

Engineering, Economics & Regulation of the Electric Power Sector

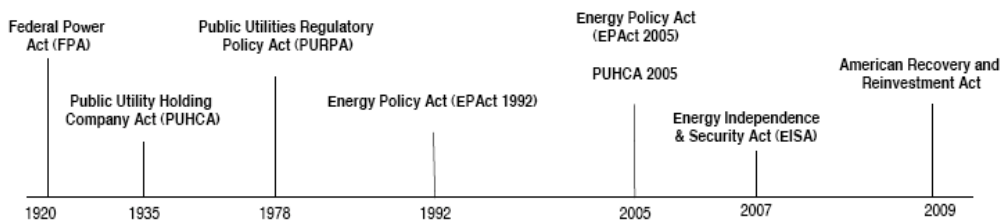
ESD.934, 6.974

Recitations 2 & 3 . February 12 & 19, 2010

Regulation of the US power sector

Prof. Ignacio J. Pérez-Arriaga

Policy Timeline: 1920 - 2009

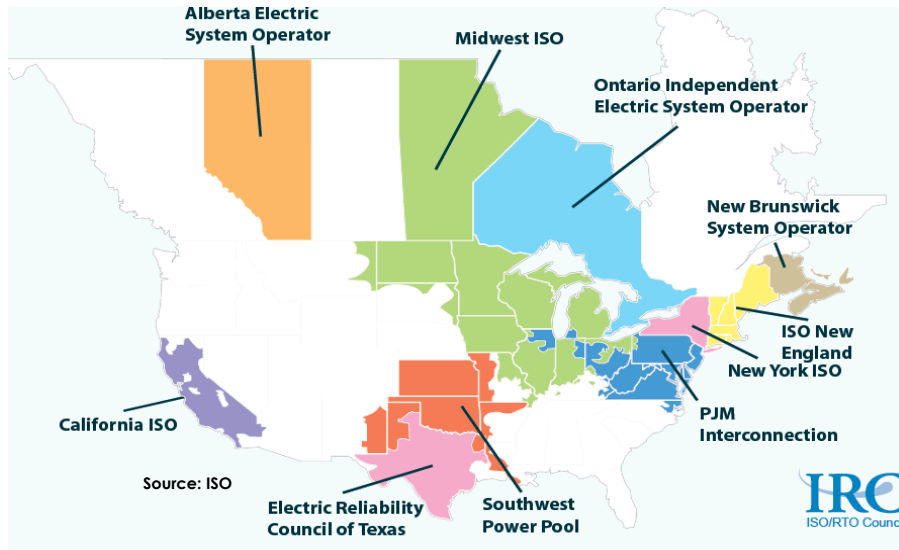


Source: Andy Whitaker

North American Organized Markets

Roughly half the installed capacity

Geographic footprint of organized wholesale markets in North America

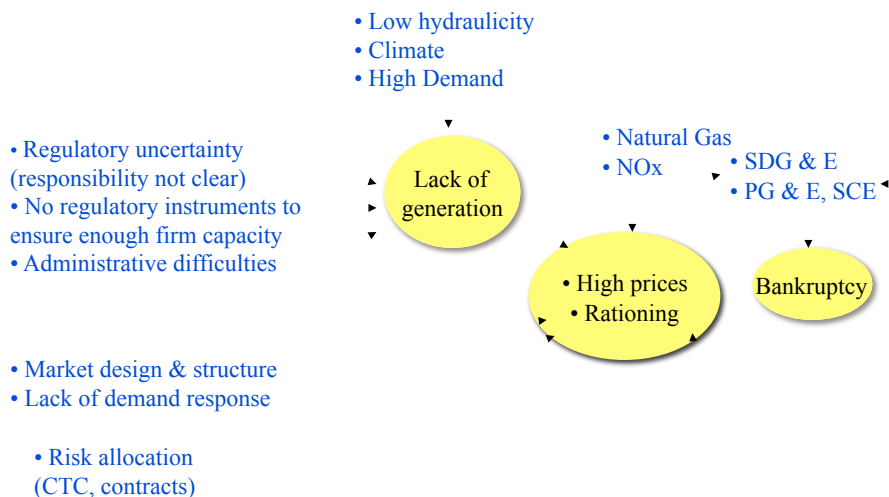


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The electricity crisis of California



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2000-01 Crisis

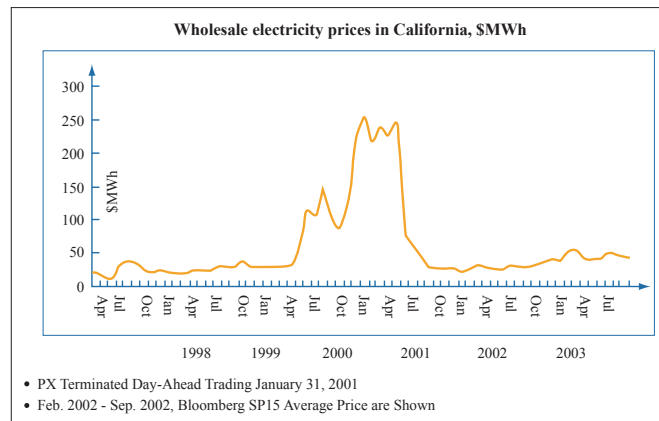


Image by MIT OpenCourseWare.

Source; Gary Stern, Southern California Edison Company

There are other explanations...

“The California crunch really is the result of not enough power-generating plants and then not enough power to power the power of generating plants”

George.W. Bush (then President elect)

(Interview by the New York Times, January 14, 2001)

Regulatory U-Turn

- 2007 Nationwide survey confirmed dramatic reversal of support among state utility regulators for “deregulated” energy markets
- One third of regulators in currently competitive states said they are seriously considering “re-regulating” utilities in their jurisdictions
- Asked to identify states operating most successful deregulated energy markets, majority of commissioners replied, “None”
- Survey found no measurable support among state regulators for any form of retail competition in foreseeable future

RKS Research & Consulting, 2007

The “textbook model” of the restructured & liberalized power sector

Some material for this section has been borrowed from S. Littlechild & P. Joskow in
Electricity Market reform: An international perspective, Elsevier, 2006. 10

Components of the “textbook model” *(the 10 commandments)*

- **Privatization**, to enhance performance & reduce the interference of the government
- **Vertical separation** of competitive & regulated monopoly activities
- **Horizontal restructuring** to create a level playing field for competition
- **Independent System Operator**
- Voluntary energy & ancillary services **markets & trading arrangements**

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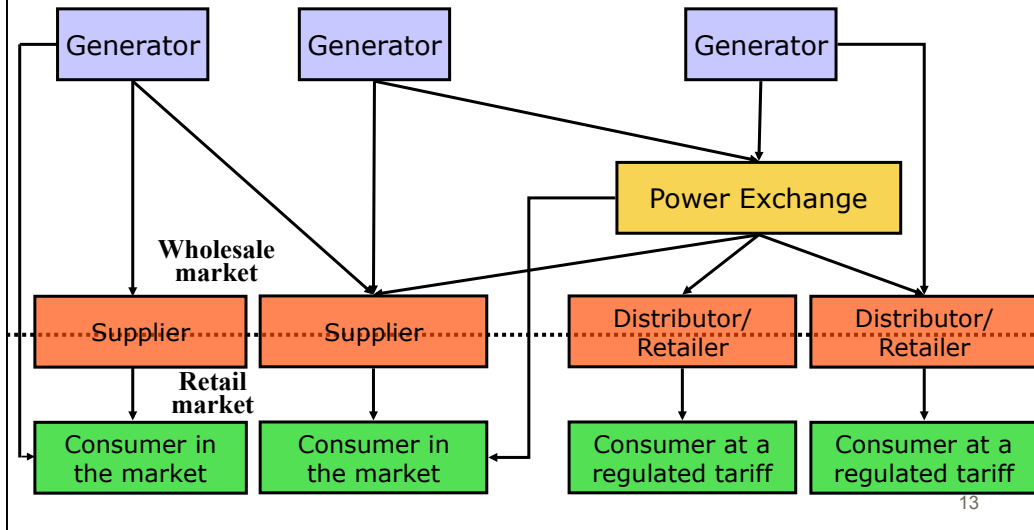
Components of the “textbook model” *(the 10 commandments)*

(continuation)

- **Open access to the transmission network**, plus adequate locational signals
- Free choice of supplier with an adequate design & utilization of **retail tariffs**
- Creation of **independent regulatory agencies**
- Provision of **transition mechanisms**
- ... & **nothing more!**

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The standard structure of full fledged electricity markets



... however, avoid “cut & paste”

- Models which appear to work well in some circumstances & places may not be easily transferable to countries facing different circumstances

(peak load, level of development, industry initial structure & ownership, fuel mix, interconnections, institutional framework)

Successes...

- Where the textbook model has been basically followed the new regulation has been quite successful
 - ◆ Nordic countries
 - ◆ UK
 - ◆ Argentina (*before the country's financial crisis*)
 - ◆ Texas & Northeast of the US
 - ◆ Australia

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... & failures

- And where the textbook model has been abandoned because of omission or commission, there have been problems
 - ◆ Omission: France (*no comprehensive wholesale market*), Germany (*lack of true open network access*), New Zealand (*no independent regulator*), ...
 - ◆ Commission: California (*poor assignment of risk*), Chile (*pioneer but too restrictive market & transmission rules*), Spain (*too much governmental intervention & horizontal concentration*), ...

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Most frequent failures

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“When structure is not conducive to competition, the regulator & pool operator will find themselves unsuccessfully chasing after conduct. The solution is not a better rule, but a change in structure”^(*)

(or a gradual introduction of competition, with rules that restrict the freedom of the market agents & prevent market power abuse)

^(*) From “Governance & regulation of power pools & system operators”, Barker, J., Tenenbaum, B. & Woolf, F., World Bank, 1997.

Frequent failures

- Inadequate **sector structure** for competition
 - ◆ Horizontal concentration
 - ◆ Insufficient vertical / diagonal unbundling
 - ★ Generation & system operation
 - ★ Distribution & retailing
 - ★ Generation & retailing (¿?)
- Incorrect **risk allocation** in the regulatory design
 - ◆ Default tariff design (*pass through of costs to consumers*)
 - ◆ Authorized trading instruments
 - ◆ Ultimate responsibility to supply

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Frequent failures

(continuation)

- Attempting to apply “textbook-like reforms” in countries without an appropriate power sector structure &/or an adequate institutional framework
- No liquid &/or supra-national **balancing markets**
- Insufficient competition in the **markets for fuel**

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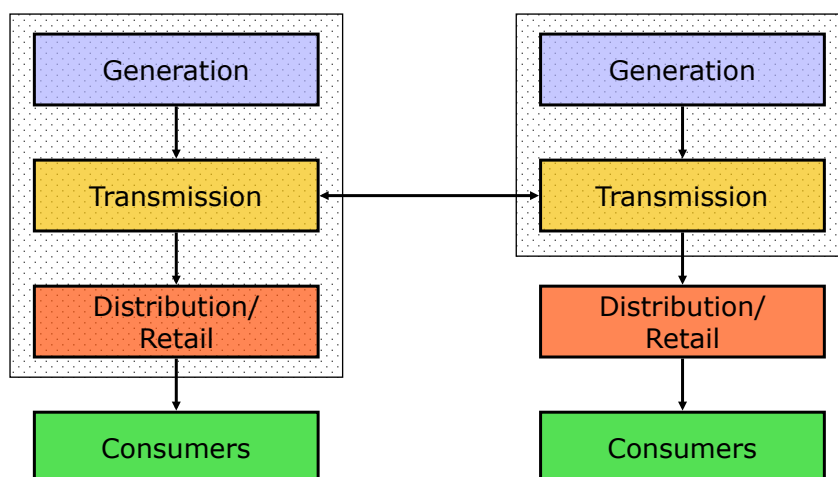
Frequent failures

(continuation)

- Absence of executive **regional institutions** in supra-national markets
 - ◆ Lack of needed harmonization
 - ◆ Inadequate cross-border trading rules
- Scarce available commercial **capacity of interconnectors**
 - ◆ Physical capacity / long-term previous contracts

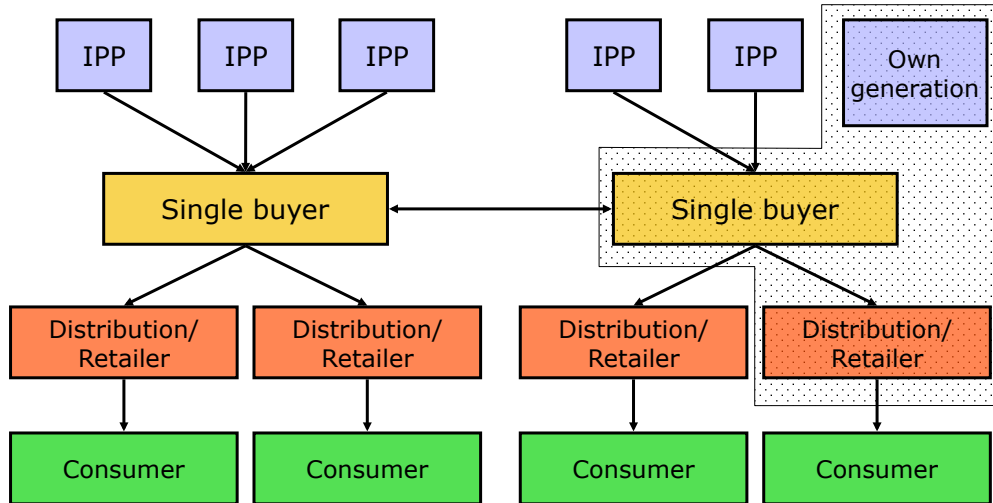
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Model 1: Monopoly



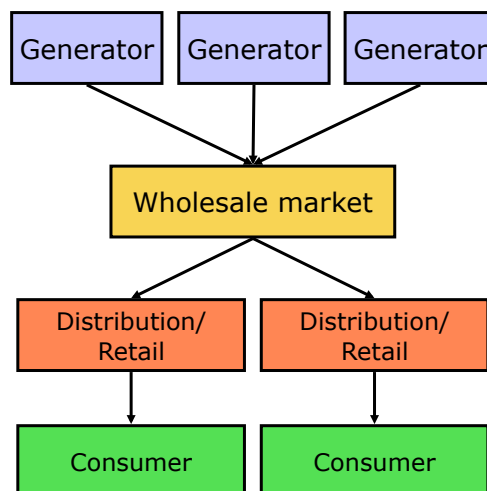
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Model 2: Purchasing agency (single buyer)



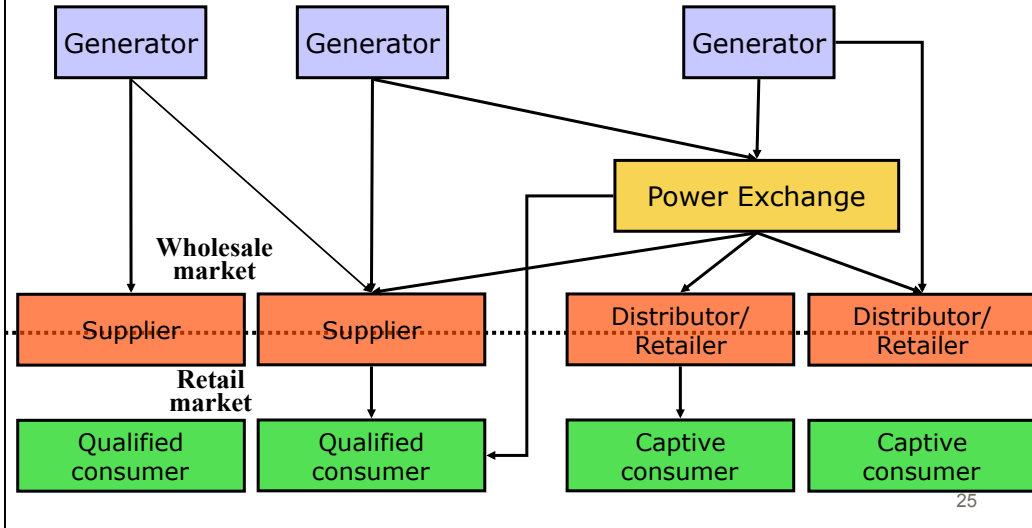
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Model 3: Wholesale competition



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4: Retail & wholesale competition



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