



# **Lecture 3: Overview of Energy Policy and A Short History of Regulation**

**Energy Law and Policy**

**Fall 2013**

# First Month Class Schedule

- 8/26: INTRODUCTION AND BACKGROUND
- 8/28: Forces controlling energy policy; Jim Halloran, PNC Bank.
- **9/4: Energy Policy Overview and History of Energy Regulation**
- 9/9: **History of Regulation**
- 9/11 Regulation of electricity in Ohio/Restructuring of Markets
- 9/16 Writing (Laura Ray)/Wholesale Power/Aggregation
- 9/18 Matt Brakey/Beth Polk – Retail Electricity Markets

# Power to the People

## Vaithesweeran

Premise: “needless” pollution and inefficiencies

- Problem: “change comes slowly in energy realm”
- Reason: Old ways of thinking
  - Encouraged monopolies
  - Shielded polluters
  - Stifled innovation

# Move to Clean Energy

- Developing economies (India and China) are following suit.
- Critical question facing society today: Can we move beyond today's dirty energy to “cleaner, smarter, and more sustainable?”
- Answer: yes
- Three “powerful trends” will enable this to happen:
  - Global move to liberalization of markets
  - Popular appeal of environmentalism
  - Surge in technical innovation

# Move to Clean Energy (continued)

- Job one: end addiction to oil
- Environmental issues not leading the move
- Economic issues as driver
  - US (especially Ohio) is importer of oil.
  - What is the real price of oil?
    - Environmental, national security, road subsidies
- Security issues as driver
  - What if hostile regimes take over oil fields?

# Oil Reserve Problem

- Argues that problem is *not* scarcity of oil
- Problem is concentration:
  - Hostile Arab states control 2/3 or world's reserves
- Problem is also rate of production:
  - Arab states allowing rest of world to deplete reserves while husbanding resources
  - Risk of disruptive monopoly control over the market increases every year.

# What Is Being Done?

- No solution to the problem yet.
- Strategic Reserve Stockpile – small
- Responses to problem:
  - Deny problem exists
  - Boost non-OPEC supply (drill baby drill)
  - Conservation

# What Is Being Done (Cont.)?

- New technologies.
  - Fuel cells – end of oil dependence?
  - Biofuels, Compressed Natural Gas
  - Plug in Hybrids
- *Nation Building*



# “Quiet Revolution”

- Rise of Market Forces
- Surge in environmentalism
- Technical Innovation
- “Bigger than the Internet”
  - Energy is by far biggest industry in world – \$2 trillion per year
  - Fundamental to health and environment
  - Fundamental to economies

# Need for “Energy Revolution”

- Monopoly led to
  - soaring costs
  - technology stagnation
  - Inefficiencies
  - Political cronyism
- Calls for reform
  - Central power no longer cheap
  - Power failures were coming from the grid
  - Grid had become main cost driver
  - Traditional ways of generating power were dirty

# Advent of Distributed Generation

- Power generated close to end user
- Grid-connected
- Use of new, cleaner generating technologies
- “Energy Internet” model
  - Combine information technology to grid
  - Creation of “plug and play” micro-generation
  - Intelligent metering and switching
  - Choices in energy generation

# The “Exxon” vs. “Enron” Models

- Exxon –
  - Develop oil and gas reserves
  - Market commodity
  - Traditional, conservative approach
- Enron
  - Energy traders
  - Traded oil, gas and electricity
  - By 2000 Enron held a 15% share of energy markets

# Exxon Model

- Traditionally oil giants were valued on reserves, not on profits.
  - Began to change with advent of nationalization of oil and gas properties (1960' s).
  - Reserve estimates have proven wildly unreliable
  - “Asset Managers”
- Exxon is the most resistant to change
  - Last major to acknowledge global warming
  - Last major to invest in hydrogen economy, renewable energy

# Collapse of Enron

- Enron goes bankrupt in 2001
  - “Indictment of deregulation” – Diane Feinstein
  - “About lying, cheating and stealing, not about energy markets.” -- Edison Electric Institute
- Oil and Gas giant merger mania
- Exxon-Mobil one of most profitable companies in the world – 2001 profits \$15 B.
- Growing Consensus: new models do not work

# New Energy Company Model

- Somewhere in the middle between Exxon and Enron models
  - Some asset based value
  - Some profits based value
- Utilities model changing
  - Historically local in nature, energy trading making utilities become multinational companies
  - Convergence of gas and electricity
  - Increasing reliance on energy services
  - Threat of distributed generation

# Disruptive Technology

- Exxon model does not account for risk of disruptive technology, such as fuel cells
  - Examples: effect of cell phones on telecommunications industry
- Shell, BP leaders in trying to position themselves for disruptive change
  - But: no truly disruptive technology ever comes from established incumbent industries – they have no motive for change



# Long Search for Sustainable Energy

## Geri & McNabb: CH 4

- 1945 to 1970            Managing a Surplus
- 1971 to 1980           Energy Shortage
- 1981 to 1999           Surplus Again;  
Deregulation Begins
- 2000 to 2007           National Security; Rising  
Oil and Gas Prices
- 2008 forward           Energy Efficiency & Energy  
Independence

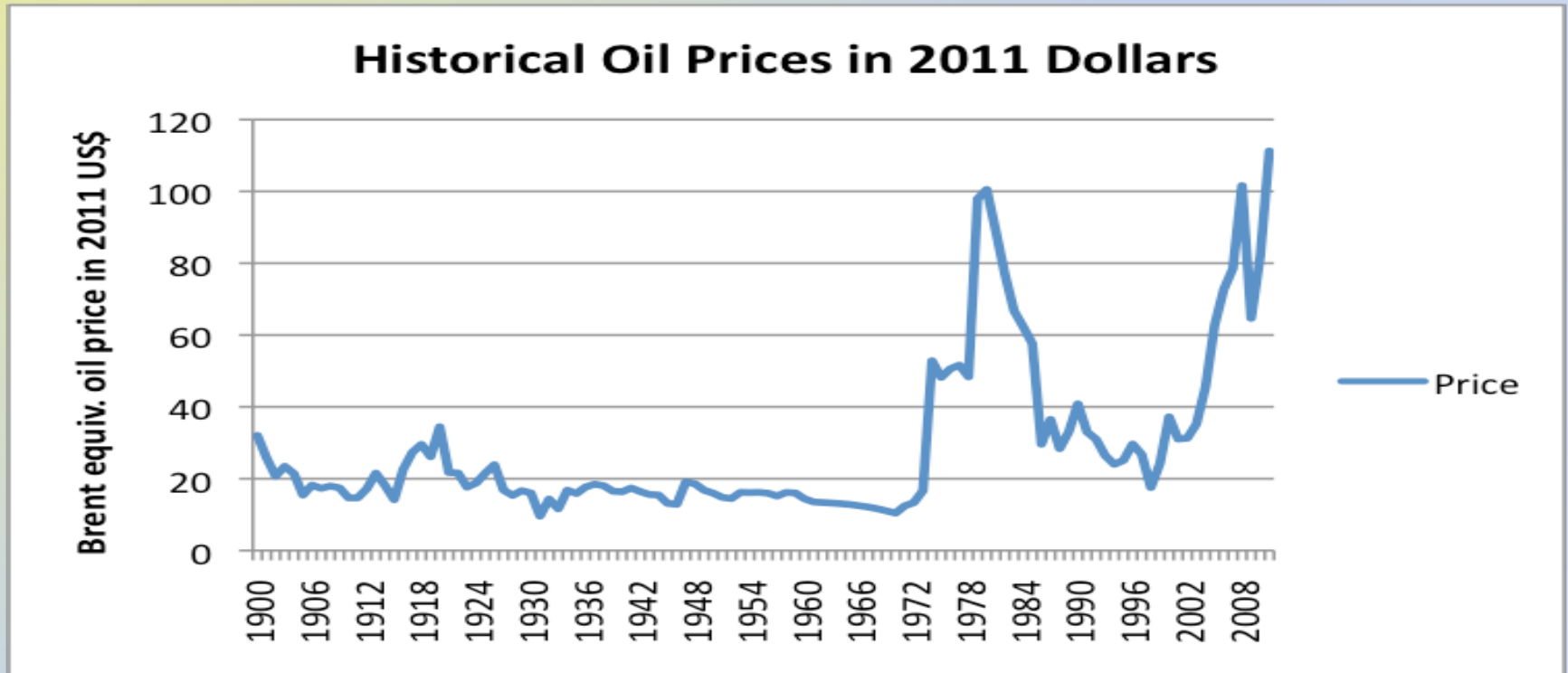
# 1945-1970: Era of Energy Surplus

- Cheap natural resources drove post war economic boom.
- Coal largely replaced by natural gas and fuel oil.
- US completely energy self-sufficient.
  - Exported oil and coal.
- Flared trillions of cubic feet of natural gas.
- No energy or environmental policies.
- Rural Electrification Act/Amer. Highway Act

# 1970-1980: Energy Shortages

- Texaco reserve mistakes – 1970-71.
- Arab Oil Embargo – 1973
- Oil and Gas prices skyrocket overnight
  - Oil prices rise by 1700%; gas by similar amounts
  - Coal re-emerges as fuel of choice
- 1978: Natural Gas Policy Act (NGPA); Public Utility Regulatory Policy Act (PURPA)
- Corporate Average Fuel Standards
- Creation of Department of Energy

# High Priced Fuel Syndrome



# 1980-2000 Deregulation

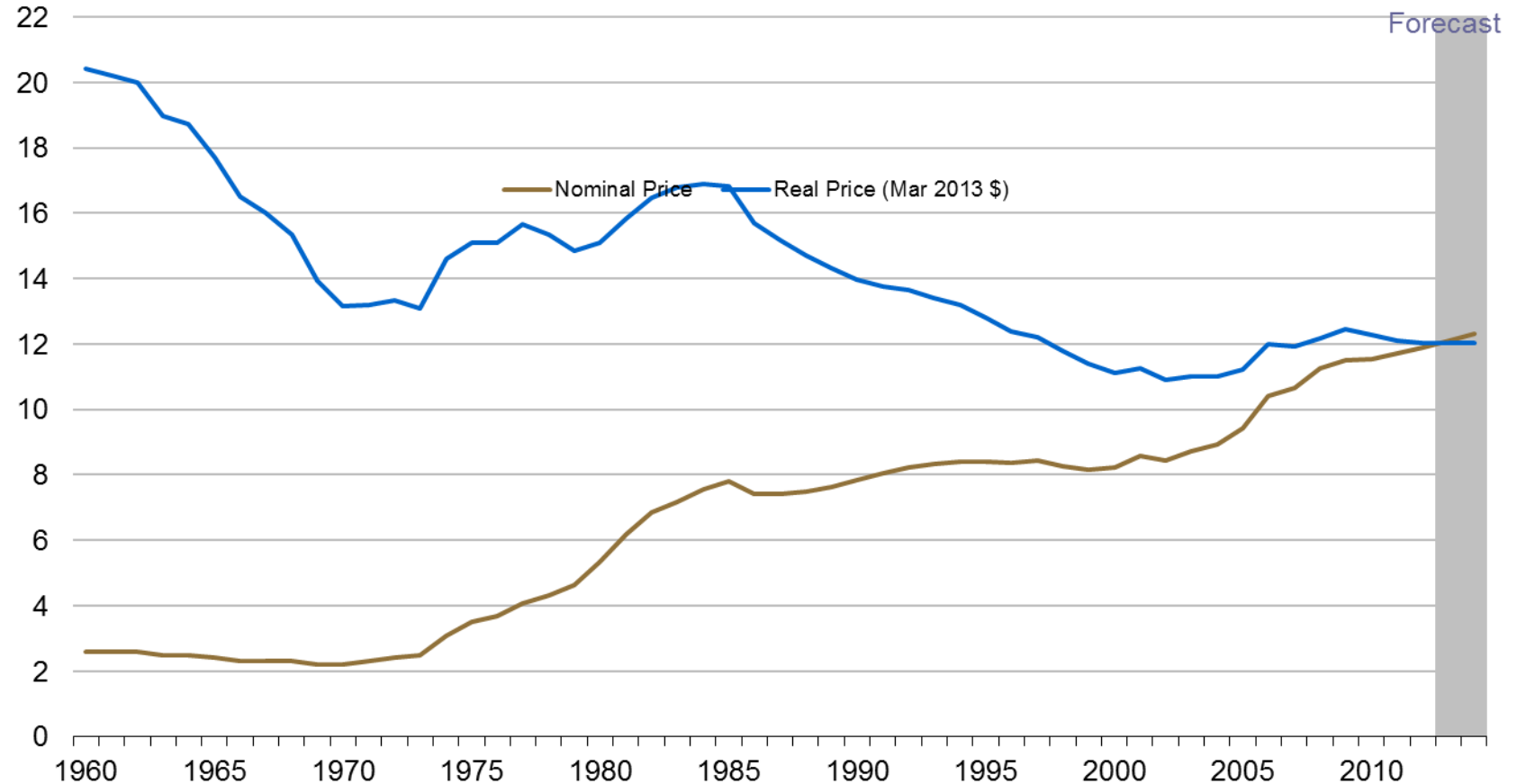
- Energy costs once again drop
  - Economy, conservation measures reduce demand
    - Oil consumption drops from 18 to 15 mmbbl/day
  - Efforts for renewable energy discarded
  - Advent of the Sport Utility Vehicle
  - No new nukes: TMI, Chernobyl
- Natural Gas deregulated
  - Pipeline open access rules
  - Paved way for electricity deregulation
    - California first to deregulate
    - FERC transmission open access rules passed

# 2000-2007 National Security

- Post 9/11 era
  - Oil prices on the rise again
    - Rapid growth of third world economies
  - War in Iraq – Security of oil
- Growth of Renewable Power
  - State renewable portfolio standards
  - Concern over global warming
- Electricity Deregulation put into place
  - But retail costs for power continue to rise
  - Enron/California debacle

# Annual Residential Electricity Price

cents per kilowatthour (kwh)



# 2008-Now: Energy Independence

- Deep world-wide recession
  - Reduction in demand for all energy
  - Wholesale power prices drop
- The Shale Gale
  - Gas surplus – price drop
  - Switch from oil, coal to natural gas
- Renewable Power
  - ARRA, portfolio standards, but no carbon laws
- Transmission Constraint
  - Energy efficiency and Demand Response
  - Distributed generation



# Regulation of Electricity and Natural Gas

- Legal Basis
- History
- Overview of Current Issues

# Unique Features of Electricity

- Cannot be efficiently stored or inventoried.
- Must be produced by generators and instantly delivered over transmission and distribution lines.
- Flow of electricity cannot be readily channeled
  - follows the path of least resistance (impedance).
  - Cannot “follow the flow” of electrons.

# Constraint

- During peak load hours, when demand is high, transmission capacity can be “constrained”
  - Line capacity full
- When capacity is unconstrained, can take generators off line.

# Unique Features of Natural Gas

- Can be stored – but not readily.
  - Inventories are possible
- Gas well gas can be shut in, but not oil well gas.
  - Like electricity, end-user requirement contracts.
  - Outputs vs Requirements contracts.
- Flow of molecules of methane cannot be readily channeled – but easier than for electricity.
  - Cannot “follow the flow” of molecules.

# Legal Basis For Regulation

- Constitutional law
- Statutory law
  - *Regulatory law is subset*
- Judge-made law (case law)
  - Interprets Constitutional, statutory and regulatory law.
  - Principal of *stare decisis*

# Setting Policy – Basic Legal Principals

- Must be consistent with the US Constitution
- Federal law preempts state law in the event of a conflict between the two
- Powers not granted to the federal government is reserved to the States (“State’s Rights”)
- Congress granted right to regulate commerce between the States.
- **Tension: Reach of Commerce Clause vs. States Rights**

# Policy and Regulatory Law

- Legislature promulgates overarching laws designed to implement policy.
- Legislature delegates details to executive branch.
  - Executive branch sets up agency to promulgate regulations to effect policy
  - Federal rules set forth in Code of Federal Regulations (CFR)
  - Agency is granted enforcement authority
- Judicial oversight delegated to Administrative Law Judge
  - Appeals of ALJ rulings limited to “abuse of discretion” and “clear and convincing” standards

# Regulatory Law

- Fundamental rule: competition is desirable
  - Framework from 1800's antitrust legislation
  - All industries subjected to some regulation to promote competition
- Exception: concept of “Natural Monopoly”
  - Some industries by nature work better for the public good as monopoly.
  - But must be heavily regulated to ensure no abuse
  - Electric grid first natural monopoly



# Energy Regulation

- Two most heavily regulated energy industries:
  - Electricity
  - Natural Gas
- Reason:
  - Unlike oil, neither can be easily stored or transported
  - Both developed special network for transportation
  - Both susceptible to “natural monopoly” status

# Traditional Model of Utility

- Investor or Municipally Owned
  - Rural Cooperatives came later
- Vertically Integrated Power
  - Owned generation
  - Owned high voltage transmission
  - Owned low voltage distribution
- Not Vertically Integrated Natural Gas
  - Did not own production or interstate pipelines
  - Owned distribution systems

# Traditional Role of Consumer

- Variable Load
  - Contracts are “supply” based (requirements)
  - Requirements peak for residents and commercial users during day
  - Industrial Users have more control over peak time
- All Power Priced the Same
  - Industrial Users have control over this now
  - Residential and Commercial users?

# Brief History of Energy Regulation

- First Electric generating station: 1879 San Francisco – powered arc lamps
- No regulation of electric companies existed
- Change: 1886 – development of alternating current, which enabled electricity to be transported long distances
- Many power companies sprouted up, but large holding companies bought them out

# Creation of the Grid

- Thomas Edison – DC power
  - More efficient
  - Cannot be transported long distances
  - Goal: nimble, efficient micropower
- Nikola Tesla/George Westinghouse – AC power
  - Less efficient, but easily transported
  - Goal: centralized power production
  - AC wins – even Edison Electric turns to AC
  - Advent of the grid

# Monopoly

- Economies of scale drive super-grid
- Consolidation leads survivors to argue exception to anti-trust laws: “natural monopoly” status
- By 1920’ s only 8 companies left
  - Public outrage led to government intervention
- Response: Public Utility Holding Company Act
  - Put in place regulations that lasted for 50 years

# History continued

- States could not regulate holding companies – were considered “interstate” in nature.
- Led to the passage of Public Utility Act of 1935
  - Created Federal Power Commission – jurisdiction to regulate where states could not.
- FPC governed utilities until mid 1970s.
  - Utilities essentially set policy – little activism
  - FPC used “cost plus” basis – guaranteed rate of return on all new plants and grid construction

# History continued

- Result:
  - Consolidation into bigger plants, more grid
  - Prices generally fell with economies of scale
- Goal of super-sized generation plants culminated in rapid development of nuclear power plants in 1970s.
  - Nuclear power created a regulatory legacy that endures today as a result of rampant cost overruns, plant delays, stranded costs, and environmental concerns



# History of Natural Gas

- Natural Gas industry first emerged in 1920' s
  - Prior to 1920' s, all natural gas was “associated gas,” meaning it was produced as a by-product of oil production.
  - Associated gas was flared.
  - Any discoveries of gas-well gas were shut in.
- Flaring continued to be commonplace until the late 1960s, when gas markets began to emerge.
- As markets developed, transportation and distribution companies (pipelines) emerged.
- Consolidation and holding company strategy followed.
- 1954 – US Supreme Court holds FPC has jurisdiction over natural gas production and interstate pipeline companies.
  - FPC freezes well head prices – triggering curtailment in exploration

# Natural Gas History

- No Vertical Integration
  - Oil and Gas Companies Own Production
    - Early ownership of intrastate pipeline companies
    - Largely abandoned after NGPA deregulation and open access rules from FERC
    - Efforts to get into distribution business failed
  - Interstate Pipeline Companies
    - Efforts to get into production have failed
- Retail Distribution and Sales Treated as Natural Monopoly

# Natural Gas Act

- Passed in 1938
- Pre-NGA – interstate pipelines were not regulated.
- NGA designed to fill in regulatory gap.
  - FPC (later FERC) set pipeline rates that were “just and reasonable”
  - Cost of providing service plus a return on invested capital

# Regulation of Production

- Initially FPC only regulated pipelines
- 1954 – Phillips Petroleum v. Wisconsin
  - Supreme Court rejects FPC approach, asserts federal jurisdiction over natural gas sales at the well head
- Proved too difficult to regulate all the wells
  - FPC uses “area rate” approach
  - Allowed higher prices based upon perceived need to drill more wells
  - By early 1970s led to gas shortfall

# Natural Gas History – 1970s

- 1970s era of widespread turmoil in energy markets
  - Peak Oil in US – 1967
  - Natural gas price freeze strangled exploration, led to widespread shortages
  - OPEC embargo – 1973
    - Affected electricity – fuel oil commonly burned to create electricity until mid 1970s.
- Led to dramatic changes in regulatory law

# National Energy Legislation of 1978

- Public Utility Regulatory Policies Act (PURPA)
  - Electric industry more affected by nuclear power plant cost overruns than the oil embargo
  - Set in motion a greater role for state utility regulators
    - No longer just arbiters of “just and reasonable rates”
    - Now included role of energy and environmental policy arbiters.
- Natural Gas Policy Act (NGPA)
  - “Phased in” approach to deregulating gas sales
  - Froze prices on “old gas,” allowed for new prices on “new gas”
  - By 1990 all remaining vestiges of the NGPA was deregulated

# 1978 NGPA

- Pre-1978: Two markets for natural gas – intrastate and interstate.
  - Interstate prices frozen at \$0.25/mcf range
  - Intrastate prices rose to over \$3.00/mcf
- 1978: Passage of Natural Gas Policy Act.
  - Deregulated “new” gas to be sold at market rates.
  - Created special rates for gas produced from high risk wells

# Open Access Rules 1985

- FERC Orders 436 and 636
  - Goal was to remove pipelines from gas sales business
  - Money made in transporting gas
- Interstate Pipelines must unbundle all sales of gas from sales of transportation.
  - Transportation and storage companies separate



# Fall out from NGPA

- High prices spurred new drilling, new discoveries.
- Bad economy combined with new sources of gas created surplus of gas.
- But Pipeline companies tied down to long term contracts at high prices.
  - Created era of “take or pay” litigation
  - By late 1980s litigation had run its course
    - But no long term available in natural gas industry since!

# Natural Gas After NGPA

- Shortages of 1970s disappeared.
- Natural gas became “fuel of choice” for both home heating and electricity generation
- By early 2000s, consumption led to a shortage, and prices rose to record highs
- This time, no price regulation.
  - Development of LNG, pipelines from Canada
  - More drilling, horizontal wells – *Shale!*
- Result: by late 2000s prices dropped again

# Current Regulation for Natural Gas

- Local Distribution Companies
  - Retail service
- “City Gate” – point of connection between LCD and the interstate pipeline company.
- Distribution and sales of natural gas within state jurisdiction – regulated by PUCO.
- Transportation and storage considered to be interstate – jurisdiction of FERC.
  - Also jurisdiction of wholesale sales

# Natural Gas Hubs

- Hubs are Market Centers
- Usually location of multiple interconnects for transfers of natural gas
- Also site of short term gas balancing, loans, and parking services
- Best known Market Center: Henry Hub in Louisiana

# How does Natural Gas and Electricity Regulation Differ?

- NGPA asserted federal jurisdiction over price of gas at the well head – regardless of where the gas was sold.
  - Set prices for old, new and high risk gas.
- Why is there no similar federal jurisdiction over electricity generation?
- What other differences are there?

# PURPA -- 1978

- States were to encourage new generation from “qualified facilities”
  - Independent power producers created
  - QF -- under 80 MW, or does not use fossil fuels
  - Utilities required to purchase power from QF
  - Purchase price set by state regulators – no wholesale electricity markets at the time
- Results:
  - prices had no relation to the electricity market
  - IPPs had no incentive to contain costs
  - Rate payers stuck with bad long term contracts

# Age of Electricity Deregulation

- Early 1990s – more IPPs
  - Development of wholesale suppliers
  - Development of surplus power
  - Increasing deregulation of power production
- Large industrial customers began to bypass utilities – forcing utilities to allocate expensive energy to commercial and residential users.
- Fundamental change: grid was regulated, power production was left to the market
- Unintended consequences: utilities value grid over power production

# Deregulation – 1990s

- Virtually all new power plants were gas fired.
  - Natural gas glut in early 1990s – cheap gas
  - Environmentally cleaner
  - Nuclear stalled over cost, safety concerns
- Natural gas prices rose in response
- Regulators gave utilities stranded costs for abandoned industrial sales
- Result: rapid price increases on residential, commercial electricity



# Deregulation – 2000s

- Ratepayer squeeze led to political backlash.
- Calls for re-regulation.
- Debate continues to this day:
  - How to encourage new generating and transmitting capacity?
  - How to protect residential/commercial users from ravages caused by large scale industrial users leaving utilities.
    - Allocation of high cost generation/stranded costs
    - Is aggregation enough?
  - How to encourage distributed generation without the ratepayers bearing the sole burden.

# FERC Orders

- FERC Order 888 (1996) and 2000 (1999)
  - Determined public interest best served by competitive wholesale power market
  - Provided for non-discriminatory open access to transmission lines
  - Required transmission owners to join an Independent System Operator (ISO)

# California: Experiments in Deregulation

- California has skyrocketing energy prices
- Electric Utility Industry Restructuring Act 1996
- Divestiture of 40% of state generating facilities by utilities to IPPs
- Partial Deregulation – retail prices remained frozen
  - But not wholesale prices
- Led to energy crisis in California that costs an estimated \$45 billion.

# Problem of California's Deregulation

- Market manipulation by energy traders.
  - “megawatt laundering”
  - Overscheduling – manipulation of transmission capacity
  - Enron was chief culprit – intentionally created shortfalls of power to drive up prices.
    - Take plants off line during peak time; bid rigging
- In summer of 2000 energy crisis leads to brownouts and rapid rise in prices
  - 800% price increase

# Fall Out from Crisis

- Rising wholesale prices were greater than frozen retail prices.
  - No incentive for consumers to cut back
  - PG&E goes into bankruptcy in early 2001
  - Southern California Edison nearly bankrupt
- By 2001 activists calling for re-regulation –
  - “limits to what markets can do.”

# Calls for Re-regulation

- In summer of 2000 energy crisis leads to brownouts and rapid rise in prices
  - deregulation blamed
- By 2001 activists calling for re-regulation –
  - “limits to what markets can do.”

# FERC Findings

- Supply-Demand imbalance, flawed market design.
- Unlawful trading strategies employed by Enron and others.
- Electricity spot markets were affected by withheld and inflated bidding.
- Major flaw of design: incomplete deregulation.

# Mistakes in Blaming Deregulation

- California was not first place to deregulate
  - Europe has had great success with deregulation
  - Texas and Pennsylvania have been successful
- Similar market reforms in other industries have been successful
  - Trucking, natural gas, telecommunications
- California never really deregulated electricity



# Problem with California Deregulation

- Under old system, utilities had incentive to build expensive power generation
- Cost overruns, delays, inefficiencies caused large industrial users to threaten to leave state if they did not get price relief
  - Big users allowed to leave utilities for better markets
- Politicians froze retail prices, while wholesale prices soared
  - Retail users have no incentive to cut use
  - Utilities cannot recoup costs – go into bankruptcy

# Problem with California Deregulation (continued)

- Regulators did not account for growth in demand.
- Fierce opposition to new power production.
- Failure to regulate market manipulations
  - Enron and other traders found regulatory loopholes that enabled them to manipulate the market to drive up wholesale prices
    - Bogus trades, grid overloads, congestion

# Result of California Disaster

- Consensus on left that “energy is too important a commodity to be put in the hands of those who place profits before social good.”
- Americans have first energy debate since 1970’ s oil embargo
- Response from left: conserve
- Response from right: build more nuclear, coal plants

# But Is Market Reform the Answer?

- Competitive markets are better at creating efficiencies than is government
- State control risks continued stagnation in technical innovation
- Markets are better at overcoming vested interests, such as coal lobbies, monopolies
- Took Britain ten years to get it right – US can learn from UK model

# Future of Electric and Gas Regulation

- Environmental concerns will be driver
- National security will be driver
- Job creation will be driver
- Decisions will have to be made in next decade that will affect how we generate and consume energy for the next 50 years.
  - *What those decisions might be, and issues, effects, and social considerations therefore, are the topic of this course*

# Thought Problem – Unanticipated Consequences

- Deregulate power production, regulate grid
  - What happens to those without leverage to negotiate?
  - Problem of growth:
    - Need more power in Geauga County
    - First Energy must either build more grid to bring nuclear power from Perry, or build small scale power plant in Geauga
    - Grid development guaranteed rate of return; power production not. What would First Energy do?

# CSU Energy Policy Center



Thank you!