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Getting Standby Rates Right for a Modern Grid

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Overview

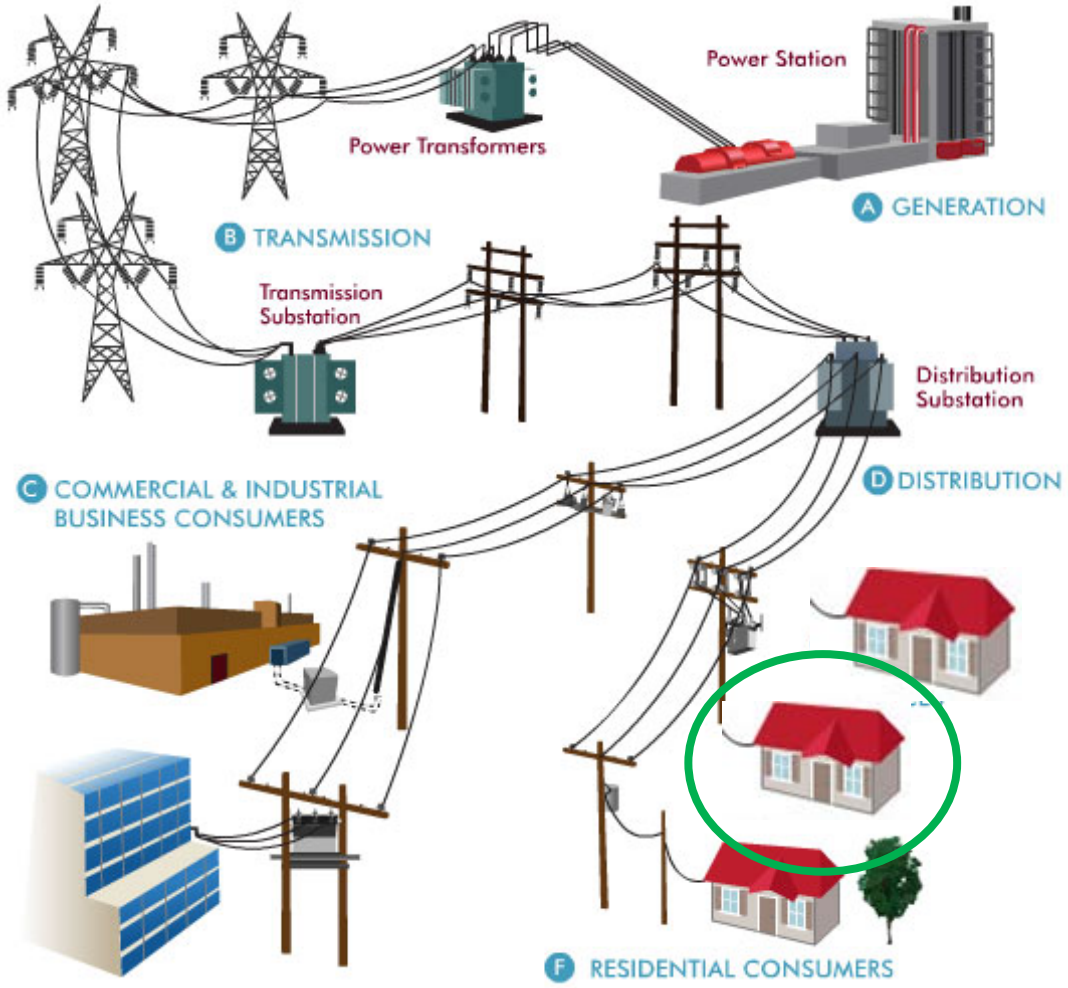
- What is Standby Service?
- Design Considerations and Principles:
  - Fair Compensation
  - Dynamic Efficiency
- Designing Standby Rates Well
- Implications for Microgrid Rate Design

1 What Is Standby Service?

What Is Standby Service?

- Set of electric utility products for customers with on-site, non-emergency generation
- Provides for a utility backstop service
- Standby service terms determine relative economics of:
  - self-provision
  - utility full requirements service &
  - purchasing competitively

Local Distribution Costs

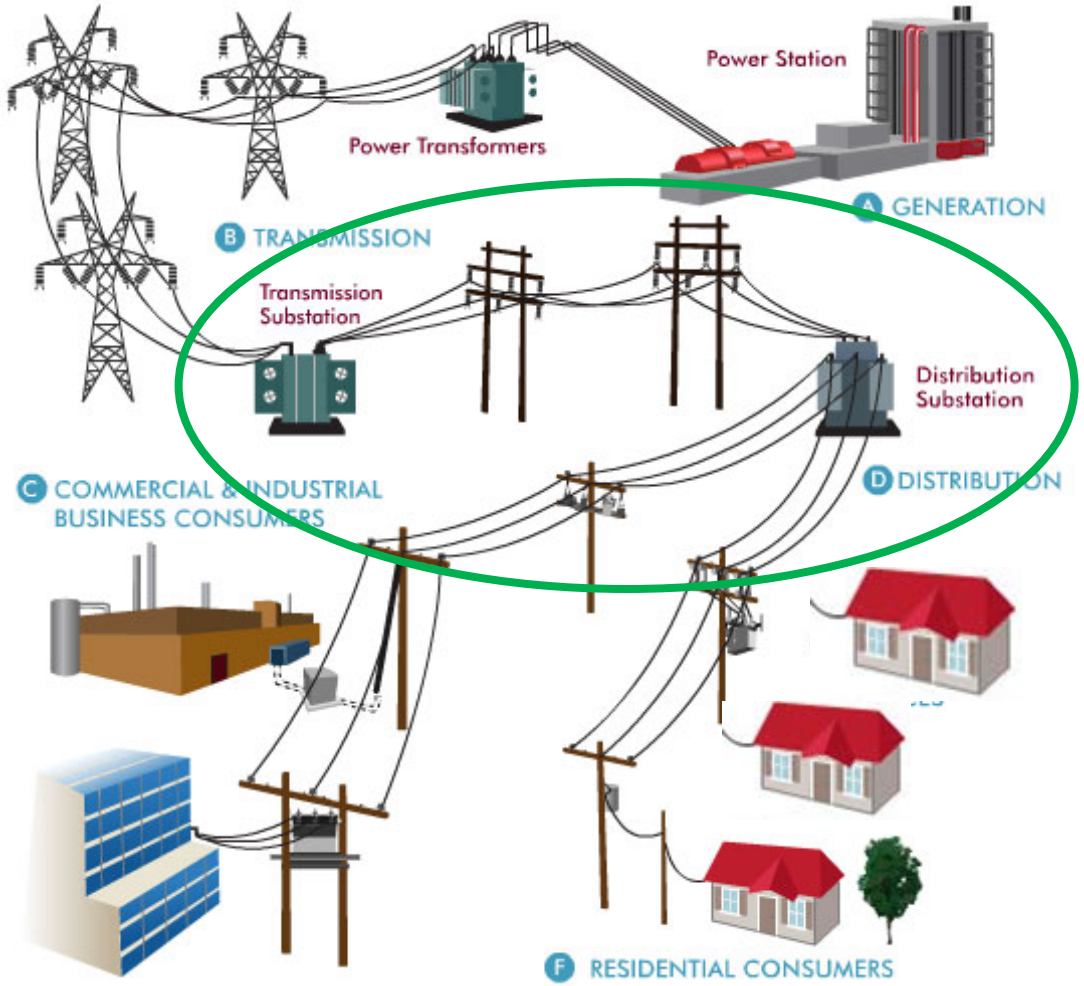


The only distribution costs that are attributable to any particular customer are the meter and service drop, and billing costs.

The transformer must be sized to the combined load of a few customers.

The rest is sized to the combined load of many customers.

Distribution Poles and Wires



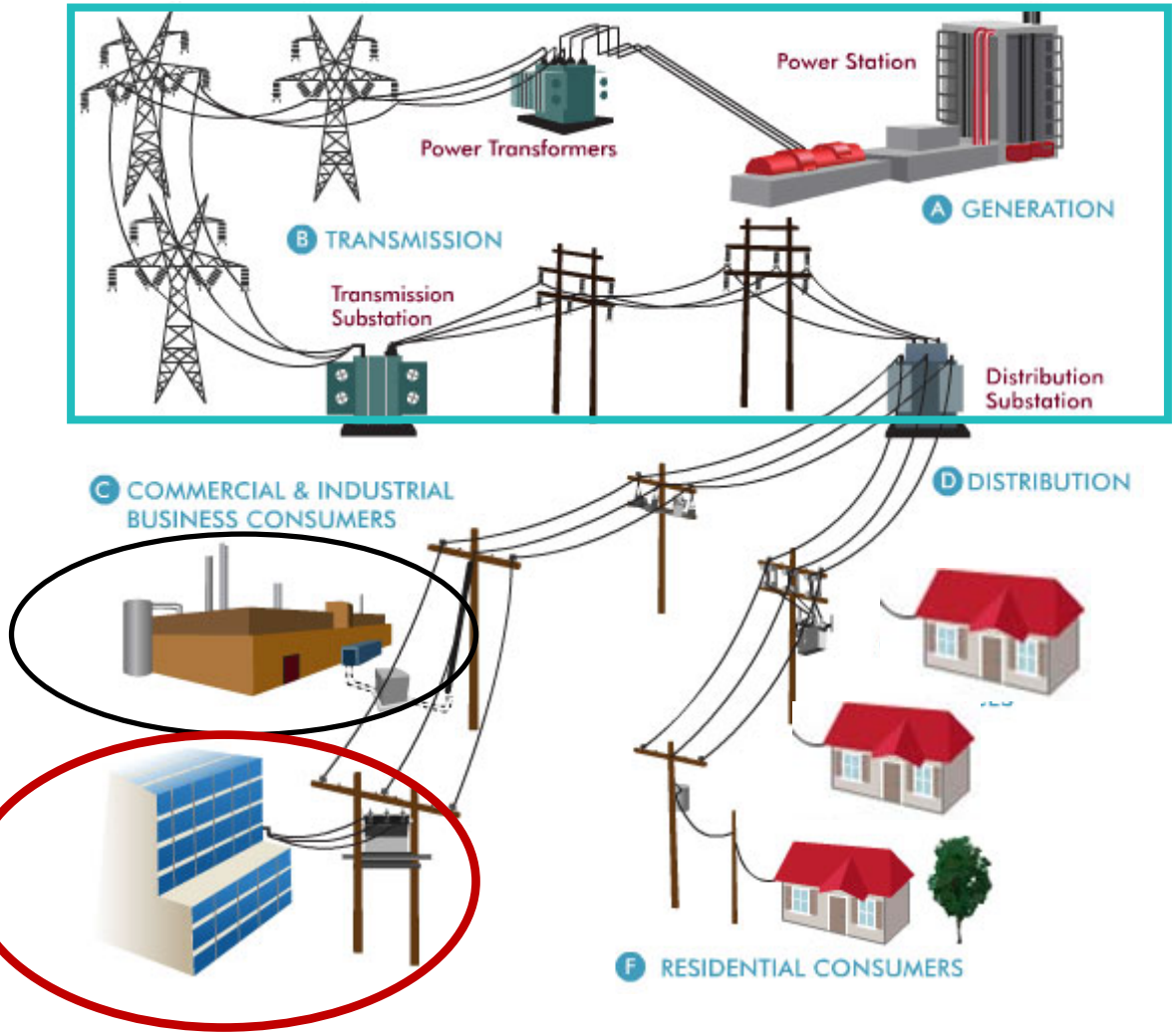
The distribution infrastructure is sized to the combined loads of all customers.

Adding (or losing) a customer does not change these costs.

They are built to deliver electricity (kWh). All customers using them should share in the cost.

If combined peak demand changes, the system design would change.

Recovery of Bulk Power Costs?



Capacity requirements are driven by peak demand.

Baseload resources are built for energy.

Transmission is mostly associated with remote (baseload and renewable) generating plant.

The size of the bulk system is driven by the combined needs of all customers.

Individual Customers and the Cost of Service

Standby service considers the components of full requirements service:

- Local distribution service
- Poles and wires
- Bulk power

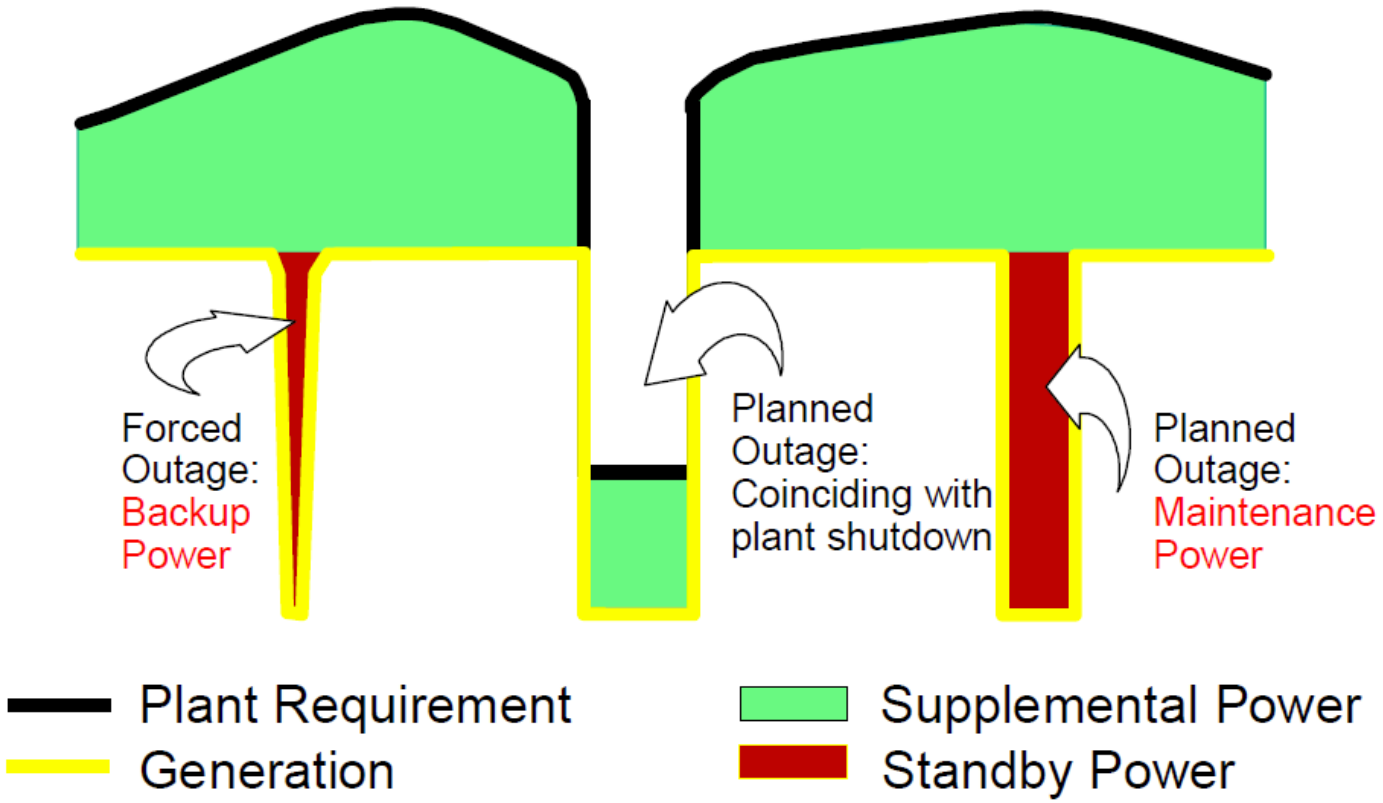
How does the individual customer affect each?

Components of Standby Service (Partial Requirements Service)

- **Backup power** during an unplanned generator outage
- **Maintenance power** during scheduled generator service
- **Economic replacement power** when it costs less than on-site generation
- **Supplemental power** when on-site generation does not meet all of customers' needs
- **Delivery service**

15 MW gas turbine generator set at Michigan State Univ., Solar Turbines Inc.

Example of a Self-Generator's Purchase Requirements



2 Design Considerations and Principles

Traditional Utility Perspective

- Obligation to serve means standing ready to provide backup power when generator is not producing
- Utility maintains generation reserves and T&D facilities to do that, at a cost
- Failure to recover these costs from customer-generators results in a subsidy by other customers (or loss to utility)
- Looks at costs from utility perspective and does not recognize benefits to grid system

“Cost Causer Pays” for Standby Service Cuts in Different Directions

- Coincident outages are likely drivers of standby costs, not sum of individual customers’ generators
- Use of standby service may not coincide with peak demand of utility facility providing service
- Individual lines and feeders may have substantial excess capacity during coincident outages (so no incremental cost), or may be fully utilized and facing upgrades in near future (and this changes over time)

Unlike Traditional Service, There Are Grid Benefits

- Where delivery system is facing upgrades:
  - Distributed generation may allow deferrals, in which case benefits may offset costs
  - In some cases, these benefits may exceed costs
- Real net costs may be negligible, negative or unknown
- In some states, public policy preference for more efficient or less polluting energy sources is recognized as a benefit
- Customers with standby service may provide demand reductions and even demand response

Design Considerations for Standby Rates

- Customer's savings per kWh produced on-site compared to buying from grid
- Reasonable balance between variable charges vs. contract demand or reservation charges
- Encouraging customer-generators to use electric service most efficiently and minimize costs imposed on electric system
- Providing opportunities for customer-generators to avoid charges when not taking service

14 MW biomass system, courtesy of MAN Diesel & Turbo North America, Inc.

More Design Considerations

- Load diversity - Generators won't all fail at same time or during system peak
  - Shared T&D facilities are designed to meet demand by a pool of customers, not a single customer's needs
  - Includes assessing CHP and PV production and failure profiles in aggregate
- Demand charges
  - Daily as-used demand charges for backup power
  - On-peak vs. off-peak demand
- Opportunities for customer-generators to buy backup power at market prices and avoid utility reservation charge for generation service
- Option for customer demand response or storage to mitigate all or a portion of backup charges

Goals in Standby Rate Design

- How can standby rates be designed that:
  - Incentivize low forced outage rates?
  - Encourage scheduled outages during off-peak periods?
  - Encourage shared capacity?

4 Best Practices

Standby Rates Best Practices: Allocation of Utility Costs

- Generation, transmission, and distribution charges can be unbundled
- Generation reservation demand charges based on utility's cost and forced outage rate of customers' generators on utility's system
- Higher-voltage delivery charges should recognize load diversity

Elements Appearing in Some Tariffs

- capacity levels and demand ratchets
- scheduled versus unscheduled use of power
- time-varying rates
- metering and billing
- minimum monthly charges
- DG compensation for generation & ancillary services to grid
- generator types or size provisions
- liability and insurance requirements
- dispute resolution
- provisions specific to wires-only companies

Interesting Tariff Elements

- Shared distribution facilities charge (e.g., substations and transmission facilities)
  - based on 15 minute demand on-peak, no annual ratchet
- Local distribution charge (e.g., transformers and local lines)
  - based on average of 2 highest non-peak demands in 12 months
  - Minimum charge is baseline but can be reduced with load curtailment plan for outages or with EE plans

More Elements

- Supplemental reserves
  - Tariff provides self-supply options including an option for an approved load reduction plan
- Unscheduled outages
  - based on real time prices
- Scheduled maintenance, economic replacement and unscheduled. outage service
  - Based on daily demand

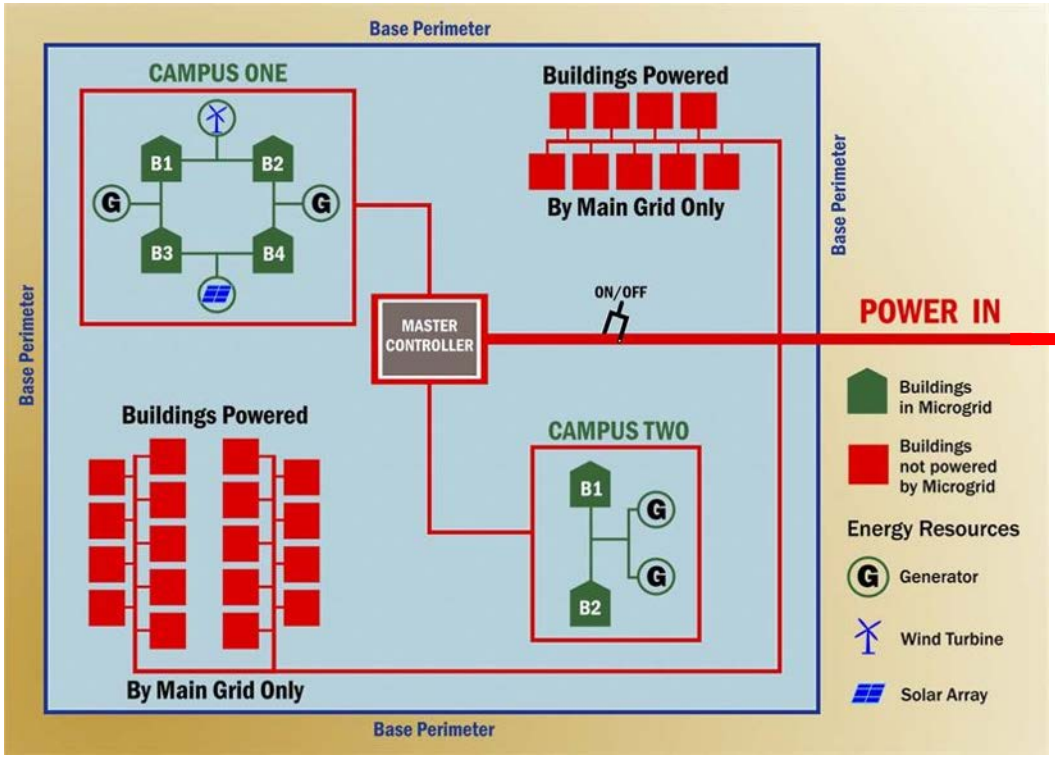
Standby Rates: Best Practices

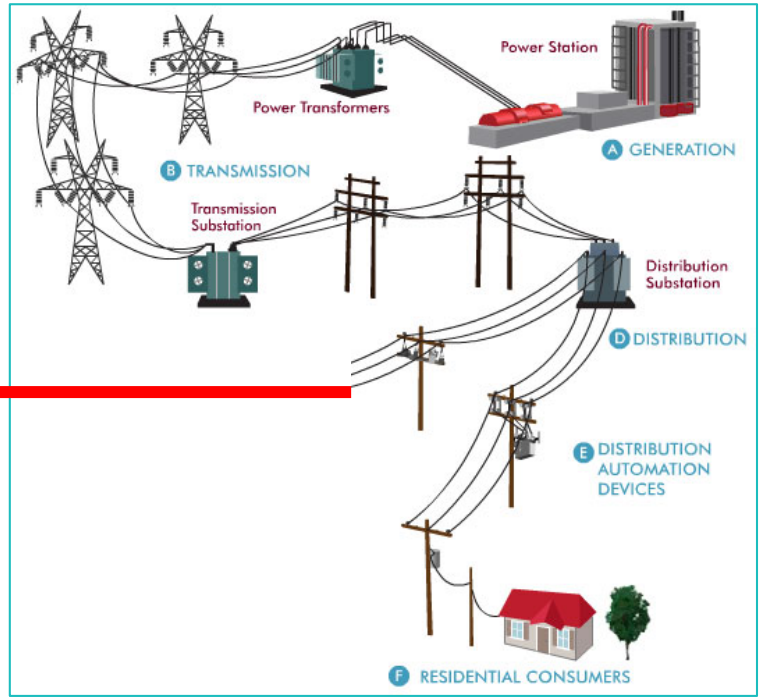
- Appropriate incentives
  - Pro-rated daily demand charges
  - Schedule maintenance with discounted daily maintenance demand charges
- Customer options
  - Interruptible standby service option
  - Customers should be able to procure standby service from the open market

5 Implications for Microgrid Rate Design

Are standby rates appropriate for microgrids - or for distributed generation plus storage users?

Is a Microgrid Different?





Utility's Costs for Microgrid

- Engineering studies
- Distribution system upgrades
  - Switching gear
  - Operational controls
  - Communications/IT (if any)
- DERs owned by utility (if any)

Customer or Third-party Microgrids

In 2017

46%

of new microgrid projects were third-party owned

New Microgrid Rate Design Considerations

All the same considerations as above, plus:

- If a microgrid provides community benefits, should non-connected customers who may benefit bear a portion of costs?
- Should macrogrid (D) operator pay microgrid owner for services on an as-procured basis, and then recover those costs from ratepayers?

About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

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