CPS Energy’s Generation Strategy

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CPS ENERGY: BY THE NUMBERS

#1
Largest municipally-owned electric and gas Utility in US

786K
Electric and Gas Customers

339K

AA+
Premier credit rating

$11B
$11B in assets

$2.5B
$2.5B in annual revenue

#1
Solar leader in Texas; Tenth in the nation.

New Energy Economy Partnerships

$1.4B
Annual economic impact to San Antonio community

>900 Jobs
More than 1,000 new jobs have been committed to San Antonio by our NEE partners.
Vision 2020 transitions CPS Energy from a company that is highly dependent on traditional generation power sources to a company that provides **competitively priced power based on a diverse generation portfolio**.

- **20% renewable energy capacity in power generation mix**
- **65% of generation low-carbon**
Diversification

Fuel and Technology Diversification - Installed Capacity

1970
- Gas-Steam 100%
- 1648 MW

1980
- Gas-Steam 75.1%
- Coal 24.9%
- 3338 MW

1990
- Gas-Steam 61.1%
- Nuclear 17.8%
- Coal 21.1%
- 3930 MW

2015
- Gas-Steam 41%
- Nuclear 13%
- Coal 27%
- Wind/Landfill Gas 13%
- Solar 1.7%
- 8056 MW
Generation Mix

2010
- Nuclear: 33.2%
- Coal: 48.9%
- Renewables and Gas: 17.9%
- Total: 82.1%

2015
- Nuclear: 29.6%
- Coal: 29.2%
- Renewables and Gas: 58.2%
- Gas: 26.3%
- Wind: 11.1%
- Solar: 1.1%
- Total: 41.2%
HOW WE GOT HERE

Innovative Strategic Approach
- Actively managing risk through diversification of generation sources
- Reducing carbon intensity / transitioning to a cleaner fleet
- Pursuing affordable renewables, supported by more flexible & dynamic traditional thermal fleet
- Leveraging clean energy development & energy efficiency initiatives to create economic opportunity in San Antonio

Our actions have included:
- Early deactivation of coal (Deely 1 & 2) & use of ultra-low sulfur coal
- Purchase of an 800MW Natural Gas Combined Cycle (Rio Nogales)
- Deployment of 500MW of Solar & 1059 MW of Wind
- Innovative & strong local rooftop solar market (~50 MW)
- STEP 771 MW - Demand Response & Energy Efficiency

“CPS Energy’s strategic goals and decisions are among the most progressive in the country. It is shooting for 20 percent renewable energy generation capacity by 2020 and has plans to mothball one of its 1970s-era coal plants in 2018, 15 years earlier than expected.”
-Jim Marsten, Founding Director of the Texas office of Environmental Defense Fund (EDF)
CPS ENERGY IS #1 IN SOLAR FOR TEXAS

Somerset Solar Farm - Southeast San Antonio
WIND IS A LARGE PART OF GENERATION MIX

Desert Sky Wind Farm - Iraan, TX Pecos County
OPTIONS, CHOICES & CONVENIENCE FOR OUR CUSTOMERS

**SAVE NOW**
- Residential and commercial energy efficiency
- Home Manager
- Smart Thermostat

**SIMPLY SOLAR**
- SolarHost SA
- Roofless Solar

**casa verde**
- Weatherization Program

**chargepoint**
- Electric vehicle charging network

**MY THERMOSTAT REWARDS**
- Nest
- Energy Hub
- Honeywell
- Weather Bug
DEMAND RESPONSE
EQUIVALENT TO A SMALL POWER PLANT

~125,000 customers on demand response programs

MW


96 105 137 172 201 196


~125,000 customers on demand response programs

11
Historical CO₂ Intensity for CPS Energy (lbs of CO₂ emissions per net mwh of generation from all sources of power including gas, coal, wind, and nuclear)

- **1988**: STP 1 & 2 added to Generation mix
- **1993**: STP shutdown for year
- **2005**: Increase STP from 28% to 40% ownership
- **2009**: Increase due to Spruce 2
WE ARE CLOSE TO MEETING GOAL OF 65% LOWER CARBON EMISSIONS

Total Generation

- Coal 25.1%
- Nuclear 25.8%
- Gas 23.3%
- Wind 9.9%
- Purch Pwr 12.0%
- Solar 1.0%
- Landfill Gas 0.3%
- STEP 2.7%

Total Carbon-Free Generation

- Nuclear 65.4%
- Wind 25.1%
- Solar 2.6%
- STEP 6.9%

STONG VALUE PROPOSITION FOR  
GRID 2.0

CURRENT STATE

• 13M miles driven annually
• 103K miles walked annually
• 4.1M calls answered annually
• Old processes

FUTURE STATE

Automating processes
Better data and decision making
New products & services
Accelerated customer response & problem resolution
BATTERY STORAGE PROJECT

Solar
5 MW Solar PV Facility

Battery Energy Storage System
10 MW-1hr Battery or 5 MW-2hr Battery

Will reduce the emissions of pollutants through Solar Shifting in addition to providing Ancillary Services in the ERCOT market.
TECHNOLOGY INNOVATION PILOTS

CPS Energy Microgrid

- **Partners:** JBSA, UTSA, Omnetric, Duke Energy
- **Location:** Fort Sam Houston Library
- **Purpose:**
  - Microgrid can isolate from the grid for resiliency and back-up purposes
  - The lessons learned from this pilot will allow for future installations throughout the service territory increasing the robustness of the utility grid

Photovoltaic system paired with a 75kW battery system
CUMULATIVE HISTORICAL WATER SAVINGS

Water saved

<table>
<thead>
<tr>
<th>Description</th>
<th>Water Saved (acre-feet)</th>
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<tbody>
<tr>
<td>CPS STEP (2005-2015)</td>
<td>5,842</td>
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<tr>
<td>CPS Renewables (2015)</td>
<td>40,410</td>
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CPS STEP (2005-2015)

CPS Renewables (2015)
ANNUAL WATER SAVINGS

Water Saved Due to Renewables & Energy Efficiency

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<tr>
<th>Year</th>
<th>STEP (Energy Efficiency)</th>
<th>Renewables</th>
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<td>2003</td>
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<td>622</td>
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<td>2004</td>
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<td>2013</td>
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<td>2020</td>
<td>1,75</td>
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COMBINED NOx + SO₂ RATE RANKING

Generating Unit Emission Rates - 2015
Combined NOx plus SO₂ (lb/MMBTU)
744 Operating Coal Units Reporting Emissions in

Deely 1 ranked #475 (64% in nation)
Deely 2 ranked #453 (58% in nation)
Spruce 1 ranked #144 (19% in nation)
Spruce 2 ranked #1

All CPS Energy Units Combined = 0.3589 lb/MMBTU (Top 35% in Nation)

U.S Average Emission Rate = 0.7517

Deely Unit 1 = 0.6061 lb/MMBTU
Deely Unit 2 = 0.5908 lb/MMBTU
Spruce 1 = 0.1868 lb/MMBTU
Spruce 2 = 0.0518 lb/MMBTU
Deely Unit 1 = 0.6061 lb/MMBTU

Numerical Ranking of Units - Worst to Best
CPS Energy has reduced NOx Emissions by over 78% since 1997.
PARTICULATE MATTER REDUCTION

CPS Energy Coal Unit Particulate Matter (PM) Emissions

Reduction due to replacing JTD1&2 Electrostatic Precipitators with more

PM emissions (tons)
SO$_2$ REDUCTION

CPS Energy Total Sulfur Dioxide (SO2) Emissions (tons/year)

2012 Reduction due to use of ULS coal at Deely
QUESTIONS?

Photo courtesy of OCI Solar