NewGen Strategies & Solutions

LOAD SHAPE ANALYSIS MODEL (LSAM™)
SCENARIO 1 USER INSTRUCTION MANUAL

a. Web-based version

   i. Save the LSAM™ Add-In .xml file onto your local machine, taking note where it is saved.

   ii. Log into OneDrive and upload the "LSAM UI" .xlsx file to your OneDrive.

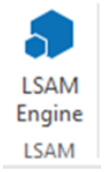
   iii. Open the "LSAM UI" file in OneDrive (Excel Online).

   iv. Once the file opens, click the “Insert” tab across the top ribbon of Excel online, and then click the Office Add-Ins icon:

   v. Click the “Upload My Add-in” hyperlink in the top right corner of the dialogue box.

   vi. Navigate to the location of the LSAM™ Add-In.xml file you saved, and initialize.

   vii. A new icon will appear in the ribbon with a dialogue box introducing the LSAM™ Add-In. Click the icon.



   viii. The LSAM™ Add-In will open and initiate on the right-hand side of the window after a period of loading.

General Troubleshooting

a. If the Add-In seems to become non-responsive, or if you wish to restore the input assumptions and rates to their defaults, click the LSAM™ Engine icon on the top ribbon:

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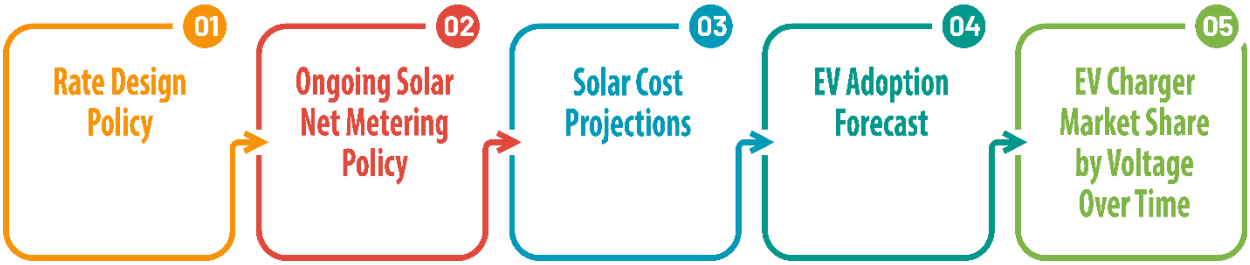
Workshop Introduction

In this workshop, we will use a case study approach to evaluate different scenarios based on different future states of the Vermont electric system, and combinations of various input assumptions and user-controllable variables. The goal will be to design retail electric rates with static, time-differentiated rates potentially differentiated by season (e.g., Summer vs. Non-Summer), On-, Off-, and Mid-Peak periods (with user controllable hours used to define those periods), and potentially demand and energy rates. We will gauge the success of newly developed rate designs against a set of Utility Cost Key Performance Indicators (KPIs).

There are various user-controllable input assumptions on the LSAM™ Add-In that are shaded in royal blue, and that will be used more commonly in differentiating one scenario from another. Further, these key inputs may provide a quick sensitivity test of a given set of assumptions or rate design(s). Those key input assumptions include:



01 Rate Design Policy

a. Toggles between "Current" and "TOU/Flexible"

02 Ongoing Solar Net Metering Policy

a. Allows the user to change current Net Metering policy and provides flexibility over the treatment of photovoltaics (PV) generation that meets onsite load, as well as PV generation exported from the customer's system to the grid

03 Solar Cost Projections

a. Toggles between the "Base" and "Low" case for solar cost projections over the forecast period

04 Electric Vehicle Adoption Forecast

a. Toggles between "Base" and "High" EV adoption over the forecast period

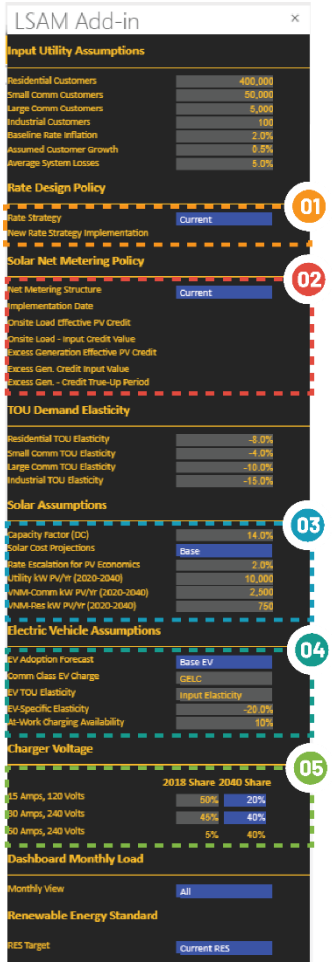
05 Electric Vehicle Charger Market Share by Voltage Over Time

a. Allows the user to input the 2040 market share between the following electric vehicle (EV) chargers:

   i. 1.8 kilowatts (kW) – 15 Amps, 120 Volts

   ii. 7.2 kW – 30 Amps, 240 Volts

   iii. 12 kW – 50 Amps, 240 Volts



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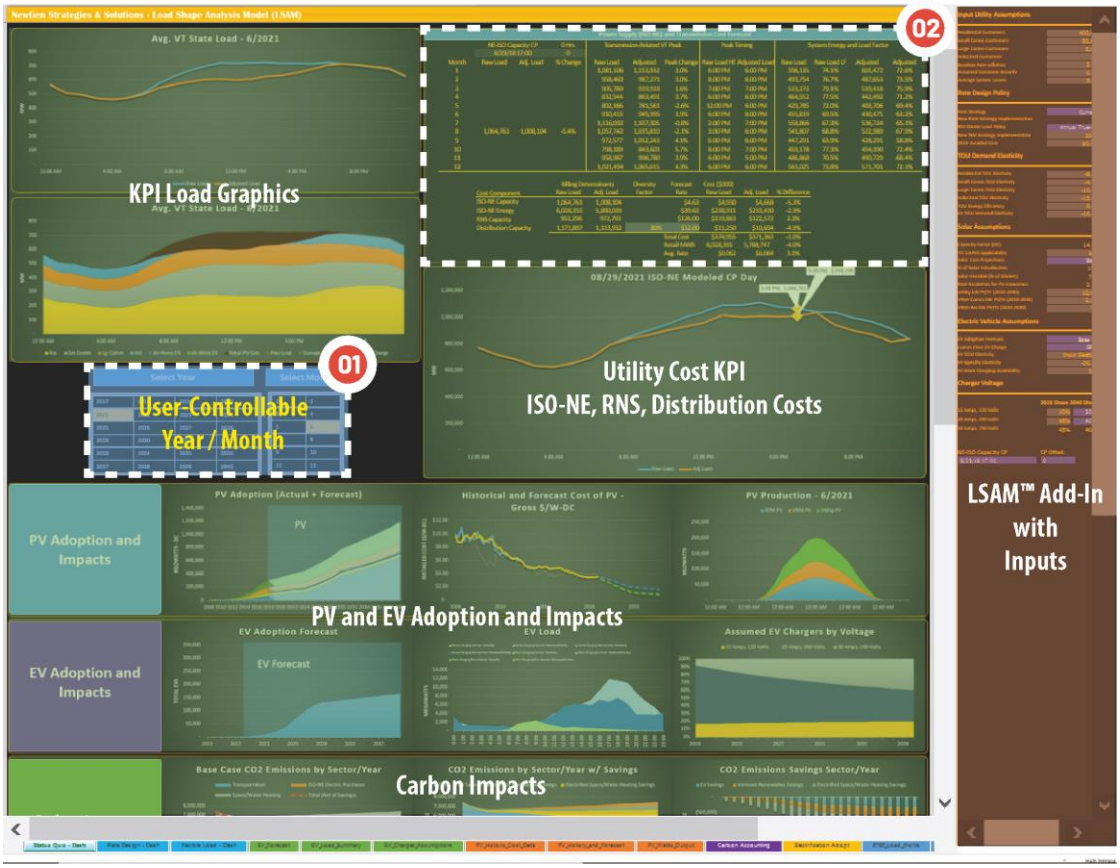
Scenario 1 – 2030 Rate Design

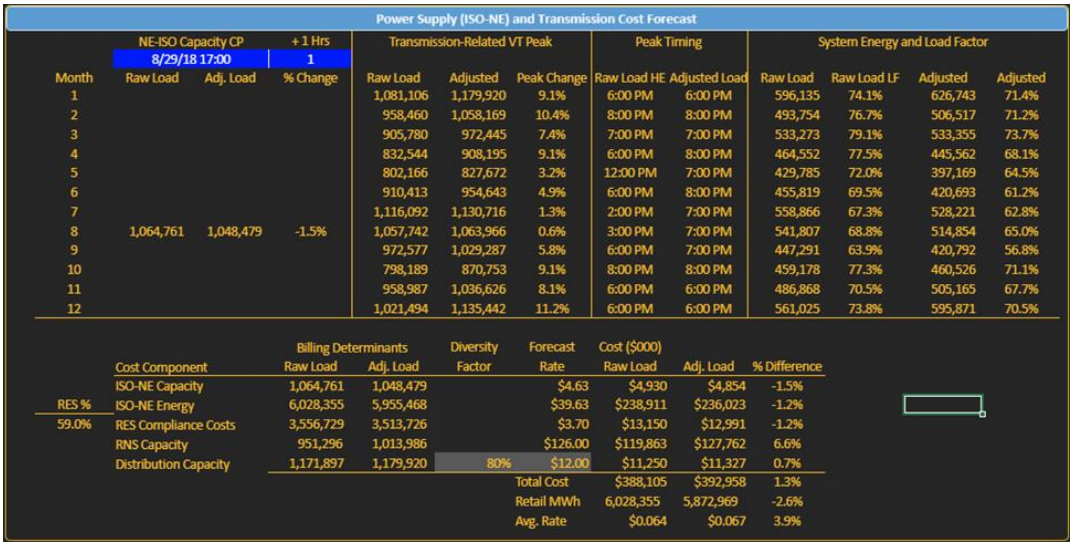
The first scenario is defined as a forecast of system dynamics in 2030, with the following set of LSAM™ Add-In Assumptions:

1. **Rate Design Policy** – **Current**
2. **Ongoing Solar Net Metering Policy** – **Current**
3. **Solar Cost Projections** – **Base**
4. **Electric Vehicle Adoption Forecast** – **Base**
5. **Electric Vehicle Charger Market Share by Voltage Over Time**
   a. **20%** 1.8 kW – 15 Amps, 120 Volts
   b. **40%** 7.2 kW – 30 Amps, 240 Volts
   c. **40%** 12 kW – 50 Amps, 240 Volts

Start on the Status Quo – Dash, and (STEP 1 below) select the year 2030 in the User-Controllable Year / Month (the selected month may be toggled, but does not impact the results of the scenario provided 2030 is selected). All other LSAM™ Add-In input assumptions from above will load automatically as LSAM™ defaults. Take note of the Utility Cost KPIs (STEP 2 below).



Scenario 1 – 2030 Rate Design
Status Quo – Dash



Power Supply (ISO-NE) and Transmission Cost Forecast

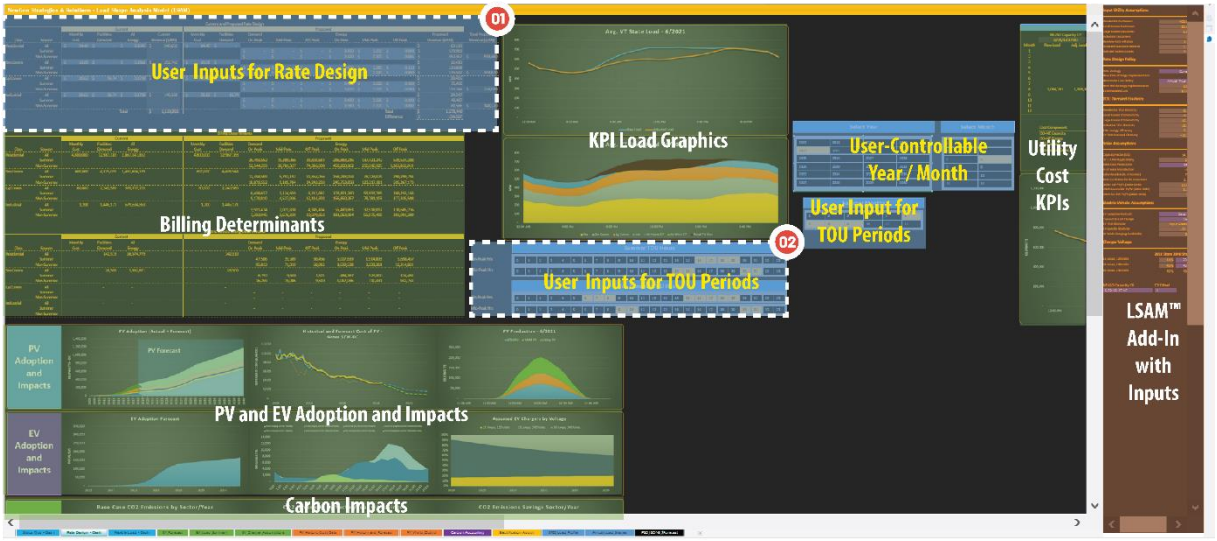
	NE-ISO Capacity CP		+ 1 Hrs	Transmission-Related VT Peak			Peak Timing		System Energy and Load Factor			
	8/29/18 17:00		1									
Month	Raw Load	Adj. Load	% Change	Raw Load	Adjusted	Peak Change	Raw Load HE	Adjusted Load	Raw Load	Raw Load LF	Adjusted	Adjusted
1				1,081,106	1,179,920	9.1%	6:00 PM	6:00 PM	596,135	74.1%	626,743	71.4%
2				958,460	1,058,169	10.4%	8:00 PM	8:00 PM	493,754	76.7%	506,517	71.2%
3				905,780	972,445	7.4%	7:00 PM	7:00 PM	533,273	79.1%	533,355	73.7%
4				832,544	908,195	9.1%	6:00 PM	8:00 PM	464,552	77.5%	445,562	68.1%
5				802,166	827,672	3.2%	12:00 PM	7:00 PM	429,785	72.0%	397,169	64.5%
6				910,413	954,643	4.9%	6:00 PM	8:00 PM	455,819	69.5%	420,693	61.2%
7				1,116,092	1,130,716	1.3%	2:00 PM	7:00 PM	558,866	67.3%	528,221	62.8%
8	1,064,761	1,048,479	-1.5%	1,057,742	1,063,966	0.6%	3:00 PM	7:00 PM	541,807	68.8%	514,854	65.0%
9				972,577	1,029,287	5.8%	6:00 PM	7:00 PM	447,291	63.9%	420,792	56.8%
10				798,189	870,753	9.1%	8:00 PM	8:00 PM	459,178	77.3%	460,526	71.1%
11				958,987	1,036,626	8.1%	6:00 PM	6:00 PM	486,868	70.5%	505,165	67.7%
12				1,021,494	1,135,442	11.2%	6:00 PM	6:00 PM	561,025	73.8%	595,871	70.5%

		Billing Determinants		Diversity	Forecast	Cost ($000)		
	Cost Component	Raw Load	Adj. Load	Factor	Rate	Raw Load	Adj. Load	% Difference
	ISO-NE Capacity	1,064,761	1,048,479		$4.63	$4,930	$4,854	-1.5%
RES %	ISO-NE Energy	6,028,355	5,955,468		$39.63	$238,911	$236,023	-1.2%
59.0%	RES Compliance Costs	3,556,729	3,513,726		$3.70	$13,150	$12,991	-1.2%
	RNS Capacity	951,296	1,013,986		$126.00	$119,863	$127,762	6.6%
	Distribution Capacity	1,171,897	1,179,920	80%	$12.00	$11,250	$11,327	0.7%
					Total Cost	$388,105	$392,958	1.3%
					Retail MWh	6,028,355	5,872,969	-2.6%
					Avg. Rate	$0.064	$0.067	3.9%

Scenario 1 – 2030 Rate Design
Status Quo – Dash

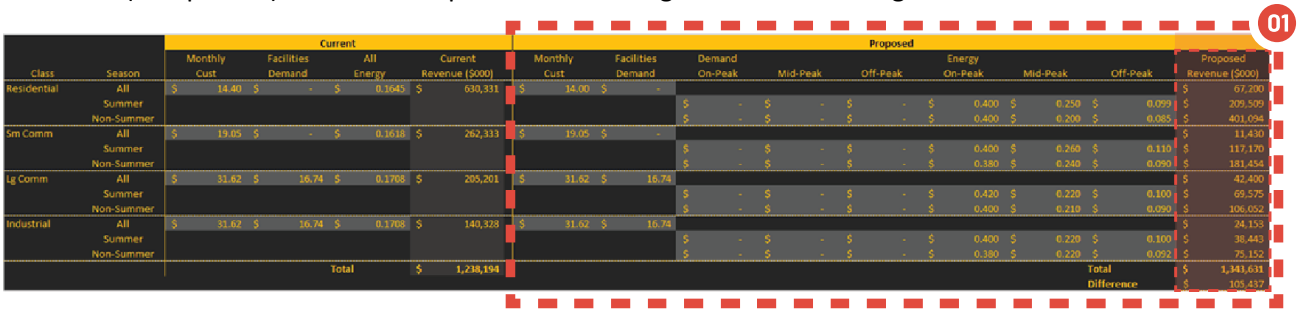
Now, toggle the Rate Design Policy from "Current" to "TOU/Flexible"; you can leave the "New Rate Strategy Implementation Year set to 2020:

Now, navigate to the Rate Design – Dash tab of the LSAM UI. Primarily, we will be interacting with the User Inputs for Rate Design (Item 1 below) and the User Inputs for Time-of-Use (TOU) Periods (Item 2 below):



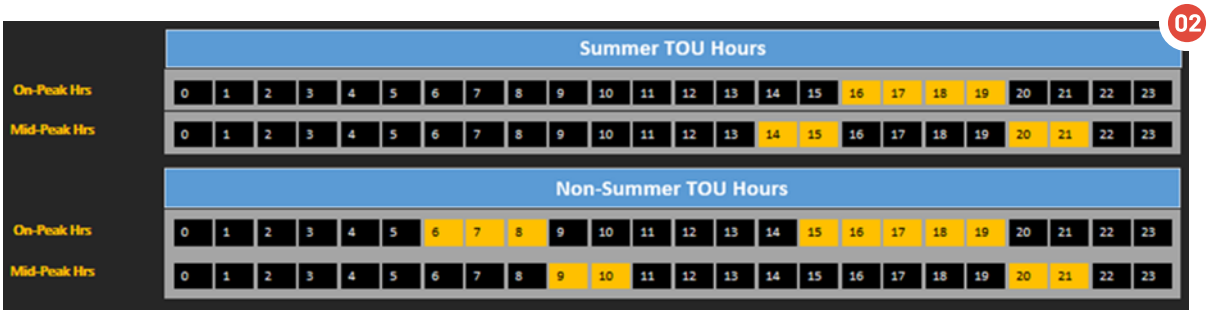
Scenario 1 – 2030 Rate Design
Rate Design – Dash

With the Rate Design Policy toggled to "TOU/Flexible" proceed to input different On-, Mid-, and Off-Peak pricing for demand and/or energy rates by class. Inputs for new rates should be made on the right-hand side ("Proposed") of the User Inputs for Rate Design on the Rate Design – Dash.

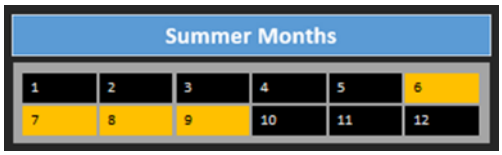


Example Rate Design – Rate Design Inputs for Proposed Rates

In addition to inputting different prices for rates, the user may also control the months that define Summer/Non-Summer, and the hours that define On-, Mid-, and Off-Peak separately for Summer and Non-Summer. The User Inputs for TOU Periods are used to define seasonal and TOU periods. The controls function based on the user's selection of certain numbers, with both a "Click and Drag" functionality to select multiple numbers consecutively, or using "CTRL+Click" to select multiple, non-consecutive numbers.



Example Rate Design – Dash Peak Period User Selections



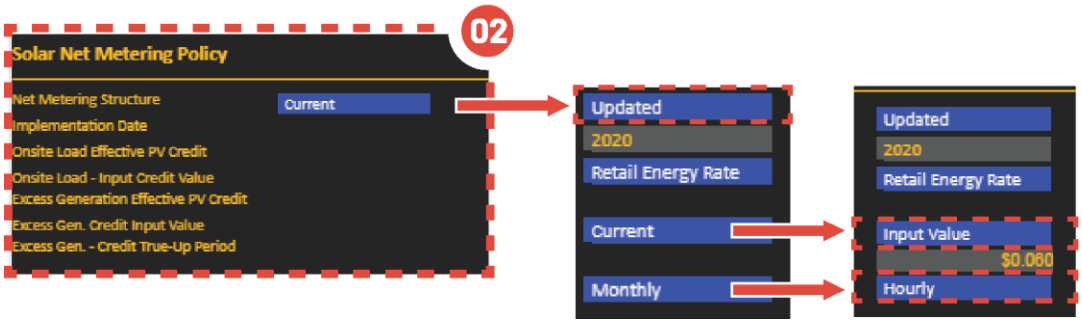
Example Rate Design – Dash Season Selections

The user should design new rates and use the Utility Cost KPIs to provide feedback on the relative success of the user in managing load shapes to minimize the costs of the utility running the system.

Scenario 1a – Impacts of Solar Net Metering Policy Change

Now that you have designed new TOU rates, look at the impacts of Net Metering Policy. As you make changes to the policy inputs, observe changes in the load shape graphics, and in the PV Adoption and Impacts graphics (rows 60-74 of the Rate Design – Dash).

First, change the Net Metering Structure to "Updated". Then, change the Excess Generation Effective PV Credit to "Input Value", and leave the default $0.06/kWh that appears. Finally, change the "Excess Gen. – Credit True-Up Period to "Hourly".



This set of inputs changed the state's Net Metering policy such that PV generation serving onsite load is valued at the effective retail rate (as defined by the TOU period in which the generation and load coincided), and any hourly generation exported to the grid is compensated to the customer at $0.06/kWh.