
Twenty Years of Electricity Market Reform: Where Have We Been and Where Are We Going?

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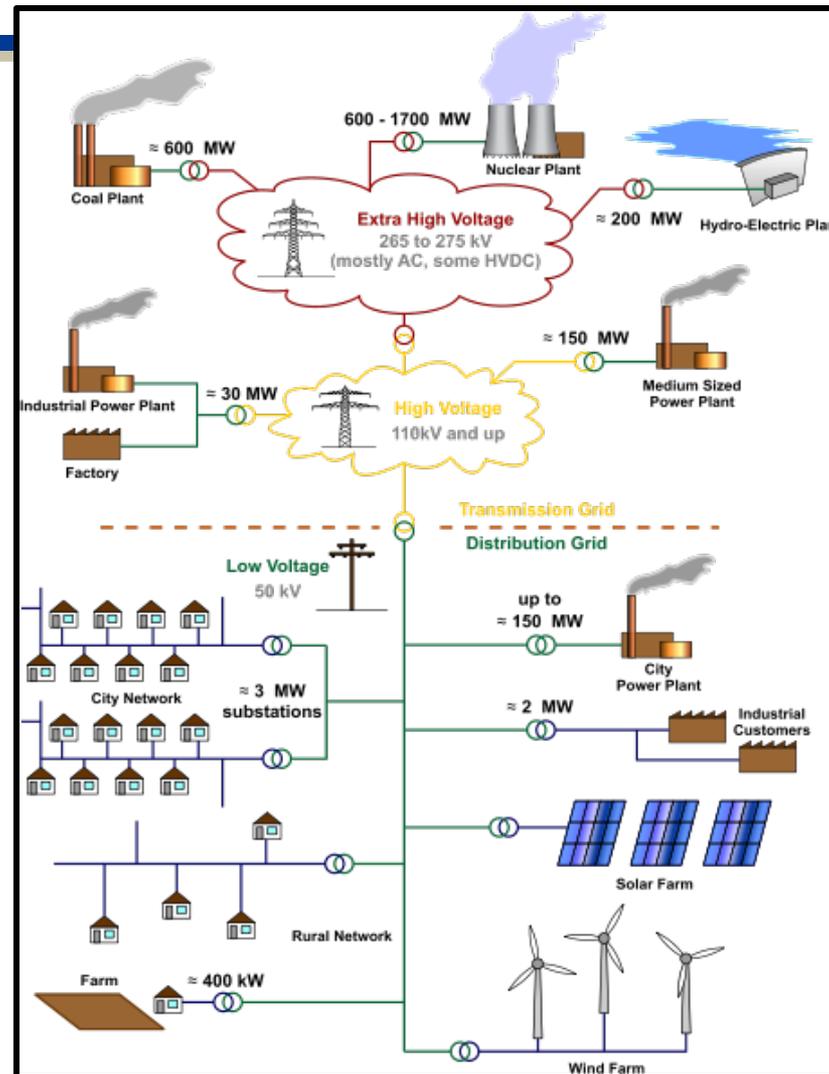
September 30, 2013

Outline

- I. Electricity basics
- II. 20-year time line of major events
- III. Two basic industry structures
- IV. Looking Back – What did we get right? What did we get wrong?
- V. Looking Ahead – What should we keep? What should we fix?
- VI. The role of the HEPG

I. Electricity for Poets: The electricity grid in pictures

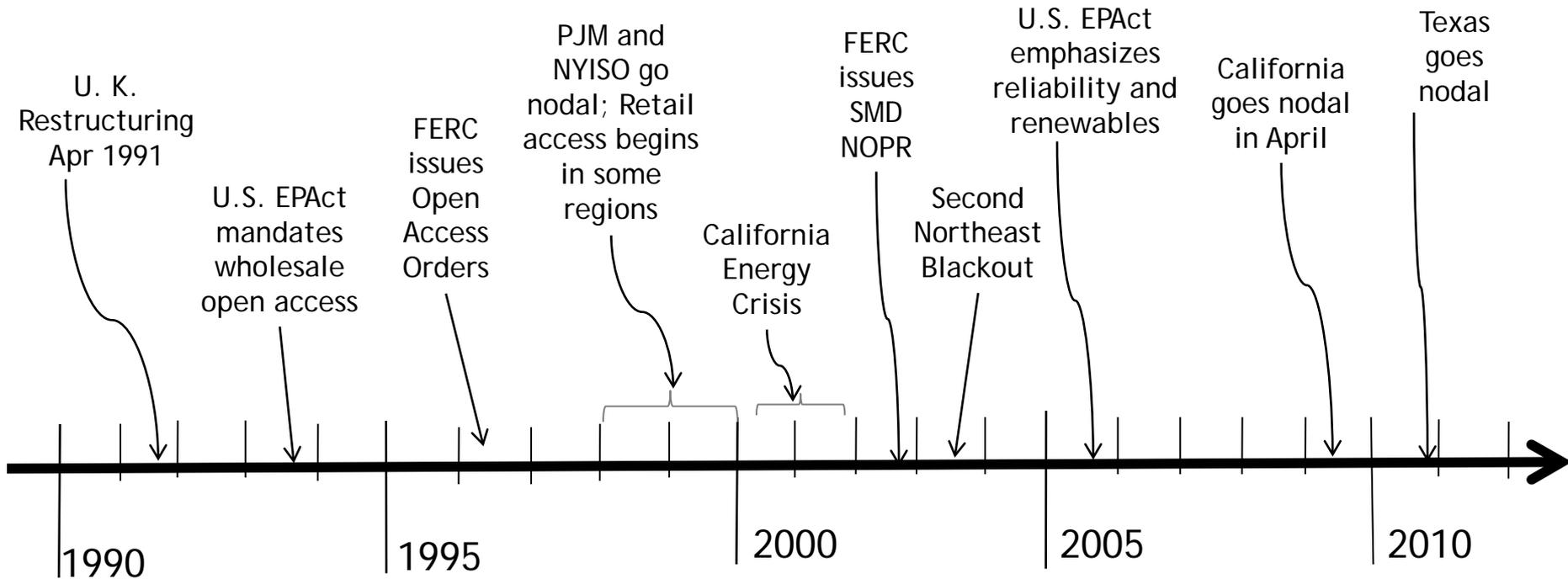
Large scale generation and high voltage transmission lines



Retail customer load

Small scale generation and lower voltage distribution lines

II. U.S. Electricity Markets – 20 years of evolution

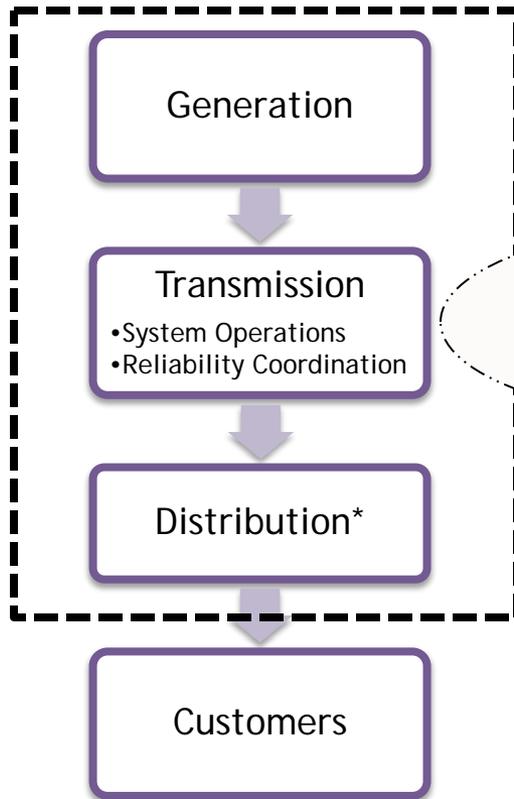


- Structure 1: Regulated model
- Structure 2: Competitive model -- wholesale and retail

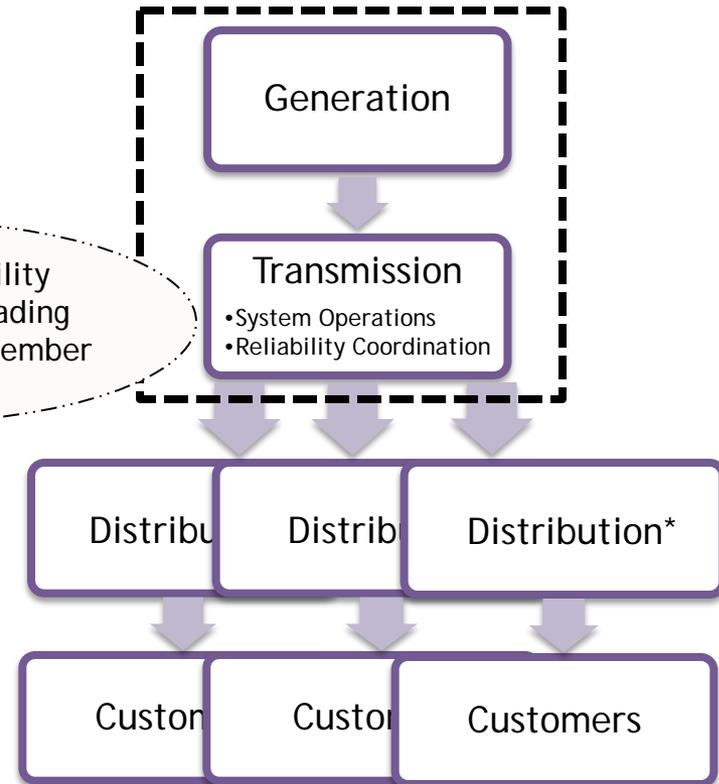
TWO BASIC INDUSTRY STRUCTURES

Structure 1: Regulated Monopoly Model

A. Vertically Integrated Structure



B. Separate Distribution Function



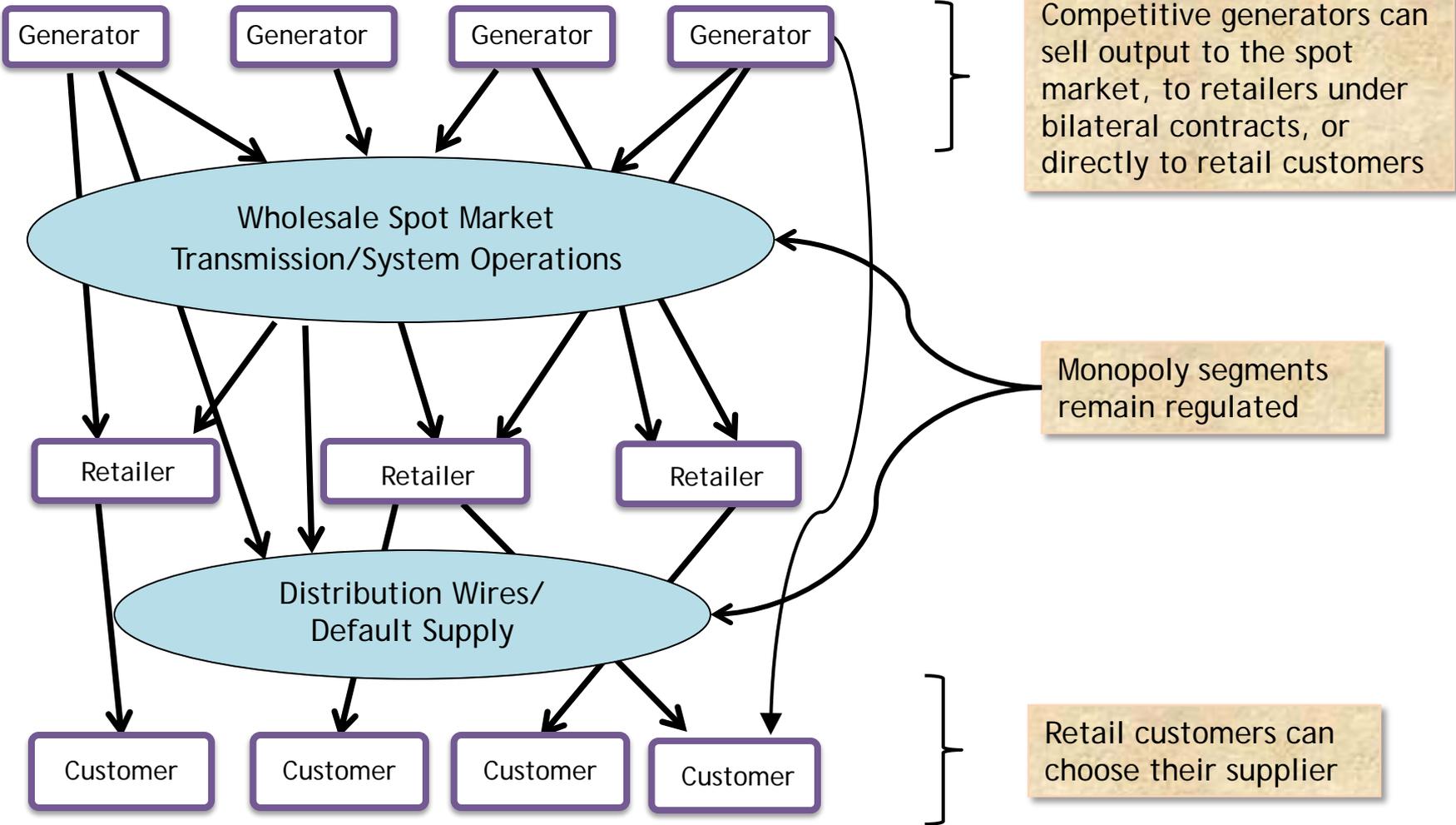
*Includes retailing and customer service functions.

--- Integrated functions

Observations on the monopoly model

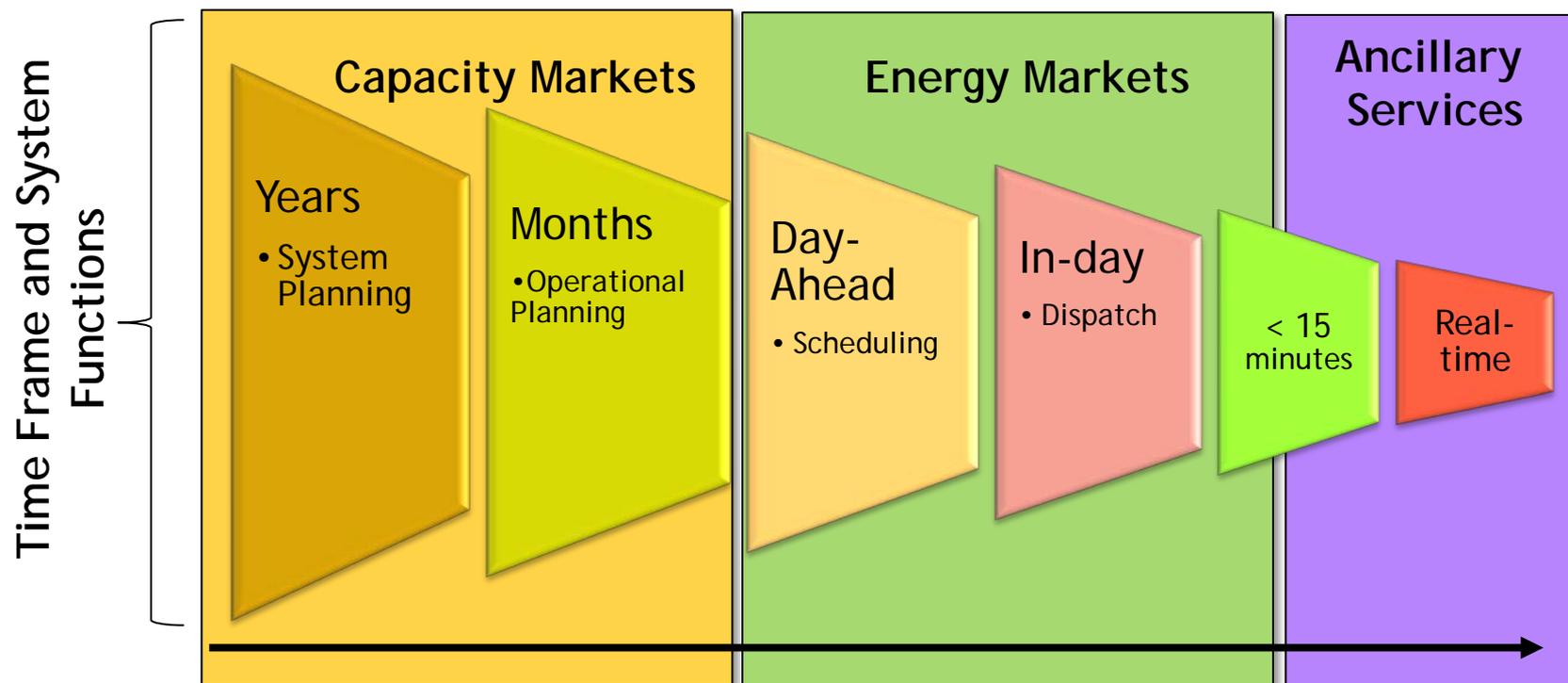
- ❑ This structure was predominant in the U.S. prior to restructuring efforts which began in the mid-1990s
 - Most of the **capacity** (~75%) in the U.S. was owned by ~200 investor-owned utilities, most of whom were vertically integrated
 - Most of the **utilities** (~3000) were small, distribution municipal or cooperatively owned systems, many of whom who bought their generation and transmission services from cooperatively owned generation and transmission (G&T) suppliers.
- ❑ Reliability and trading agreements between monopolies were common.
 - In the Northeast, there were a number of “tight” power pools which became PJM, NYISO and NE-ISO.
 - In other regions, there were reliability and trading agreements, but not central dispatch of utility-owned systems which characterized the tight power pools.
- ❑ Both versions of the monopoly structure shown are still common in those regions of the U.S. that have not opened their markets to competition.

Structure 2: Wholesale & Retail Competition



Multiple markets operate in different time frames

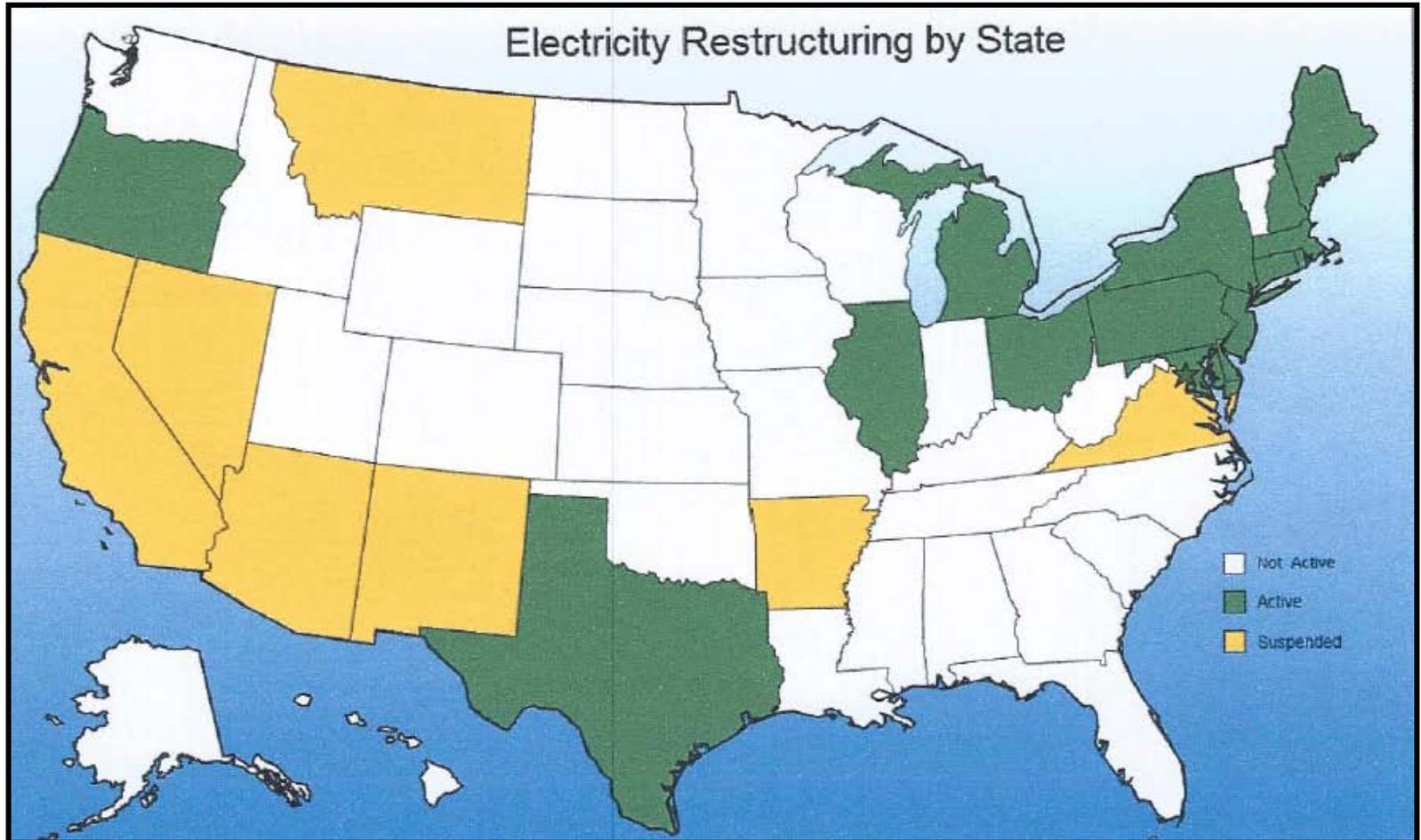
- Under the vertically integrated model, engineering, economic planning, system operations are closely linked over time.
- However, a market can contain one or more of the components



Observations on competitive markets

- ❑ This is the model that was pursued by most states in the U.S. who embraced restructuring (such as California, New York, New Jersey, Pennsylvania, Massachusetts, Illinois, Rhode Island, Maine, New Hampshire, Virginia, etc.)
- ❑ Wholesale competition is more widespread than retail competition, even in states where retail customers can choose
- ❑ Structured wholesale markets serve 66% of consumers in the United States, and more than 50% of Canada's population
- ❑ There are no credible proposals to eliminate existing ISOs/RTOs.
- ❑ In other regions, further restructuring has stalled
 - Emphasis in bilateral markets is on improving open access
 - There's no political support to introduce competition
 - Strong support in the Northwest and Southeast for state regulation over federally mandated organized markets

Retail Electricity Markets by State (as of Sept. 2010)



Source: Energy Information Administration.

http://www.eia.gov/electricity/policies/restructuring/restructure_elect.html

**IV. LOOKING BACK: WHAT DID WE
GET RIGHT? WHAT DID WE GET
WRONG?**

Looking Back: What were the goals?

□ The problem

- Electricity prices were outrageously high (in high-cost states)
- Management and/or regulatory mistakes were perceived to be the problem

□ The hope – that competition in generation would:

- Result in cheap electricity
- Shift the cost of management mistakes and forecast uncertainty from customers to suppliers
- Lead to all kinds of nifty new value-added services
- Punish the incumbents
 - Incompetent utility managers
 - Misguided regulators

What were the problems that had to be solved?

- ❑ The money issues (stranded costs)
- ❑ Technical issues (market design)
- ❑ Who's in charge issues (state vs. federal)
- ❑ Transitional issues
 - Retail access rules
 - Separation of generation from transmission

Looking Back – What did we get largely right?

- ❑ **Stranded Cost Recovery was handled through settlements**
 - Initially thought to be the unsolvable problem
 - It's largely resolved and rarely mentioned

- ❑ **Basic principles of workable competitive energy markets**
 - Rules need to reflect underlying reality of the grid
 - Core features of workable wholesale markets
 - Independent operation of transmission
 - Voluntary energy spot markets
 - Bid-based, security constrained economic dispatch with nodal prices (Locational marginal pricing)
 - Congestion revenue rights to hedge transmission

Looking Back - What did we get largely wrong?

- ❑ Potential for short-term efficiency gains in electricity generation
- ❑ Economics of commodity retailing
 - How regulated (default) service would interfere with the development of a competitive retail market
 - Mass market economics in particular
 - Limited potential for “value added” services
 - Measures of competitive success (low prices do not necessarily indicate markets are working well)
- ❑ The need to have workable wholesale markets before opening up retail markets for most customers

Key differences: Who decides and who pays?

| | Monopoly Model | Competitive Model |
|---|--|---|
| Who decides: <ul style="list-style-type: none"> • How much capacity? • What fuel type? • Where to site? | <ul style="list-style-type: none"> • Regulated utility develops subject to regulatory approval • G&T Cooperative | <ul style="list-style-type: none"> • Competitive supplier • Customer • Anyone with the money & inclination |
| Who builds or acquires? | <ul style="list-style-type: none"> • Utility under rate-base construction? • G&T Cooperative | <ul style="list-style-type: none"> • All of the above, plus • Utility (if default provider) |
| Who pays? Who bears risk? | <ul style="list-style-type: none"> • Investor-own Utilities: <ul style="list-style-type: none"> • Customers pay for prudent investment • Investors pay for imprudent investments • G&T Coop – customers pay | <ul style="list-style-type: none"> • When market prices are low: <ul style="list-style-type: none"> • Investors absorb costs • Customers benefit • When market prices are high: <ul style="list-style-type: none"> • Investors benefit • Customers pay more |
| Price Levels | <ul style="list-style-type: none"> • Based on Average Costs | <ul style="list-style-type: none"> • Based on Marginal Costs |

What should we be worried about?

- ❑ **Capacity Markets:** adopted in some markets to solve the “missing money” problem created by wholesale market bid price caps

- ❑ **Continuing disconnect between pricing at the retail and wholesale level**
 - Concerns about retail price impacts have led to problems in the design of wholesale markets
 - Experience in Texas and New York may reduce concerns elsewhere
 - Rate averaging of costs during peak hours is ultimately counter-productive from an efficiency point of view

ROLE OF THE HARVARD ELECTRICITY POLICY GROUP

Role of the HEPG in Electricity Restructuring

- ❑ Organized ~six months after EPAct of Oct 1992 (first meeting July 7, 1993)
- ❑ Goal: assure vigorous, broad and informed debate around the issues associated with restructuring
 - Consciously and deliberately seek out a diversity of ideas
 - Intellectual content of ideas was important
 - “Bring together the best thinkers and doers in industry and government”
- ❑ HEPG itself remained neutral as to policy choices, but relentless in its mission to focus on the important issues as they emerged

Role of the HEPG - A 20-year veteran's perspective

- ❑ Restructuring in New York began in a rate case filing
 - Range of issues are limited to what is filed by the parties and process was very inflexible (11 month suspension period)
 - Analogous to a public flogging
 - Generic proceedings followed, but were still characterized by parties taking strong positions for bargaining purposes

- ❑ Provided a safe haven for discussing issues that were otherwise too radioactive to have a civilized debate
 - Design of energy markets (LMP vs. flow gates)
 - Stranded cost recovery
 - Identifying problems that weren't contemplated in the legislation (i.e., municipalization)

- ❑ Employed Chatham House Rules – comments off the record and not for attribution

Role of the HEPG - A 20-year veteran's perspective (2)

- ❑ Meeting format encouraged wide range of discussion
- ❑ Provided access to a range of people and policy makers that would otherwise never be available
- ❑ Ensured a broad debate – speakers are recruited to ensure that a full range of views were presented
- ❑ Relentless focus on important issues (SMD) and tireless attention to issues as they evolve
- ❑ Enormous amount of work and intellectual energy (20 years of 4-6 sessions/year = 106 sessions!)