaction Critical
- Computation Low Cost
- Labor Expensive
- Fuel Costs Highly Variable
- Waste Disposal Expensive
- Materials Expensive
- Distributed Models Based on Systems Approach

Diagram 5. Electricity Flow, 2001
(Quadrillion Btu)



EIA continued

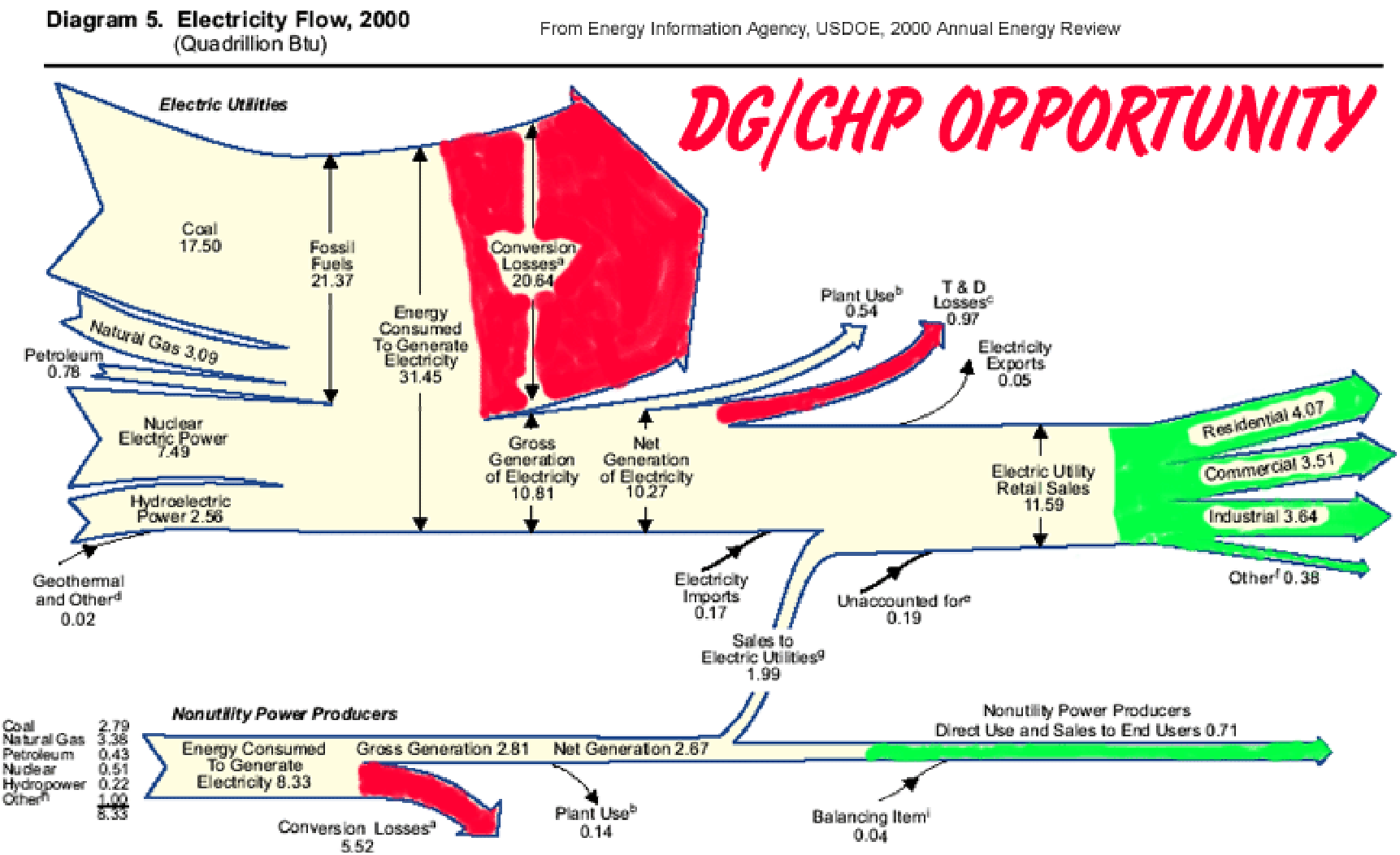
Unfortunately, in an explanatory note some 35 pages later, the EIA states, in part:

Electrical system energy losses are estimated as the difference between total energy consumed to generate electricity and the total energy content of electricity consumed by end users. ***Most of these losses occur at steam-electric power plants (conventional and nuclear) in the conversion of heat energy into mechanical energy to turn electric generators. This loss is a thermodynamically necessary feature of the steam-electric cycle.*** *…*

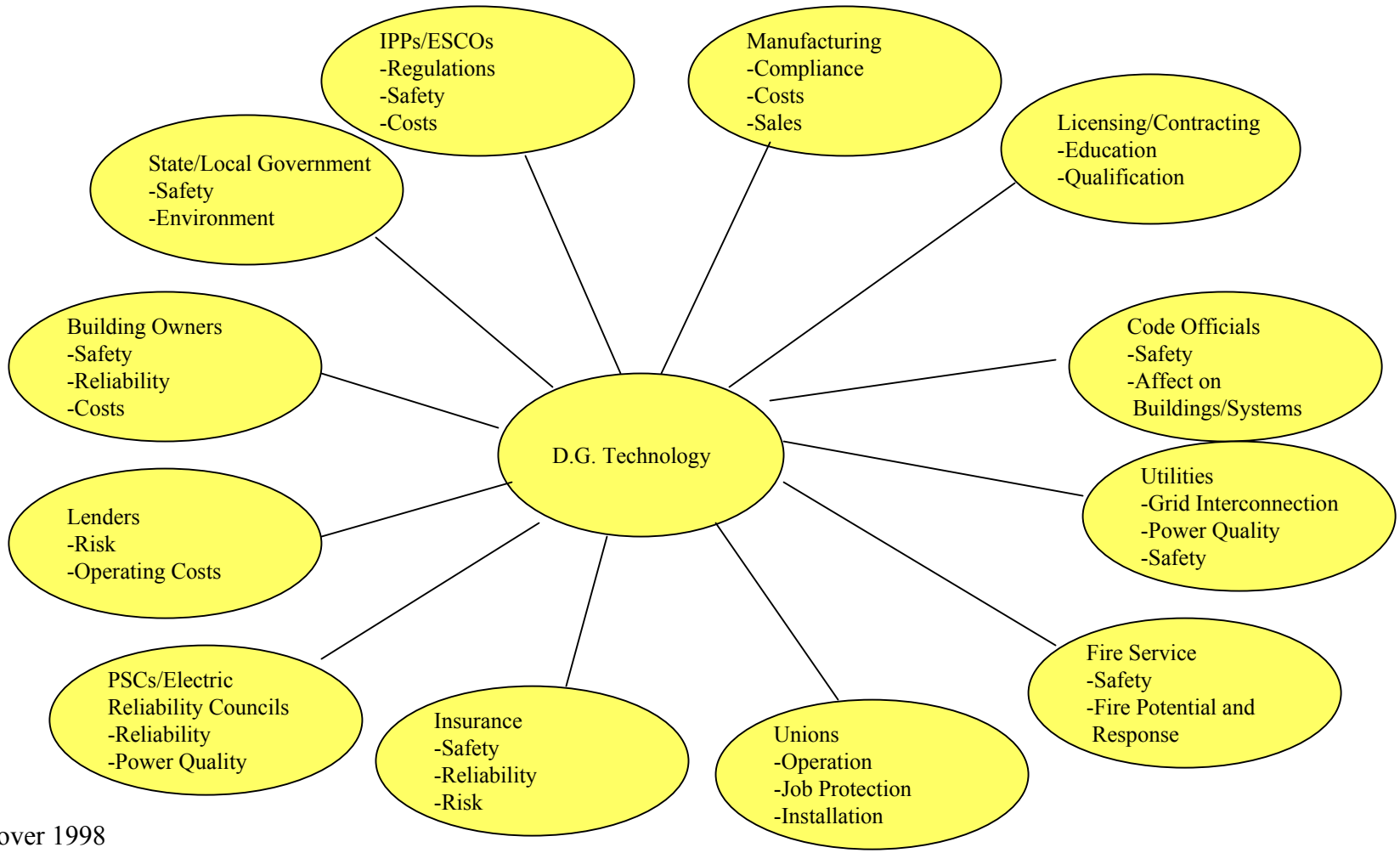
… Overall, approximately 67 percent of total energy input is lost in conversion; of electricity generated, approximately 5 percent is lost in plant use and 9 percent is lost in transmission and distribution.

–Footnote 1, p. 252 (emphasis added}

Ultimate Driver



DG Related Stakeholders and Some Issues of Concern



Dave Conover 1998

How Air Regulators See DER

- A tidal wave of new, “unregulated” sources.
- The arrival of “clean” DG.
- More diesel engines.

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

Why is DER Different Than Large Generators for Air Regulation?

Large Generators

- Individually designed/field erected
- Large capital cost
- High transaction cost
- Industrial site
- Skilled operators

DER

- Mass produced
- Low capital cost
- Low transaction cost
- Possible non-industrial site
- No operators

From Joel Bluestein EEA, Lead Author of *The Impact of Air Quality Regulations on Distributed Generation*

CHP - Beneficial But Difficult to Regulate Appropriately

- Simultaneous generation of heat and power from one heat input.
- Increases efficiency, reduces total emissions.
- Replaces two conventional emission sources.
- Difficult to fit into conventional air permitting framework.

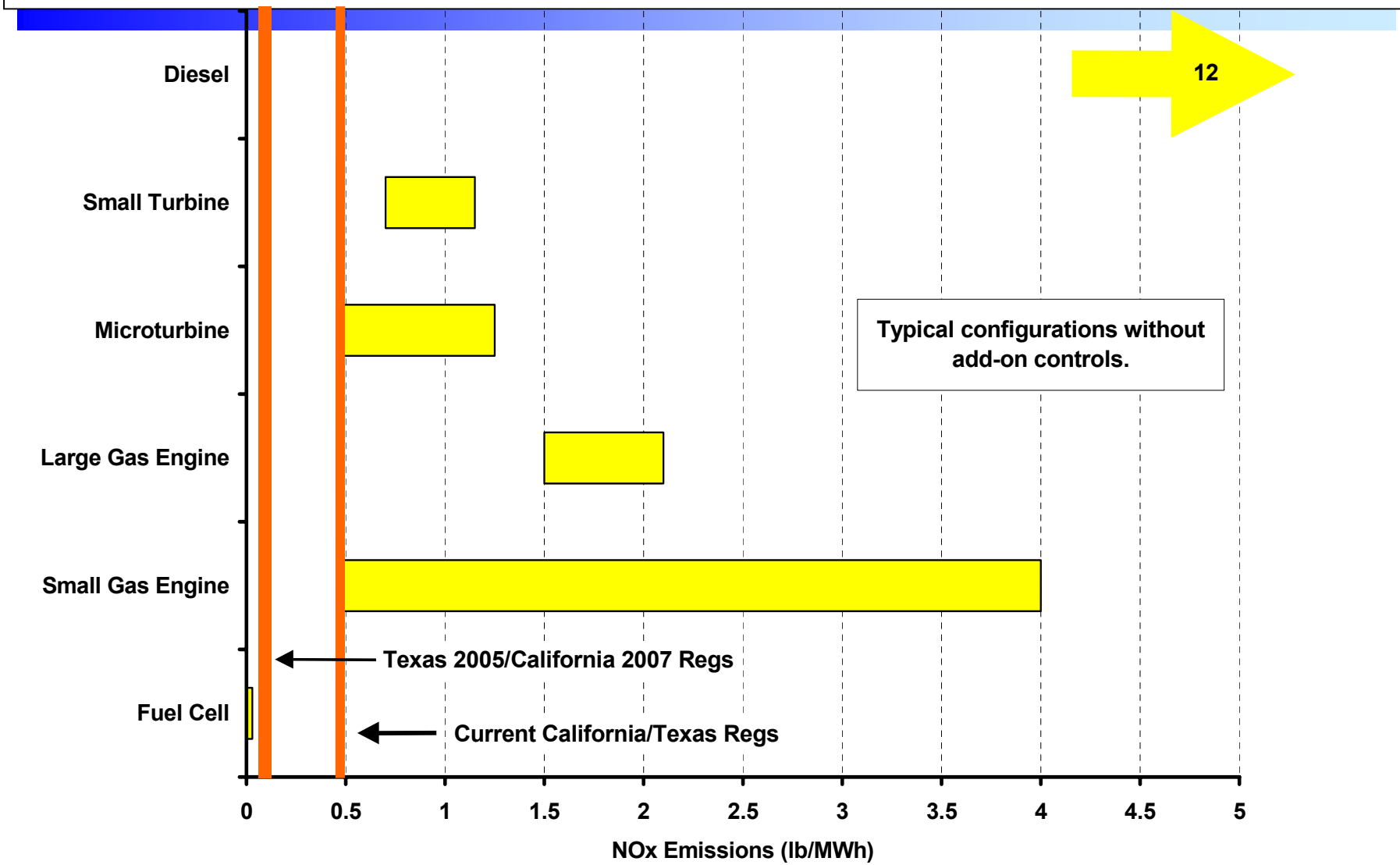
From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

Recent Regulatory Experience

- States beginning to develop new air regulations for DER focused on:
  - Limiting use of diesel peakers.
  - Standard limits for new units - CA, TX.
- Regulatory limits for new units are pushing the limits of current small DER technology.

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

Much DER Cannot Meet The New Regs



From Joel Bluestein EEA, Lead Author of *The Impact of Air Quality Regulations on Distributed Generation*

The Impact of Air Quality Regulations on Distributed Generation

- Recent NREL report assesses impact of air quality regulations on DER.
  - Through interviews with developers, regulators and OEMs
  - Analysis of regulatory/technology issues
- What are the problems?
- What solutions can be proposed?

From Joel Bluestein EEA, Lead Author of *The Impact of Air Quality Regulations on Distributed Generation*

Summary of Problems Found

- Case-by-case permitting not appropriate for small systems.
- No credit for CHP.
- Inadequate credit for pollution prevention and efficiency.
- No credit for avoided or displaced emissions.
- Need for outreach and education.

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

List of Recommendations

- Develop uniform, achievable air emissions standards for DER.
  - Recognize efficiency and P2.
  - Promote certification
- Provide credit for CHP and avoided/offset emissions.
- Provide outreach and education for regulators and developers.

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

The Impact of Air Quality Regulations on Distributed Generation

NREL/SR-200-31722

Available at DOE DER homepage.

http://www.eren.doe.gov/der/environmental_regulations.html

AND ON GREATEST HITS CD IN BACK

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

National "Model" Emissions Rule

- A national "model" rule incorporating most of these features has been developed under DOE funding through a stakeholder process facilitated by the Regulatory Assistance Project.
- Draft rule available at: http://www.rapmaine.org/workgroup.html

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

Model Rule

- Sets uniform output-based standards.
- Includes credit for CHP and avoided emissions.
- Encourages precertification.
- Three phases of progressively more stringent limits.

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

Proposed Model Rule Emission Limits[1]
(lb/MWh)

	NO_x Attnmt	NO_x Nonattnmt	CO	PM^2
Phase I – '04	4	0.6	10	0.7
Phase II – '08	1.5	0.3	2	0.07
Phase III[3] – '12	0.15	0.15	1	0.03

[1]All non-emergency engines
[2] Non-gas technologies only
[3]Subject to technology review. Only low sulfur diesel can be used.

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

Conclusions

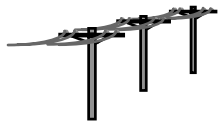
- For better or worse, DG has attracted the attention of air regulators.
- The most negative DER aspects seem to be the most prominent in the market today.
- DER technology is improving but the environmental “promise” of DG is still a promise.
- In the interim, the elements of appropriate “driving” regulation have been proposed.

From Joel Bluestein EEA, Lead Author of ***The Impact of Air Quality Regulations on Distributed Generation***

NREL DER Test Facility

NREL Distributed Power Testing Capabilities

Microturbines



Diesel Generators

Load Simulators

Fuel Cells

Electrolyzer

PV Array

Additional Information

- **http://www.eren.doe.gov/distributedpower/**
- Gary_Nakarado@NREL.Gov, or 303-275-3719