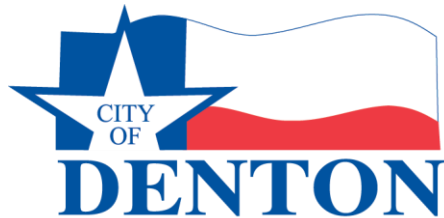


RENEWABLE DENTON WORK SESSION

City Council

1/05/2016



**RENEWABLE
DENTON**

Executive Summary

- Council Direction: renewables, rates, reliability
- DME response: Renewable Denton Plan
- The Renewable Denton Plan:
 - 70% Renewable Energy, replaces coal generation
 - Rate decreases beginning in 2020
 - 74% portfolio emission reduction
- This presentation
 - Utility scale battery update
 - Size of proposed quick start facilities
 - Community emissions impact
 - Questions

Utility Scale Battery Update

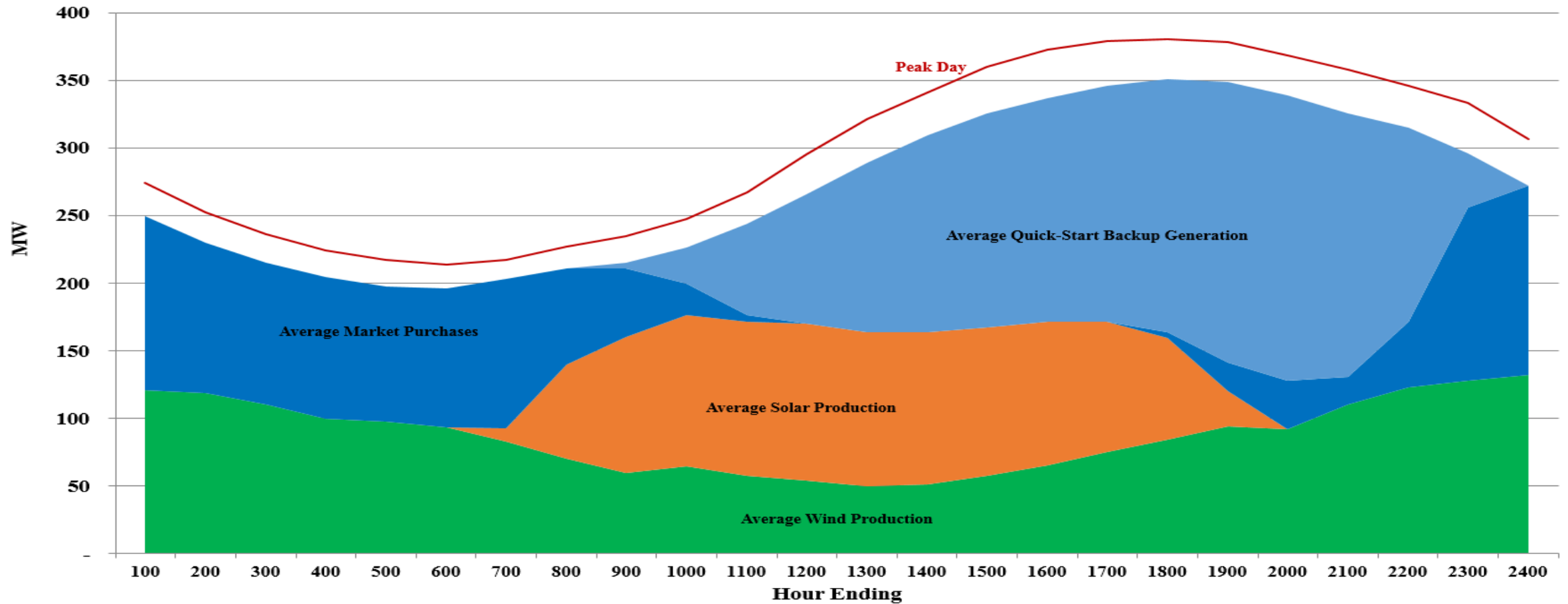
- Capital cost is 3-4 times higher than quick-start plants
- Life span is 1/2 as long or less than quick-start plants
- Technology has not been proven over many years
- Used for ancillary services, not to meet load requirements
- Uncertain rules in ERCOT for operations
- Citibank analysts expect battery storage to start to be cost effective around the year 2030

Why 220 MW of Quick-Start Units?

- 100 MW: allows option to replace Gibbons Creek
 - Reduces potential exposure to market
 - Market MWs have higher emissions
 - Volatile pricing for market MWs
 - Much more flexible generation
- 100 MW: backs up wind energy
 - Mitigates risk
 - Allows more favorable contract terms
- 20 MW: backs up solar energy and accounts for load growth
 - Mitigates risk, allows us to meet growth forecasts
 - Allows more favorable contract terms

220 MW usage on an average summer load day

Projected Portfolio Demand and Resources-August Monthly Average in 2019



12 units vs 6 units

Comparison criteria	12 units	6 units
Cost	\$225,000,000	\$150,000,000
GHG Emissions Reduction	74%	32%
20 Year Savings	\$526MM	\$320MM
Market Risk	Less	More
Rates decrease beginning	2020	2025
Option to replace Gibbons Creek	Yes	No

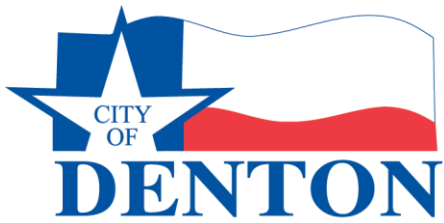
2019 Projected Emissions and Gas Usage Reduction Amounts

	Business as Usual	RDP	% reduction
GHG (CO2e)	1,088,309	287,574	74%
Criteria Pollutants	1845.1	487.9	74%
NG Usage	4,740,018	2,961,765	38%

Assumptions:

All quantities are for serving city demand

Criteria Pollutants are NOX, SO2, VOC, PM



RENEWABLE DENTON