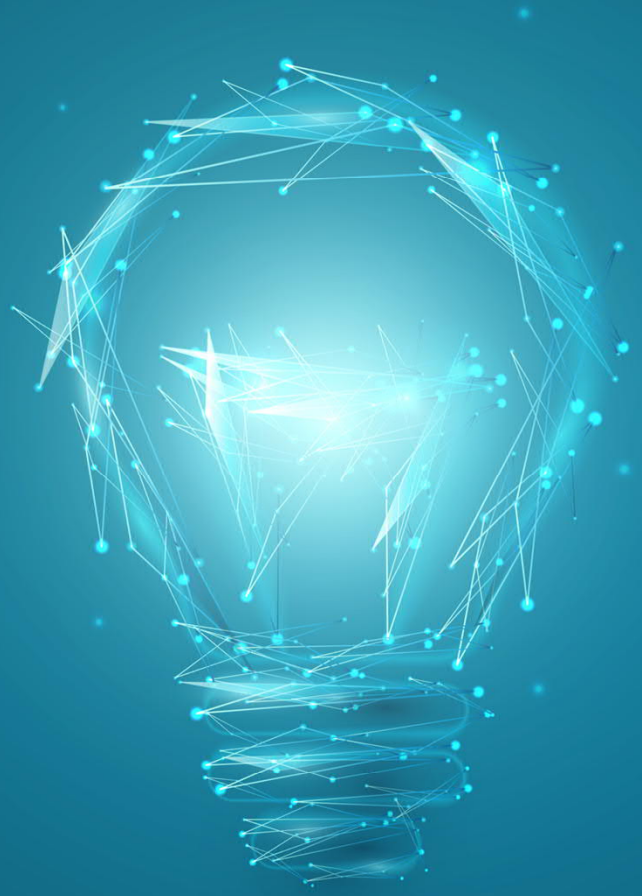
Utility Reimagined



2018 IRP Public Meeting #2

Presentation of 2018 Integrated Resource Plan Report

Entergy New Orleans, LLC

August 9, 2019

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Agenda

- 2018 IRP Process Overview
- Inputs and Assumptions
- Demand-Side Management (DSM) Inputs
- Planning Scenarios and Strategies
- Portfolio Optimization and Total Relevant Supply Cost Analysis
- Stochastic Risk Analysis
- Distribution Planning Capabilities
- Action Plan
- Question and Answer Period

Purpose: Integrated Resource Plan

- Council IRP Rules: "It is the Council's desire that a comprehensive IRP conducted in accordance with these IRP Rules provide **a full picture** of **all reasonably available resource options** in light of current and expected market conditions and technology trends, and generate an informed understanding of the **economic, reliability, and risk evaluation** of utility resource planning as well as associated **social and environmental impacts** [emphasis added]."

- Following an extensive and collaborative process, ENO filed its 2018 Integrated Resource Plan Report on July 19, 2019.

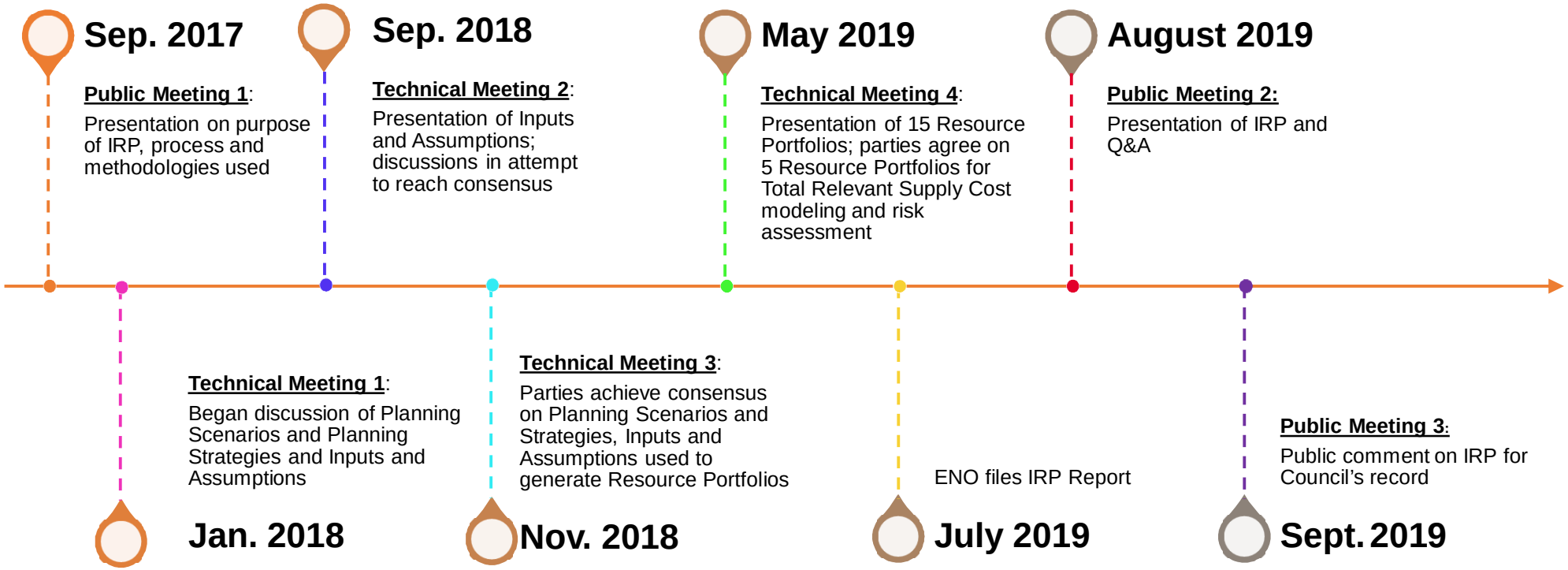
- Today's meeting is to present the Report and answer questions from the public.

- Another public meeting is scheduled for September 11, 2019, at which members of the public may make comments to the Council to convey their opinions on the IRP Report.

Important Considerations

- ENO does not have a capacity-driven need to add further resources until 2033 under current assumptions.
- New IRP Rules removed requirement that ENO select a Preferred Portfolio. Value of the IRP is as a general planning tool to give the Council and the public a view of various possibilities for New Orleans' energy future in a wide range of possible scenarios.
- IRP will inform the development of an Implementation Plan for Program Years 10-12 of the Council's Energy Smart program, which ENO administers.
- Two different Demand Side Management (DSM) Potential studies will inform the Implementation Plan, which ENO will file later this year.
- Due to wide variance between DSM Potential Studies used in the IRP, direct comparison of Resource Portfolios on a cost basis is not possible or meaningful.

Stakeholder and Public Process Review



Energy Smart Milestones

Aug. 2019

Energy Smart Draft Implementation:
ENO to file meeting materials for Technical Meeting 5 related to Energy Smart Implementation Plan for Program Years 10-12

Sep. 2019

Technical Meeting 5:
Presentation on Energy Smart Implementation Plan for Program Years 10-12

Nov. 2019

Proposed Interim Technical Meeting:
ENO has proposed to hold an additional Technical Meeting for receiving feedback on a Draft Energy Smart Implementation Plan, which ENO would submit in advance of the proposed Technical Meeting

Dec. 2019

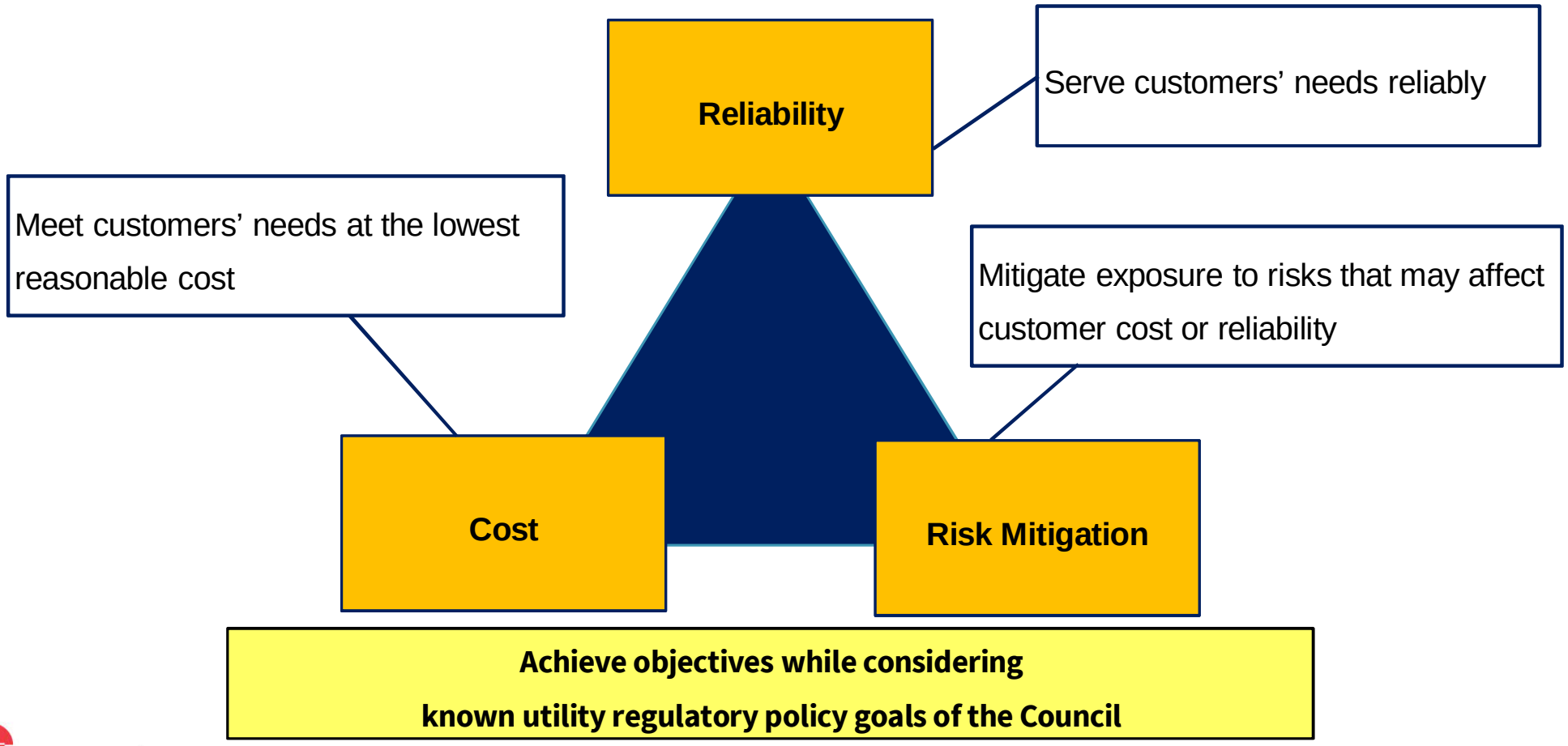
Energy Smart Implementation Plan Filing:
ENO files Implementation Plan for Program Years 10-12 for Council review and approval

January 1, 2020

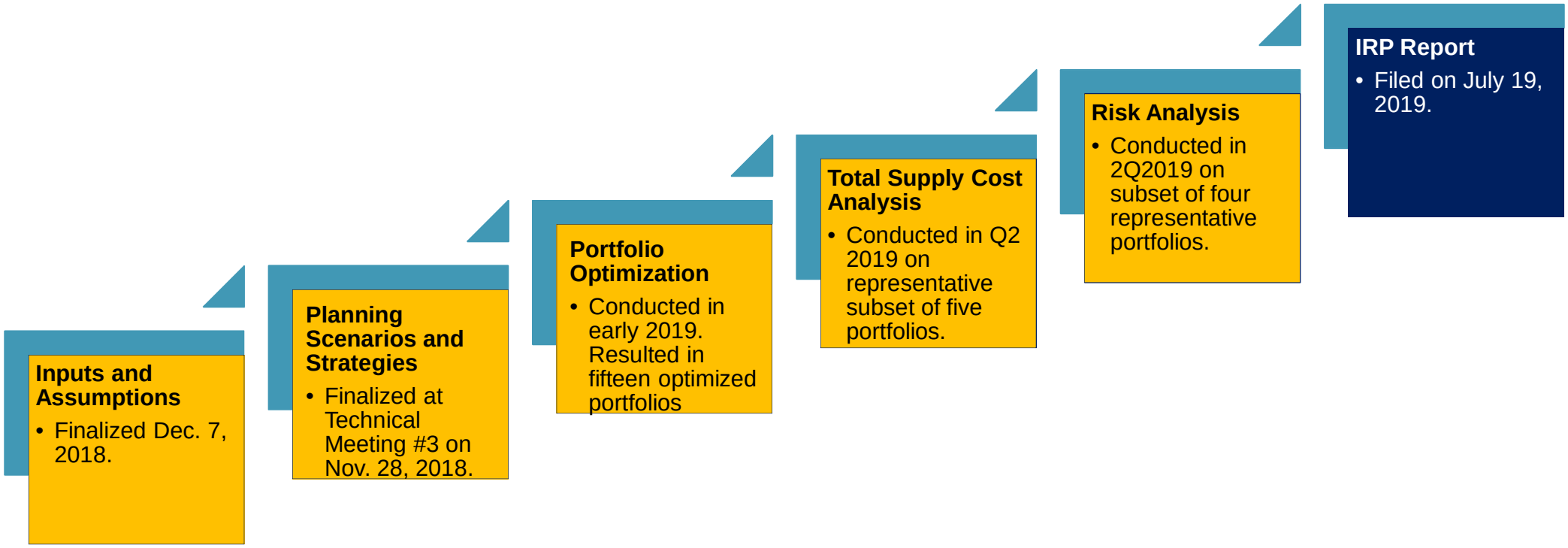
Program Year 10 scheduled to begin

Achieving the Goal-Planning Objectives

The IRP planning process seeks to balance three main objectives: **reliability, cost, and risk**



Path to the 2018 IRP Report

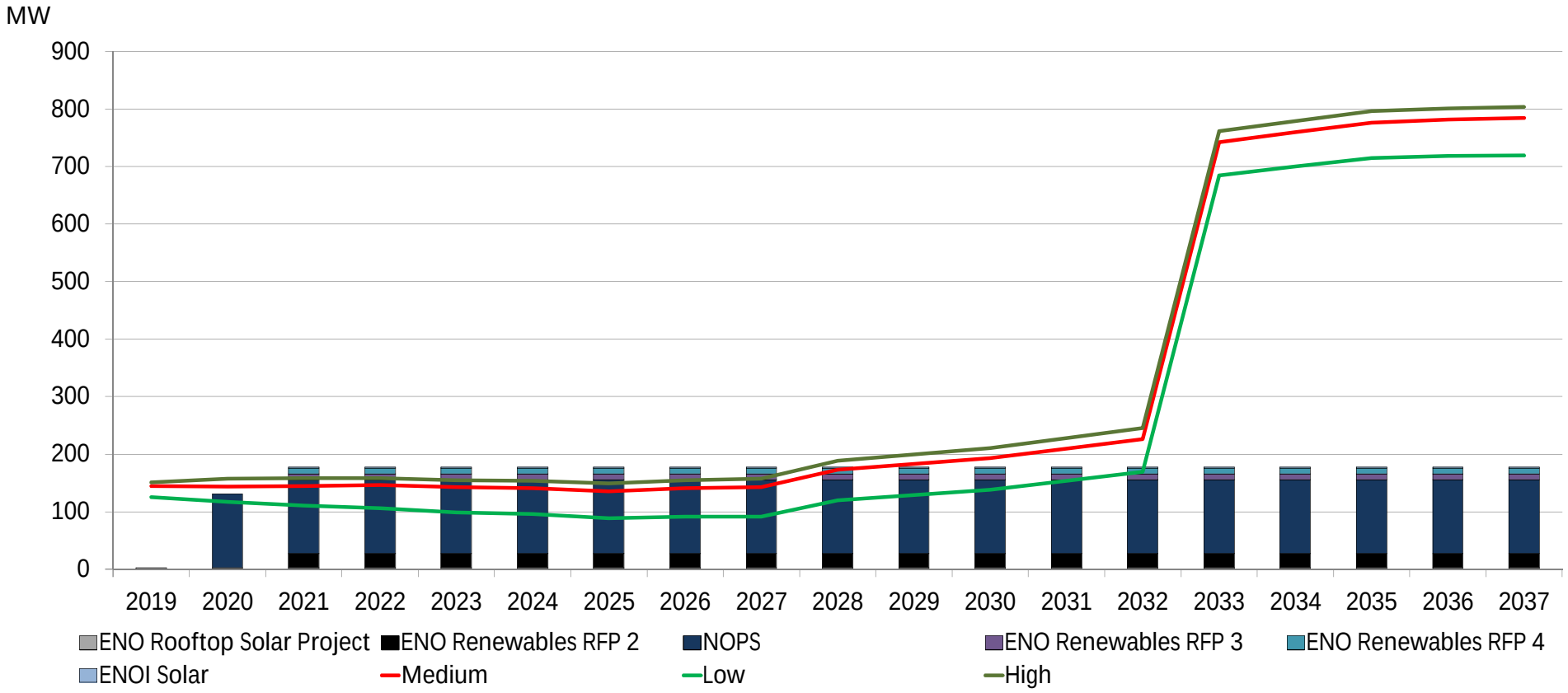


Inputs and Assumptions

Customer Need	Supply Side and Demand Side Resources	Transmission	Economic & Financial
• Peak Load Forecast w/ Sensitivities • Reserve Requirements	• Existing Fleet capability • Resource deactivation assumptions • Power Purchase Agreements • Technology Assessment (capital and operating costs) • Impact of existing DSM • DSM Potential Study	• Import/Export Limits	• Inflation Rate • Discount Rate • Fuel Forecasts • Environmental pricing (e.g., CO_2) • Capacity Value • Locational Marginal Prices (LMPs)

ENO's Long-Term Capacity Need

ENO's existing and planned capacity portfolio over the 20 year planning period



Demand-Side Management (DSM) Potential Studies

- DSM Potential Studies examine how much electricity usage can be reduced during the planning period to offset need for new generation. DSM Potential Studies in the IRP inform plans for the next Program Years of Energy Smart.
- Optimal Energy prepared a potential study on behalf of the Council and Navigant Consulting prepared a potential study for ENO.
- Different Planning Strategies use different input cases from the two DSM Potential Studies, making direct comparison of Resource Portfolios from different Planning Strategies impossible.
- Resource Portfolios using Optimal input cases generally reflect lower total costs; but likely underestimate the costs associated with DSM programs.
- Both Studies will inform the proposed Energy Smart Implementation Plan for 2020-2022.

DSM Programs Evaluated and Included in IRP

Navigant DSM Programs
Com Behavior
Large C&I
Small C&I
Consumer Products
HPwES
HVAC
Low Income and Multi Family
Res Behavior
School Kits

Optimal DSM Programs
Home Energy Services
Res HVAC
Res Efficient Products
Res Lighting
Efficient New Homes
Appliance Recycling
CVR- Res
Small Business DI
Commercial Prescriptive
Commercial Custom
Retro commissioning
New Construction
CVR – C&I

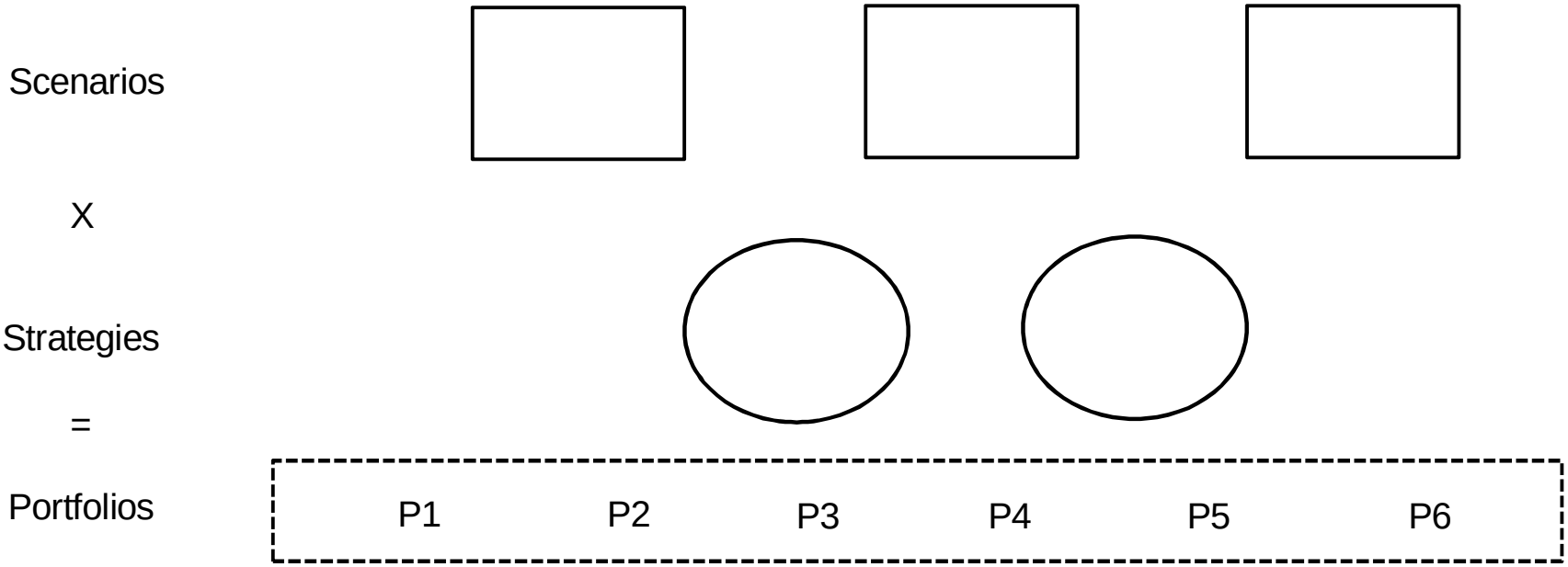
Demand Response Programs Evaluated and Included in IRP

Navigant Demand Response	
Program	**Description**
DLC-thermostat- HVAC	Control of cooling load using a PCT.
Dynamic Pricing w/o Enabling Tech	Voluntary opt-in dynamic pricing offer with enabling technology.
Dynamic Pricing with Enabling Tech	Voluntary opt-in dynamic pricing offer without enabling technology.
DLC-Switch-HVAC	Control of cooling load using a load control switch.
C&I Curtailment-Manual HVAC Control	Firm capacity reduction Commitment. $/kW payment based on contracted capacity plus $/kWh payment based on energy reduction during an event.

Optimal Demand Response	
Program	**Description**
RES DLC/ADR	Reduce residential peak demand during load control events through remotely controlled programs and software.
Res- Pricing- PTR	Pay-for-performance incentive programs that pay participants to reduce energy use during certain hours of selected days when a peak event is called.
Large Cust SOP	The customer is paid to allow the utility to curtail load for a maximum number of times during set periods, usually with 24 hour advance notice.

Planning Scenarios and Strategies

- Planning Scenario—Definition of market outlook consisting of key parameters not controlled by ENO or the Council (Macroeconomic)
- Planning Strategy—Defined set of resource constraints, regulatory policies, or business decisions over which ENO, the Council, or Intervenors have control (Microeconomic or Policy Sensitivities)
- Each Scenario combined with each Strategy results in one Resource Portfolio
- Example: if there are three Scenarios and two Strategies, then the analysis would result in six Resource Portfolios to be evaluated



IRP Planning Scenarios

Scenarios finalized at IRP Technical Meeting #3

	Scenario 1 (Moderate Change)	Scenario 2 (Customer Driven)	Scenario 3 (Stakeholder)
Peak Load & Energy Growth	Medium	High	Low
Natural Gas Prices	Medium	Low	High
Market Coal & Legacy Gas Deactivations	60 years	55 years	50 years
Magnitude of Coal & Legacy Gas Deactivations[1]	17% by 2028 57% by 2038	31% by 2028 73% by 2038	46% by 2028 76% by 2038
MISO Market Additions Renewables / Gas Mix	34% / 66%	25% / 75%	50% / 50%[2]
CO_2 Price Forecast	Medium	Low	High (Start 2022)

- Scenario 1: Flat-to-declining electricity sales, partially offset by increased customer count, market balances new generation additions between renewables and gas.
- Scenario 2: Electricity sales increase, sustained low gas prices cause older units to retire, majority of new resources are gas resources.
- Scenario 3: Low electricity sales, federal CO_2 regulations increase cost of carbon starting in 2022, causing early retirements of older fossil units, replacement capacity evenly split between renewables and gas.

IRP Planning Strategies

Strategies finalized at IRP Technical Meeting #3

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5
Objective	Least Cost Planning	0.2/2% DSM Goal	Optimal Program Achievable DSM	Navigant High DSM	Stakeholder Strategy
Capacity Portfolio Criteria and Constraints	Meet 12% Long-term Planning Reserve Margin (PRM) target using least-cost resource portfolio	Include a portfolio of DSM programs that meet the Council's stated 2% goal	Meet peak load need + 12% PRM target using Optimal Program Level DSM and resources selected by model	Meet peak load need + 12% PRM target using Navigant High Case DSM and resources selected by model	Meet peak load need + 12% PRM target using Optimal Program Level DSM, renewables, and energy storage
Description	Assess demand- and supply-side alternatives to meet projected capacity needs with a focus on total relevant supply costs	Assess portfolio of DSM programs that meet Council's stated 0.2/2% goal along with consideration of additional supply-side alternatives	Assess portfolio of DSM from Optimal Program Achievable case along with consideration of additional supply side alternatives	Assess portfolio of DSM from Navigant High case along with consideration of additional supply side alternatives	Assess demand and Supply-side alternatives to meet projected capacity need with a focus on adding renewables and storage
DSM Input Case	Navigant Base (Optimized)	Navigant 2%	Optimal Program Achievable	Navigant High	Optimal Program Achievable (Optimized)

Capacity Expansion Portfolio Selections

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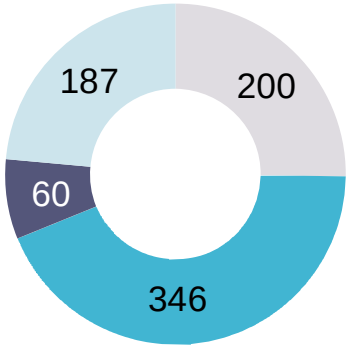
★ Indicates initial recommendation for further Total Supply Cost evaluations

☆ Strategy 3 Scenario 3 Portfolio is identical to Strategy 5 Scenario 3 Portfolio

Total Relevant Supply Cost – Portfolios Analyzed

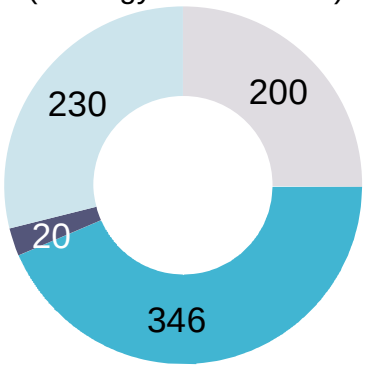
Parties agreed at Technical Meeting 3 that these Resource Portfolios should be carried forward for Total Relevant Supply Cost analysis.

Portfolio 1
(Strategy 1 Scenario 1)



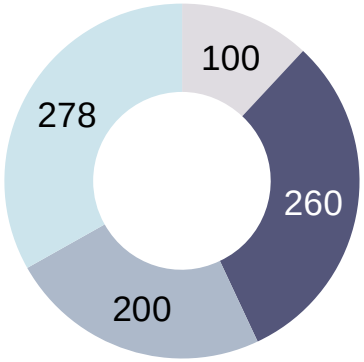
Resource	Year	Cap (MW)
M 501 J CT	2033	346
Solar	2033	200
Battery	2033	20
Battery	2034	20
Battery	2035	20

Portfolio 2
(Strategy 2 Scenario 1)



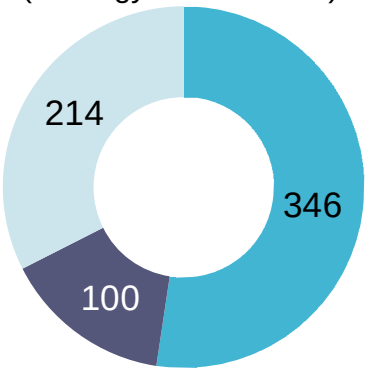
Resource	Year	Cap (MW)
M 501 J CT	2033	346
Solar	2033	200
Battery	2038	20

Portfolio 3
(Strategy 3** Scenario 3)



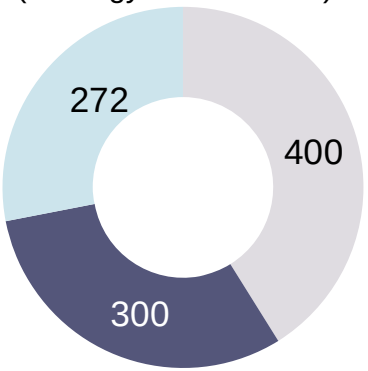
Resource	Year	Cap (MW)
Solar	2033	100
Battery	2033	240
Battery	2034	20
Wind	2038	200

Portfolio 4
(Strategy 4 Scenario 2)



Resource	Year	Cap (MW)
M 501 J CT	2033	346
Battery	2033	60
Battery	2034	20
Battery	2035	20

Portfolio 5
(Strategy 5 Scenario 1)



Resource	Year	Cap (MW)
Battery	2033	240
Solar	2033	400
Battery	2034	40
Battery	2038	20

Solar M501 CT Battery Wind DSM

**DSM value represents last years' (2038) peak reduction throughout study period, inclusive of EE and DR contribution*

**Portfolio 3 is identical to Strategy 5 Scenario 3

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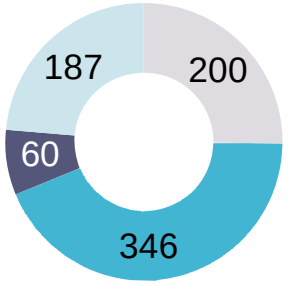
Total Supply Cost Analysis--Valuation of Resource Portfolios

- Optimized portfolios were assessed based on the economic impact to customers under each of the defined scenarios
- Each resource portfolio was tested in each scenario using AURORA production cost modeling software
- For each resource portfolio, a present value forward revenue requirement (i.e., a Total Supply Cost, that includes both relevant fixed and variable costs) was calculated for the 20 year planning period

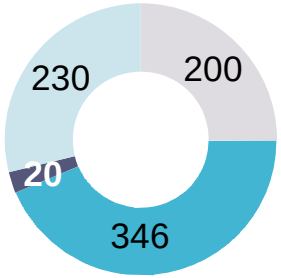
Navigant-Based Portfolios' Total Relevant Supply Cost Results* (2019$ NPV)

Portfolio 1



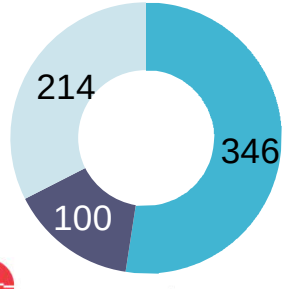
Strategy 1: Scenario 1		Scenario 1	Scenario 2	Scenario 3
Variable Supply Costs	[$MM]	$1,114	$912	$1,248
Resource Additions (Levelized Real)	[$MM]	$134	$134	$134
Capacity Purchases/(Sales)	[$MM]	($35)	($28)	($59)
DSM Fixed Costs	[$MM]	$198	$198	$198
TOTAL SUPPLY COST (2019$ NPV)	[$MM]	$1,411	$1,217	$1,521

Portfolio 2



Strategy 2: Scenario 1		Scenario 1	Scenario 2	Scenario 3
Variable Supply Costs	[$MM]	$961	$799	$991
Resource Additions (Levelized Real)	[$MM]	$121	$121	$121
Capacity Purchases/(Sales)	[$MM]	($46)	($38)	($69)
DSM Fixed Costs	[$MM]	$542	$542	$542
TOTAL SUPPLY COST (2019$ NPV)	[$MM]	$1,577	$1,423	$1,584

Portfolio 4



Strategy 4: Scenario 2		Scenario 1	Scenario 2	Scenario 3
Variable Supply Costs	[$MM]	$1,104	$902	$1,224
Resource Additions (Levelized Real)	[$MM]	$97	$97	$97
Capacity Purchases/(Sales)	[$MM]	($33)	($25)	($56)
DSM Fixed Costs	[$MM]	$333	$333	$333
TOTAL SUPPLY COST (2019$ NPV)	[$MM]	$1,501	$1,307	$1,597

***As noted above, direct comparison of the costs of portfolios using different DSM Studies is not possible.**

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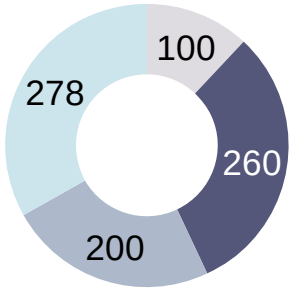
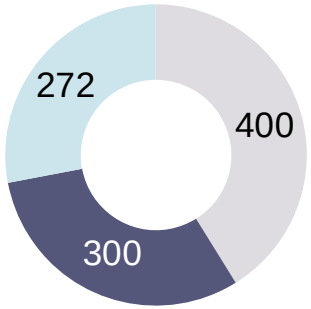
Optimal-Based Portfolios' Total Relevant Supply Cost Results* (2019$ NPV)

Portfolio 3



Strategy 3: Scenario 3		Scenario 1	Scenario 2	Scenario 3
Variable Supply Costs	[$MM]	$986	$814	$1,030
Resource Additions (Levelized Real)	[$MM]	$114	$114	$114
Capacity Purchases/(Sales)	[$MM]	($47)	($39)	($70)
DSM Fixed Costs	[$MM]	$258	$258	$258
TOTAL SUPPLY COST (2019$ NPV)	[$MM]	$1,311	$1,147	$1,331

Portfolio 5

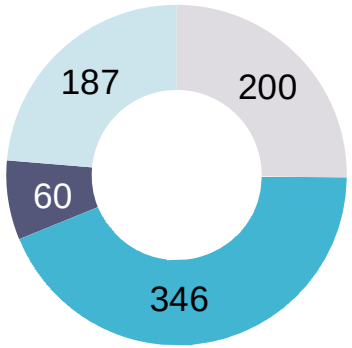


Strategy 5: Scenario 1		Scenario 1	Scenario 2	Scenario 3
Variable Supply Costs	[$MM]	$942	$784	$964
Resource Additions (Levelized Real)	[$MM]	$181	$181	$181
Capacity Purchases/(Sales)	[$MM]	($75)	($67)	($98)
DSM Fixed Costs	[$MM]	$247	$247	$247
TOTAL SUPPLY COST (2019$ NPV)	[$MM]	$1,295	$1,146	$1,294

***As noted above, direct comparison of the costs of portfolios using different DSM Studies is not possible.**

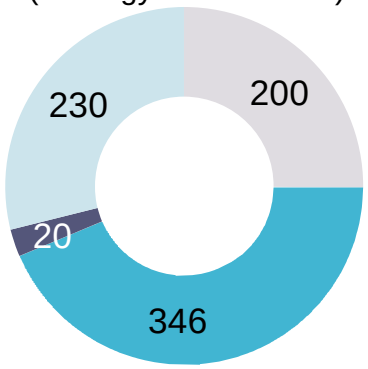
Stochastic Risk Analysis

Portfolio 1
(Strategy 1 Scenario 1)



Resource	Year	Cap (MW)
M 501 J CT	2033	346
Solar	2033	200
Battery	2033	20
Battery	2034	20
Battery	2035	20

Portfolio 2
(Strategy 2 Scenario 1)



Resource	Year	Cap (MW)
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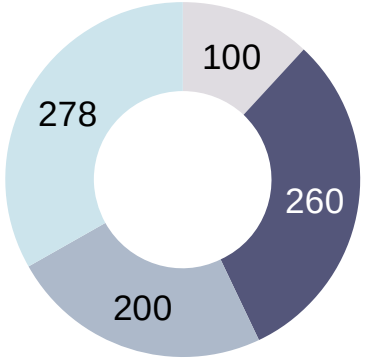
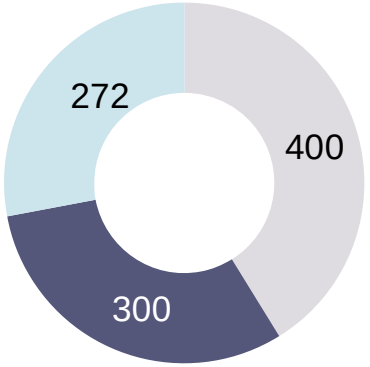
Solar	2033	200
Battery	2038	20

Portfolio 3
(Strategy 3 Scenario 3)



Resource	Year	Cap (MW)
Solar	2033	100
Battery	2033	240
Battery	2034	20
Wind	2038	200

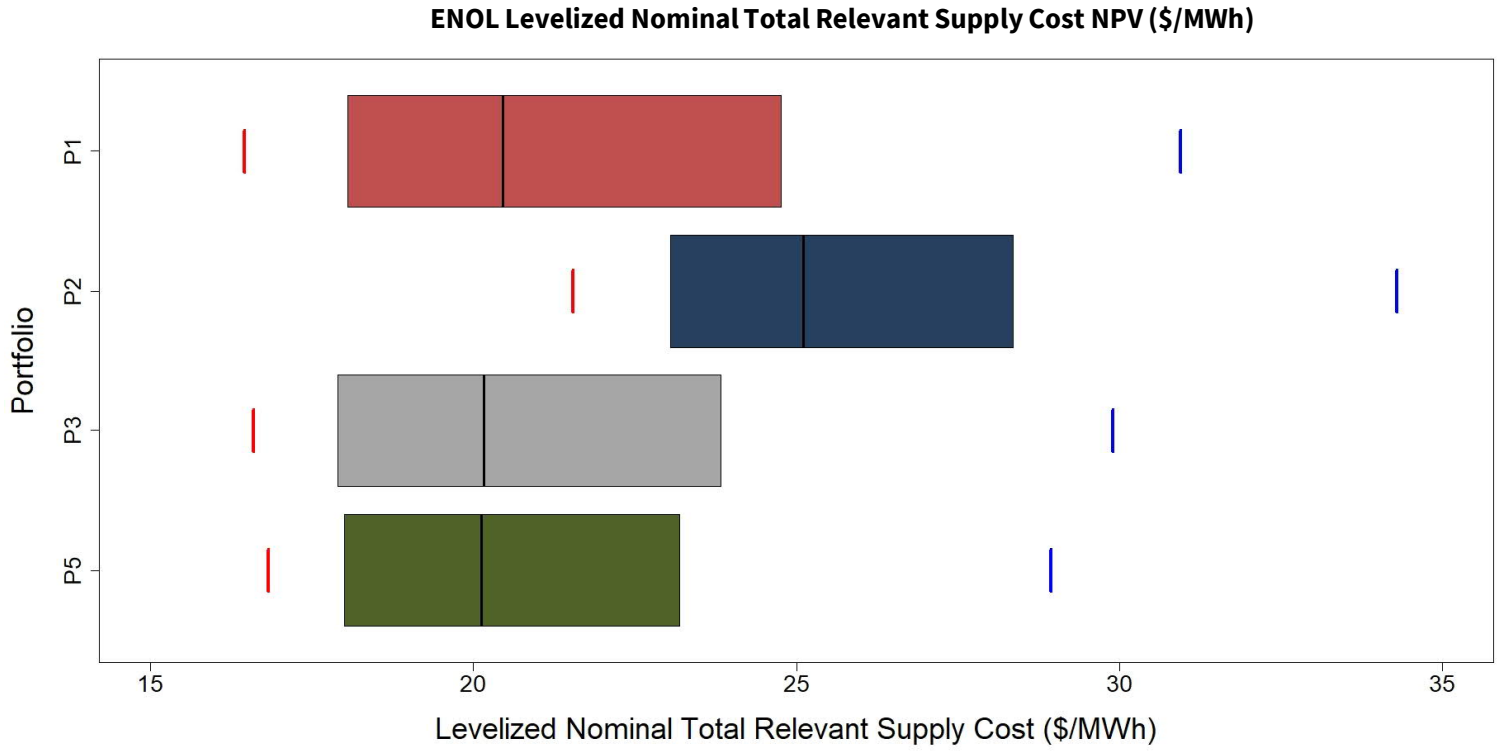
Portfolio 5
(Strategy 5 Scenario 1)



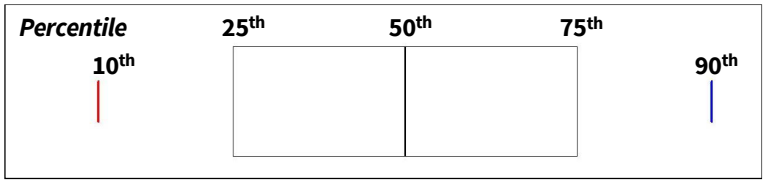
Resource	Year	Cap (MW)
Battery	2033	240
Solar	2033	400
Battery	2034	40
Battery	2038	20

Solar M501 CT Battery Wind DSM

2018 ENOL IRP Stochastics Results – Gas Price



Percentile	Levelized Real Gas Price (2019 $/mmBtu)
10	$1.03
20	$1.41
30	$1.82
40	$2.22
50	$2.61
60	$3.02
70	$3.81
80	$4.72
90	$7.06
95	$9.84
99	$24.66



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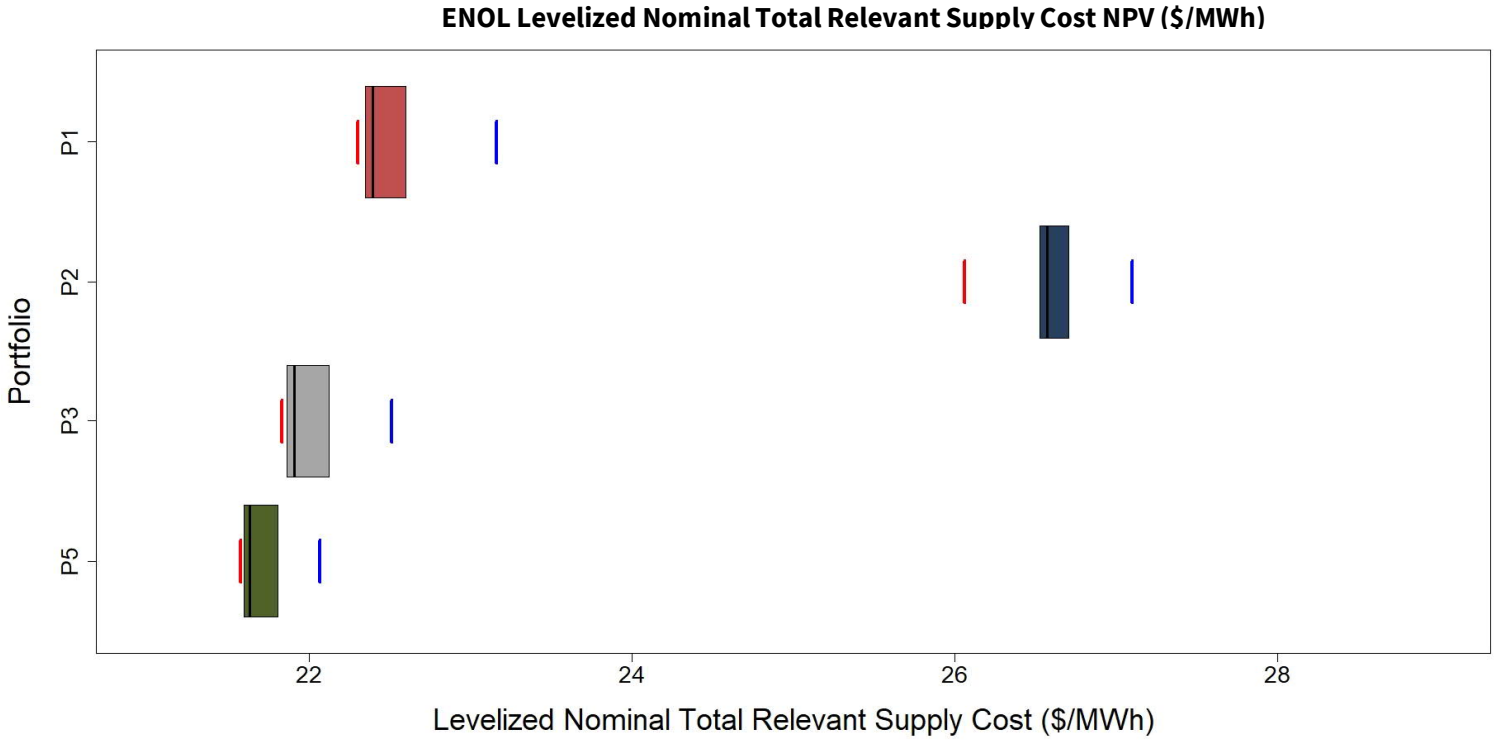
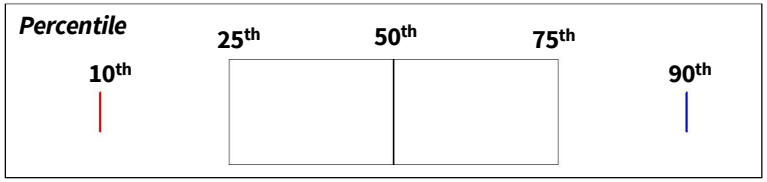
2018 ENOL IRP Stochastics Results – CO_2 Price



Percentile	Levelized Real CO2 Price $2019
10	$0.39
20	$0.66
30	$0.90
40	$1.29
50	$1.70
60	$2.23
70	$3.29
80	$5.08
90	$9.44
95	$14.32
99	$26.74

CO2 price assumption begins in 2026



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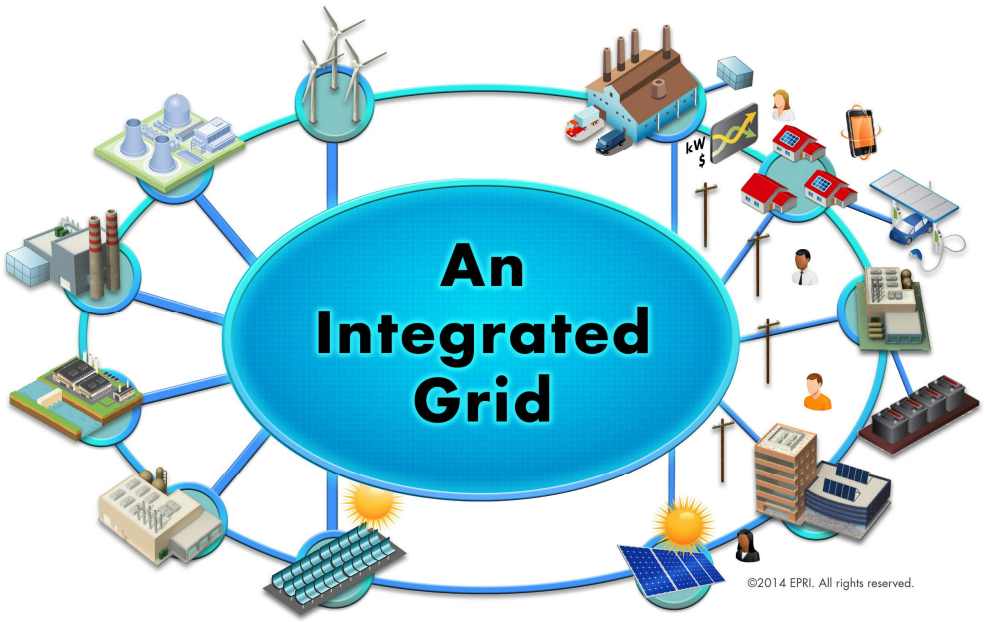
Advanced Distribution Planning – Path to Optimization of the Distribution Grid

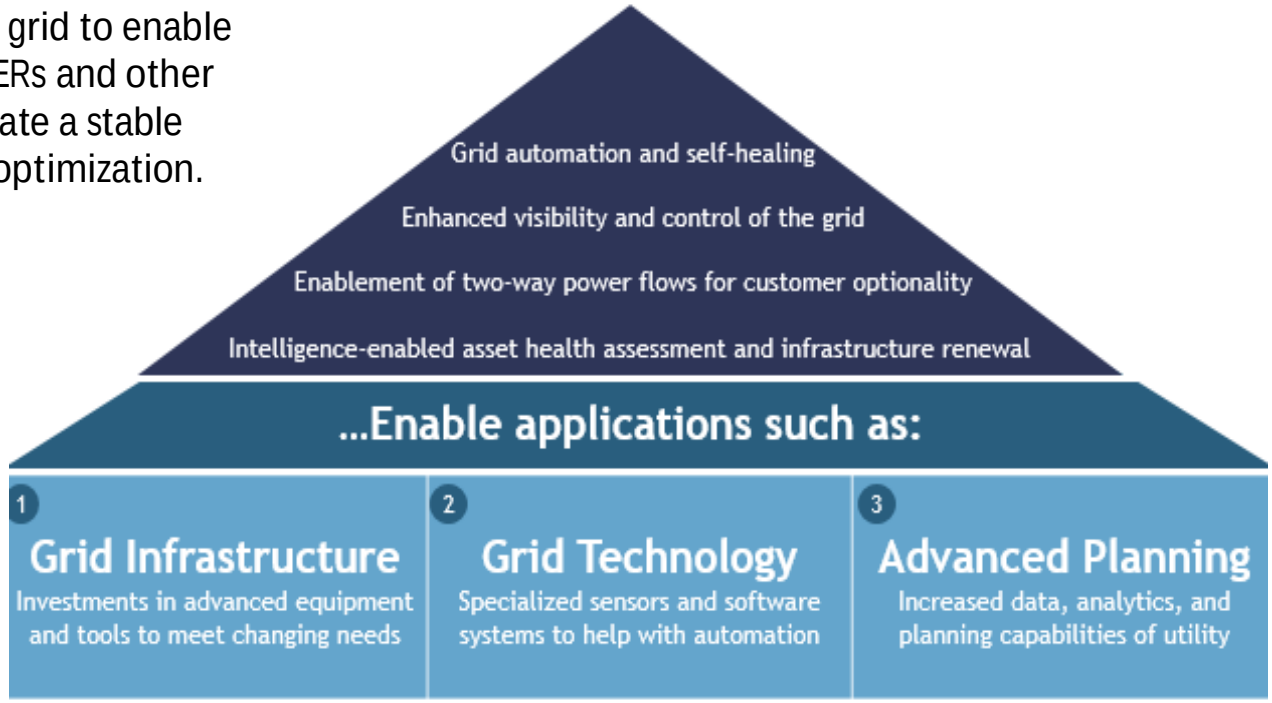


- For the past several years, ENO has been working on projects that will upgrade the distribution system to provide a foundation for the utility of the future, or an Integrated Grid. Examples of this foundational work include deployment of an Advanced Metering Infrastructure (AMI) and Grid Modernization.
- These projects will enable many benefits and advanced functionalities for customers, including a future where third-party Distributed Energy Resources (DERs), e.g. customer-owned solar panels, can be operated in coordination with ENO's system in order to optimize the utilization of DERs on the distribution grid.
- The Council's new IRP Rules require ENO to provide an update on its efforts to develop these capabilities in this and future IRPs.

Path to Optimization – Three Pillars of the Modernized Electric Grid

Grid Infrastructure: Upgrading the distribution grid to enable accommodation of the added power flow of DERs and other new technologies (e.g., electric vehicles) to create a stable platform for advanced functionalities like DER optimization.

Grid Technology: Smart infrastructure and software that allows for greater visibility into real-time conditions on the grid, as well as coordinated understanding of interaction among all components and devices operating on the grid. Examples are the new Outage and Distribution Management Systems, an advanced Geospatial Information System, and the AMI communication network.



Advance Planning: Increased awareness of the distribution grid enabled by data from smart devices, coupled with supporting software, will allow for ENO to prepare its workers to utilize tools necessary to perform the kind of advanced analyses necessary to optimize DERs on the grid. Additional necessary components include LoadSEER software and a Distributed Energy Resources Management System or "DERMS." ENO continues to monitor the market for viable DERMS products while pursuing the necessary foundational steps described above through its Grid Modernization efforts.

2015 IRP Action Plan

Description	Action to be Taken	Resolution
Deactivation of Michoud Units 2 and 3	Confirmed Attachment Y deactivation request complete for Michoud 2 and 3 pursuant to the MISO tariff. Units 2 and 3 will be deactivated June 1, 2016 subject to completion of necessary transmission upgrades as required by Attachment Y.	Deactivation completed June 1, 2016.
Union Power Station	Obtained council approval on November 19, 2015 for ENO purchase of Union Power Block 1. Transaction scheduled to close in early 2016.	Unit purchase transaction closed in 2016.
ENO Solar Pilot	Construction to begin 1st quarter 2016. Target in service date Summer 2016.	A.B. Paterson 1 MW Solar + .5 MWh battery storage project New Orleans Solar Pilot Project began operation in June 2016.
DSM	Continue implementation and performance monitoring of Council approved programs for Energy Smart Years 5 and 6 through March 2017.	Continue implementation and performance monitoring of Council approved programs for Energy Smart Years 7-9 through December 2019.
Renewable RFP	Conduct a Renewable RFP to obtain actionable information on the cost and deliverability of renewable resources.	Approval of 90 MW portfolio of solar resources selected from the Company's 2016 Renewables RFP was requested in Docket UD-18-06; an Agreement in Principle ("AIP") was filed in June 2019, representing a settlement among the Company, Advisors, and Intervenors. Council approved the AIP and the 90 MW portfolio via Resolution R-19-293 on July 25, 2019. Council approved construction of 5 MW Distributed-Generation-scale solar project June 2018 in Docket No. UD-17-05 via Resolution R-18-222; construction is underway.
AMI	ENO is currently considering various future investments to modernize the distribution grid and more fully utilize new technologies. AMI continues to be analyzed and ENO plans to talk further with the City Council and the Advisors regarding potential future AMI investments.	The Council approved the Company's application to implement AMI throughout the city in Resolution R-18-37. Accelerated implementation is ongoing and is expected to be complete in late 2020.

2018 IRP Action Plan

Description	Action to be Taken
90 MW Portfolio Implementation	Undertake construction of New Orleans Solar Station project at NASA Michoud and monitor counterparty efforts to bring projects underlying the St. James and Iris solar PPAs online in accordance with contractual deadlines.
Commercial Rooftop Program	Complete installation of Council-approved 5 MW_{AC} rooftop solar projects. Report on project outcome to Council and consider whether requesting expansion of program beyond 5 MW limit is warranted.
Community Solar Program Implementation	Continue building internal resources and processes to support administration of Council's Community Solar program under new Council rules.
Distribution Planning Capabilities	As discussed above the Company is taking numerous steps to develop its capabilities to analyze the impacts of DERs on the distribution system as contemplated by the Council's updated IRP Rules.
DSM/DR Implementation	File Implementation Plan for Energy Smart Program Years 10-12 as required under Resolution R-17-430.
Grid Modernization Implementation	Continue implementing Grid Modernization as outlined in plans submitted in Docket UD-18-01 and Docket UD-18-07.
One Hundred Homes Rooftop Solar Initiative	Complete implementation of rooftop solar pilot program with up to 100 low income residential customers in 2019.
Smart Cities Implementation	Continue working with Advisors and other stakeholders in Docket UD-18-01 to support equitable implementation of Smart Cities technologies and EV charging infrastructure solutions.