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Subsidies, Climate Change, Electricity Markets and the FERC

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Regulatory interventions, subsidies and electricity markets

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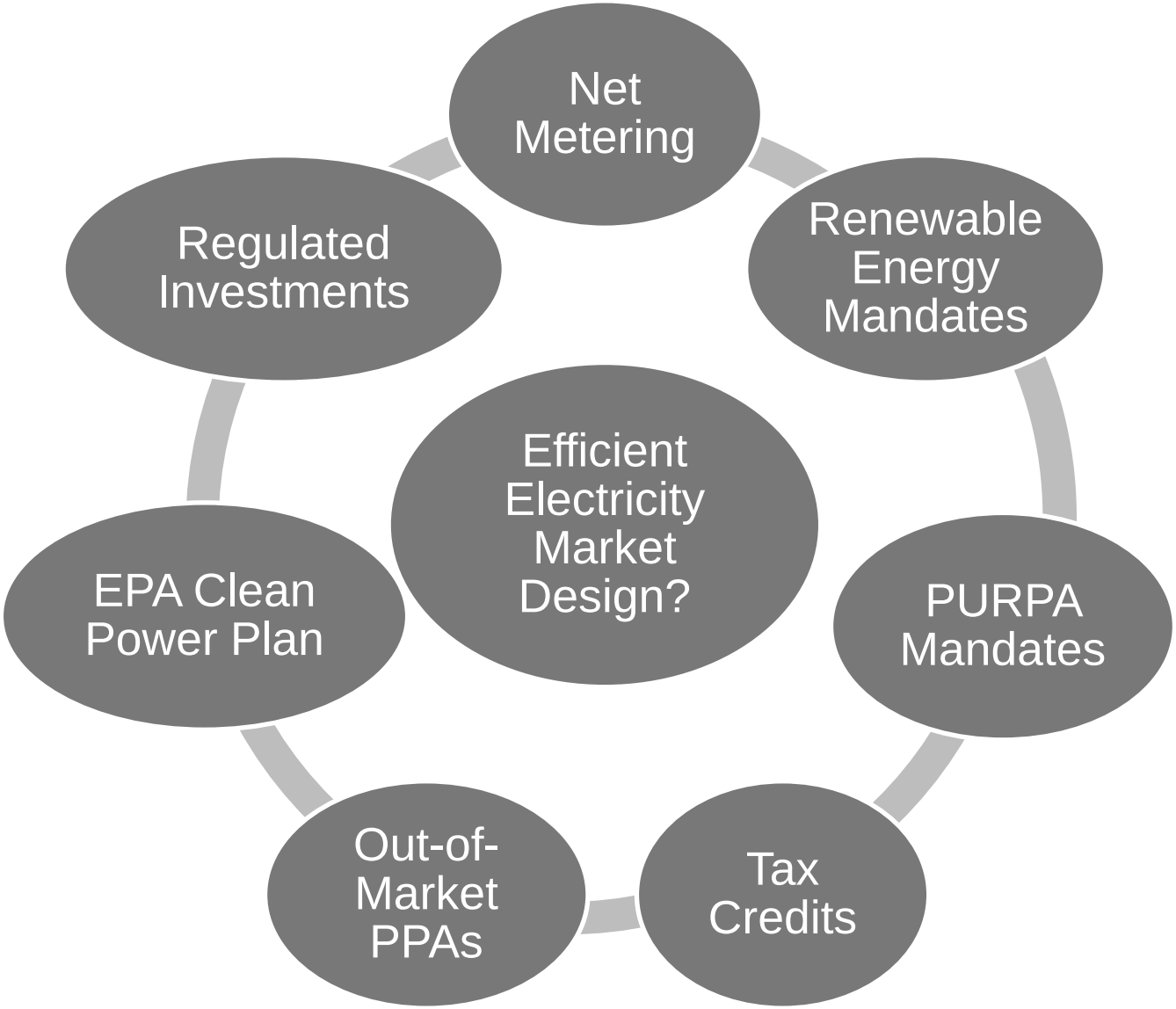

What is the nature of the problem?

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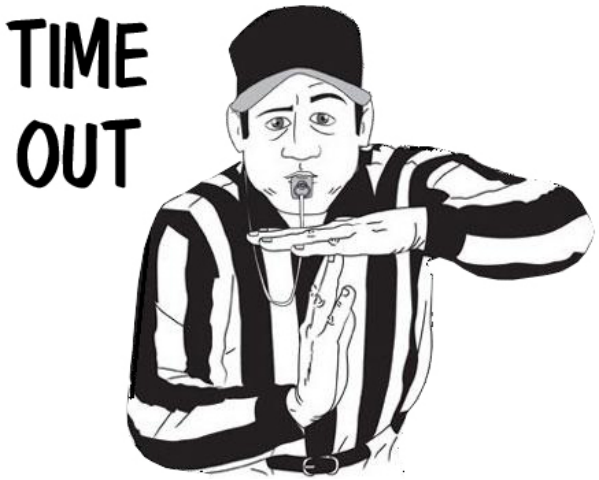
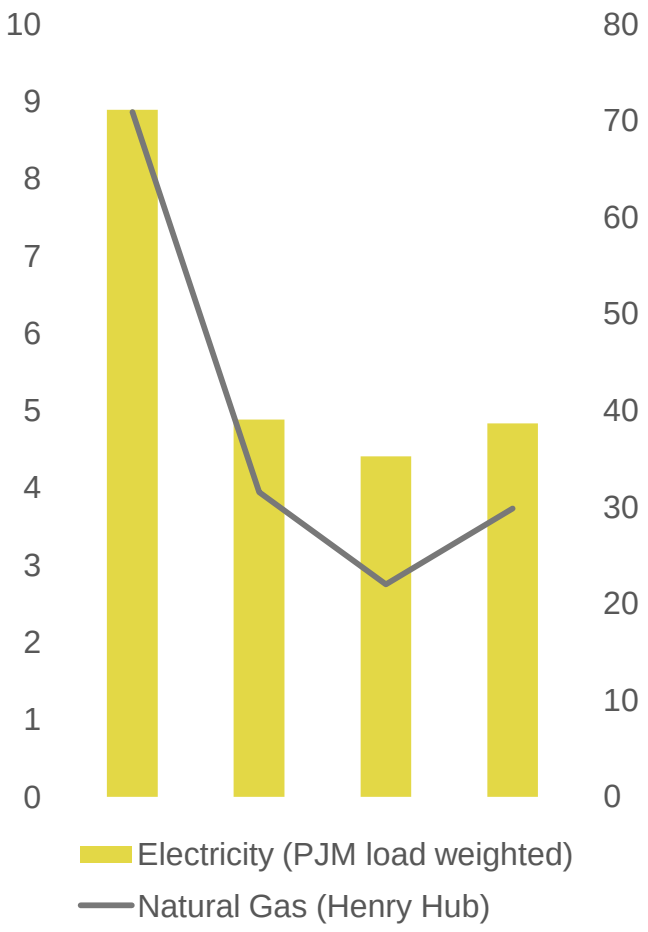
- *Stated broadly, it is government interventions in wholesale electric markets that distort efficiency*
- *The problem is not related solely to climate change*
  - Out-of-market contracts for conventional generation depress capacity prices
  - Rate base investments can be favored over market responses
- *But subsidies to address climate change are a recurring example*
  - Examples include net metering for rooftop solar, federal tax credits, PURPA mandates, renewable energy mandates, etc.
- *Why should we care?*
  - Distorted investment and production incentives
  - Cost shifts among customer groups
  - Undermining confidence in the market
  - Unintended effects (e.g., nuclear retirements offsetting carbon reductions)
  - *In the end, the customers and taxpayers pay for the inefficiencies*

Definitional caveat: what is a subsidy anyway?



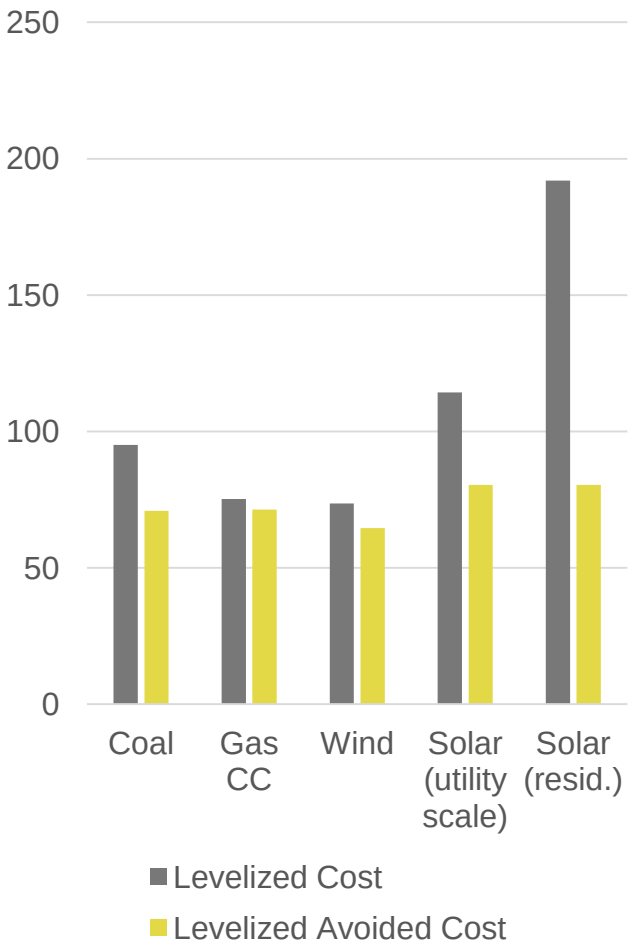
- The traditional definition of "subsidy" includes all forms of government support, but . . .
  - A subsidy can be efficient if it addresses a market failure. Identifying market failures is not easy though. When is a loan guarantee efficient vs. a handout?
- Climate change presents its own definitional conundrum because the carbon externality is not priced into the market
  - Subsidies for green technologies are therefore said to "level the playing field"
- Even if a subsidy is deemed appropriate, the *form* of the subsidy matters. "The multitude of solar deployment subsidies that currently exists at the federal, state, and local levels in the United States adds up to an extremely inefficient policy regime." *See The Future of Solar Energy* (MIT 2015):

Low energy prices influence the current subsidy debate



- The debate over subsidies does not occur in a vacuum: a particular technology does not need a subsidy if it is already competitive
- Shale gas and lower electricity demand has driven down natural gas and wholesale electricity prices since 2008 (left). That is good news for ratepayers and the economy, but bad news for the debate over subsidies:
  - Low prices increases the pressure for subsidies for renewable energy
  - Low electricity prices also undermine baseload generation (coal and nuclear), causing them to seek their own forms of government support
- This paradigm may not change any time soon, as low natural gas prices may persist and increasing renewables penetration places further downward pressure on electricity prices

Market prices, avoided cost and the cost of new entry



- EIA (June 2015) data in chart (left) compares the levelized cost of various technologies to avoided cost. (Residential solar LCOE derived from MIT (2015) data.) The data underscores the pressure for subsidies, particularly for solar
- The estimates are sensitive to assumptions:
  - Lower natural gas price forecast would imply larger cost-value spread for renewables
  - Solar value declines as PV penetrations increase due to downward pressure on market prices (MIT 2015), creating a cycle where the success of subsidies breeds a need for more
  - Solar development costs are sensitive to assumptions re future cost reductions
  - Cost and value estimates differ by region
- Note that, even if a $38/ton “cost of carbon” is added, utility solar remains higher cost than combined cycle natural gas unit MIT 2015)

What is FERC's role in this debate?

Legal Authority

- Wholesale electricity prices must be "just and reasonable," but what does that mean?
  - Market power is mitigated
  - Competition used to drive prices toward marginal cost (production and new entry)
  - These principles are simple in concept but the market design solutions are often complex and controversial
  - FERC statutory charge is *fuel neutral*

"Political Authority"

- What is the influence of Congress, states and industry on FERC policy?
  - See, e.g., current pressure on FERC re EPA CPP and 2002-03 debate over standard market design

FERC's role in the climate change debate

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- Reflecting the cost of carbon in electricity market prices?
  - FERC cannot require that wholesale prices include the cost of carbon. Other entities (e.g., Congress and/or the states) must take that action
  - Once the carbon externality is regulated, wholesale market design can efficiently incorporate the cost of carbon into market clearing prices
- Removing discriminatory barriers to green technologies?
  - FERC can, however, remove barriers to green technology that are found unduly discriminatory. Past examples have included:
    - » Reducing energy imbalance charges (penalties) for non-dispatchable technologies
    - » Lowering transaction costs barriers to large-scale transmission investment to integrate wind and solar technologies
  - FERC cannot, however, subsidize any technology. See *EPSA v. FERC* where the D.C. Circuit remanded FERC's pricing of demand response

Mitigating the impact of subsidized new entry

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- One of the most vexing problems facing FERC is whether and how to address the market price suppression from subsidized new generation entry, which often pits FERC directly against state policies incentivizing new entry
- General principle: uneconomic (subsidized) entry must offer into capacity markets at an administratively determined competitive entry price, but the application of that principle has varied widely across the various regions:
- PJM (Mid Atlantic)
  - Mitigation applies only to combined cycle gas plants, but exemptions exist for competitive entry and load serving entities that are not short on resources
- New England
  - Controversial exemption for renewable resources approved after FERC changes direction
- New York
  - Applies only in Southeastern portion of the state but being studied for rest of state; scope of "competitive entry" exemption currently in litigation
- MISO (Midwest)
  - Voluntary capacity market with no buyer side mitigation but issue remains in litigation, with independent market monitor favoring buyer-side mitigation

The continued relevance and impact of PURPA

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- PURPA was enacted in 1978 to lower barriers to entry for certain technologies (cogeneration and renewable energy)
  - PURPA's central tool was the mandatory purchase obligation at avoided cost
  - It spawned a merchant generation industry but overaggressive implementation by states helped pave the way for organized markets/retail access in the 1990s
  - In 2005 Congress cut back on the purchase obligation in organized markets
- Yet PURPA remains relevant in the current era of low market prices and public support for renewable energy. Implementation disputes include:
  - Scope of the 2005 Act exemption for organized markets
    - A Catch 22 test to determine whether the exemption applies to small QFs
    - Lack of clarity on what is an "avoided cost" in an organized market
    - Litigation over when transmission constraints negate organized market exemption
  - Implementation uncertainty and litigation in bilateral markets
    - Can states set avoided cost rates solely by competitive process (e.g., auction)?
    - What is the "value" (avoided cost) of rooftop solar?

The escalating war over net metering

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- Rooftop solar energy is generally compensated through "net metering" policies that pay for solar energy at the retail rate, including wires charges
  - These policies have been criticized as creating large cost shifts between customers and as inefficient in discriminating against cheaper utility scale solar
    - "If the objective of deployment [subsidies] is to increase solar generation at least cost, favoring residential PV [solar] makes no sense." (MIT 2015)
  - But residential solar has become the "retail access" of our time—drawing on a powerful combination of disparate political currents—*e.g.*, climate change (environmental), customer choice (libertarian), anti-big business (populist)
- The resulting policy fights are being fought primarily in the states
  - A similar problem faces most states: once subsidies generate significant solar market penetration, how and when do you stop or trim the program?
- But other legal challenges are emerging too (Solar City antitrust lawsuit)
- FERC may some day be drawn into the debate: (i) when does the output of a rooftop solar installation become a wholesale sale, and (ii) what is the proper definition of avoided cost for that sale under PURPA?

Rate base (self build) vs. purchases from merchants

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- This is an old controversy, not a green one
  - The issue is whether utilities have an incentive to favor building generation to meet load rather than purchasing power long-term from merchant generators
  - The source of the concern is that utilities earn a return on their own investments, but nothing on wholesale purchases
- Many states use competitive procurement rules to offset the potential bias from these incentives (Tierney and Schatzki 2008)
- What is the impact of organized wholesale markets on the choice between regulated and merchant generation?
  - Organized markets provide transparent prices and an independent grid operator to help facilitate financing merchant generation and facilitate better comparisons of market and self-build (regulated) options
  - Merchant generation penetration remains relatively modest, however, in organized markets retaining traditional regulation/vertical integration (MISO)
  - Mix of regulated/merchant generation also can affect market design: FERC rejected mandatory capacity auction in MISO due to level of vertical integration.

When is transmission investment a subsidy?

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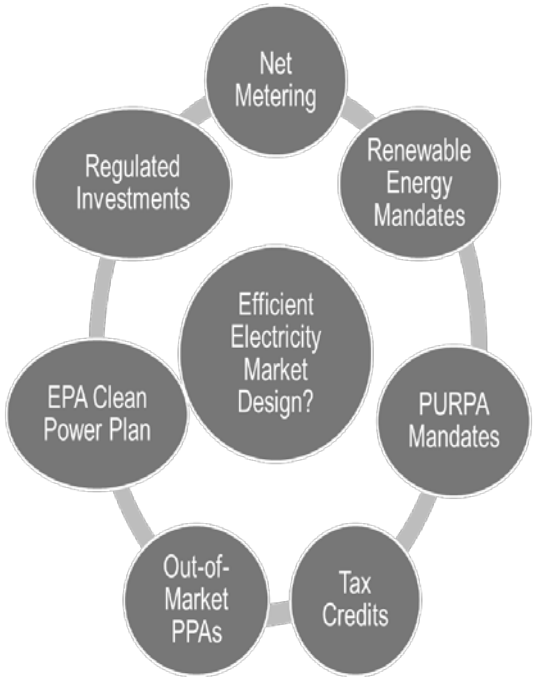
- Transmission and generation investments can be alternatives to relieving congestion or create tradeoffs in locating new generation supply. This can raise bias and subsidy concerns in several different respects:
  - In restructured markets where the transmission owners do *not* own generation, will they favor transmission investments over market responses to congestion?
    - » And, conversely, if transmission owners *do* own generation, do they have an incentive *not* to build if their generation is located in constrained, higher price locations
  - Even if transmission should be built, how should the costs be allocated?
    - » Is it a subsidy to require customers, rather than wind developers, to pay the cost of transmission to integrate new wind resources? And, if not, which customers should be required to pay? *See, e.g.*, MISO's MVP cost allocation rules
    - » The "beneficiary pays" approach to cost allocation is widely supported but what does it actually mean? Who benefits from reducing congestion? *See* Hogan (2013)
    - » And how do we address the transaction costs in getting beneficiaries to agree on a voluntary allocation of costs? *See, e.g.*, New York rules that use a voting protocol for specified beneficiaries to approve congestion relief projects.
  - Finally, should *regulated* transmission investment be opened up to competition? *See* FERC's Order No. 1000 reforms eliminating certain barriers to entry.

What subsidies should we care most about?



The answer tends to differ widely across policymakers, reflecting normative assumptions:

- For policymakers who believe combatting *climate change* is the paramount objective, renewable subsidies are a good thing, not a bad thing, and having inefficient subsidies is better than having no subsidies
- For policymakers who believe enhancing *reliability* is the paramount objective, transmission investments tend to be favored and renewable subsidies that discriminate against baseload generation (nuclear and goal) tend to be disfavored
- For policymakers who believe achieving a *low cost energy supply* is the paramount objective, inefficient subsidies are viewed as bad and market outcomes tend to be favored over regulated solutions, although not always

The first run of the movie 1980-1999: (cost overruns at nuclear plants) + (PURPA-related subsidies) + (low wholesale market prices) = retail access and organized market formation

The sequel today? There are some parallels today, but the results will likely be different

- The similarity will be the continued migration from bilateral markets to organized markets, but the impetus this time will be the proven benefits of organized markets, not a vote against cost of service regulation
- States in organized markets will continue to support the elements of wholesale markets they favor, but will continue to intervene to affect market *outcomes*.
- Rooftop solar will become the new "retail access" and will have more staying power than the original version of retail choice

The future: hope or despair?

- Organized wholesale electric markets are here to stay, but regulatory interventions will continue because electric markets are desired for particular outcomes (*e.g., "*low" prices, renewables), not necessarily because they are more efficient
- These regulatory interventions will be hard to correct:
  - Reliable data on the cost of regulatory interventions is elusive and public perceptions of market failures tend to be more powerful and not dependent on hard data
  - The multiplicity of government entities, both federal and state, responsible for energy policy is also a barrier to a more consistent, coherent view of markets
- Thus, although organized markets will endure, they may come to be viewed primarily as vehicles to *optimize dispatch* of whatever generation portfolio results from government intervention, rather than as the primary driver of new generation investment. This is not an attractive prospect but may be where we are headed.