RENEWABLE DENTON UPDATE

City Council

11/10/2015

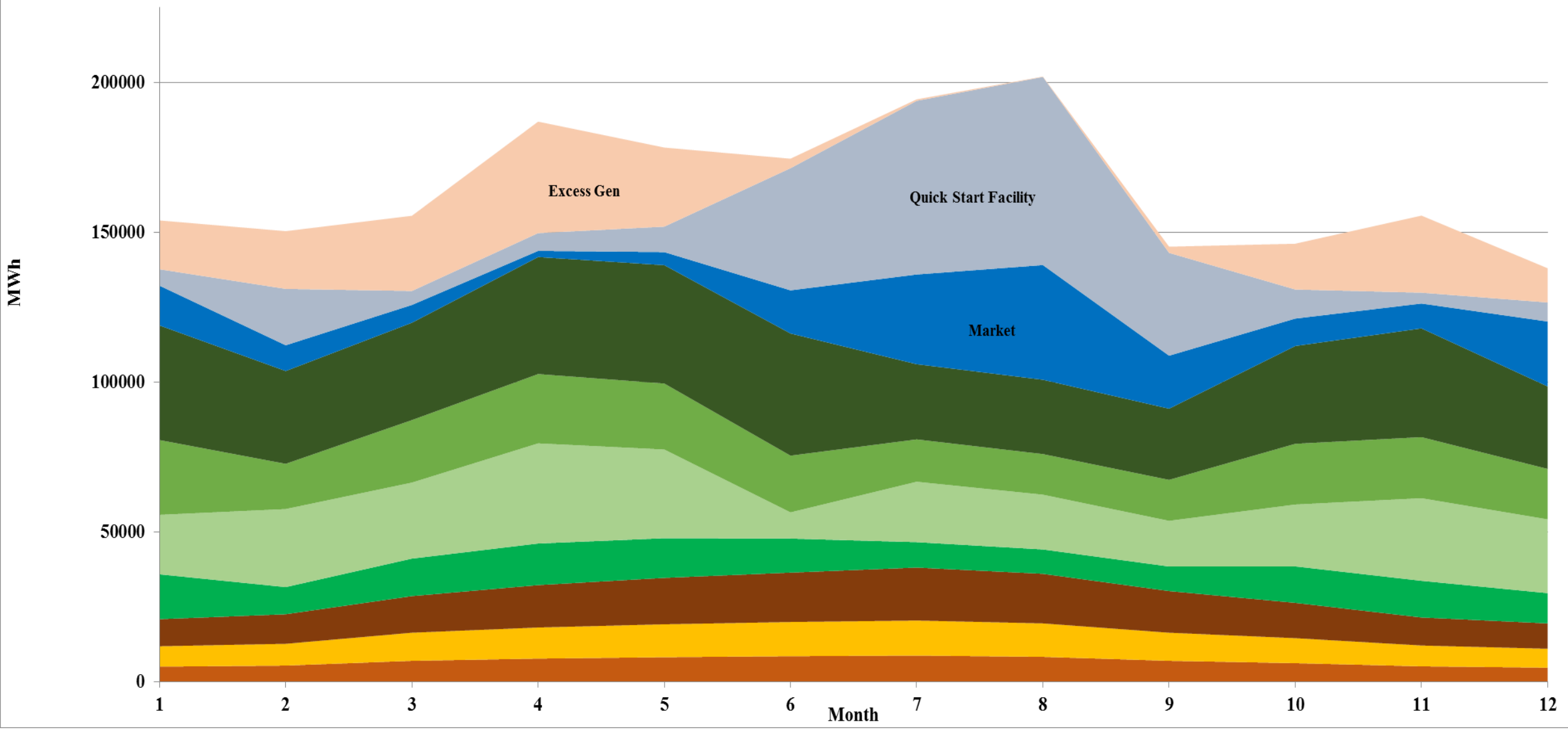
RENEWABLE
DENTON

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
  - 75% portfolio emission reduction
  - Two Energy Centers
    - Quick-start units
    - Space for renewable R&D testing

RENEWABLE DENTON

2019 Load Projection by Resource - Monthly



Previous Discussions with Board and Council regarding Renewable and Backup Generation

- 46 total discussions/presentations on renewables and/or firm backup since 2009
- Since 40% renewables achieved in May 2009, numerous options and possibilities have been explored and discussed

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Recent Presentations

Description	Date Presented to PUB	Date Presented to City Council
Generation Briefing	2/24/2014	4/1/2014
TMPA 2018 Plan	3/24/2014	4/1/2014
TMPA 2018 Plan	4/14/2014	5/6/2014
Generation Briefing - Joint Session	6/2/2014	6/2/2014
Future Power Supply Options Briefing	12/8/2014	1/6/2015
Power Supply Strategy Briefing	1/12/2015	1/13/2015
Power Supply Strategy Briefing	5/4/2015	5/5/2015
Power Supply Briefing - Status Update & Financing	8/10/2015	8/25/2015
Project Communication Plan Briefing	8/10/2015	8/25/2015

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Earlier Presentations

- 12/2009 TMPA Options
  - "the variable nature of renewable generation requires some firm power as a back-up"
- 02/2012 PPA for Solar Installations
  - 10 to 20 MW, demo projects, local manufacturer
- 09/2012 CHP Strategic Business Discussion
  - need to develop larger resources; exploring additional generation
- 01/2013 Power Supply Briefing
  - larger scale generation (up to 200 MW) is feasible
- 12/2013 Configuration and Financial Analysis
  - included cost per kW and total capital cost

RENEWABLE DENTON

Public Outreach

- Press Conference 10/6
- Website 10/6
- Open Houses 10/19; 10/27
- Other Meetings 10/18; 10/28
- PUB Meetings 11/09; 11/23
- Council Meetings 11/10; 11/17; and 12/1

RENEWABLE DENTON

Press Conference

- Held on 10/6/2015
- NBC, Denton Record Chronicle, and DTV in attendance
- Over 100 views on Periscope
- Media coverage:
  - Texas Tribune
  - KERA
  - Star Telegram
  - NBC DFW
  - Denton Record Chronicle
  - Public Power Daily
  - NT Daily TV
  - DTV

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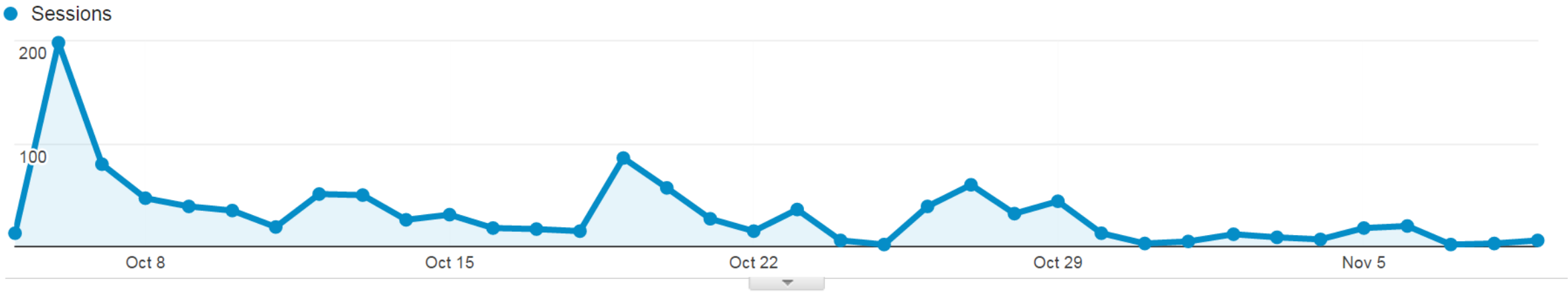
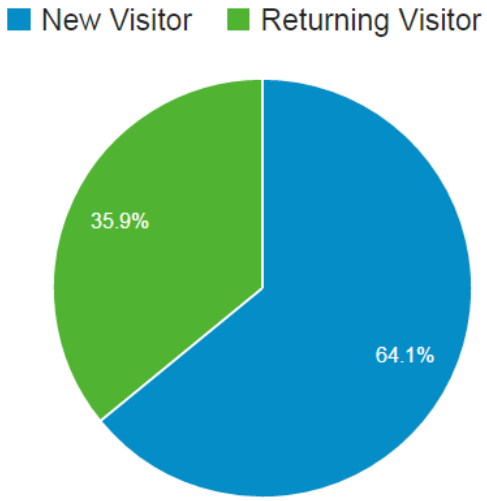
www.RenewableDenton.com



Sessions	Users	Pageviews
1,141	737	2,598

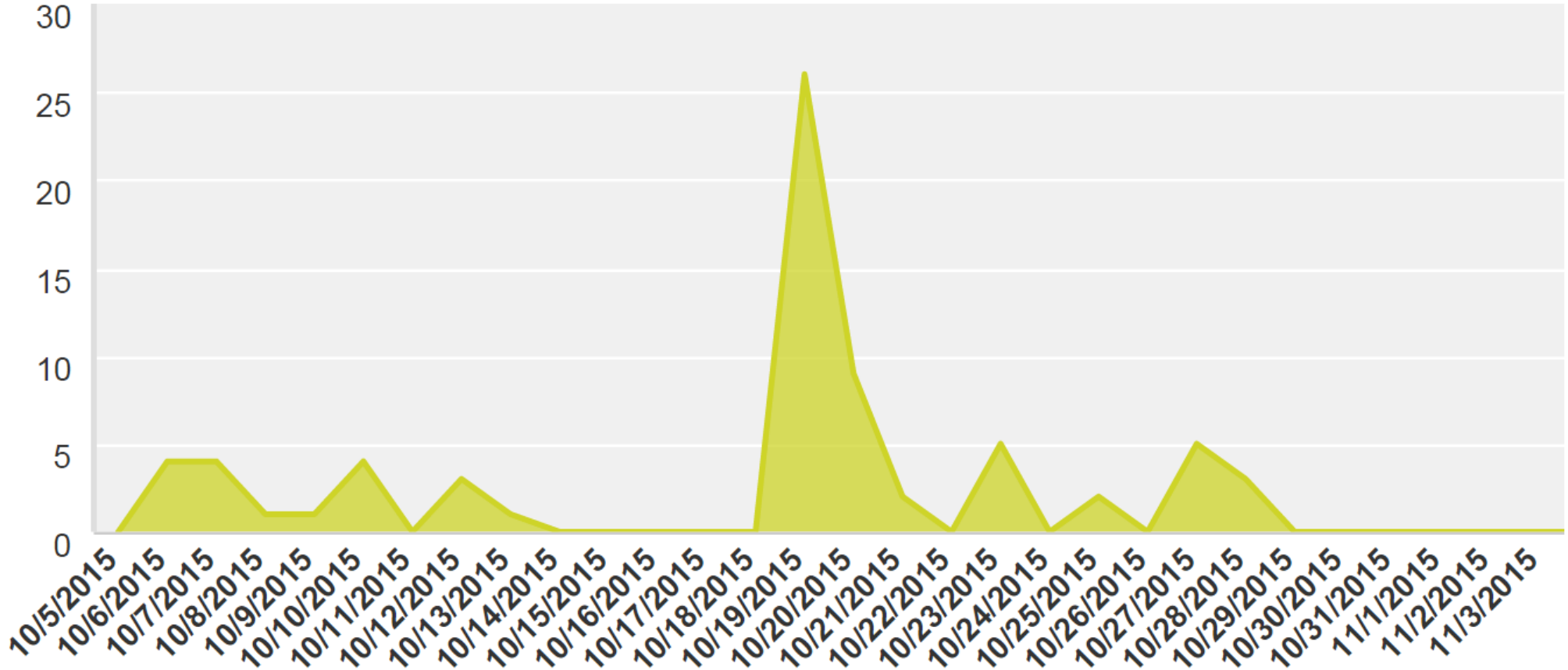
Pages / Session	Avg. Session Duration	Bounce Rate
2.28	00:02:36	49.96%



RENEWABLE DENTON

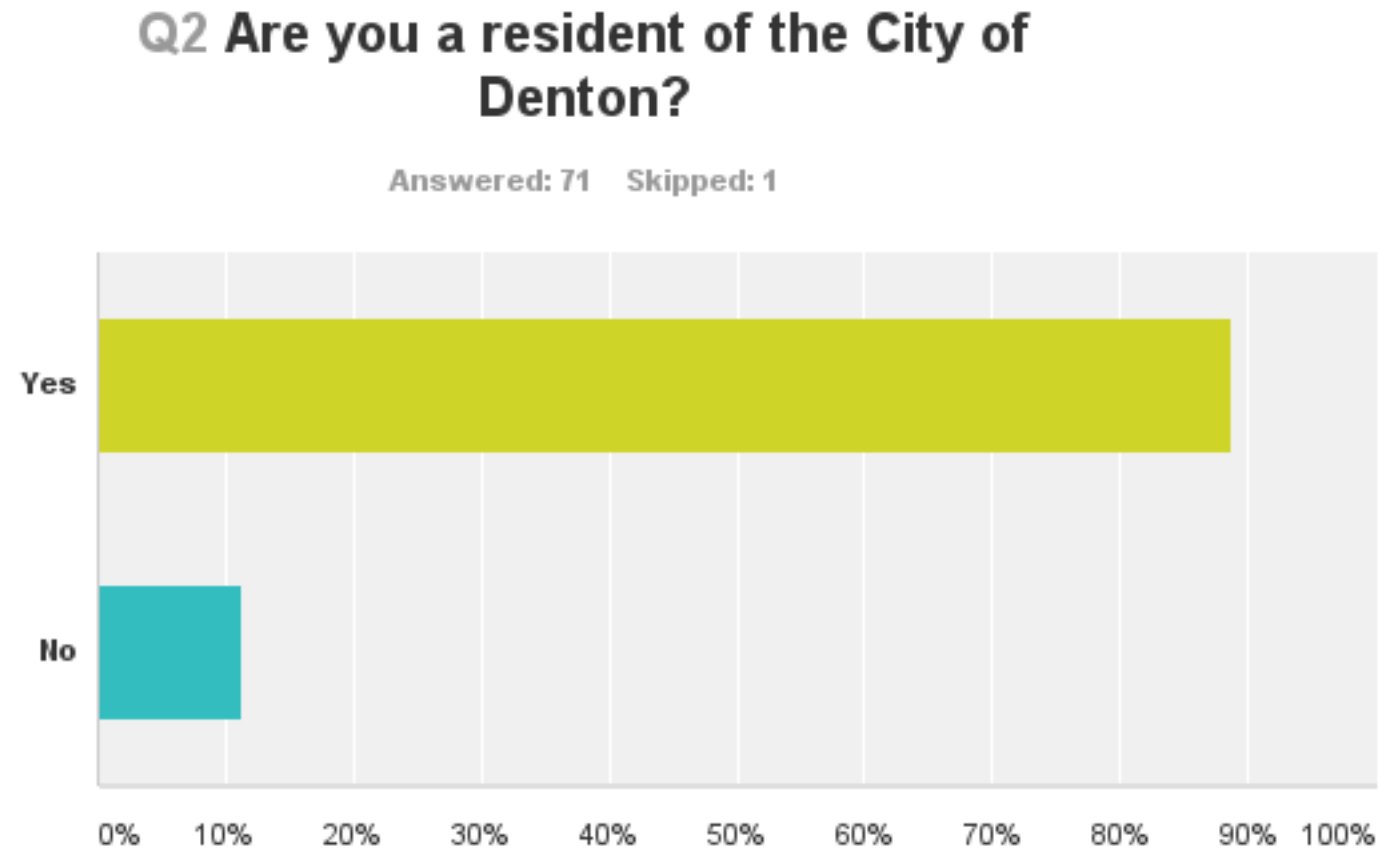
Online Comment Forms

First: 10/6/2015 Zoom: 10/5/2015 to 11/3/2015



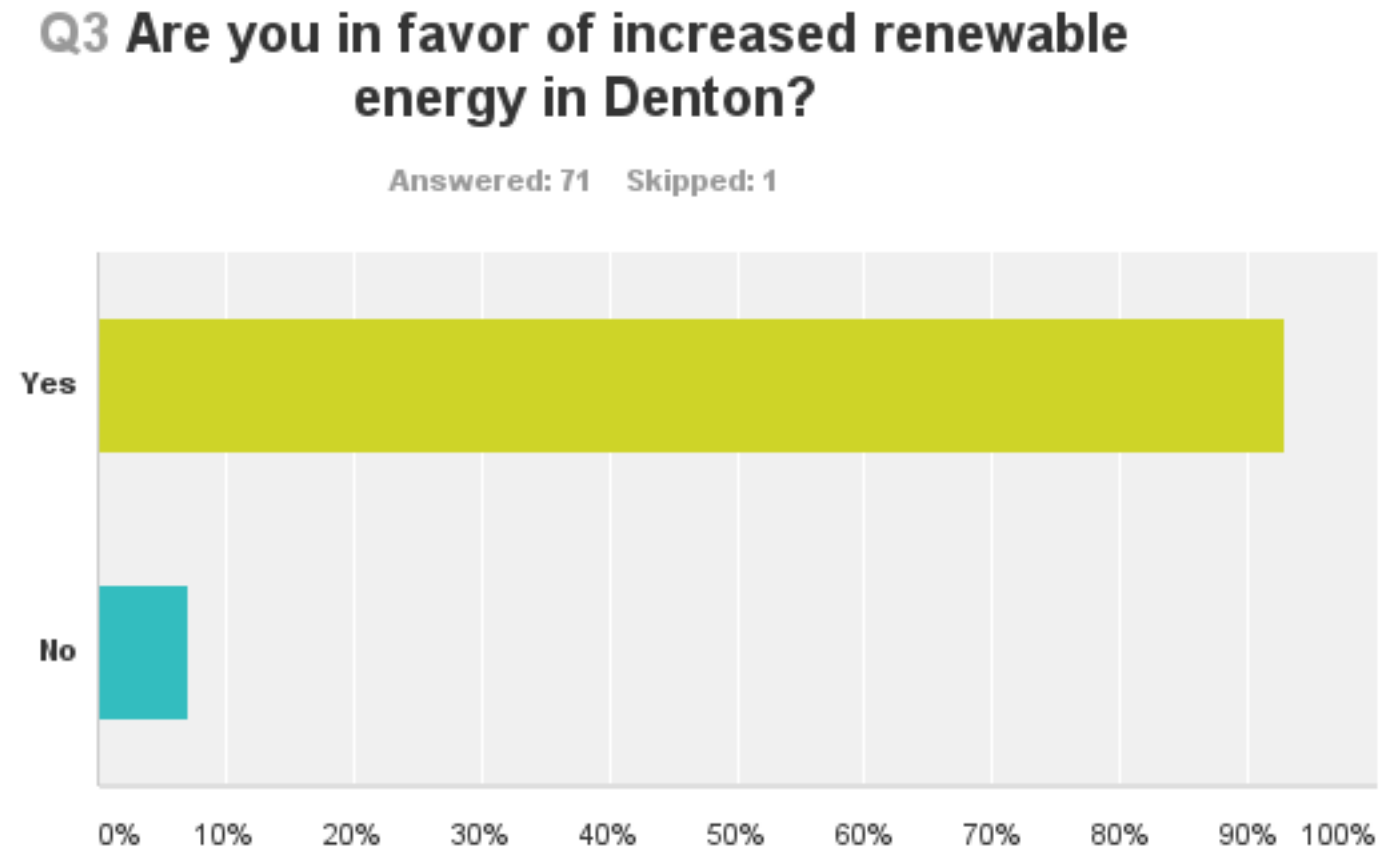
RENEWABLE DENTON

Online Comment Forms



RENEWABLE DENTON

Online Comment Forms



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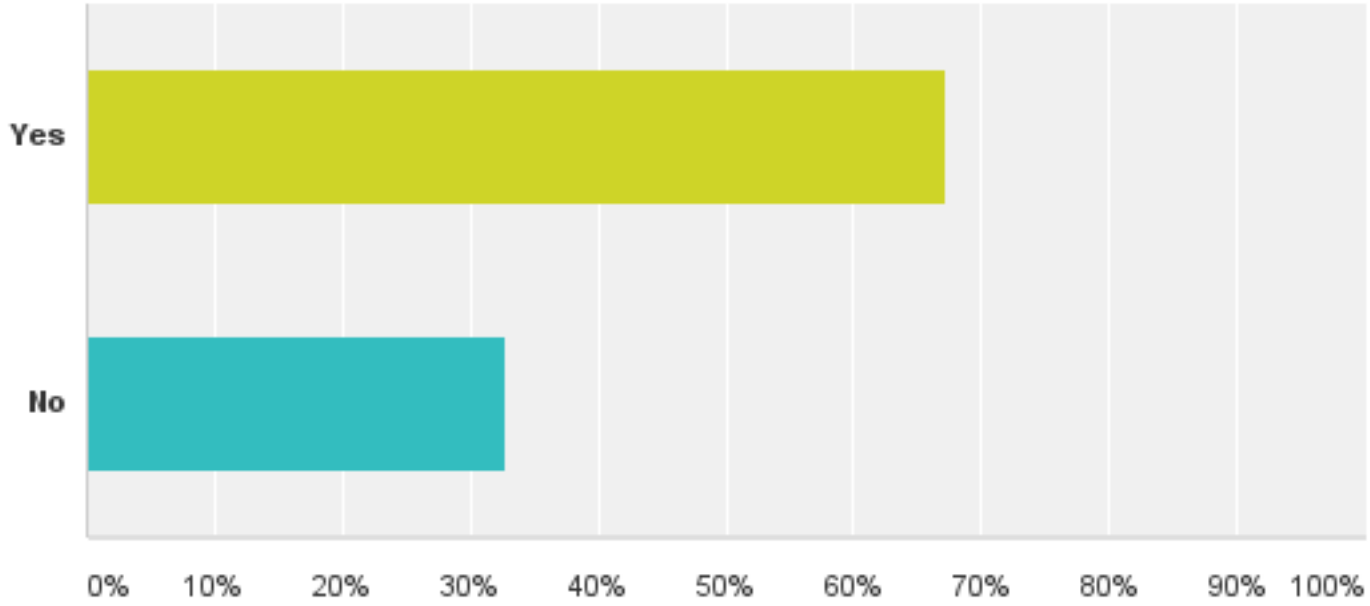
Online Comment Forms

Q4 Do you understand why the Denton Energy Center is needed in order to reach our goal of using 70% renewable energy?

Answered: 70 Skipped: 2



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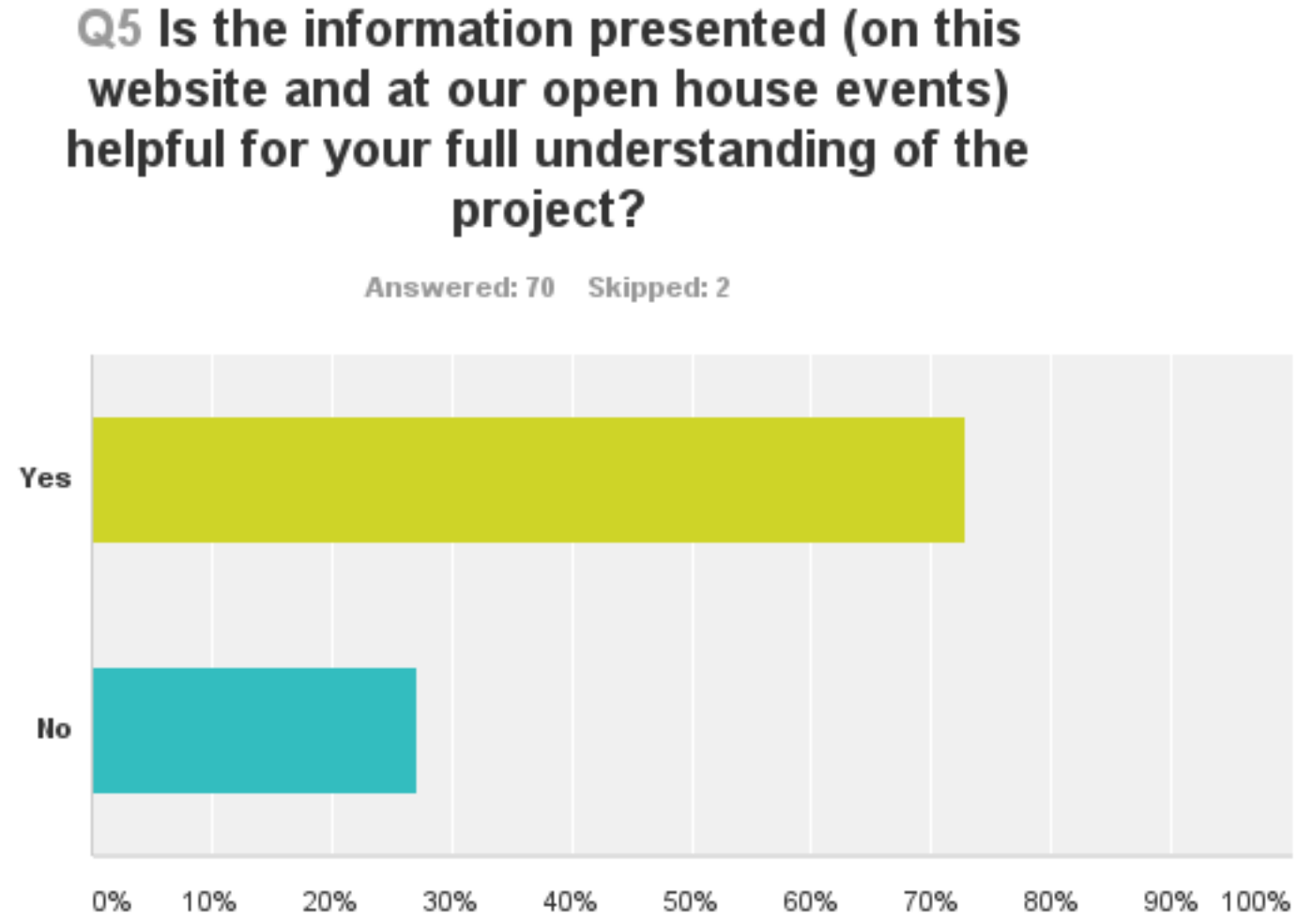
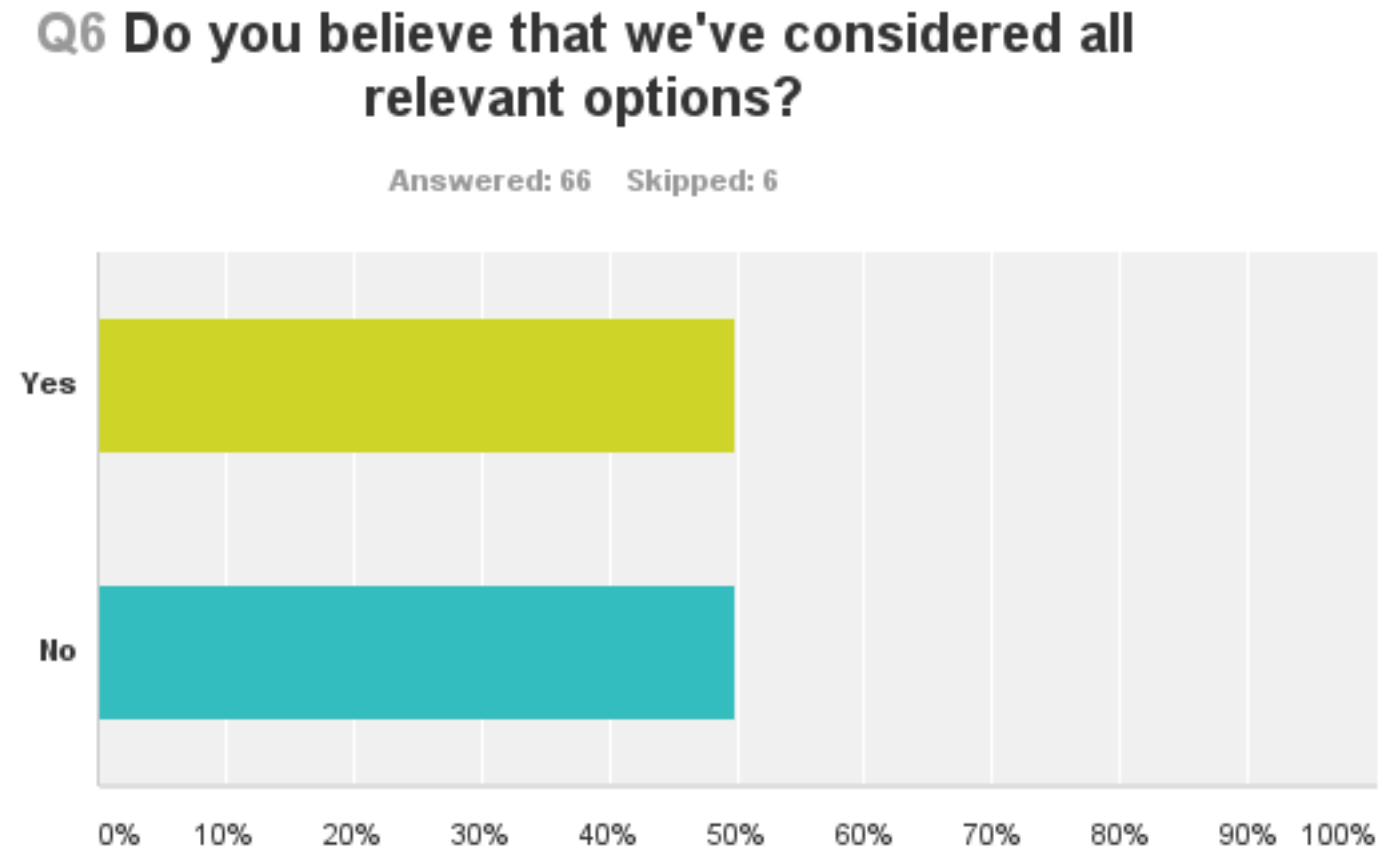
Online Comment Forms



RENEWABLE DENTON

Online Comment Forms



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www.RenewableDenton.com

comment	frequency
in favor of plan	23
favor more than 70% renewable	16
against/concerned about natural gas plant	9
remarks regarding a vote	8
reliability/rates more important than renewables	7
remarks regarding battery technology	6
remarks regarding rooftop solar	6

RENEWABLE DENTON

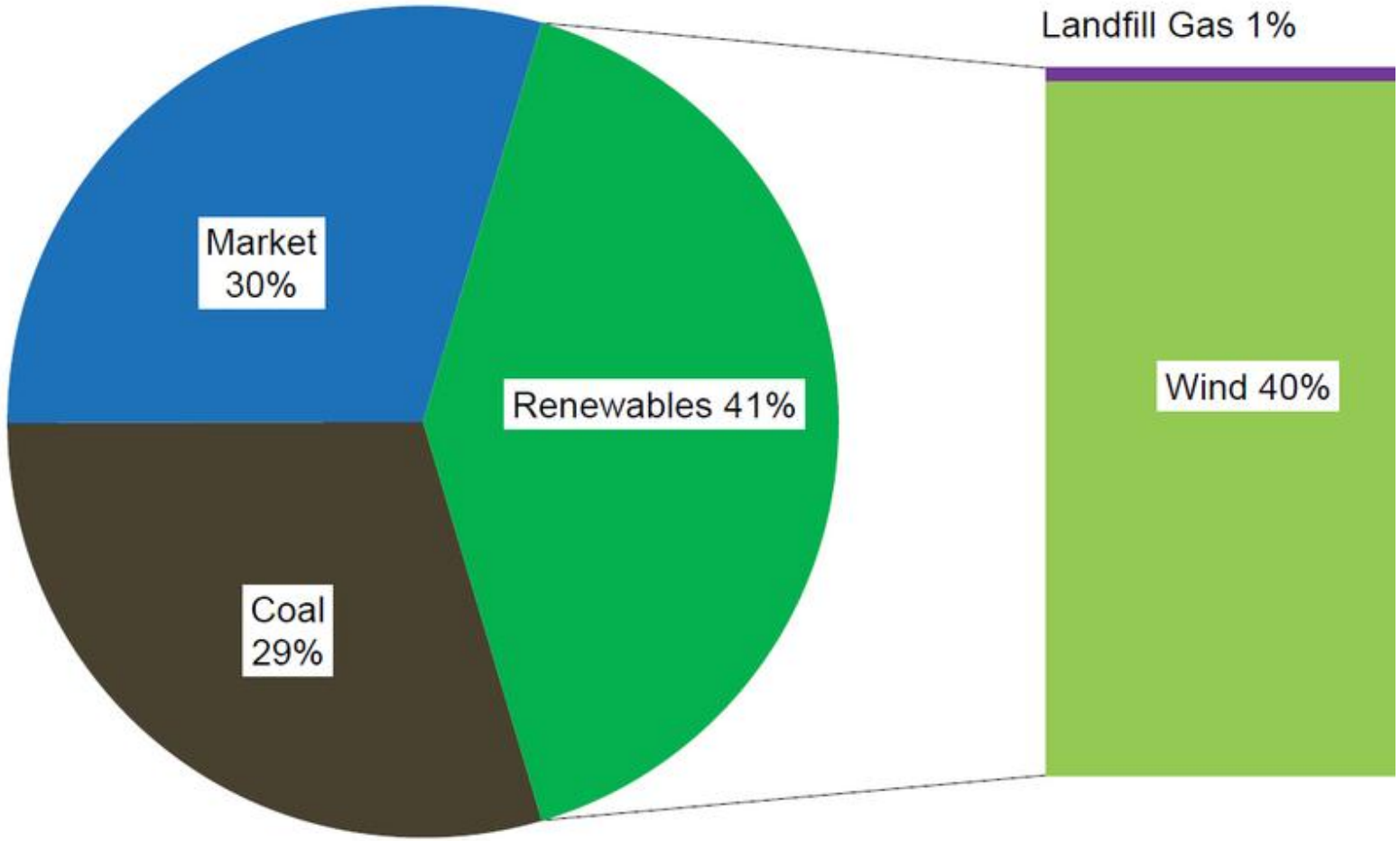
Open House Events

- 44,928 invitations sent
- Mailboxes on 10/10/2015
- 10/19/2015 – 73 in attendance
- 10/27/2015 – 39 in attendance

RENEWABLE DENTON

Project Briefing

Current Energy Portfolio Mix



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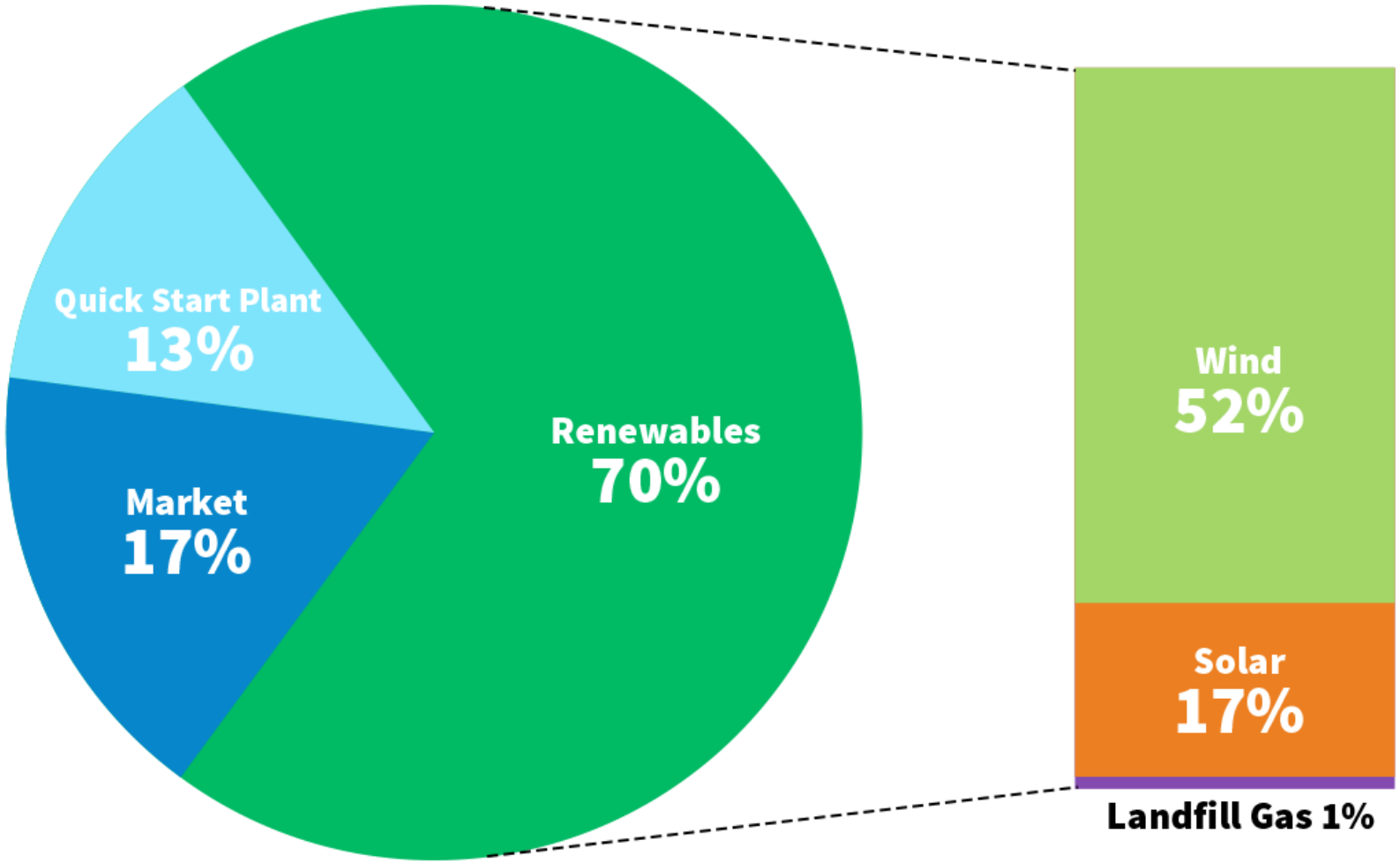
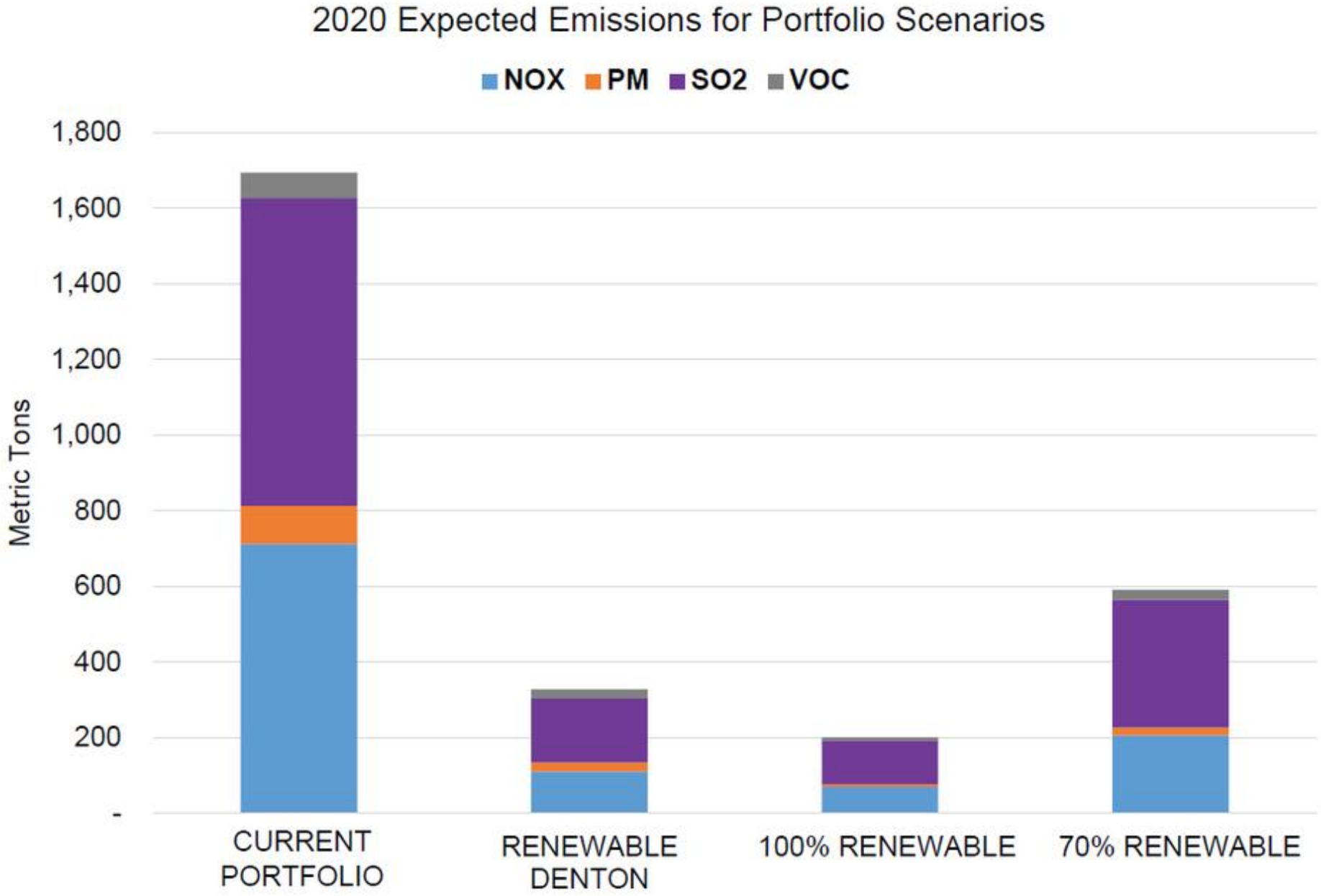
PROJECTED ENERGY MIX WITH RENEWABLE DENTON



RENEWABLE DENTON



*EIA and vendor supplied information

Alternative Technologies Investigated

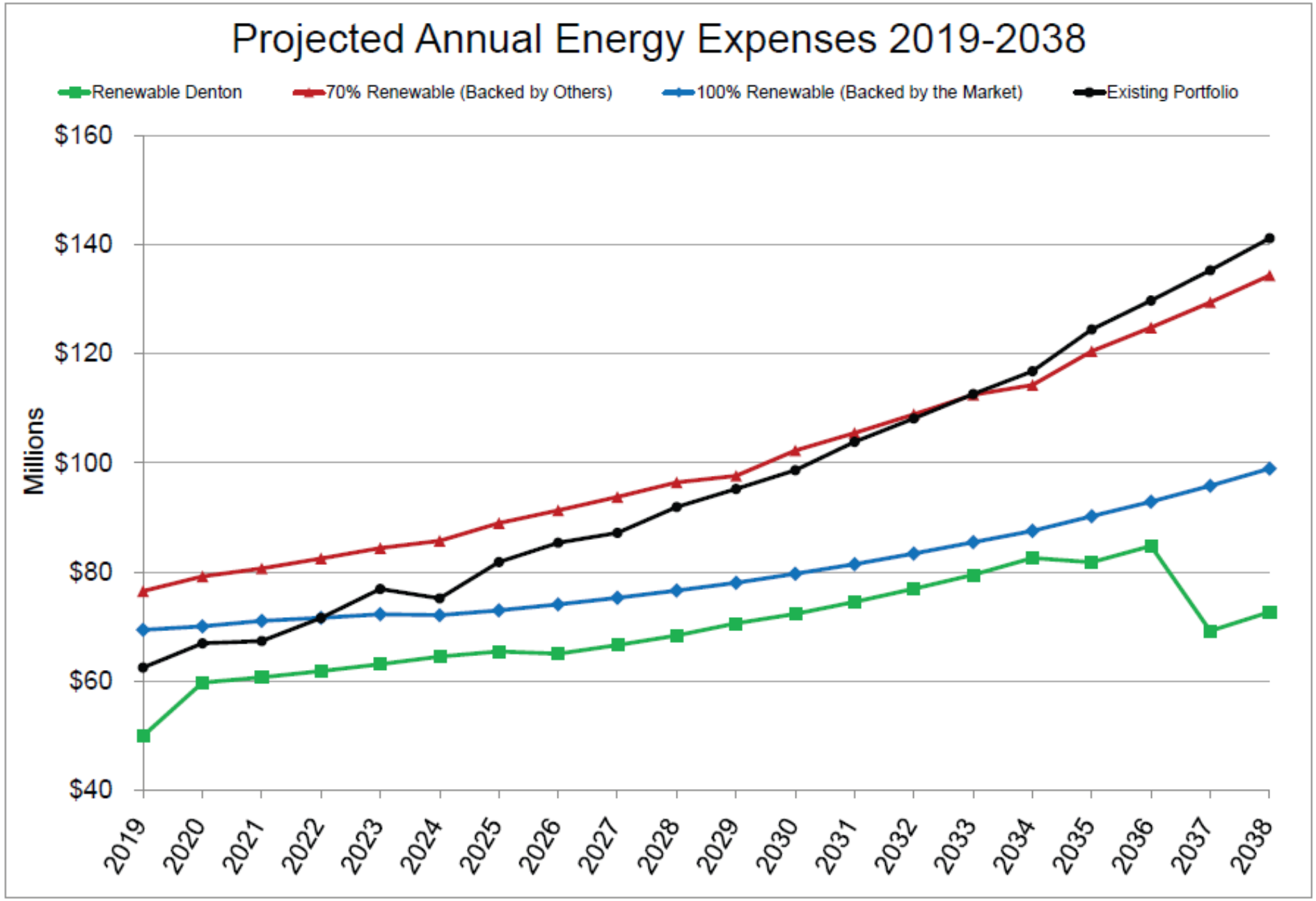
- Fuel cells
- Compressed air (CAES)
- Pumped hydro storage
- Battery storage
- Liquefied air storage
- Biomass
- Coal plant options
- Geothermal
- Solar roadways
- Rooftop solar
- Concentrating solar
- Tidal energy
- Water pipe turbines
- Waste-to-energy
- Combined cycle
- HVDC transmission

RENEWABLE DENTON

Other Strategies Investigated

- 100% renewable without quick-start backup
- 83% renewable without quick-start backup
- 70% renewable without quick-start backup
- 70% renewable with backup by counterparty contract
- Conservation/efficiency
- Wait and see

RENEWABLE DENTON


Projected Annual Energy Expenses 2019-2038
Renewable Denton
70% Renewable (Backed by Others)
100% Renewable (Backed by the Market)
Existing Portfolio
Millions
$160
$140
$120
$100
$80
$60
$40
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038

Business As Usual

- Results in rate increases totaling more than 7% (2017 – 2019)
  - $9/month for average residential customers
  - $14,000/month for average Top 20 large customers
- No savings
- Excess energy purchased that must be sold at market prices (approx. 2,000 MWh/year)

RENEWABLE DENTON

Renewable Denton Plan

- Results in rate increases totaling more than 7% (2017 – 2019)
  - $9/month for average residential customers
  - $14,000/month for average Top 20 large customers
- Approximately $530 Million savings over Business As Usual over 20 years
- Excess energy purchased that must be sold at market prices (approx. 190,000 MWh/year)
- Results in rate decreases beginning 2020

RENEWABLE DENTON

100% Renewable Without Quick-start Backup

- Results in rate increases totaling more than 16% (2017 – 2019)
  - $21/month for average residential customers
  - $35,000/month for average of Top 20 large customers
- Approximately $215 Million more expensive than Renewable Denton Plan
- Excess energy purchased that must be sold at market prices (approx. 900,000 MWh/year)

RENEWABLE DENTON

83% Renewable Without Quick-start Backup

- Results in rate increases totaling more than 12% (2017 – 2019)
  - $16/month for average residential customers
  - $25,000/month for average of Top 20 large customers
- Approximately $300 Million more expensive than Renewable Denton Plan
- Excess energy purchased that must be sold at market prices (approx. 500,000 MWh/year)

RENEWABLE DENTON

70% Renewable Without Quick-start Backup

- Results in rate increases totaling more than 9% (2017 – 2019)
  - $12/month for average residential customers
  - $19,000/month for average of Top 20 large customers
- Approximately $400 Million more expensive than Renewable Denton Plan
- Market risk
- Higher emissions than RDP
- Excess energy purchased that must be sold at market prices (approx. 190,000 MWh/year)

RENEWABLE DENTON

70% Renewable Backed by Counterparty Contracts

- Results in rate increases totaling more than 21% (2017 – 2019)
  - $28/month for average residential customers
  - $44,000/month for average of Top 20 large customers
- Approximately $630 Million more expensive than Renewable Denton Plan
- Higher emissions than RDP
- Excess energy purchased that must be sold at market prices (approx. 190,000 MWh/year)

RENEWABLE DENTON

Conservation/Efficiency

- Utility-scale efficiency programs
  - On average save a total of 0.8%* of peak usage
- Remaining 99.2% load must be served
- GreenSense Program from 2003 to current
  - $2.5 MM in rebates for efficiency and conservation upgrades
  - 4,620 rebates have been paid
  - 1,700 free energy and water audits
  - GreenSense 100% Renewable Rate – 79 accounts

* The Future of Utility Customer-Funded Energy Efficiency Programs in the United States: Projected Spending and Savings to 2025; report from ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY, January 2013

RENEWABLE DENTON

Wait and See = BAU

- Savings opportunity of $36,165/day would be lost
- Emission reduction opportunity (for NOx, VOC, SO2 and PM) of 3.75 metric tons/day would be lost
- Emission reduction opportunity (for CO2) of 1,941 metric tons/day would be lost
- Higher rates than RDP after 2019
- Excess energy purchased that must be sold at market prices (approx. 2,000 MWh/year)
- Limits opportunities to remove Gibbon's Creek from portfolio

RENEWABLE DENTON

Timeline Considerations

- Delayed emissions reductions
- Delayed savings
- Expiration of RFP and RFQ bids
- Expiration of site control
- Expiration of environmental permits
- Exchange rates
- Potential expiration Production Tax Credits
- Interest rates

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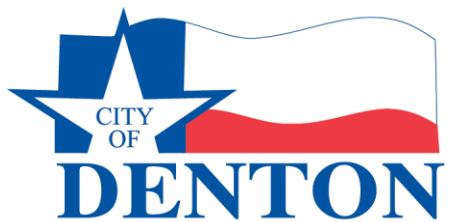
RENEWABLE DENTON

Approval Process

- Financing
- Land Purchase
- Engine RFP
- Design/Build RFQ
- PPAs for renewable energy



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Revenue Bonds

- Pledge of City utility system revenues
- Can capitalize interest during construction and one year after completion
- Higher interest rates than with property tax pledge
- No notice or election required prior to sale
- No ability for City to call a binding election under state law

RENEWABLE DENTON

Certificates of Obligation

- Pledge of property taxes and City utility system revenues
- Can capitalize interest during construction and one year after completion
- Lower interest rates than revenue bonds due to property tax pledge (difference to street maintenance fund)
- Requires publication of a notice of intent to issue CO's with the first publication at least 31 days prior to the sale
- CO's subject to referendum by a petition signed by 5% or more of registered voters
- No ability for City to call a binding election under state law unless receive petition

RENEWABLE DENTON

General Obligation Bonds

- Pledge of property taxes (can administratively pay debt service from utility revenues)
- Restrictions on capitalized interest
- Lower interest rates than revenue bonds due to property tax pledge (difference to street maintenance fund)
- Requires election on uniform election date (November or May) with simple majority of voters to approve bond sale

RENEWABLE DENTON

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DENTON

The Mission:

Increase renewable power in Denton from 40% to 70% by 2019.

Who Are We?

Denton Municipal Electric (DME) is Denton's community-owned electric utility. Created by the citizens of Denton in 1905, DME has the responsibility of providing safe, reliable electric power to our customers.

We answer to our customers through Denton's publicly-elected City Council and the Council-appointed Public Utilities Board.

The residents of Denton have called for more renewable energy that is reliable and competitively priced. The Renewable Denton Plan is our answer to that call.

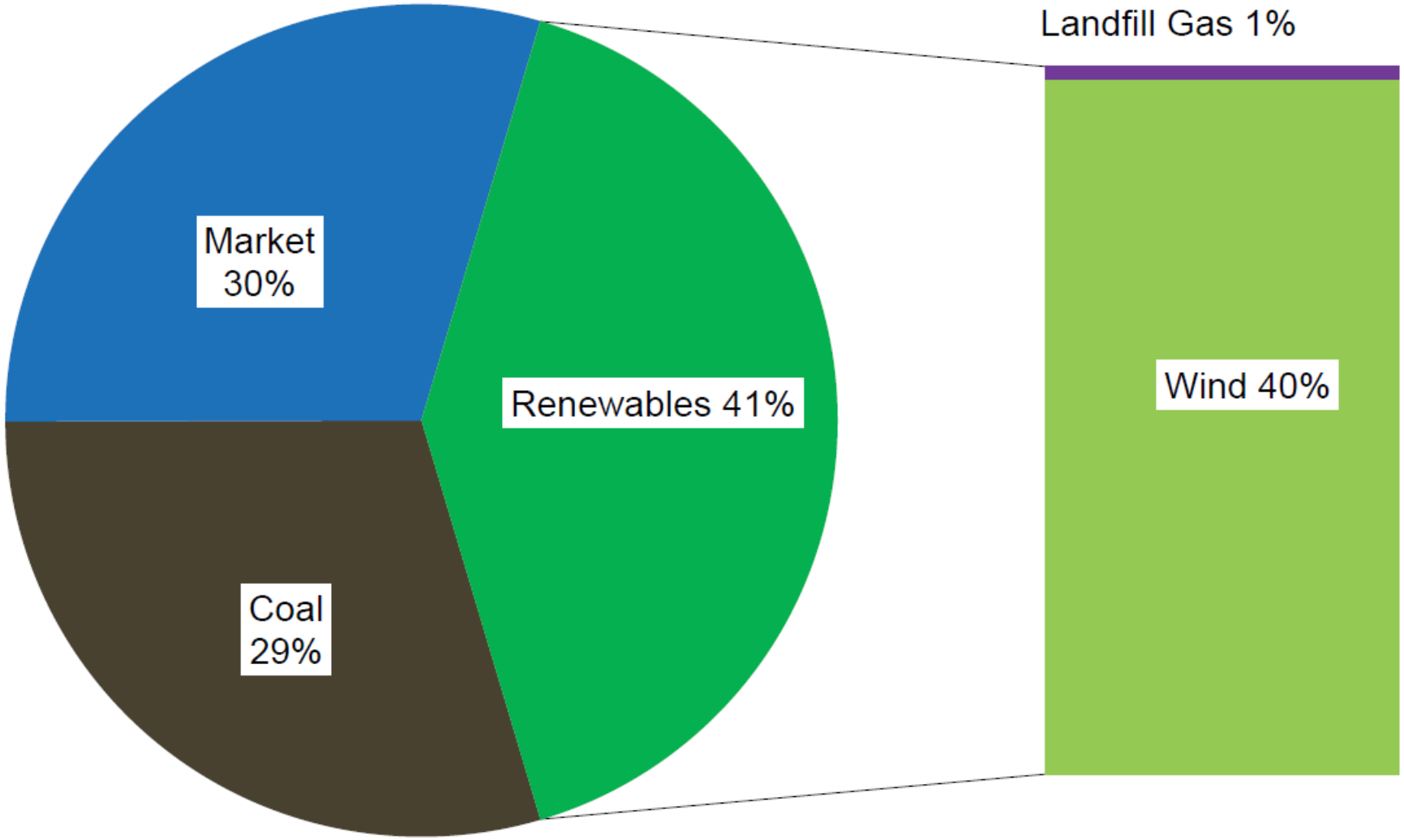
We've Heard You

We know that renewable power is an important issue to Denton residents. You told us about your interest in wind and solar power as we created the Sustainable Denton Plan in 2012 and the recent Denton 2030 Plan. We've heard you in one-on-one conversations as you've voiced your preference for energy that is renewable, reliable, and comptetitively priced.

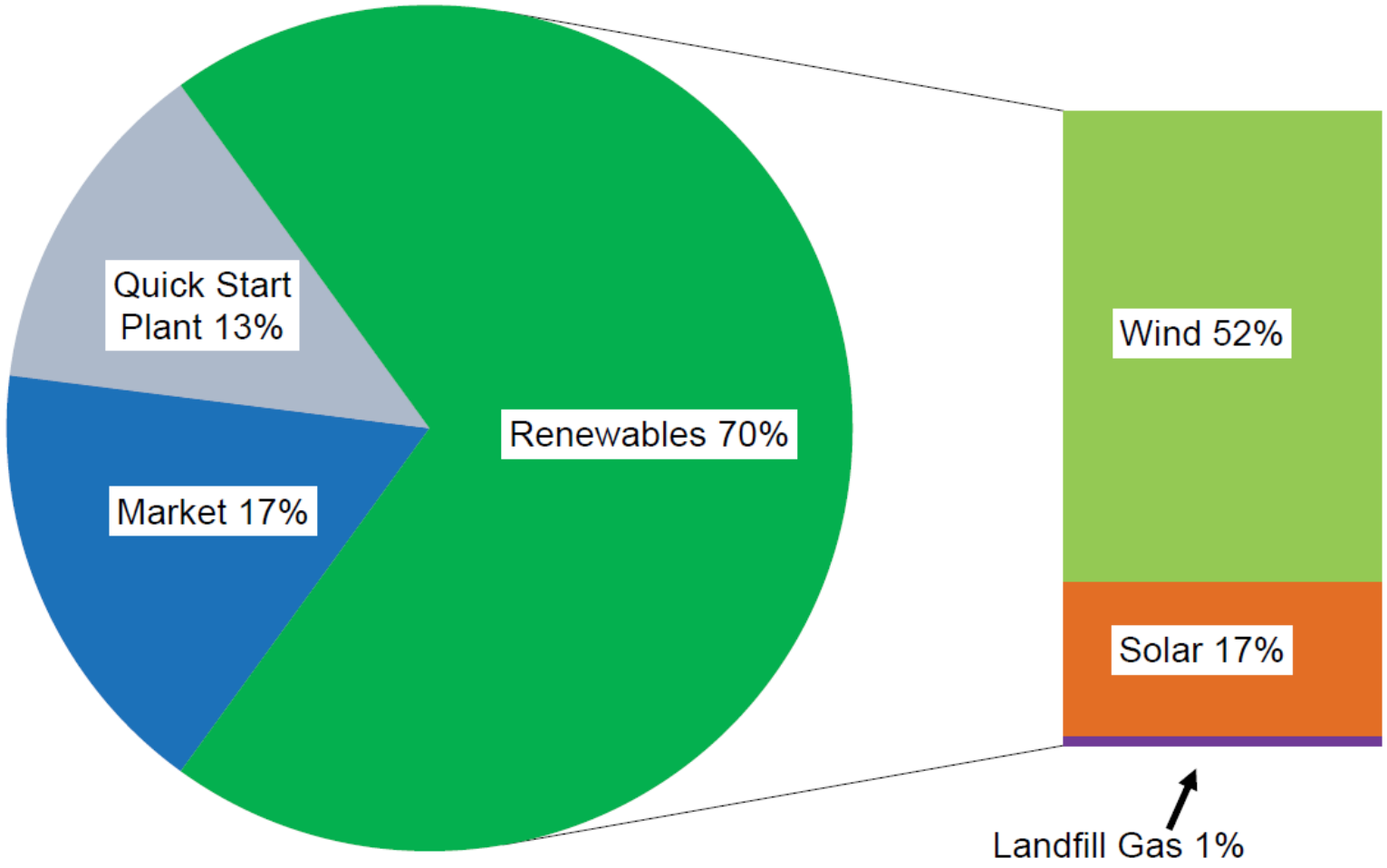
The Renewable Denton Plan is our proposed answer. Denton is a national leader in renewable energy, providing 40% wind power to every Denton Municipal Electric Customer. The Renewable Denton Plan takes us even further, providing 70% renewable power to every customer without an associated increase in rates.

DENTON RENEWABLE

Current Energy Portfolio Mix



Future Projected Portfolio Mix



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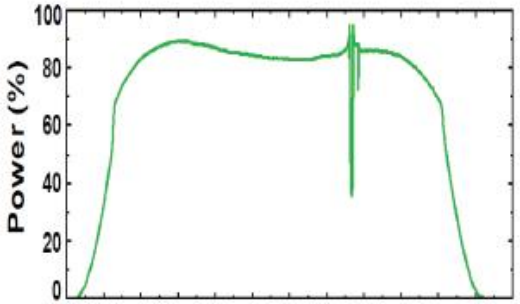
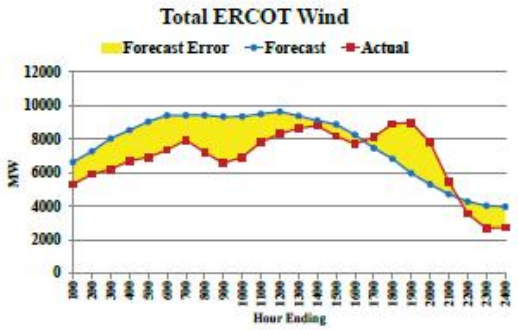
Variability of Renewable Energy Production



Cloud Cover

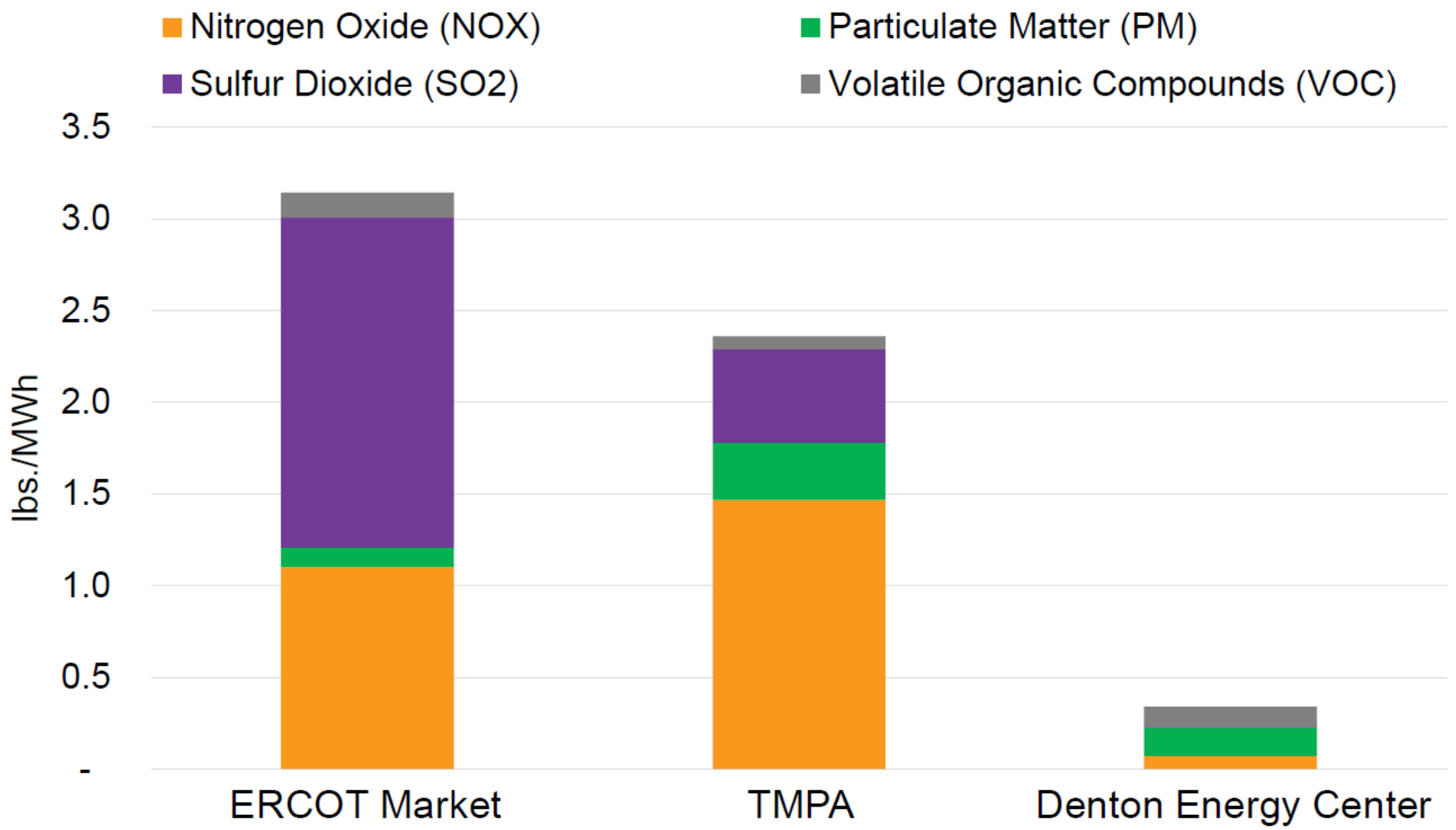


Variable Wind Patterns

The sun doesn't always shine, and the wind doesn't always blow.

Simulations of the Proposed Denton Energy Center

Emissions Comparison



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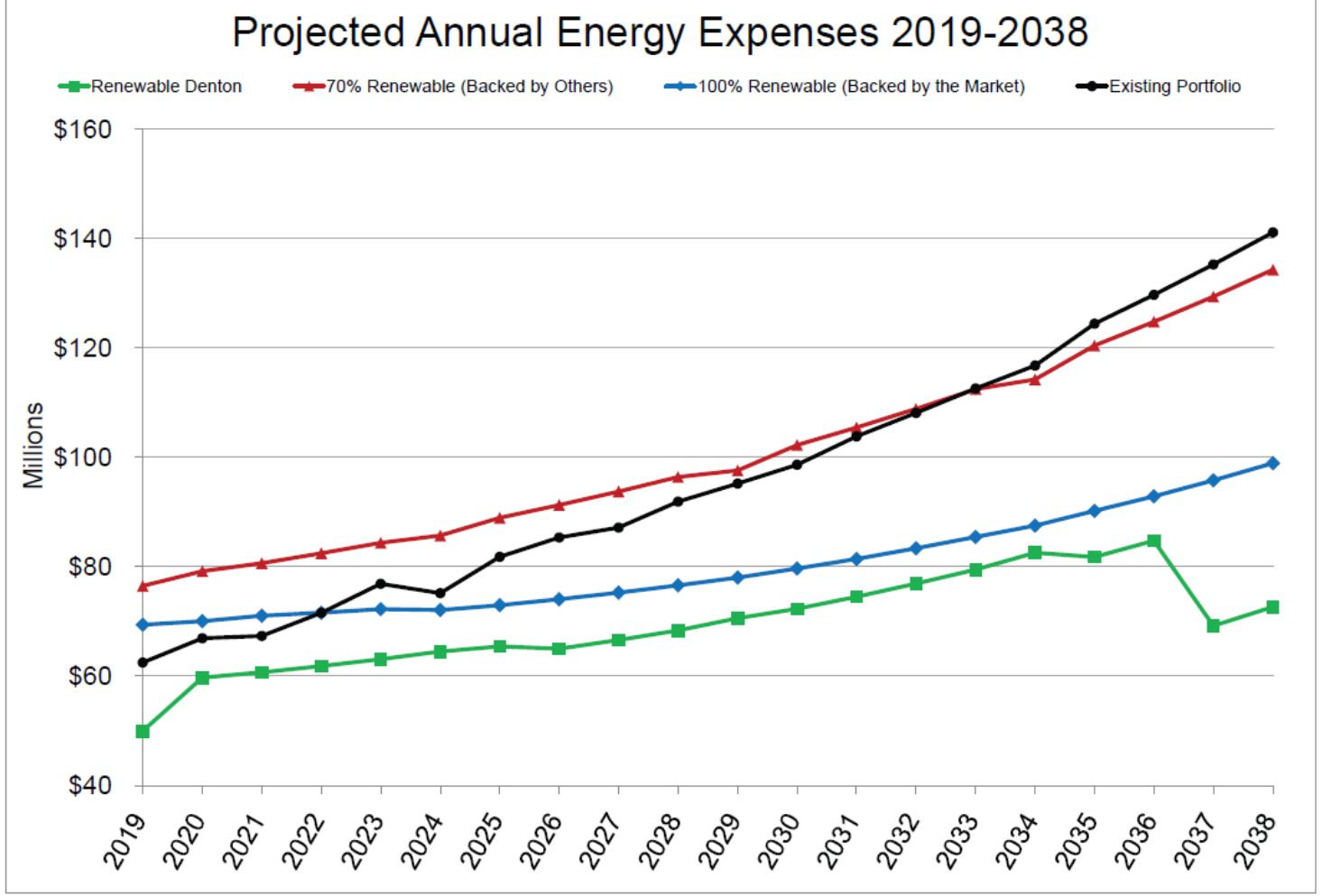
Projected Annual Energy Expenses 2019-2038



Plan	Projected 20 year Cost	Risk Level (1-10)	Risks
Renewable Denton	$ 1,389,708,079	2	DEC Outage, 15% of load from market
Existing Portfolio	$ 1,932,182,154	6	TMPA Outage, 35% of load from market
100% Renewable	$ 1,598,417,803	7	No quick-start backing, 900,000 excess MWh per year
70% Renewable	$ 2,008,975,936	2	30% of load from market

* Key assumptions include:
Natural Gas Futures Market (U.S. Energy Information Administration)
Power Purchase Agreements for Renewables (current and indicative pricing)
ERCOT Market Projections (heat rate and market volatility)

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RENEWABLE DENTON

Conservation and Efficiency

DME has long offered rebates to customers who make energy efficiency improvements to their homes or businesses. Since 2003, DME has granted rebates for more than 4,600 items and rebated more than $2.6 million.

DME's solar rebate program is the most generous in the state of Texas, offering up to $30,000 to offset the cost of purchasing and instaling photovoltaic solar panels.

DME also offers free energy audits to every customer. These audits give home and business owners personalized information about how they use energy and how to conserve. Through this program, over 1,500 free energy audits have been performed in the past ten years.

For more information, call (940) 349-8202 or
visit: www.sustainabledenton.com

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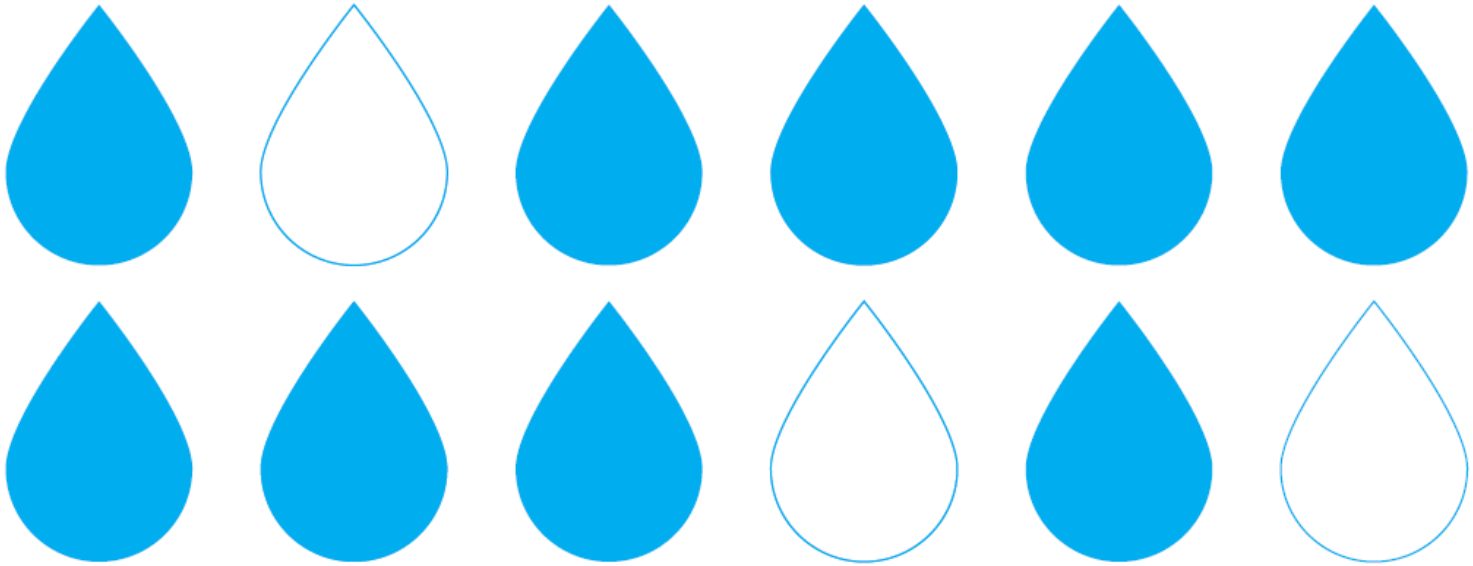
100% Renewable Rate

Since 2004, DME has offered our customers the option to sign up for the GreenSense Renewable Rate. This green energy program allows you to receive 100% of your energy from renewable sources such as solar and wind.

The GreenSense Rate adds approximately $5 to the monthly bill of an average, residential customer.

For more information, call (940) 349-8700 or
visit: www.cityofdenton.com/GreenSenseRate

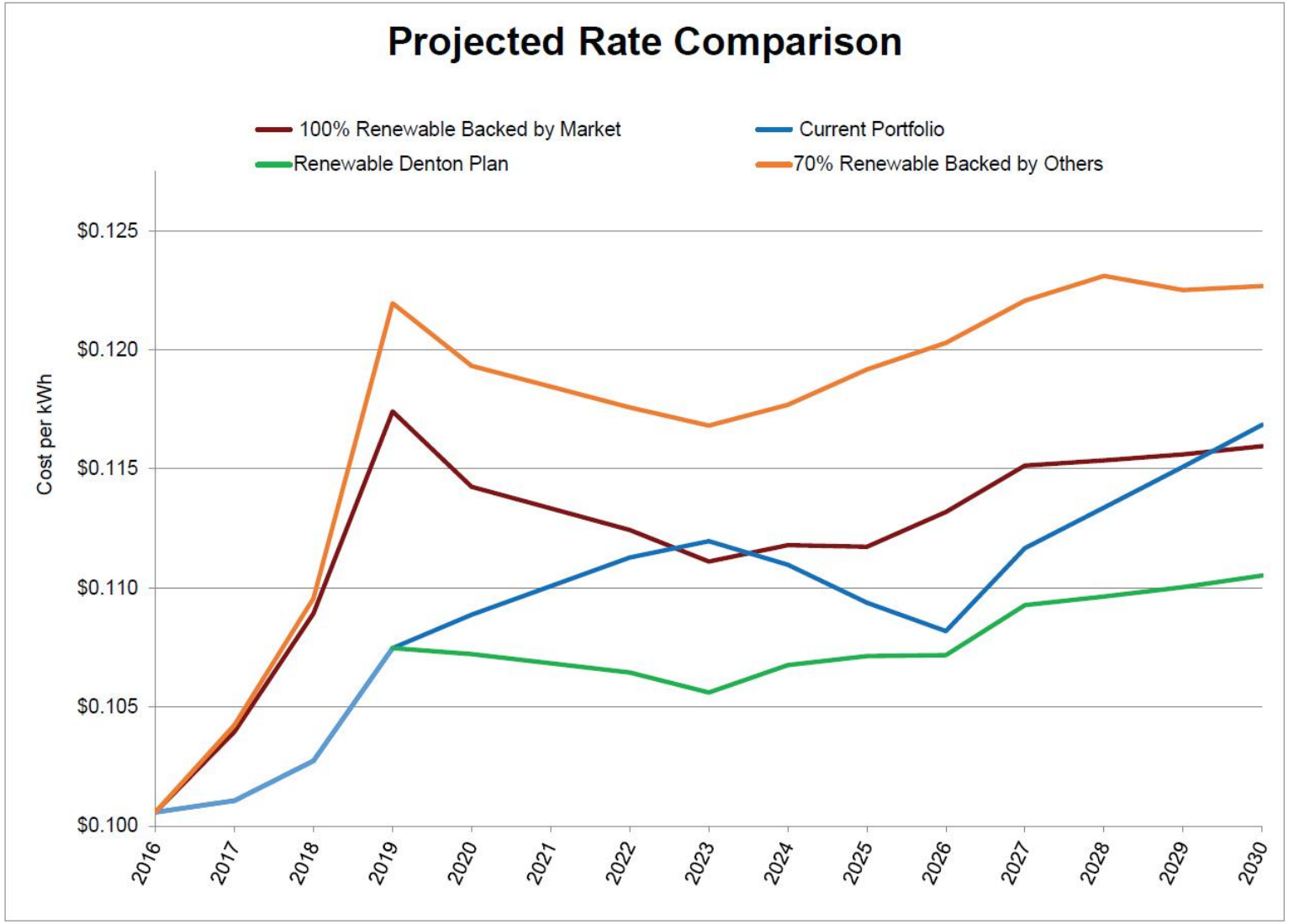
Water Usage



The proposed plan calls for a type of generation facility that has very low water usage - approximately 12 gallons per week. Such low water usage is an advantage in drought-prone areas.

*Vendor-supplied information

Projected Rate Comparison



* Key assumptions include:
  20 year debt service for the Denton Energy Center
  Natural Gas Futures Market (U.S. Energy Information Administration)
  Power Purchase Agreements for Renewables (current and indicative pricing)
  ERCOT Market Projections (heat rate and market volatility)

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We Want to Hear from You

Open House #1
Scheduled for Monday, October 19, 6:00 p.m. – 8:00 p.m.
Denton Civic Center, 321 E McKinney St, Denton, TX 76201

Open House #2
Scheduled for Tuesday, October 27, 6:00 p.m. – 8:00 p.m.
Denton Civic Center, 321 E McKinney St, Denton, TX 76201

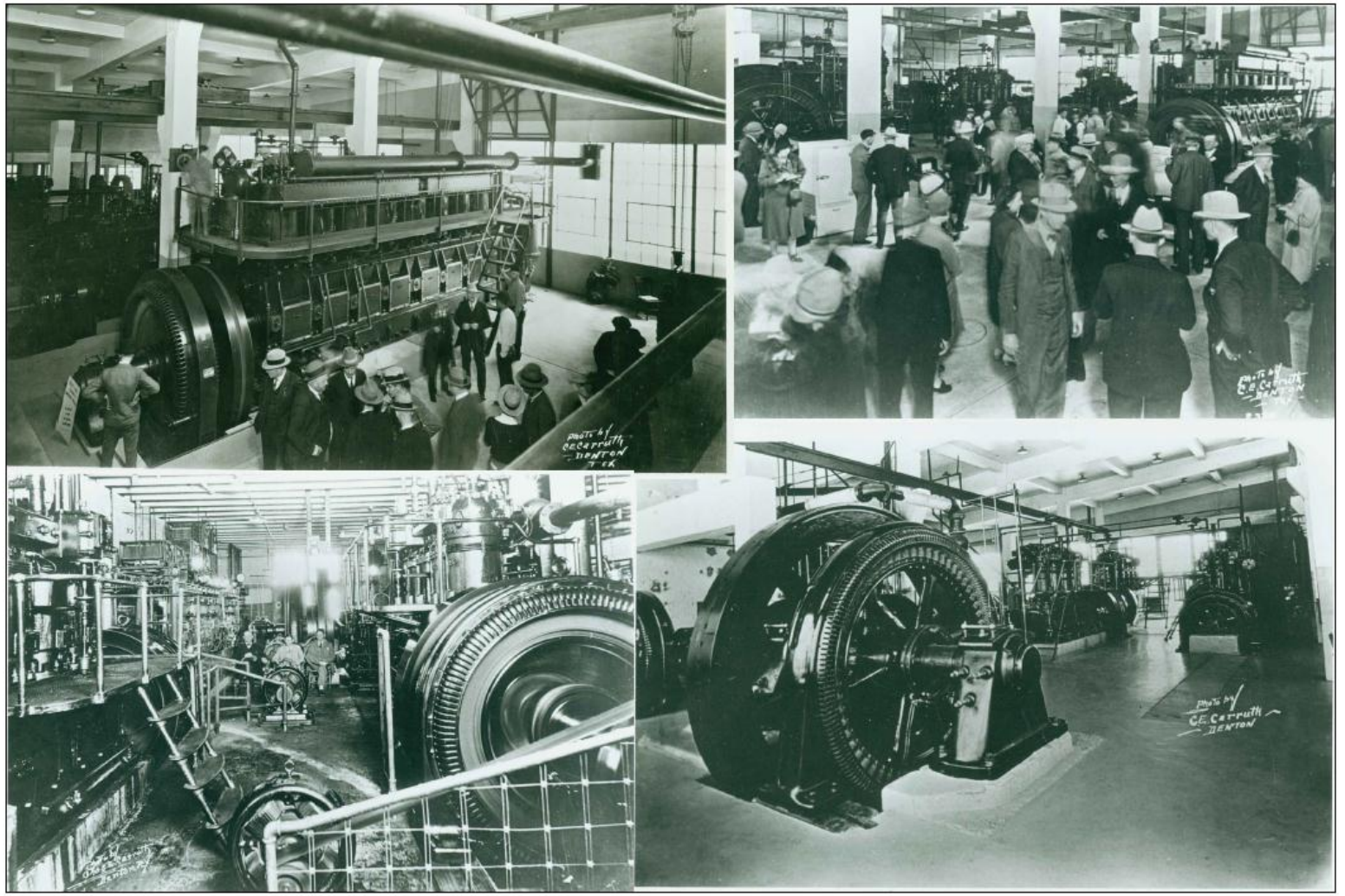
www.RenewableDenton.com
Learn more and fill out a comment form.

Public Utilities Board Meeting
The PUB will discuss the Renewable Denton Plan and provide a recommendation to Council. This meeting has not yet been scheduled.

City Council Meeting
Council will discuss and vote on the Renewable Denton Plan. This meeting has not yet been scheduled.

DENTON RENEWABLE

Historical Photos of Power Generation in Denton



Provided by the Greater Denton Arts Council, these photos show the original use of the Patterson-Appleton Center for the Visual Arts, which was constructed in 1929 as a gas fired electrical plant.

DENTON RENEWABLE