Two types of renewables: utility scale and distributed

<table>
<thead>
<tr>
<th>Description</th>
<th>Recent Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Utility Scale</strong></td>
<td>• Corporates are driving demand, largely in Texas</td>
</tr>
<tr>
<td>• Greater than 10MW; most</td>
<td>• Long-term renewable contracts beat the market</td>
</tr>
<tr>
<td>often 50+MW</td>
<td>price</td>
</tr>
<tr>
<td>• Solar and wind farms</td>
<td>• Aggregations forming to achieve better pricing</td>
</tr>
<tr>
<td>• Often located in west and</td>
<td>• Transmission costs have been on the rise,</td>
</tr>
<tr>
<td>north Texas</td>
<td>creating tremendous economic case</td>
</tr>
<tr>
<td><strong>Distributed Scale</strong></td>
<td>• Regulated-region customers can work with</td>
</tr>
<tr>
<td>• Less than 10MW / most</td>
<td>local co-op or muni</td>
</tr>
<tr>
<td>often less than 1 MW</td>
<td></td>
</tr>
<tr>
<td>• Typically solar</td>
<td></td>
</tr>
<tr>
<td>• Located on site of the</td>
<td></td>
</tr>
<tr>
<td>buyer’s facility</td>
<td></td>
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</tbody>
</table>
ERCOT Transmission Charge Escalation

ERCOT 4CP Transmission Demand Charge ($/kW-yr)

Worsening Congestion Drives More Transmission

Source: PUCT

Source: ERCOT
ERCOT Transmission Charge Escalation

- Oncor transmission charges will closely follow ERCOT “Postage Stamp” Rate
- Slight discount to “Postage Stamp” rate due to cross-subsidization (small commercial and residential paying a little more than their fair share)

ERCOT “Postage Stamp” Rate = $53.58 / kW-yr = $4.47 / kW-mth
Sept. ‘18 Average Oncor Transmission Cost Recovery Factor (“TCRF”) = $47.48 / kW-yr = $3.96 / kW-mth

<table>
<thead>
<tr>
<th>Class</th>
<th>Charges</th>
<th>Oncor - Docket 48408</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary &gt; 10 kW IDR</td>
<td>per 4CP kW</td>
<td>$4.566693</td>
</tr>
<tr>
<td>Primary &gt; 10 kW IDR</td>
<td>per 4CP kW</td>
<td>$4.107310</td>
</tr>
<tr>
<td>Primary &gt; 10 kW Substation</td>
<td>per 4CP kW</td>
<td>$3.148377</td>
</tr>
<tr>
<td>Transmission IDR</td>
<td>per 4CP kW</td>
<td>$4.006269</td>
</tr>
</tbody>
</table>
On-site solar reduces transmission charges

Every 4CP moment has occurred between 3:45 and 5pm...

...No need to enroll in 4CP predictive services because the sun is shining >90% of time
Co-ops and muni’s are racing ahead with solar

City of Kerrville — utility-customer solar generation agreement

Description
• Local non-profits host solar arrays for municipal utility, KPUB
• Projects are front-of-the-meter (on distribution grid)
• Sized at 0.99 MW to capture transmission savings
• Hosts receive discounted power rates
• Remaining power provides lower rates to low income housing.
• KPUB developed tariff structure, determined hosting finalists, and awarded solar projects in 2018

Lessons
• Took a substantial time and internal resources for KPUB to find non-profit hosts and the solar provider
• Utility-scale renewables procurement is a lower resource burden for KPUB

Benefits
• Provides savings to KPUB via transmission (4CP) and energy cost savings — savings passed on to hosts and low-income housing
• Property tax payments of power projects stays within community

Source: Hill Country Community Journal
Comparing utility- and distributed-scale solar

**UTILITY SCALE** versus **DISTRIBUTED SCALE**

Solar PPA Prices Converted to Utility-Scale PPA-Equivalent ($/MWh)

- **UTILITY SCALE**
  - (> 75 MW; located in Far West TX; priced at North LZ)
- **ON-SITE GROUND-MOUNTED**
  - (> 1 MW; DFW metro area; free land lease)
- **ROOFTOP SOLAR**
  - (DFW metro area; > 1 MW co-located; >0.1 MW per bldg.; flat roof)

- **~25%**
- **~10%**
Today's agenda

[2:00–2:20] Welcome
[2:55–3:10] Experiences*
[3:25–4:00] Options for procurement
[4:00–4:30] Action planning*

* Includes small group discussion
Experiences

2:55–3:10

1. Form small groups
2. Share your experiences with renewables (10 min)
   a) Have you considered renewables? Why or why not?
   b) How did the renewable energy offers perform?
3. Sharing in the plenary (5 min)
   a) Volunteers share their discussions/insights
Framework: How do the renewables energy offers perform?

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Performance</th>
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<tbody>
<tr>
<td></td>
<td>1 = very weak</td>
</tr>
<tr>
<td></td>
<td>5 = very strong</td>
</tr>
<tr>
<td>Contracting simplicity</td>
<td></td>
</tr>
<tr>
<td>Competitively bid on supplier qualifications</td>
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<tr>
<td>Budget certainty</td>
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<tr>
<td>Length of contract</td>
<td></td>
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<tr>
<td>Cost savings</td>
<td></td>
</tr>
<tr>
<td>Ability to track savings</td>
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<tr>
<td>Additionality (sustainability)</td>
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<td>Scale (% of your consumption)</td>
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# Framework: Rate your priorities

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<th>How important?</th>
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Distributed Solar: Options for Procurement

1. Self-procurement
- Description:
  - Release RFP
  - Evaluate bids and select a provider
- Assessment:
  - Highly customized
  - Proceed at your own pace
  - Higher price

2. Muni or Co-op
- Description:
  - Work with local utility to procure the solar
  - Bilateral contract/tariff
- Assessment:
  - Enables transmission cost savings for better economics
  - Can be part of an aggregation
  - Muni or co-op can be challenging to work with

3. Aggregation
- Description:
  - Multiple entities release RFP together
  - Individual contracts
- Assessment:
  - Can reduce cost by ~10% in relation to self-procurement
  - Additional buyers can complicate the procurement
Aggregation of distributed solar saves 10% on PPA price

Cost Savings through Aggregation of Distributed Solar by State

- PPA Offer ($/MWh)
- Regional Portfolio (MW)
- New Mexico
- Colorado
- Texas

10% cost savings through aggregation of distributed solar by state.
Utility-scale Renewables: Options for Procurement

1. Retail Electricity Provider
   - Contract for “100% renewable” power
   - Fixed price, matches load
   - 2–10 year term

2. Power Purchase Agreement
   - Agreement with renewable project developer
   - Variable volume, fixed price
   - 15–20 year term

3. Public Power Blocks
   - Subscription to an aggregated power purchase
   - Fixed price block
   - 15–20 year term

RECS = Renewable Energy Certificates
Public Power Block is the biggest public entity renewables aggregation, offering low prices and budget certainty

**What it is**
- A 150+ MW block of power composed of new-build solar, new-build wind, and grid power (natural gas, coal, nuclear, and existing renewables)
- 15–20 year term, beginning mid-2020
- To be competitively bid on price and qualifications for the Texas Power Pool early 2019

**Why it matters**
- Immediate cost savings
- Reduced exposure to electricity market volatility
- Integrates with existing and future retail electricity provider contracts
- Enables 150–200 MW of new-build solar and/or wind
- Creates revenue for Texas university systems

**Target Customers**
- State of Texas entities or AA-rated-or-higher Texas municipal entities, ISDs and universities
- Minimum 20 million kWh annual power consumption
The Public Power Block (PPB) enables public entities to lock in historic low temporary pricing, but now for 15–20 years.

**Historical ERCOT Values**

Source: Actual wholesale values are historical load zone settlement prices taken from ERCOT State of the Market reports.
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Action Planning

4:00–4:25

1. Form small groups

2. How can you overcome renewable energy procurement challenges? (5 min)
   a) What are your procurement challenges?
   b) What does success look like?

3. What are the most important steps to take? (10 min)
   a) What do you need to accomplish?
   b) Who should be involved?
   c) How will you know when you are making progress?

4. Sharing in the plenary (10 min)
   a) Volunteers share their discussions/insights
Concluding messages

• Texas Power Pool is a power purchasing option made available through the Comptroller Statewide Procurement Division

• Renewable energy is the lowest cost power in Texas if procured long-term

• No need to wait for your retail power contract to expire

• Renewable energy provides long term hedge against future prices

• Savings vs long-term market prices are not guaranteed, but most deals are done based on high probability
THANK YOU

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