

# **ELECTRICITY TRANSMISSION INVESTMENT: THEORY AND PRACTICE**

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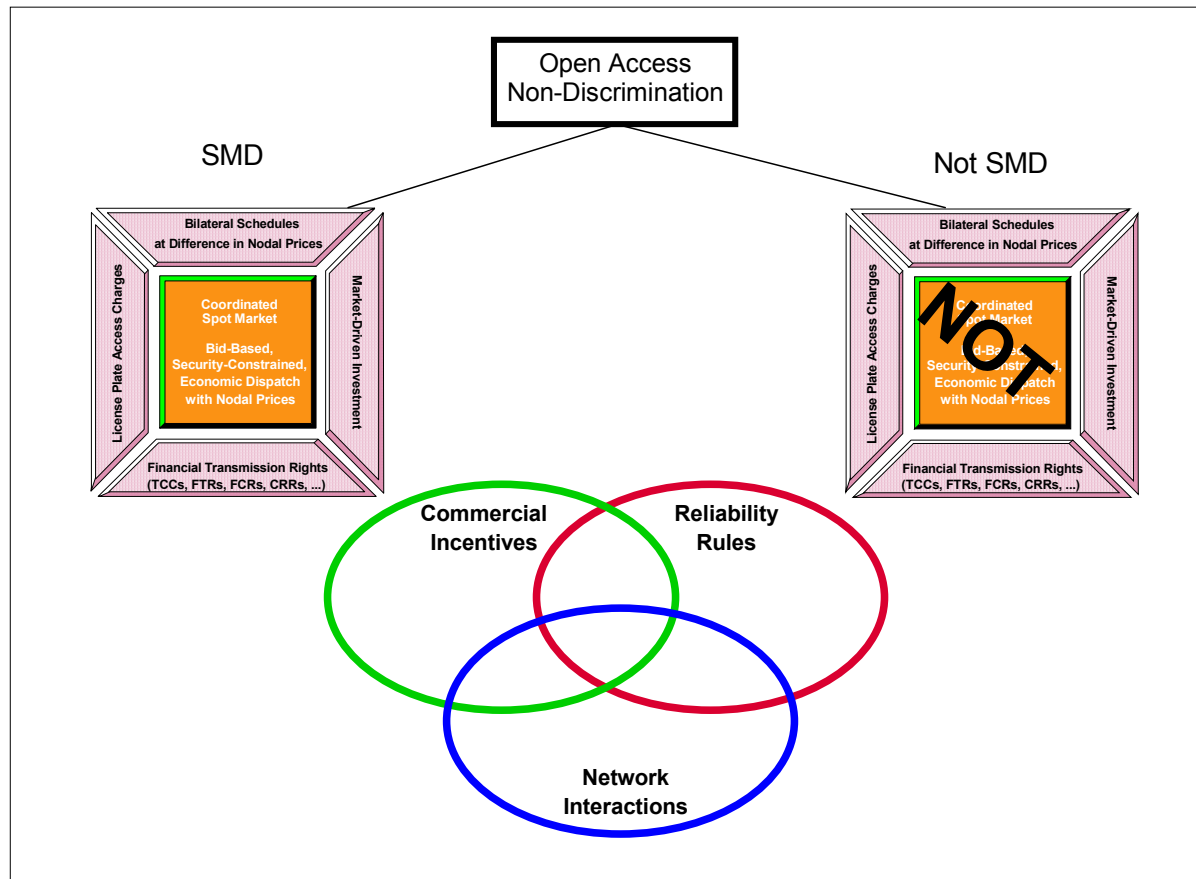
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# ELECTRICITY MARKET

# Electricity Restructuring

The public policy debate over reshaping the electricity industry confronts major challenges in balancing public interests and reliance on markets.



# ELECTRICITY MARKET

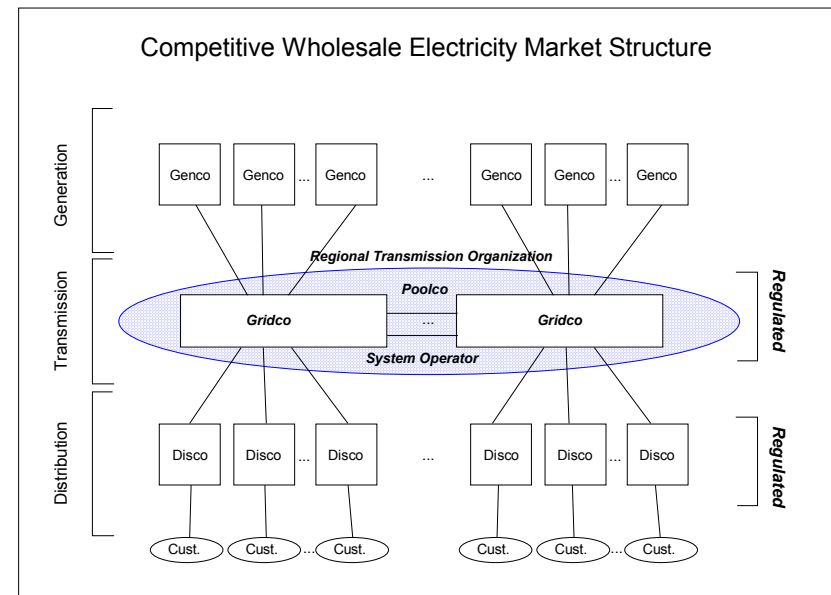
# Electricity Restructuring

The evolution of electricity restructuring contains a thread of issues related to counterintuitive market design requirements requiring coordination for competition.

- **PURPA, 1978.** The rise of the new generators.
- **Markets for Power, 1983.** Joskow and Schmalensee.

"The practice of ignoring the critical functions played by the transmission system in many discussions of deregulation almost certainly leads to incorrect conclusions about the optimal structure of an electric power system."<sup>1</sup>

- **Schweppe et al., 1988.** Spot Pricing of Electricity, Kluwer. Using prices to direct the dispatch.
- **Hogan, 1992.** "Contract Networks for Electric Power Transmission," JRE. Spot market pricing and financial transmission rights.
- **EPAAct, 1992.** The 'camel's nose' of wholesale competition.

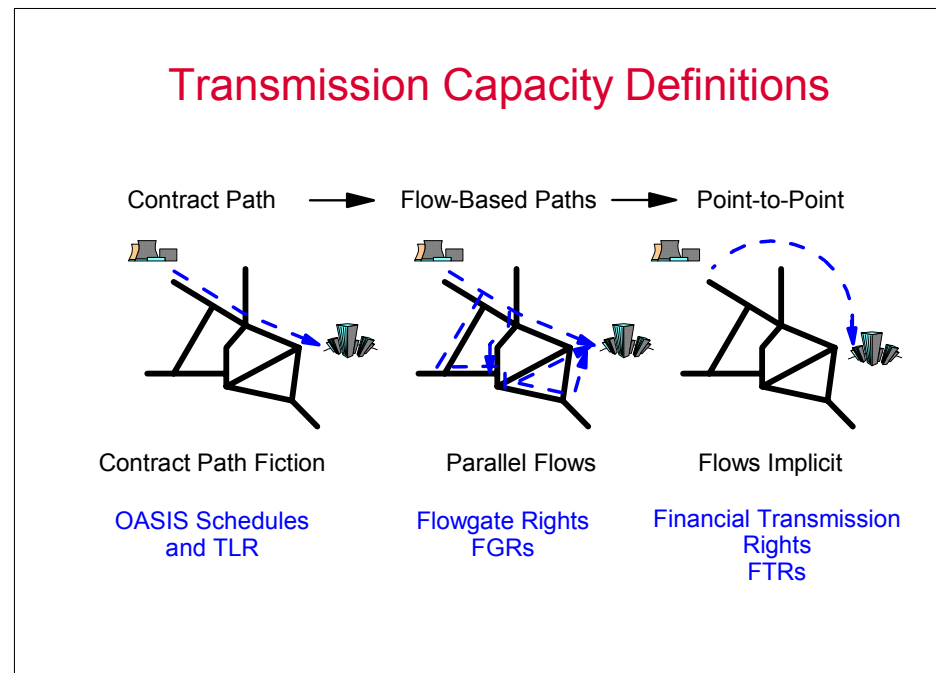


<sup>1</sup> Paul L. Joskow and Richard Schmalensee, Markets for Power: An Analysis of Electric Utility Deregulation, MIT Press, 1983, p. 63.

The evolution of electricity restructuring thread ...

## It won't work in theory, but will it work in practice?

- **Order 888, 1996.** Non-discrimination, Open Access to Transmission. Contract path fiction would not work in theory.
- **Capacity Reservation Tariff (CRT), 1996.** A new model.  
"The proposed capacity reservation open access transmission tariff, if adopted, would replace the open access transmission tariff required by the Commission ..."<sup>2</sup>
- **NERC Transmission Loading Relief (TLR), 1997.** The unscheduling system to complement Order 888.

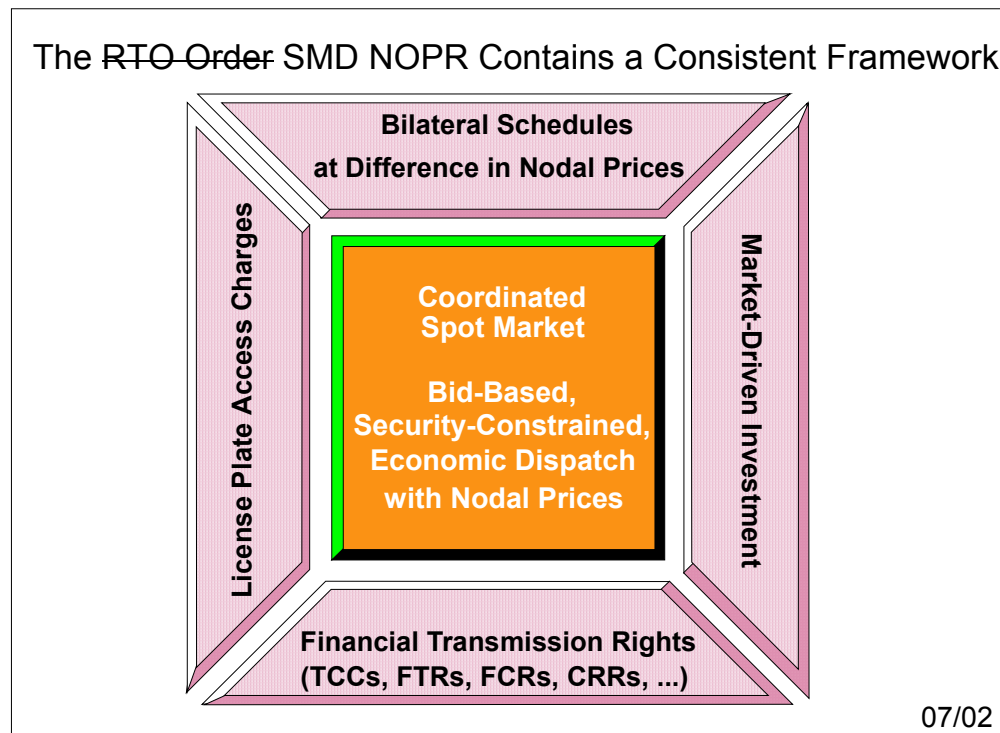


<sup>2</sup> Federal Energy Regulatory Commission, "Capacity Reservation Open Access Transmission Tariffs," Notice of Proposed Rulemaking, RM96-11-000, Washington DC, April 24, 1996, p. 1.

# ELECTRICITY MARKET

# A Market Framework

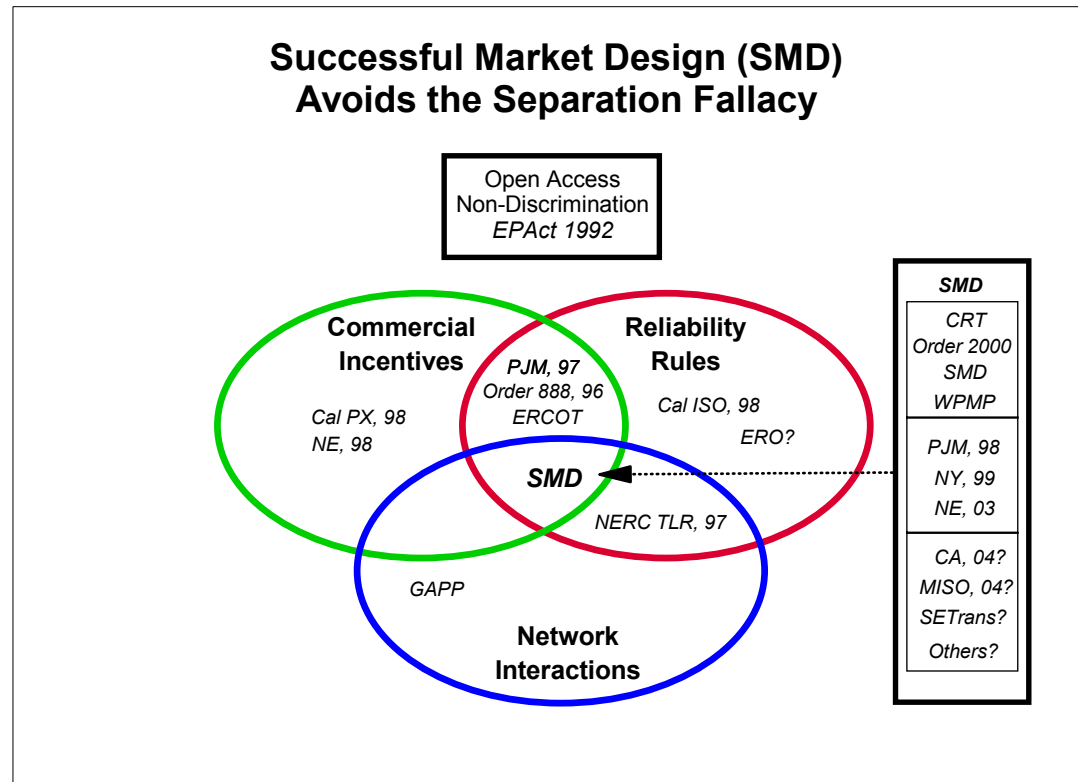
~~CRT, Regional Transmission Organization (RTO) Millennium Order (Order 2000)~~ Standard Market Design (SMD) Notice of Proposed Rulemaking (NOPR), provides a workable market framework that is working in places like New York, PJM in the Mid-Atlantic Region, and New England.



Poolco...OPCO...ISO...IMO...Transco...RTO... ITP...WMP...: "A rose by any other name ..."

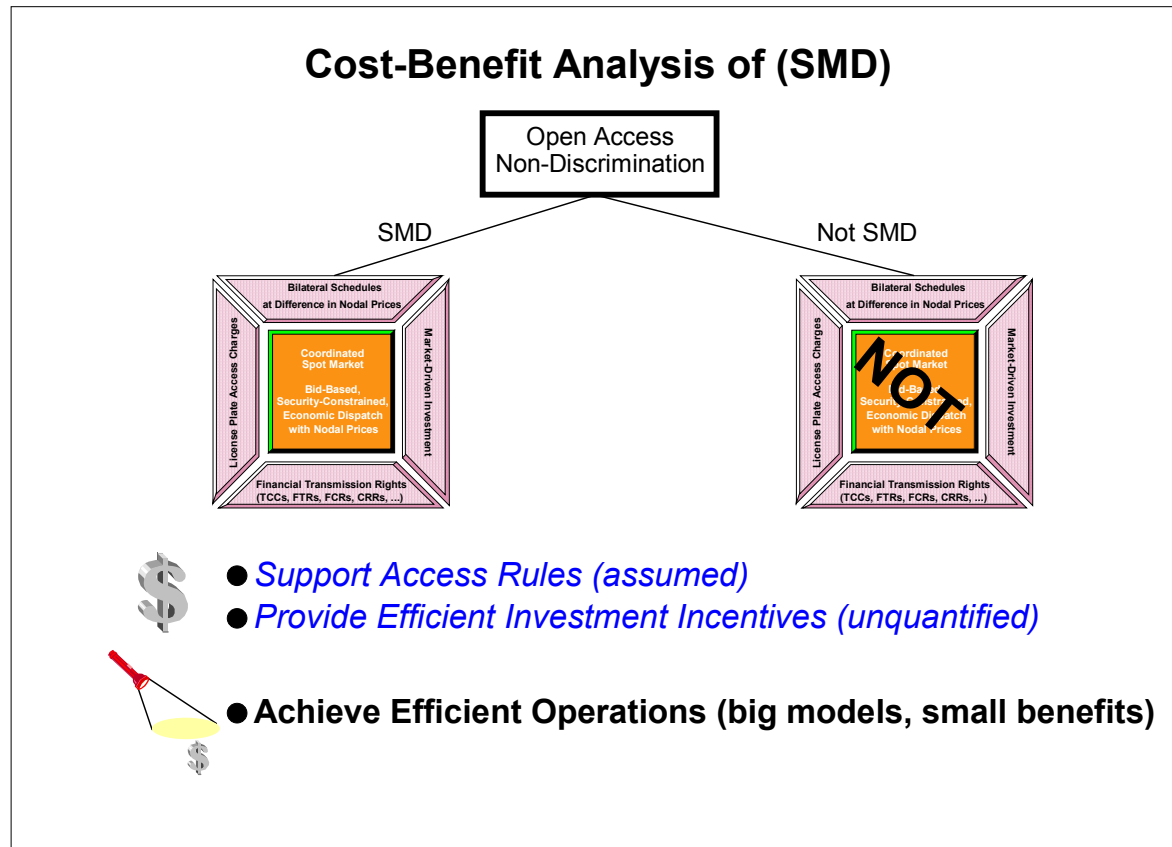
The evolution of electricity restructuring thread ...

- **Standard Market Design (SMD), 2002.** A good design is necessary, but not sufficient.
- **Regional Revolt Opposing SMD, 2003.** Changing paradigms and defending turf.
- **Northeast Blackout, 2003.** An isolated incident with an engineering fix, or part of the continuing thread?



The FERC “Successful Market Design” (SMD) faces major political opposition. A recent focus is cost-benefit analysis.

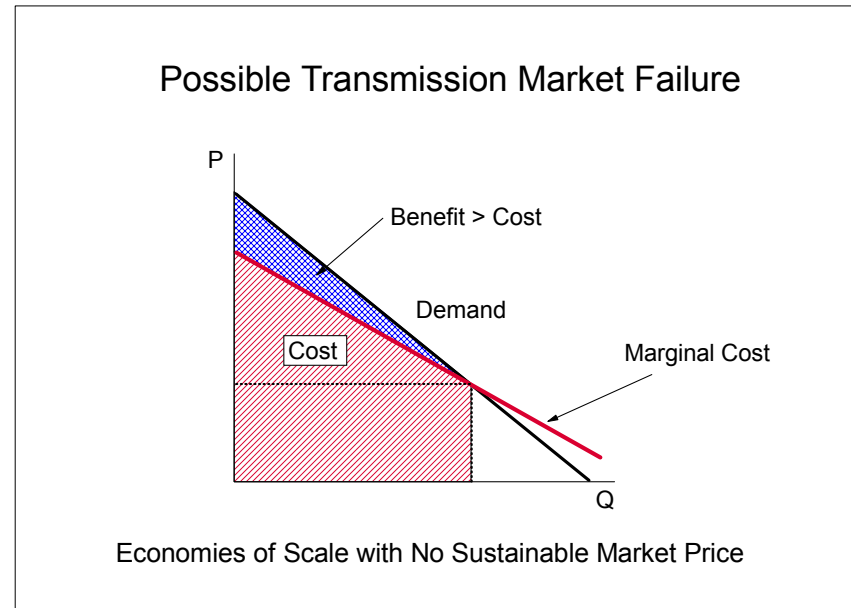
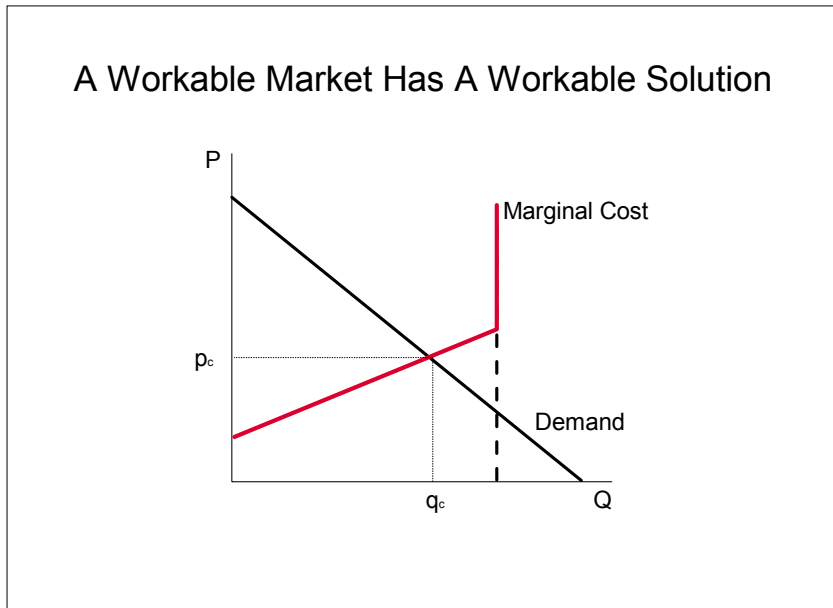
The cost-benefit focus should be on investment incentives, not operational efficiency. With workable markets, market participants spending their own money would be better overall in balancing risks and rewards than would central planners spending other people’s money. If not, restructuring itself would fail the cost-benefit test.



# ELECTRICITY MARKET

# Transmission Investment

Can a market support all electricity investments? Perhaps not. Economies of scale and scope imply possible market failure. Most prominent case is transmission investment.



How can regulators define rules to support market investments when markets work, and intervene when markets fail?

**Focus on the market failures**



### **How well is FERC doing in theory?**

A good start with the SMD: Efficient spot market design, locational opportunity cost pricing, license plate access charges, financial transmission rights for incremental investments, emphasis on market-driven investments, and participant funding for regulated investments.

The theory needs a workable definition of market failure to demarcate the boundary between regulated and market-based investments. We need a principled hybrid system.

- **Reliability Investments.** Limited in scope to deal with benefits not priced in the market.
  - Keeping the lights on (e.g., reactive power support).
  - Not just keeping prices low.
- **Economies of Scale and Scope.** Regulated investments would address economic benefits when private incentives do not support aggregate efficiency
  - Lumpy investments that produce material changes in market prices. Ex post value of financial transmission rights less than cost of investment.
  - Capture other externalities, such as mitigating market power, in a least-cost framework.
- **Mitigating Free Riding Incentives.** Participant funding would require beneficiaries to pay.
  - Identifying beneficiaries as well as benefits.
  - Using the coercive power of regulation to make beneficiaries pay.

**How well is FERC doing in practice?**

Recent decisions suggest an agenda to support transmission infrastructure investment no matter what the cost. Apparently we don't need a market because we know what to do: you can never have enough transmission.

The operational definition of market failure seems to become:

**De Facto Market Failure:**

***Failure of the market to make investments  
chosen by the central planner!***

- **PJM Mandates for Economic Investments.**
  - Economic investment for “Unhedgeable Congestion.” A creative idea that does not withstand examination. Under SMD all congestion is hedgeable, at a price.
  - A short window for market investments before central planning kicks in to socialize costs.
- **NEPOOL Tariff and Transmission Cost Allocations.**
  - Participant funding morphs into that which market participants volunteer to pay.
  - Identifies net benefits but not net beneficiaries. Not everyone benefits, but everyone pays.

Does it matter if FERC practice differs from SMD theory?

### **It won't work in theory, but will it work in practice?**

- **SMD Intentions.** FERC's stated policy is to support both merchant and regulated transmission investment.
- **FERC Actions.** Motivated by pressure to stimulate transmission investment, recent FERC decisions could undermine the policy goal and foreclose merchant investment.
- **Slippery Slopes.** Absent a bright line between merchant and regulated transmission investment, there will be enormous and justifiable pressure on the regulator to put generation and demand alternatives on the same playing field of reduced risk and mandatory collection through regulated mechanisms. The intended modest domain of regulated transmission would expand to include full blown integrated resource planning. A poor design for transmission investment is a threat to the entire premise of the SMD. The end state could be recreation of the central regulatory decision problems that motivated electricity restructuring in the first place.

*Are we going around a very expensive policy circle?*

- **A Possible Line Between Merchant and Regulated Investment.** Regulated transmission investment would be limited to those cases where the investment is inherently large relative to the size of the relevant market and inherently lumpy in the sense that the only reasonable implementation would be as a single project like a tunnel under a river. Everything else would be left to the market. This would be a principled hybrid system.

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