



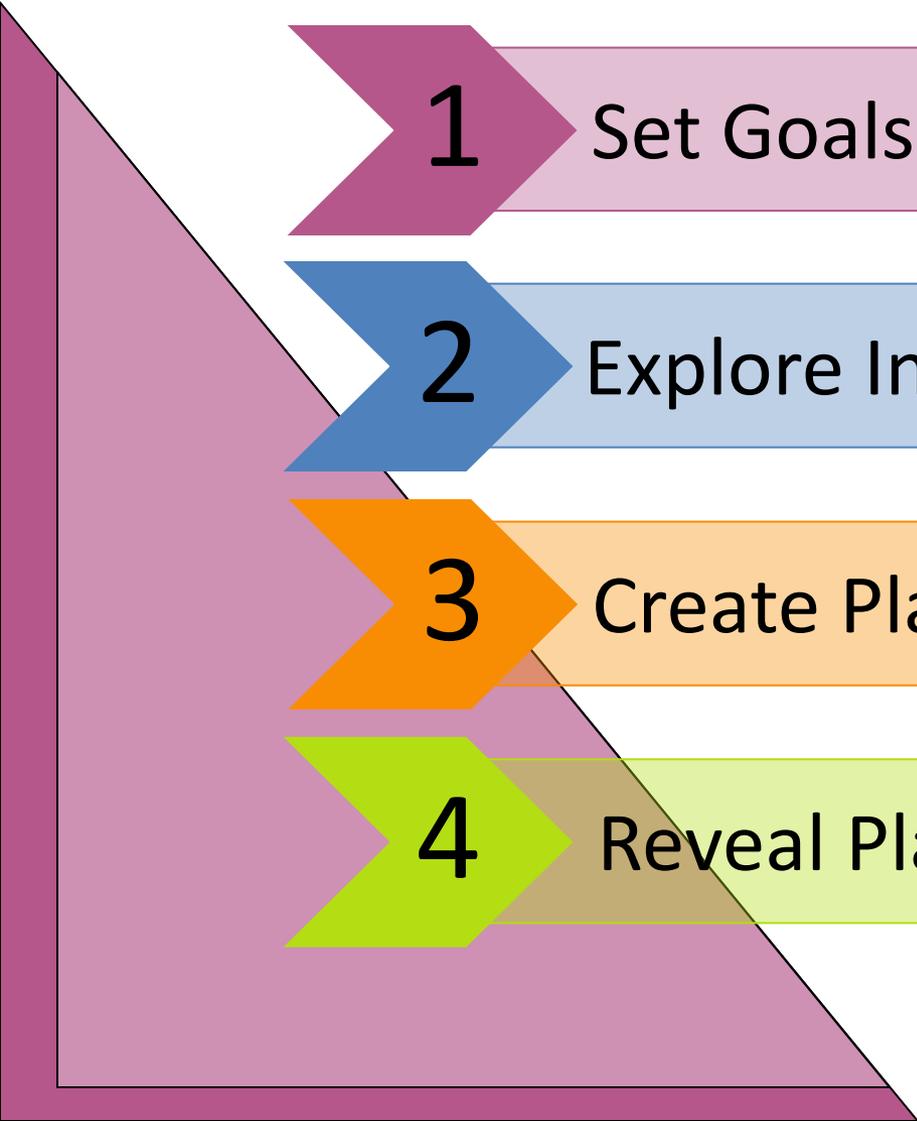
CONCORD MUNICIPAL
LIGHT PLANT

ELECTRIC | BROADBAND | ENERGY MANAGEMENT

Strategic Plan 2018 - 2025

Presented
on August 16, 2017

Agenda



1 Set Goals

2 Explore Initiatives

3 Create Plan

4 Reveal Plan



We will **partner** with our customers, civic institutions, and employees to **foster** a vital **community**, in the near and in the long term, in which to live, raise a family, work, and operate a business.

THE POWER OF A ***VISION STATEMENT***

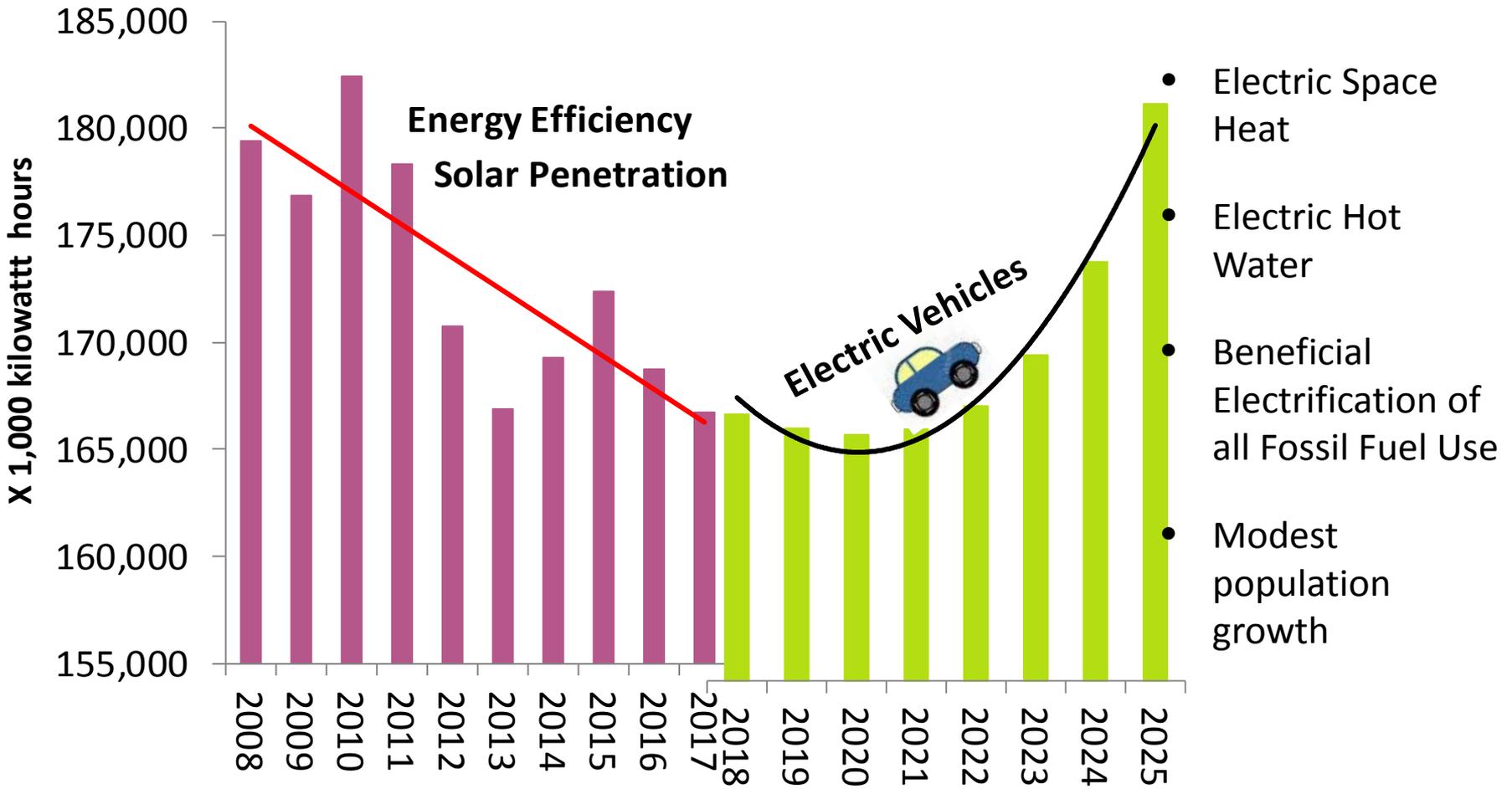
Step 1:

SET GOALS

CMLP's Goals

	Goal	Target Value
1.	Maintain System Reliability	No change in customer rating (95.2%)
2.	Maintain or Increase Customer Satisfaction/Perception of Value	≥ 85.8%
3.	Provide Energy Related Services to As Many Customers as Possible	25% Res. Participation 50% Comm. Participation
4.	Increase Revenue	0% to 5%
5.	Increase Net Operating Income	0% to 5%
6.	Reduce GHG Emissions	100% of 35% goal for 2025

Adjusted Load



CMLP's Goals

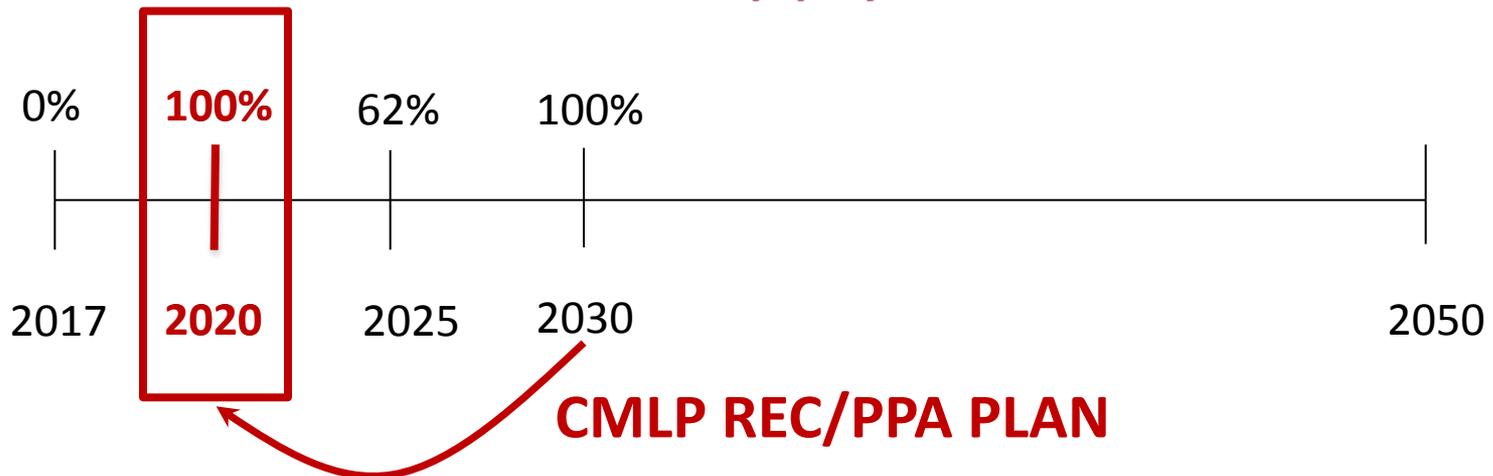
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6.	Reduce GHG Emissions	100% of 35% Town-wide goal for 2025

EFTF GHG Emissions Goals

GHG Emissions Goal



Carbon Free Power Supply



GHG Reduction Target

Source	2008 GHG emissions (tons)	2025 Town Reduction Goal (tons) (35%)	2025 CMLP Contribution (%)	2025 CMLP Contribution (tons)
electric	83,850	29,348	100%	83,850
gas	51,643	18,075	← 7.5%	1,356
fuel oil	47,056	16,470	← 7.5%	1,235
gasoline	68,302	23,906	← 5.0%	1,195
total	250,851	87,798		87,636

} 3,786

CMLP Contribution as % of 2025 Town Reduction Goal 99.82%

Step 2:

EXPLORE INITIATIVES

Narrowing the List

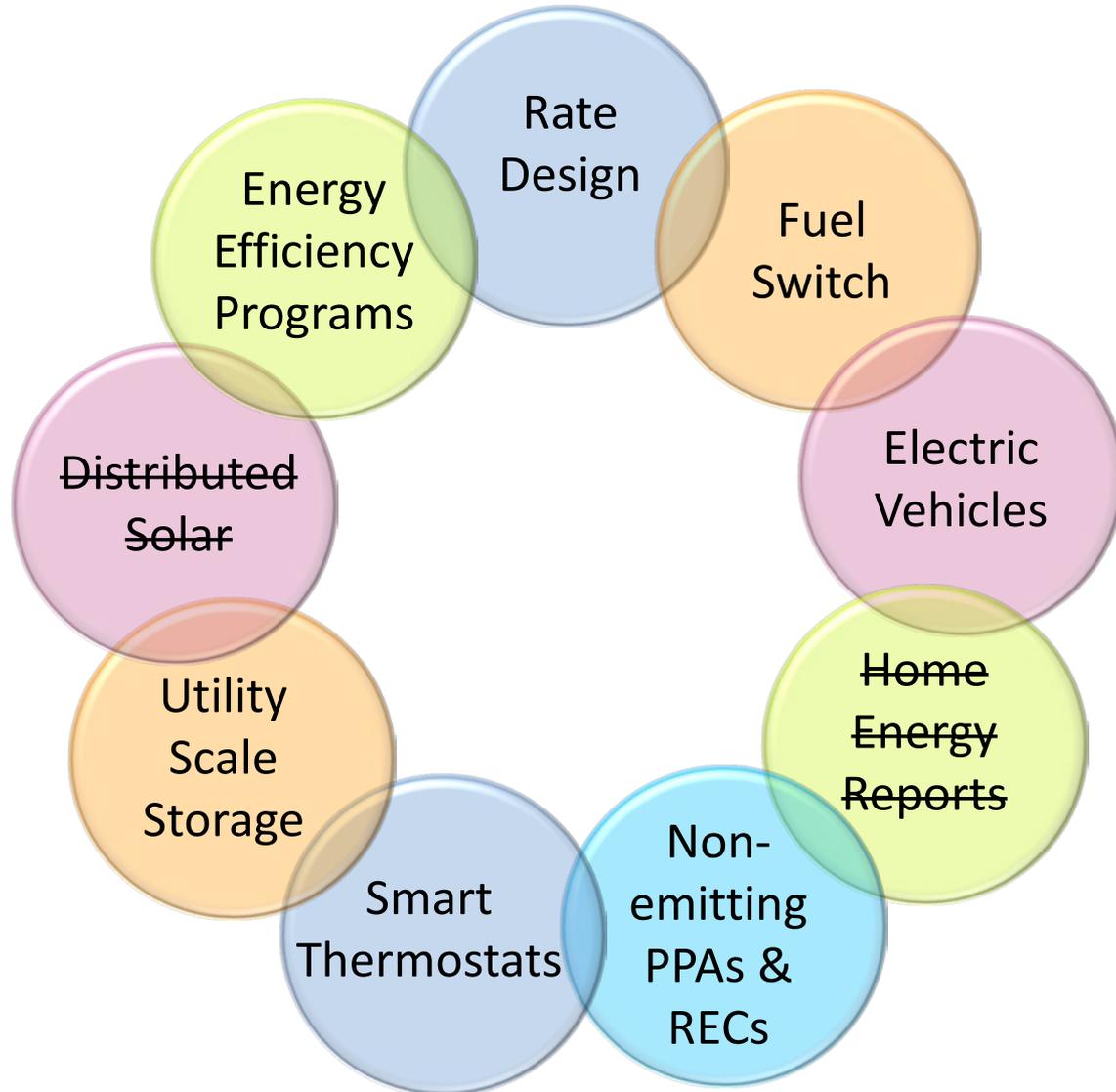
Impact on Goals

-  Revenue
-  Net Income
-  GHGs
-  or  Customer Satisfaction
-  Reliability
- Engage Many Customers

Feasibility

- Level of effort
- Capital Intensity
- Uptake Potential
- Timing
- Risk
- Leveraging Other Programs

Strategic Initiatives



Strategic Initiatives – Impact on Goals

- Time of Use Rate
- Higher Fixed Charges
- Fuel Switch
- Electric Vehicles
- Utility Scale Storage
- PPAs & RECs for Non-emitting Power
- Smart Thermostats
- Energy Efficiency Programs

REV	NET INC	GHG

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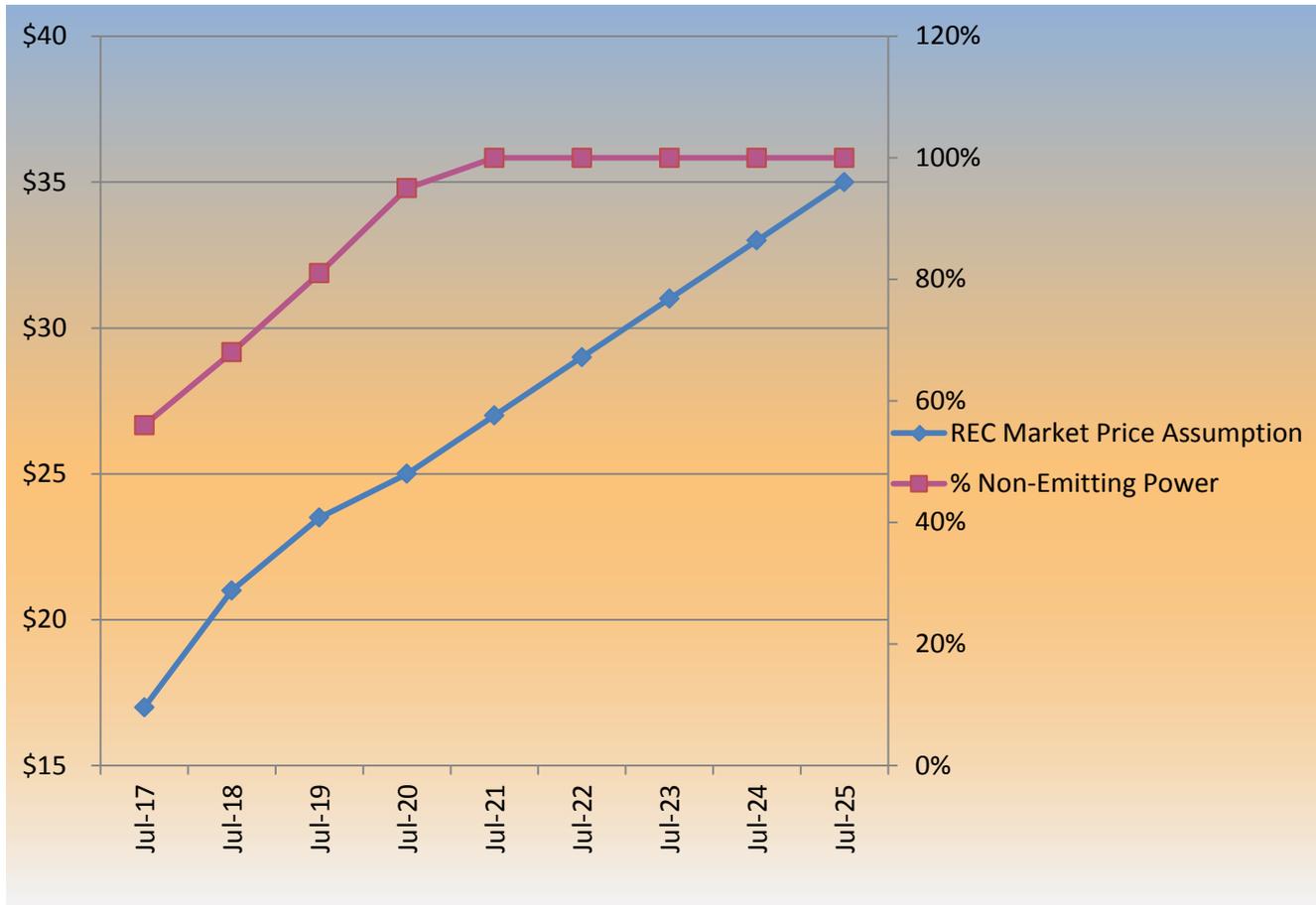
REV	NET INC	GHG

REV	NET INC	GHG

PPAs and RECs for Non-Emitting Power

Description	Purchase RECs and Non-Emitting Power						
Purpose	Provide customers with a non-emitting power supply						
Input Assumptions	<p>By 2021, increase REC purchases to offset all GHG-emitting power sold</p> <p>By 2025, increase non-emitting power purchased through PPAs (RECs retired) to 25% of portfolio</p>						
Impacts on Goals	<table border="1"> <thead> <tr> <th>REV</th> <th>NET INC</th> <th>GHG</th> </tr> </thead> <tbody> <tr> <td>█</td> <td>█</td> <td>█</td> </tr> </tbody> </table>	REV	NET INC	GHG	█	█	█
REV	NET INC	GHG					
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Outstanding Issues	Uncertainty in future REC and power prices						

PPAs and RECs for Non-Emitting Power



Rate Design – Residential

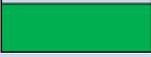
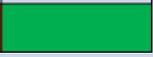
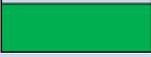
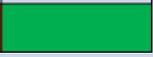
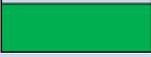
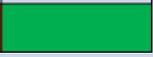
Time of Use Rates

Description	Two –Period Time of Use Rate with Opt-Out Option						
Purpose	Send a price signal to customers to shift their consumption to off-peak periods						
Input Assumptions	On-Peak to Off-Peak Rate Ratio is 2.5:1 On-Peak is 2pm to 7pm on Weekdays						
Impacts on Goals	<table border="1"> <thead> <tr> <th>REV</th> <th>NET INC</th> <th>GHG</th> </tr> </thead> <tbody> <tr> <td>■</td> <td>■</td> <td>■</td> </tr> </tbody> </table>	REV	NET INC	GHG	■	■	■
REV	NET INC	GHG					
■	■	■					
Outstanding Issues	More in-depth rate design will need to be done						
Case Study	Reading Municipal Light Plant						

Rate Design – Higher Fixed Charges

Description	Moves More of the Cost of Grid Connection into Higher Monthly Fixed Charge						
Purpose	Sends clearer price signal to customers and grid services providers about value of the connection they are using						
Input Assumptions	Residential and G1 Charges Rise to \$30/Mo. by 2021 G2 & G3 Charges Rise to \$100/\$600 by 2021						
Impacts on Goals	<table border="1"> <thead> <tr> <th>REV</th> <th>NET INC</th> <th>GHG</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	REV	NET INC	GHG			
REV	NET INC	GHG					
Outstanding Issues	More in-depth rate design will need to be done -- impact on GHG emissions -- impact on low use/low income customers						
Case Study	Minster Electric, Minster Ohio						

Fuel Switch

Description	Rebates, Promotion and Technical Assistance to Foster Adoption of Air Source Heat Pumps (ASHPs) and Heat Pump Water Heaters by Residential and G1 Customers						
Purpose	Beneficial Electrification						
Input Assumptions	770 new ASHPs installed by 2025 2,362 kWh used annually per ASHP \$1,500 customer acquisition cost per ASHP						
Impacts on Goals	<table border="1"> <thead> <tr> <th>REV</th> <th>NET INC</th> <th>GHG</th> </tr> </thead> <tbody> <tr> <td>  </td> <td>  </td> <td>  </td> </tr> </tbody> </table>	REV	NET INC	GHG			
REV	NET INC	GHG					
							
Outstanding Issues	Program Details Timing						

Electric Vehicles

Description	Increases number of electric vehicles owned by residential customers, above and beyond BAU projection						
Purpose	Beneficial Electrification						
Input Assumptions	<p>40 CMLP-driven purchases per year = 320 additional EVs by 2025</p> <p>\$1,500 customer acquisition cost per EV</p> <p>4,500 kWh used annually per EV</p>						
Impacts on Goals	<table border="1"> <thead> <tr> <th>REV</th> <th>NET INC</th> <th>GHG</th> </tr> </thead> <tbody> <tr> <td>█</td> <td>█</td> <td>█</td> </tr> </tbody> </table>	REV	NET INC	GHG	█	█	█
REV	NET INC	GHG					
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Outstanding Issues	Mechanisms needed to ensure that charging is done off-peak, including participation in TOU rates or controlled charging programs						
Case Study	Belmont Municipal Light Department						

Utility Scale Storage

Description	Installation of one utility-scale battery storage system						
Purpose	Shave Monthly Peak Demand Charges						
Input Assumptions	5 MW Discharges 15 MWh over 3 hours \$4.5 million cost in 2017; Costs decreasing 7% per year						
Impacts on Goals	<table border="1"> <thead> <tr> <th>REV</th> <th>NET INC</th> <th>GHG</th> </tr> </thead> <tbody> <tr> <td style="background-color: #cccccc;"></td> <td style="background-color: #008000;"></td> <td style="background-color: #ffff00;"></td> </tr> </tbody> </table>	REV	NET INC	GHG			
REV	NET INC	GHG					
Outstanding Issues	System Engineering, Cost						
Case Studies	Minster Electric, Sterling Municipal Light Department						

Smart Thermostats

Description	Promotes residential customer adoption of smart thermostats that allow control by CMLP						
Purpose	Shave Monthly Peak Demand Charges						
Input Assumptions	\$85 up-front incentive Ongoing management costs 290 sign ups in year 1 and 90 more per year thereafter						
Impacts on Goals	<table border="1"> <thead> <tr> <th>REV</th> <th>NET INC</th> <th>GHG</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	REV	NET INC	GHG			
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Outstanding Issues	No widely adopted standards for communication/control technologies						
Case Studies	Austin Energy; Green Mountain Power						

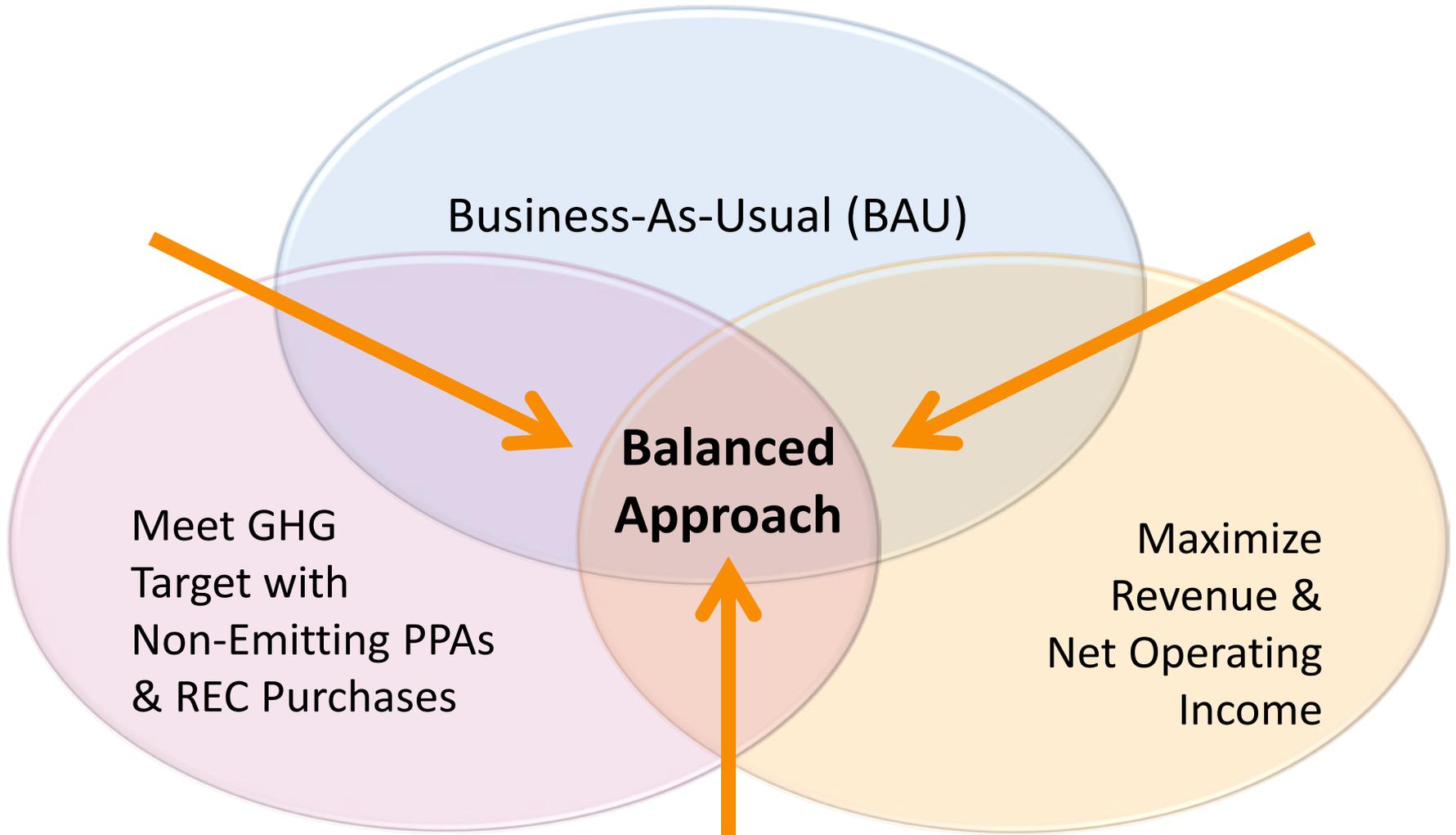
Energy Efficiency Programs

Description	Efficient products and upgrades in the residential, commercial, and low-income customer sectors; lighting, HVAC, refrigeration, compressed air, process heat, and motors end-uses; and new construction, retrofit, and replacement markets.						
Purpose	Help customers reduce their electricity bills						
Input Assumptions	Residential savings of 2.5% of sales by 2025 Commercial savings of 3.2% to 4.6% of sales by 2025						
Impacts on Goals	<table border="1"> <thead> <tr> <th>REV</th> <th>NET INC</th> <th>GHG</th> </tr> </thead> <tbody> <tr> <td style="background-color: red;"></td> <td style="background-color: green;"></td> <td style="background-color: gray;"></td> </tr> </tbody> </table>	REV	NET INC	GHG			
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Outstanding Issues	Uncertainty regarding the nature and extent of effective energy efficiency programs over the next few years						

Step 3:

CREATE PLAN

Solution Scenarios



Scenario Planning Tool

- Questions answered
 - Can the goals be accomplished?
 - Are alternative solutions possible?
 - How to balance solution elements?
 - Does it document milestones and metrics?



CMLP Business Component: Electric Sales and Customers

Sales Assumptions		alternative year-by-year from ISO 2017 CELT											-0.3%	-0.5%	-0.3%	-0.5%	-1.0%	-1.2%	-0.9%	-0.1%
Sales Growth Rate (CAGR)	-0.7%	ISO NE "CELT" repc Gross Sales less PV less passive DR											-0.7%	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%
Residential Sales (% of total)	42%	see calculations below											42%	42%	42%	42%	42%	42%	42%	42%
Small GS Sales (% of total)	8%	see calculations below											8%	8%	8%	8%	8%	8%	8%	8%
Medium GS Sales (% of total)	19%	see calculations below											19%	19%	19%	19%	19%	19%	19%	19%
Large GS Sales (% of total)	32%	see calculations below											32%	32%	32%	32%	32%	32%	32%	32%
Residential customer growth rate	1.1%	EIA form 861 Customer Sales and Concord FY18 Proposed Budget											1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
C&I customer growth rate	0.6%	EIA form 861 Customer Sales and Concord FY18 Proposed Budget											0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Municipal customer growth rate	0.0%												0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BAU																				
Sales	source	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Residential sales (MWh)	Concord FY18 Propos	70,455	68,905	72,471	71,314	70,735	73,875	71,349	72,156	71,737	70,699	70,080	70,171	70,572	71,449	73,057	75,788	80,245	87,300	
Small GS (MWh)									13,281	12,858	12,726	12,704	12,616	12,528	12,441	12,355	12,269	12,184	12,098	
Medium GS (MWh)									31,985	30,966	30,648	30,595	30,383	30,172	29,962	29,754	29,548	29,342	29,136	
Large GS (MWh)									54,927	53,177	52,631	52,541	52,176	51,814	51,454	51,097	50,742	50,389	50,036	
Commercial sales (MWh)	Concord FY18 Propos	98,000	97,000	98,000	96,000	89,000	82,000	86,095												
Municipal sales (MWh)	Concord FY18 Propos	11,000	11,000	12,000	11,000	11,000	11,000	11,837												
Total Sales (MWh)		179,455	176,905	182,471	178,314	170,735	166,875	169,281	172,348	168,738	166,703	165,920	165,345	165,086	165,307	166,263	168,346	172,160	178,600	
Peak Load		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Residential (MW)									17.4	17.3	17.1	16.9	17.0	17.1	17.3	17.7	18.3	19.4	21.0	
Small GS (MW)									4.3	4.1	4.1	4.1	4.1	4.0	4.0	4.0	3.9	3.9	3.8	
Medium GS (MW)									6.9	6.7	6.6	6.6	6.5	6.5	6.5	6.4	6.4	6.3	6.2	
Large GS (MW)									11.9	11.6	11.4	11.4	11.3	11.3	11.2	11.1	11.0	11.0	10.9	
Total (MW)		45	42	44	45	41	43	37	39.8	40	39	39	39	39	39	39	40	41	42	
% Change			-7%	7%	2%	-9%	4%	-12%	6%											
Average % Change									-1.3%											
Adjustment to add EV load																				
Total Sales (MWh) w/out EV load											166,015	164,862	163,717	162,580	161,451	160,330	159,217	158,111	157,000	
Additional Residential load from EV (BAU)											688	1,058	1,628	2,505	3,855	5,933	9,130	14,049	21,600	

Step 4:

REVEAL STRATEGIC PLAN

Strategic Initiatives in Balanced Plan

- Rate Design
- Fuel Switch
- Electric Vehicles
- PPAs and RECs for Non-Emitting Power
- Utility Scale Storage
- Smart Thermostats
- Energy Efficiency Programs



CMLP's Goals

Goal	Target Value	Projected Value
Maintain System Reliability	No change in customer rating (95.2%)	No change in customer rating (95.2%)
Maintain or Increase Customer Satisfaction	≥ 85.8%	≥ 85.8%
Provide Energy Related Services to Many Customers	25% Res. Participation 50% Comm. Participation	25% Res. Participation 50% Comm. Participation
Increase Revenue	0% to 5%	15%
Increase Net Operating Income	0% to 5%	2%
Reduce GHG Emissions	100% of 35% goal for 2025	98% of 35% goal for 2025

Planned GHG Reduction Projection

Source	2008 GHG emissions (tons)	2025 Town Reduction Goal (tons) (35%)	2025 CMLP Contribution (%)	2025 CMLP Contribution (tons)
electric	83,850	29,348	100%	83,850
gas	51,643	18,075	3.24%	1,119
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gasoline	68,302	23,906	4.00%	956
total	250,851	87,798		85,925

CMLP Contribution as % of 2025 Town Reduction Goal	98%
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CMLP Contribution as % of 2025 Town Reduction Goal	100%
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Recommended Timing and Dependencies

	Initiative	Calendar Year Projection	Dependencies
1	Non-Emitting PPAs and RECs	2017 - 2025	none
2	NISC	2017 - 2018	none
3	Electric Vehicle Adoption	2018	none
4	Smart Meters (AMI)	2018 - 2019	2
5	Utility Scale Storage	2019	4
6	Fuel Switching for Space & Hot Water Heating	2019	none
7	TOU Rates and Higher Fixed Charges	2020	2,4
8	Smart Thermostats	2020	4
9	Energy Efficiency Programs	2020	none

Other Considerations

- RECs will drive rates up about 17% over 4 years (consistent with the forecast in the EFTF Final Report)
- RECs are not our long term strategy
- Other initiatives will increase rates less than 5%
- FCM, transmission, REC markets and policy changes could vary greatly from assumptions



Challenges for Concord

- Ramp Up Fuel Switching
 - Facilitate electric space and water heating in new construction and existing buildings
 - Speed the adoption of electric vehicles
- Reduce Remaining Fossil Fuel Use
 - Weatherize buildings still partially or fully heated with fossil fuels
 - Reduce vehicle miles driven

Final Thoughts

- CMLP alone can achieve the Town's GHG goals by 2025
- Long downward trend in sales is predicted to end (EV, HP)
- We have a plan!

