Overview of Draft Manual on Distributed Energy Resources Compensation

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Overview

- What is this project?
- Why a manual?
- Efforts to date
- Chapter by Chapter overview
- Comments on whole document
- Next steps

What is this?

- Annual Meeting in Austin created new Subcommittee
- President Kavulla tasked Subcommittee with developing a Manual:

  This subcommittee will work to create a practical set of tools—a manual, if you will—for regulators who are having to grapple with the complicated issues of rate design for distributed generation and for other purposes.
- Staff Subcommittee a forum for Staff to discuss the issues of the day
  - Includes rate design issues for electricity, natural gas, and water

Why a “Manual”?

- NARUC drafts manuals from time to time
- Assist states on topics of major importance
  - Cost allocation
  - Natural gas rate design
- Lays out variety of options and considerations
- Describes a How To framework for working through options
- Does not prescribe solutions; designed to help states wade through these issues and develop solutions appropriate to their state or jurisdiction

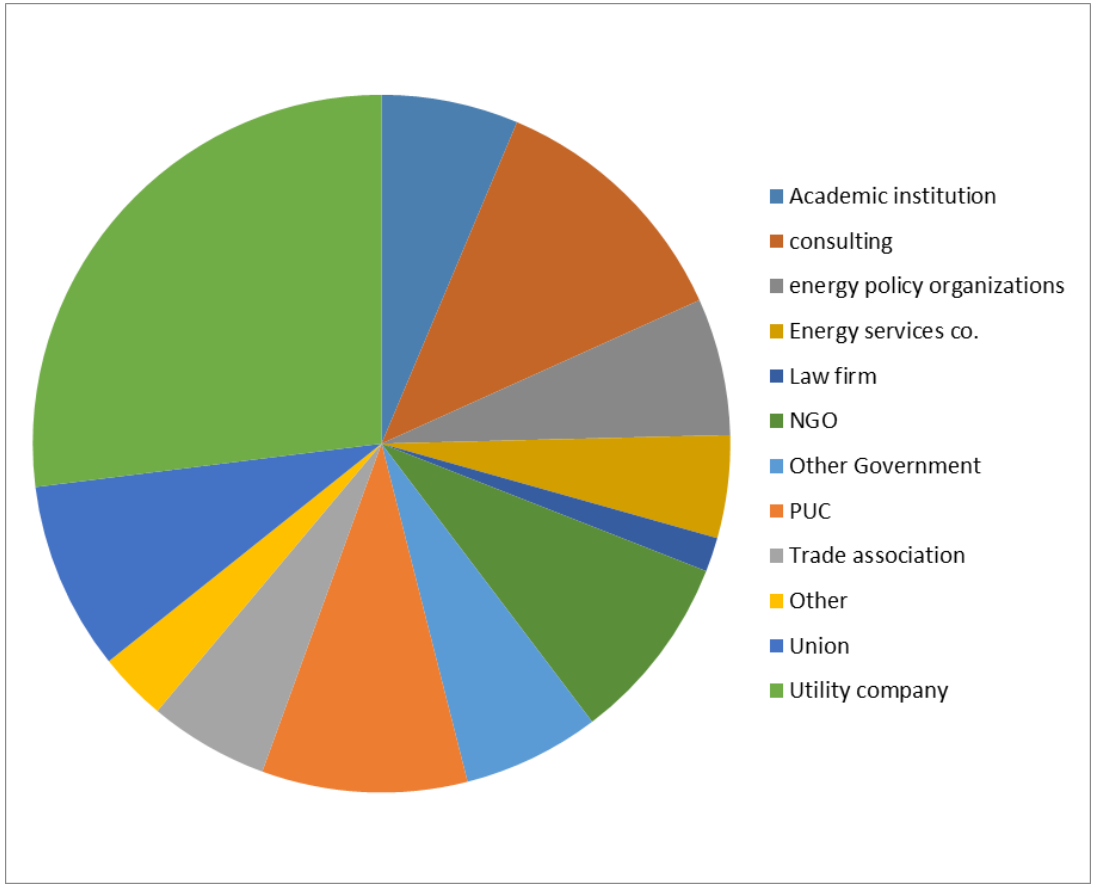
Efforts to Date

- Work began in February
- Drafting team identified
  - Represented states from coast to coast; Canada to the Gulf
  - Restructured and vertically-integrated
  - RTOs and non-RTO markets
- Released survey to gather initial input in March 2016
- Responses due April 2016
- Around 130 responses
  - Variety of interest groups
- Drafts sent via email, multiple phone calls, and 1 in-person drafting session.
- Draft released on July 21, 2016

Survey Results

- 126 Responses
- Variety of organizations and interests

Academic institution	**8**
consulting	**15**
energy policy organizations	**8**
Energy services co.	**6**
Law firm	**2**
NGO	**11**
Other Government	**8**
PUC	**12**
Trade association	**7**
Other	**4**
Union	**11**
Utility company	**34**



Overarching Themes

- Fixed costs
  - In short term, utility costs are fixed
  - In long term, utility costs are variable
- Revenue recovery
- Cost allocation
- Market value
- Technology
- Adoption rates

Chapter 2- Rate Design Process

- Intro to principles on Rate Design
  - Bonbright
- Foundation for staff new to Commissions or unfamiliar with rate design considerations
- In order to understand why DER impacts rate design, need to know the how of rate design
- What are other structural considerations for rate design

Chapter 2 – Sections

- Rates and Costs
- Basic Rate Options
  - Flat rates
  - Block Rates- Increasing and Declining
  - Time Variant
  - Three Part Rate/Demand Charge
- Other Considerations
  - Vertically integrated vs Restructured
  - Decoupling
  - Rate design as social policy
  - Low income/Affordability
  - Wholesale Markets

Chapter 3- What is DER

- So, what are distributed energy resources
- Provides working definition for purposes of manual
- Identifies initial set of technologies and actions categorized as DER
  - EE and DR
  - Technologies
- What do they do?
- Why are these important?
- Increasing adoption of DER by customers resulting in existing regulatory and utility models.

Chapter 3 – Sections

- Definition

  A DER is a resource sited close to customers that can provide all or some of their immediate power needs and can also be used by the system to either reduce demand (such as energy efficiency) or increase supply to satisfy the energy or ancillary service needs of the distribution grid. The resources, if providing electricity or thermal energy, are small in scale, connected to the distribution system, and close to load. Examples of different types of DER include photovoltaic solar, wind, and combined heat and power (CHP), energy storage, demand response, electric vehicles, microgrids, and energy efficiency.

- Types of DER
  - Solar PV
  - CHP
  - Wind
  - Storage
  - Microgrids
  - DR
  - EVs

Chapter 3 continued

- What is a resource
- DER adoption rates and its importance in the future
- DER impacts on utility costs
  - Revenue erosion
  - Cost recovery
  - Cost shifting
  - Interconnection
- Benefits of DER
  - Location vs system
  - Existing rate design misses DER benefits
  - Identifying new benefits and incorporating them into rate design
- Ownership and Control
  - Non-utility ownership vs utility ownership
  - Regulations and statutes over 3rd party models
  - Customer protection

Chapter 4 – Rate Design Considerations

- Outlines rate design consideration and impacts from DER
- Current issues facing states
- Potential issues facing states on DER
- An analysis of how DER impacts specific rate design options
- Need for more data

Chapter 4 - Sections

- What should the rate do?
  - Which costs should come from DER vs rate base?
  - Rate design for all customers or just DER
  - New customer classes
  - What is the appropriate price signals
    - Rates should reflect a price signal
  - Long term vs short term
    - Costs
    - Benefits
- Impacts on other customers
  - Does DER avoid infrastructure costs
  - Cost shifting
  - DER customer still connected to grid and reliant on service for other times
  - Cost allocation
  - Asset lifetime- DER vs utility
  - Stranded costs

Chapter 4 continued

- Impacts on utility
  - System planning
  - Required to serve all customers
- Cross subsidies
  - DER vs non-DER
  - Restructured vs Vertically-integrated
    - Different sets of costs to recover
    - Different ways to recover costs
  - Other cross subsidies
    - Residential and C&I
- Grandfathering
  - Certainty for DER vs Utility revenue stability
  - Adoption over time
  - Impacts on payback period for investment
  - Phase in rate change

Chapter 5 – Compensation Methodologies

- Options for compensating DER
- Identifies 6 potential considerations
- Describes the option
- Identifies pros and cons
- Provides some direction to jurisdictions on process and questions to ask related to option

- Realized…..where does technology fit?

Chapter 5 – Net Energy Metering

- Simplest and least costly
  - Does not require AMI
- May have total system savings through avoided generation purchases
- Compensates customer at retail rate, typically
- Offsets against total bill
- Doesn’t account for time or location
- Rate may not reflect value to grid
- May result in excess credit over time
  - Utility not recovering costs
  - Other customers make up difference
- Understanding impacts when paired with certain rate designs

Chapter 5 - Valuation

- aka Buy all/Sell all
- Customer paid for generation separate from consumption
- Identifies 3 types of valuation
  - Value of Resource (VOR)
  - Value of Service (VOS)
  - Transactive Energy (TE)
- Technology needs
- Valuation models can change over time as adoption rates progress
  - VOR = low adoption
  - VOS = medium adoption
  - TE = high adoption

Chapter 5 - VOR

- Identifies specific values of a resource
  - Manual identifies 11 values/costs
- Technology specific
  - *e.g.*, Value of Solar
- Can encourage development of DER at more beneficial locations
- Provides certainty on investment, at least over short term
- Requires technology to implement
- Caution when utilizing carbon credits as a value
- Requires subjective judgments on value determination
- Proceeding determining values/costs may be contested

Chapter 5 - VOS

- Identifies distribution grid services that can be valued, or priced
  - Ancillary services in transmission
- Functional unbundling of distribution grid
- Allows for additional services from DER to be valued and used
  - Voltage support
  - Storage
  - Ramping
  - Can be locational or service territory
- Requires technology on utility and customer side
- Require new ways for utility to recover costs – departure from traditional model
- Attempt to better integrate DER into utility planning to become dispatchable
- Adoption rates of DER important to monitor

Chapter 5 - TE

- Peer to peer transactions
- Buying and selling between actors connected to the grid
  - Customer to customer
  - Customer to utility
  - Utility to customer
- Requires significant technology investment for distribution grid
- Extract additional benefits out of DER
  - If utility doesn’t need specific benefit, maybe another customer does?
- Regulatory constraints
  - What is a utility?
  - Role of 3rd party aggregators
- Option for large adoption of DER – in the future.

Chapter 5 – Demand Charges

- Long history of use for C&I
- Bills customers for peak consumption
  - Coincident vs non-coincident
  - What is peak- customer, location, system?
- Addition to traditional bill – 3 part rate design
  - Customer charge, volumetric, demand
  - Splits “fixed” charges (customer charge)
  - Lowers volumetric
- Price signal?
- Requires AMI
- Customer confusion/education
- Lack of experience with demand charges for residential
- Impacts on customers, both DER and non-DER

Chapter 5 – Fixed Charges and Minimum Bills

- Keep 2 part tariff, and increase fixed charge/customer charge
- Recover “fixed” costs
  - Determination of what are fixed costs- short term vs long term
- Provides rate stability for utility
  - Over time?
  - Risk of defection
- Price signal muted
- Minimum bill ensures all customers pay something
- Free electricity!
- Loss of conservation signal
- States are looking as an option

Chapter 5 – Standby and Backup Charges

- History of use for some customers that can self-generate
- Utility provides service when on-site generation fails
- Costs charged for service since utility must meet operating conditions
  - Utility must maintain levels of reliability, these customers introduce uncertainty, so utility charges those customers for the risk
  - Avoids large reserve margins, but utility must provide service to these customers when self-generation goes down
- Typical customer industrial or large commercial location
- But, DER……likely residential or somewhere else on distribution grid
  - Reliability borne by system or DER?
  - Aggregation of DER may mimic industrial or other large customer
- Adoption rates important to consider as it impact reliability
- Not currently being considered
  - Need to understand costs and benefits better

Chapter 5 – Interconnection Fees

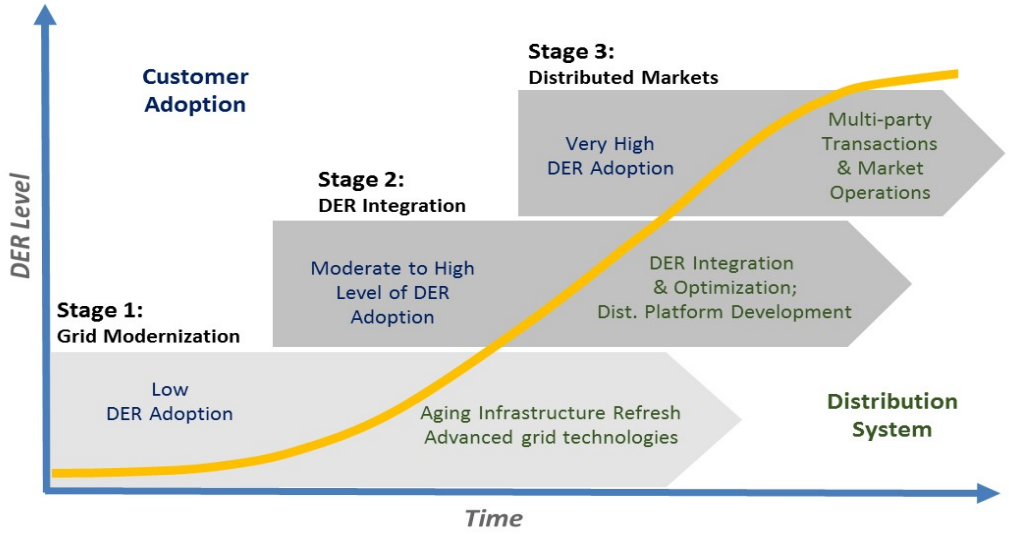
- Costs to interconnect already existing in many tariffs
  - One-time fee to interconnect with utility system
- If there are costs to connect (i.e., new infrastructure), DER responsible
- Acts as a fixed cost
- Recovers costs directly from DER seeking to connect
- May delay payback period of DER investment
- May impact the value of DER if charge is too high

Chapter 6 – Technology, Services, and Markets

- Adoption rates
- How can technology help
- Identifies an initial set of technology that may be useful
- Use technology to monitor adoption levels
- Technology can help identify tipping points
  - Need to be flexible
  - Compensation methodology and rate design may need to change over time in response to adoption
- Three step adoption curve and impact on utility and markets
  - DeMartini/Kristov curve

Chapter 6 – Monitoring and Adoption

- Adoption levels will impact rate and compensation options
- These vary across the country
- Need for flexibility in policy and rate reforms



- DeMartini/Kristov curve

Chapter 6 - Technology

- Technology is required to use certain rate design and compensation options
- Technology can also assist regulators monitor adoption and identify benefits and costs of DER
- Awareness of what is going on
- Options
  - AMI
  - ADMS/DERMS
  - Smart Inverters
  - Hosting Capacity
- DER will have increasing impact at locations
  - Impacts costs, planning, and reliability for utility
  - Also potential for benefits to utility and customer if better integrated

Next Steps and Conclusion

- Comments were due September 2
  - Comments are being evaluated
  - Will improve final document
- Still more work to be done on Manual
- Release of final Manual before Annual Meeting