

PURPA

Current issues for generators to qualify for payment under PURPA and calculation of avoided costs

National Regulatory Research Institute

PURPA: Options for States

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Overview

1. **Basics of PURPA** – What is a QF?
2. **Avoided Costs** – How rates are calculated
3. **PURPA's Evolution** – 35 years of boom and bust
4. **Recent Trends** – Putting on the breaks?

What is PURPA?

- **Public Utility Regulatory Policies Act of 1978**
 - Pub. L. No. 95-617, 92 Stat. 3117
- **Congress' primary policy objectives:**
 - Promote energy efficiency (e.g., Cogeneration)
 - Reduce demand for fossil fuels (e.g., alternative energy sources like waste, wind and solar)
 - Overcome reluctance of traditional utilities to purchase power from non-utility generators

PURPA, Title II

- **Qualifying Facilities** – PURPA established a class of non-utility generators eligible for special treatment called “Qualifying Facilities” or “QFs.”
- **Traditional Utilities must:**
 - interconnect with QFs;
 - purchase power from QFs at non-discriminatory rates;
 - sell back up power to QFs at non-discriminatory rates.

QF Regulatory Exemptions

- Qualifying Facilities are exempt from most state and federal utility regulation, including:
 - FPA §§ 205, 206 (rate regulation)
 - FPA §§ 203, 204, 208, 301, 302, 304 and 305
 - PUHCA – “electric utility company” does not include QFs
 - No state regulation of QFs if inconsistent with PURPA
- Exemptions do not apply to QFs > 30 MW, except for biomass

QF Defined

- A Qualifying Facility is either a **Cogeneration Facility** or a **Small Power Production Facility** that meets the requirements of PURPA section 201.



Cogeneration Facility

- A facility which produces “electric energy and forms of useful thermal energy (such as heat or steam), used for industrial, commercial, heating, or cooling purposes, through the sequential use of energy.” 18 CFR 292.202(c)
- Policy: Cogeneration facilities use significantly less fuel to produce electricity and steam (or other useful thermal energy) than would be needed to produce the two separately.
- No maximum size for PURPA eligibility.

Small Power Production Facility

- A facility that is fueled by biomass, waste, geothermal, or renewable resources (including wind, solar or hydro) and which, together with any other facilities at the same site (within one mile), has a capacity ≤ 80 MW.
- Policy: Reliance on the listed sources of energy can reduce reliance on fossil fuels to generate electric power.



Ownership Limitation

- Historically, a cogeneration facility or small power production facility could not be a QF if it was owned by a utility.
- Policy: Congress didn't want PURPA's regulatory exemptions to apply to utilities.
- The Energy Policy act of 2005 lifted this restriction and utilities can now own QFs.

Who has to buy QF power?

- The PURPA “must-buy” obligation applies to essentially all electric utilities.
- It applies to IOUs, Municipalities, PUDs, rural cooperatives, water districts, and even BPA.
- FERC can grant a waiver or excuse a utility under PURPA section 210(m).

EPAAct '05 – End of Must-Buy?

- New PURPA §210(m) plus FERC's decision to implement through rulemaking rather than case by case, means ...
- Utilities no longer have an obligation to purchase QF power if QF > 20 MW has non-discriminatory access to:
 1. An ISO [independently administered, auction-based day ahead and real time wholesale markets and wholesale markets for long-term sales of capacity and energy--e.g., Midwest ISO, PJM, ISO-NE, NYISO], or
 2. An RTO with competitive wholesale markets, or
 3. Wholesale markets that are comparable to (1) or (2).

Purchase Price Defined

- **PURPA § 210(b)**

- Rates shall be just and reasonable to the electric customers of the electric utility and in the public interest
- Rates shall not discriminate against cogenerators or small power producers,
- Rates ***must not exceed*** the incremental cost to the electric utility of alternative electric energy.

- **FERC Implementation – 18 CFR § 292.101(b)(6)**

- Rates ***must equal*** the utility's "full avoided costs" which are "the incremental costs to the electric utility of electric energy or capacity or both which, but for the purchase from the QF or QFs, such utility would generate itself or purchase from another source."

Avoided cost rates need to be just right!



How are avoided costs calculated?

- States have tried many different approaches
- The most common methods are:
 - 1. The Proxy Method**
 - 2. The Peaker Method**
 - 3. Differential Revenue Requirement**
 - 4. Auctions**
- PURPA is the only area where states get to regulate wholesale power sales rates

Proxy Resource Method

Avoided Cost = Cost of utility's next planned resource addition (called the "proxy resource"); usually a Combustion Turbine

Energy Cost: Function of heat rate, gas price forecast, variable O&M of proxy plant

+

Capacity Cost: Function of capital plant cost, fixed O&M, taxes, cost of debt and equity

Peaker Method

Avoided Cost = Utility's highest cost energy and lowest capital-cost generator

Energy Cost: Function of utility's system marginal cost of energy (λ) and QF's generation profile

+

Capacity Cost: Function of capital plant cost, fixed O&M, taxes, cost of debt and equity for utility's lowest cost generation resource (typically a CT peaker)

Differential Revenue Requirement

- Avoided cost is calculated as the difference between the system revenue requirement without the QF and the system revenue requirement with the QF as a must-run, zero cost resource.
- The result is effectively an avoided cost rate that takes into account both energy and capacity cost simultaneously
- Requires generation expansion model and financial planning model
- Most theoretically pure approach, if the inputs are valid.
- However, can be opaque to stakeholders making it hard to obtain consensus and acceptance.

Auctions

- Utilities issue Request for Proposal
- Successful bidders receive capacity and energy payments
- Unsuccessful QF bidders may sell energy but not capacity
- Small QFs generally cannot successfully outbid larger QFs



Standard Rates

- FERC's regulations require standard avoided cost rates for QFs of capacity of 100 kW or less.
- This is a floor, not a ceiling, states may allow standard rates and contracts for larger QFs.
- Standard rates simplify contract negotiations.
- Standard rates are typically calculated with a simplified avoided cost methodology.
- Standard rates are generally considered favorable to QFs and a higher eligibility threshold for standard rates tends to result in more QF development.

Avoided Cost Methods Compared:

	Proxy	Peaker	DRR	Auction	Standard
Pro:	Simple; transparent	Better match to QF than Proxy; simpler than DRR	Theoretically correct; unit specific	Market finds correct price	Simple; low trans. cost
Con	QF might be very different from proxy; timing of output not considered	Ignores impact of the QF on the utility's marginal cost	Complex; black box; potential lack of QF buy-in	Smaller QFs may be uncompetitive	Risk of over-supply if rate set too high
Basis	Admin.	Admin.	Admin.	Market	Admin.

The 1980s – 1st QF Boom

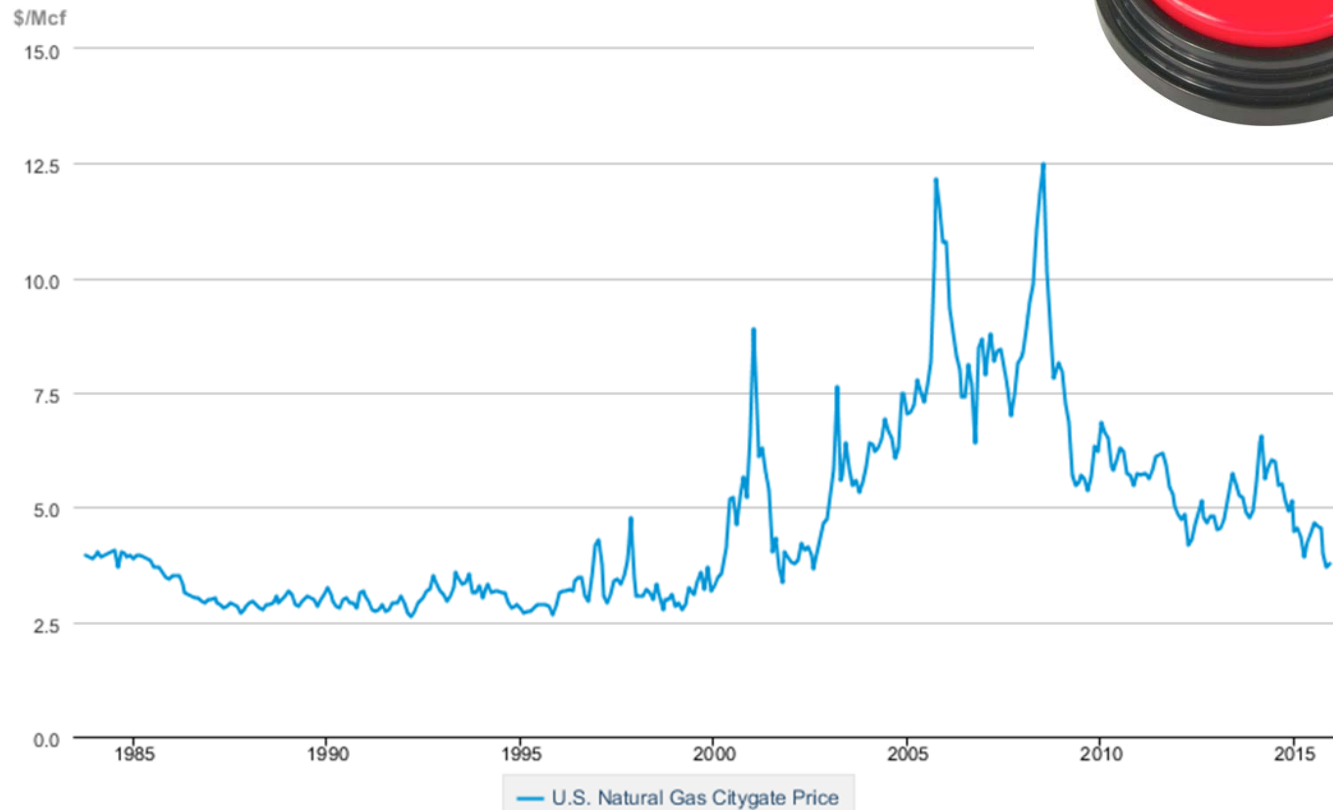
- High inflation; Utilities building high cost coal and nuclear
- State Commissions set generous PURPA rates.
- Huge Response –
 - Predicted QF capacity for 1985: 2,600 MW
 - Actual installed QF capacity in 1985: 12,000 MW
- California IOUs scrapped plans for 22 coal plants
- In some cases, QF response to standard rates was overwhelming
 - New York: \$60/MWh price floor led to massive oversupply and subsequent buyout of 14 QF contracts totaling \$3.9 billion plus 23% of Niagara Mohawk equity
 - California: Standard Offer 4 Contract—more than 16,000 MW subscribed in 15 months



Low gas prices in the '90s limited PURPA growth



Natural Gas Prices



The 2000s – 2nd QF Boom

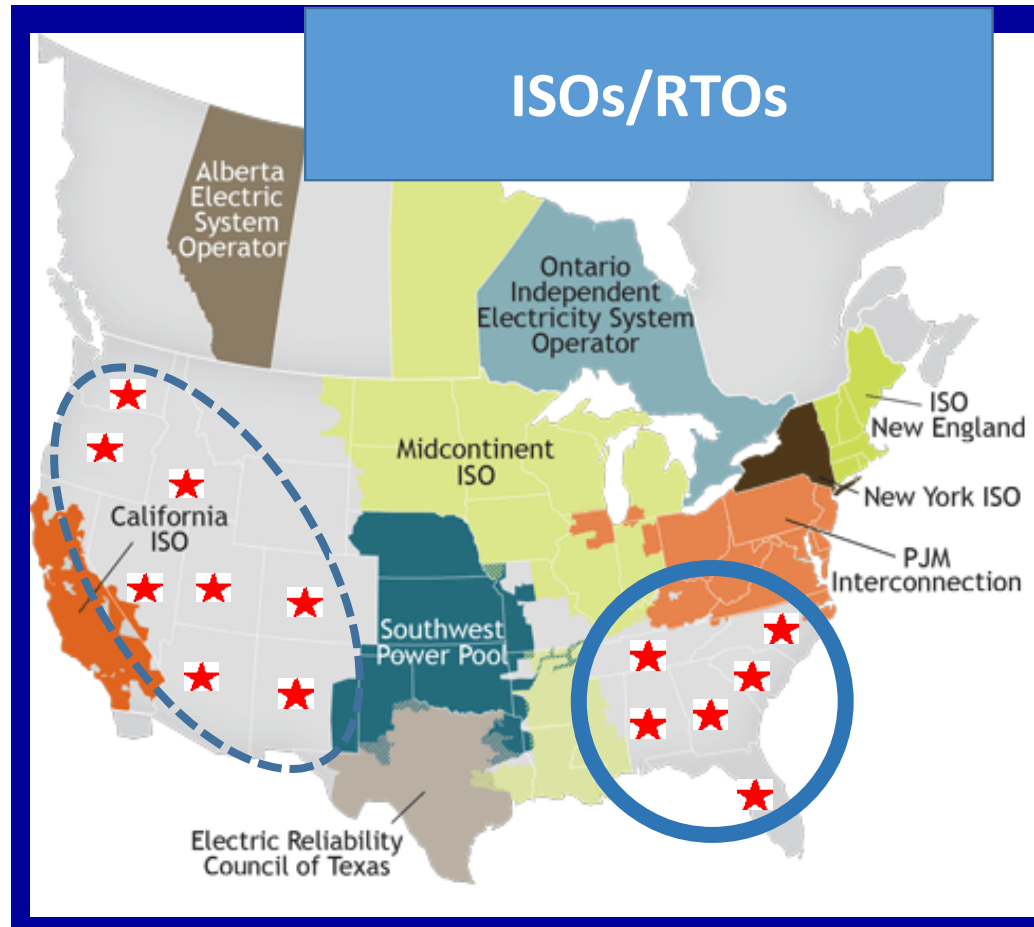


- Gas prices tripled from 1999-2005
- RECs, PTC and Accelerated Depreciation subsidized cost of renewable projects
- Large scale wind turbine technology maturing
- Open Access to transmission is largely accomplished
- Wind developers, and other QFs, have finance-able projects; market barriers that prompted enactment of PURPA largely remedied by Open Access

EPAAct '05 rolled back PURPA privileges:

- New restrictions to limit “PURPA machines”
- Repeal of prohibition on utility ownership
- New §210(m) requires FERC to excuse purchase obligation if QF has access to a sufficiently competitive market for its power.
- FERC policy presumes QFs > 20 MW in ISO or RTO have such access and therefore utilities have no must buy obligation ...

PURPA activity is in the West and SE



Emerging Issues

- Idaho
 - Responded to explosive growth in wind and solar QF development
 - Reduced eligibility for standard rates (10 aMW → 100 kW)
 - Reduced length of PURPA contracts (20 years → 2 years)
- Wyoming
 - Currently considering reduction in length of PURPA contracts
- Utah
 - Smaller reduction in the length of PURPA contracts (20 years → 15 years)
- Oregon
 - Comprehensive PURPA policy docket
 - Adjustment factors for integration and capacity characteristics
 - More frequent rate updates
 - Trying to resolve when a LEO is formed

Idaho: Avoided Cost Calculation

- Standard Rates
 - Historically available to QF ≤ 10 aMW
 - Calculated using the Proxy Method
 - Referred to as the “Surrogate Avoided Resource” or SAR Method
 - Uses a hypothetical gas fired CCCT as a proxy
 - May have been giving erroneously high price because of
 - Outdated fuel price forecast; outdated assumptions regarding capacity needs; outdated cost of capital assumptions; failure to capture integration cost of non-dispatchable QFs; no mechanism to modify when large QFs dis-aggregate and cause a change in a utility’s real avoided cost
- Non-Standard Rates
 - Calculated using an IRP-based, differential revenue requirement method

Idaho: 2010-11 Wind Boom

- Large Wind QFs disaggregating into 10 aMW blocks to qualify for standard rates
- Tremendous increase in wind QF contracts
- Idaho Power:
 - 200 MW of wind on system
 - +250 MW of Commission-approved QF wind contracts
 - +80 MW of QF wind pending Commission approval
 - +550 MW of new wind QF contract requests
 - total of ~1100 MW of wind generation—exceeded utility's 2010 minimum load

Idaho: 2010-11 Wind Boom

- Utilities and Commission fear price signal is wrong
- Commission Staff noted:

“When large QFs are added to a utility’s renewable portfolio, but the QFs disaggregate in order to qualify for the published rate, the avoided cost paid to the QF becomes inaccurate, because under the published rate methodology, there’s no mechanism to reflect the utility’s reduced avoided cost.”

See, IPUC Order No. 32176, p.8 (February 7, 2011)

- **Commission lowers eligibility cap for standard rates for wind and solar QFs from 10 aMW to 100 kW**

Idaho: LEO Litigation

- In February 2011, IPUC reduced the eligibility cap for standard rates to 100 kW—effective December 14, 2010
- IPUC rejected 18 standard contracts with Wind QFs in the 10 aMW range because not signed or finalized by December 14, 2010
- A number of QFs petitioned FERC
- FERC issued a declaratory order holding that the IPUC violated PURPA when it concluded that a QF cannot establish a legally enforceable obligation until both parties sign a PURPA contract.

Cedar Creek Wind, 137 FERC 61,006.

Idaho: 2014-15 Solar Boom

- Large Solar QFs finance-able under non-standard QF rates
- Tremendous increase in solar QF contracts
- In late 2014, Commission expresses concerns:
 - 220 MW of QF solar recently approved
 - 181 MW more awaiting approval
 - \$1.4 billion cost to Idaho Power ratepayers
 - Concerned PURPA was requiring utilities to buy power they do not need
 - Directed utilities to inform Commission whether additional review of PURPA contract terms is warranted

Idaho: 2014-15 Solar Boom

- **Utilities petition to reduce the term of PURPA contracts from 20 to 2 years**
- IPC – 2,187 MW of PURPA generation on-line, contracted, or proposed
- IPC – 1,100 MW minimum system load; 3,400 MW maximum peak load
- Non-standard PURPA rates based on IRP which is updated every two years.
- 2 year term for PURPA contracts would allow contract rates to be updated at the same pace as IRP – Insuring utility is not overpaying or underpaying.
- Developers argued that they can not finance a project based on a 2 year contract
- August 2015 – IPUC lowered term of PURPA contracts from 20 to 2 years.

Wyoming: Contract Term

- Rocky Mountain Power has requested that the Wyoming Public Service Commission reduce the term of contracts from 20 years to 3 years.
 - Docket No. 20000-481-EA-15.
 - A hearing occurred in late March 2016.
 - The parties are awaiting a decision by the Wyoming Public Service Commission

Utah: Contract Term

- In May of 2015, Rocky Mountain Power asked the Utah Commission to reduce the term of PURPA contracts from 20 to 3 years. Docket No. 15-035-53.
- Rocky Mountain argued that significant increase in QF contract requests in 2014-15 exposed customers to potential harm of rate increases arising from over generous PURPA terms.
 - >1,000 MW existing PURPA contracts in Utah
 - >2,200 MW of proposed PURPA contracts in Utah
 - Total of almost 3,300 MW of existing and potential PURPA contracts in Utah
 - RMP's average retail load in Utah in 2014 was less than 3,000 MW
 - Utah customers will pay \$73.3 million for PURPA contracts in 2015
 - Customers are exposed to a \$26.02/MWh premium when purchasing QF power (average PURPA price of \$64.13/MWh less average forward price for Mid-C wholesale of \$26.02)
- **Utah Commission decided to lower PURPA contract term from 20 to 15 years**

Summary of Developments

- Idaho, Wyoming and Utah are all concerned PURPA may compel utilities to pay too much for unneeded power.
- All three states are exploring options to tune the level of QF expansion and to insure rate accuracy to protect ratepayers and QFs.
- Given federal statutory and regulatory constraints, it may be difficult for states to “fine tune” PURPA demand and rate adjustments; this leaves states with blunt tools to address PURPA problems and may result in outcomes that either over-incentivize or quash QF development.

Oregon: UM 1610

- Comprehensive policy docket to address seven PURPA topic areas and 30 sub-topics.
- Phase I was completed in 2014
 - Retain 10 MW eligibility cap for standard rates
 - Retain Proxy Method to set standard rates
 - Adopt modifiers to address:
 - integration cost for wind
 - Different capacity characteristics of different classes of QF
- Phase II - Order No. 16-174 issued May 13, 2016
 - Utilities own RECs even when market rates apply in last 5 years
 - PacifiCorp authorized to use Differential Revenue Requirement for non-standard rates
 - LEO occurs when QF signs final draft of PPA

Oregon: UM 1610

- Standard Rates:
 - Cost of Proxy Resource (natural gas CCCT) during periods of resource insufficiency
 - monthly market prices during periods of resource sufficiency
- Standard Renewable Rates:
 - Cost of Proxy Resource (next identified renewable in IRP, currently wind) during periods of resource insufficiency
 - monthly market prices during periods of resource sufficiency

OREGON: UM 1610

- Wind Integration Cost Adjustment for Standard Rates:
 - For wind QFs inside the purchasing utility's Balancing Area Authority, subtract the integration costs that the wind facility imposes using the wind integration cost estimates from the utility's most recently acknowledged IRP
 - For wind QF located outside BAA, no adjustment (wheeling utility can factor into OATT charge)
 - If QF not wind, no adjustment

OREGON: UM 1610

- Wind Integration Adjustment for Standard Renewable Rates:
 - If the QF is not wind, then wind integration cost is avoided so **add** estimated wind integration cost from IRP to rate
 - If QF is wind, then:
 - if both QF and proxy wind are in utility's BAA, no adjustment
 - if QF in BAA and proxy wind outside BBA, then adjustment is net difference between QF's imposed integration costs (estimated in IRP) and proxy resources integration costs (e.g., integration charge under OATT or imposed by BPA)

OREGON: UM 1610

- Capacity factor adjustment:
- Takes the capacity component embedded in the proxy method
- And multiplies by a “capacity contribution factor” equal to the expected contribution to peak load of the specific QF resources type
- The capacity contribution factor is the contribution used in the utility’s IRP for the specific type of generation (wind, solar, etc.).

OREGON

- In late March 2016, the OPUC lowered the eligibility cap for standard rates for solar QFs seeking PPAs from Idaho Power and PacifiCorp (See OPUC Order Nos. 16-129 and 16-130).
- Solar QFs with nameplate capacity of 3 MW or less are still entitled to standard rates and contracts.
- Solar QFs with nameplate capacity above 3 MW but equal to or less than 10 MW are entitled to a standard contract but not standard rates.
- The eligibility cap for standard rates and contracts remains 10 MW for all other types of QF generation

Final Thoughts

- PURPA and avoided cost ratemaking is complex
- Errors in administratively established avoided cost are inevitable – the inputs are outdated almost immediately
- Tariffs and Orders need to be written with safeguards to limit unintended consequences of PURPA implementation
 - Limit size of QF eligible for standard rates
 - Limit ability of large projects to dis-aggregate (see e.g. OPUC Order No. 06-586, Appendix B at 11-12).
 - More frequent updates to standard rates
 - Shorter terms on PURPA contracts
 - Empower utilities to refer “gamers” to Commission
 - PUC reasonableness review at time of execution
 - Preset cap on MW between price updates
 - Prompt PUC suspension of rates when needed

Thank You!

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