California Public Utility Commission's SB 884 Guidelines: June 24, 2025

Interruption Cost Estimator Calculator 2.0 (ICE 2.0)

California Public Utilities Commission

Grilling Safety

- “Almost 20,000 patients go to emergency every year because of grilling related injuries.” - NFPA
- Never grill near flammable materials or structures and don't leave it unattended.
- Use proper tools for grilling to prevent injury.

Agenda

Introductions	1:00 – 1:05 pm
Purpose and Expected Outcomes of TWGs	1:05 – 1:10 pm
Interruption Cost Estimator Calculator 2.0 (ICE 2.0): Lawerence Berkeley National Laboratory (LBNL) Presentation	1:10 – 1:40 pm
Q&A for LBNL	1:40 – 2:00 pm
Break	2:00 – 2:10 pm
Using the ICE 2.0 Calculator in the 2027 Test Year General Rate Case: Pacific Gas and Electric (PG&E)	2:10 – 2:40 pm
Q&A for PG&E	2:40 – 3:00 pm
Break	3:00 – 3:10 pm
General Discussion: ICE 2.0 Calculator	3:10 – 4:00 pm

Purpose and Expected Outcomes of TWGs

1:05 pm – 1:10 pm

Purpose and expected outcomes of TWGs

TWG #1 – June 3, 2025

- The purpose of TWG #1 was to introduce the draft SB 884 Project List Data Requirements Template and to gather stakeholder feedback. The data template is intended to support Phase 2 Application and progress reports of Electrical Undergrounding Plans required under Senate Bill 884.
- SPD shared and presented the Excel-based data template along with the accompanying PDF guideline, providing explanations of data structure, field names, descriptions, and input constraints.

TWG #2 – June 10, 2025

- Building on TWG #1, the TWG #2 meeting focused on discussing stakeholder feedback and addressing questions related to the Data Template. The discussion aimed to clarify specific data elements and the overall structure of the data template.

Purpose and expected outcomes of TWGs

TWG #3 – June 24, 2025

- The TWG #3 meeting will focus on the underlying methodology used to monetize reliability benefits in cost-benefit analyses, specifically the adoption of the ICE 2.0 (Interruption Cost Estimator) Calculator developed by LBNL.
- LBNL will present the major updates in ICE 2.0, which is required for utilities transitioning to the CPUC's Cost-Benefit Approach under Decision D.22-12-027.
- PG&E will share how they applied ICE 2.0 in support of their 2027 General Rate Case (GRC), providing a practical example of its application.
- The group will discuss whether the existing SB 884 data templates should be updated to reflect the new changes introduced in ICE 2.0.

Interruption Cost Estimator Calculator 2.0 (ICE 2.0)

Presenter: Lawerence Berkeley National Laboratory,

1:05 pm – 1:35 pm

Release of Updated ICE Calculator: Phase 1

Kristina LaCommare, Peter Larsen, and Joe Eto - LBNL
George Jiang and Chris Ramee - Resource Innovations, Inc.

June 24, 2025

ICE 2.0 research team

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Outline

- ❑ Motivation for updating the ICE Calculator
- ❑ ICE Calculator is being updated in 3 phases
- ❑ Surveying approach and results
- ❑ Modeling approach and results
- ❑ ICE Calculator website and API
- ❑ Comparison ICE 2.0 to 1.0

Motivation for updating the ICE Calculator

ICE Calculator estimates customer costs of shorter duration interruptions

- Berkeley Lab's Interruption Cost Estimate (ICE) Calculator is the leading and only publicly-available tool for estimating the customer cost impacts of power interruptions
- Development of the ICE Calculator was sponsored by the U.S. Department of Energy (DOE)
- ICE Calculator is being used to:
  - Support internal utility reliability planning activities
  - Provide a basis for discussing utility reliability investments with regulators
  - Assess the economic impact of past power outages

Motivation for updating the ICE Calculator

- The original ICE Calculator, ICE 1.0, is based on utility-sponsored customer surveys
- Reliance on ICE 1.0 has been challenged because the surveys are:
  - Dated—many of the surveys are 25+ years old
  - Not statistically representative of all regions of the U.S.
  - Limited survey data available for estimating the cost of interruptions over 12 hours

Summary of ICE 1.0 Surveys

Utility Company	Survey Year	Number of Observations			Min. Duration (Hours)	Max. Duration (hours)
		Medium and Large C&I	Small C&I	Residential		
Southeast-1	1997	90			0	1
Southeast-2	1993	3,926	1,559	3,107	0	4
	1997	3,055	2,787	3,608	0	12
Southeast-3	1990	2,095	765		0.5	4
	2011	7,941	2,480	3,969	1	8
Midwest-1	2002	3,171			0	8
Midwest-2	1996	1,956	206		0	4
West-1	2000	2,379	3,236	3,137	1	8
West-2	1989	2,025	5		0	4
	1993	1,790	825	2,005	0	4
	2005	3,052	3,223	4,257	0	8
	2012	5,342	4,632	4,106	0	24
Southwest	2000	3,991	2,247	3,598	0	4
Northwest-1	1989	2,210		2,126	0.25	8
Northwest-2	1999	7,091		4,299	0	12

Updating and upgrading the ICE Calculator

Berkeley Lab/Resource Innovations and sponsoring utilities have:

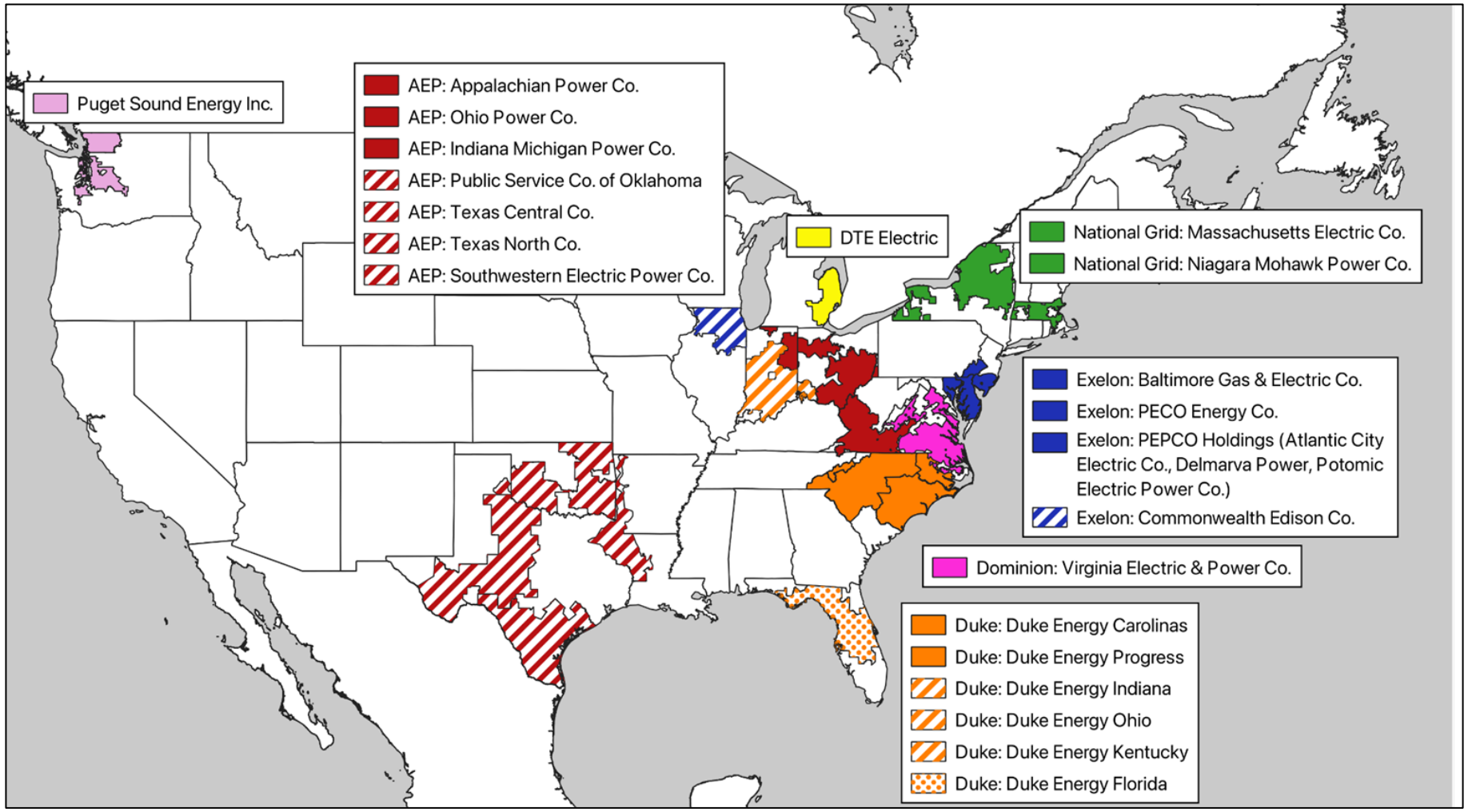
- ❑ Created a Project Executive Committee (PEC) made up of the sponsoring utilities
- ❑ Created a Project Advisory Committee (PAC) made up of well-known external stakeholders
- ❑ PEC and PAC provided key feedback and/or approvals throughout the Initiative
- ❑ Developed a consistent set of short duration (up to 24 hours) customer interruption cost surveys
- ❑ Coordinated consistent administration of surveys
- ❑ Developed new short duration customer damage function (CDF) equations with new survey information
- ❑ Updated the ICE Calculator website including new enhancements

ICE Calculator is being updated in 3 Phases

Update of ICE Calculator happening in phases

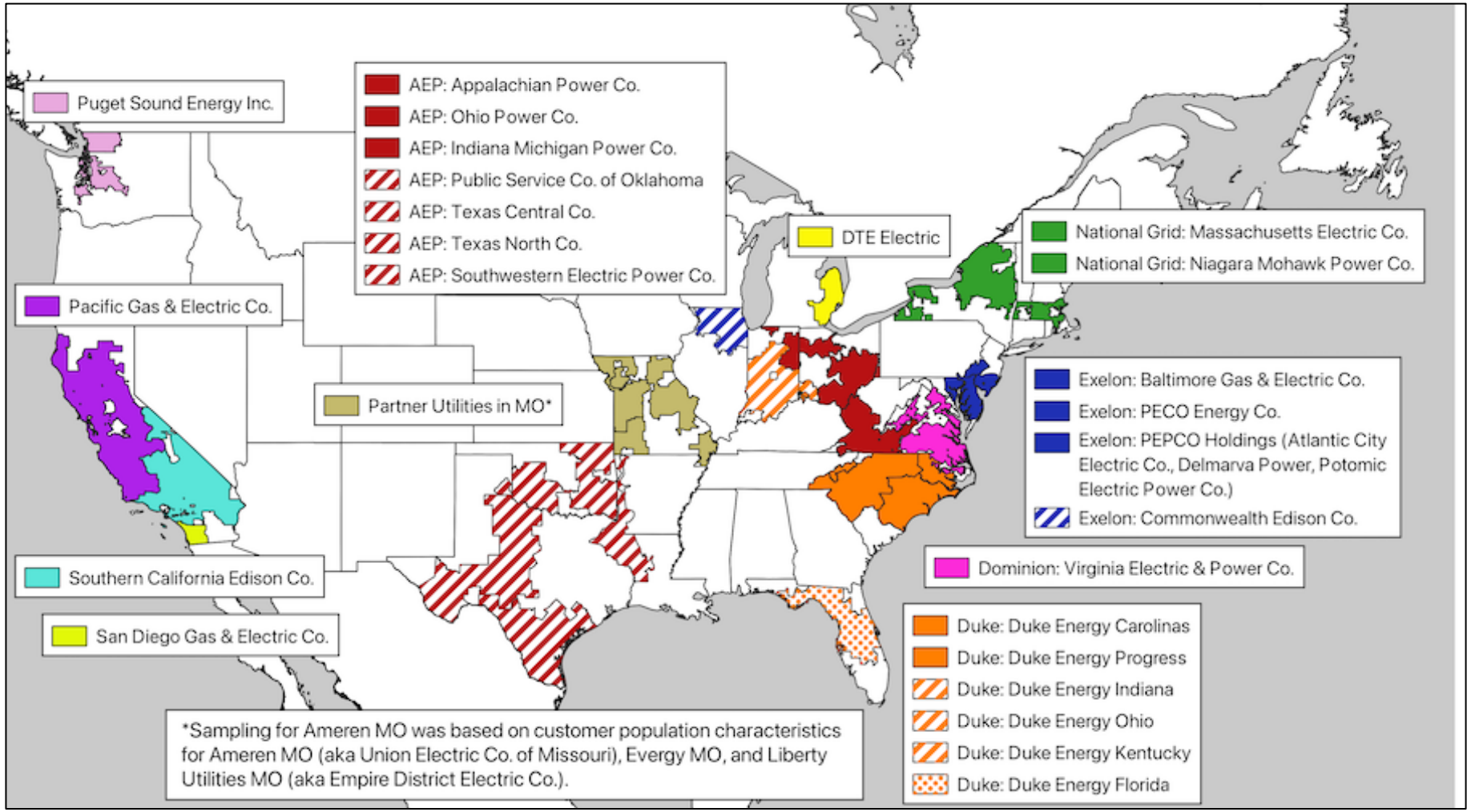
- Phase 1 (complete)
  - Based on 11 surveys conducted in Eastern and Midwestern U.S., with one utility in the Pacific Northwest
  - ICE Calculator 2.0 released April 28, 2025
  - Newly developed customer damage functions
  - Upgraded web interface with an API capability
- Phase 2 (in process)
  - Surveying just completed (California investor-owned utilities and Missouri utilities)
  - ICE Calculator update expected late 2025/early 2026
- Phase 3 (in process)
  - Surveying in process with select utility cooperatives in the U.S.
  - Surveying later this year with another Western utility
  - Recruitment still ongoing

Participating utilities: Phase 1 (Current ICE 2.0)



- ➔ 8 sponsors
- ➔ 11 distinct survey activities
- ➔ 24 investor-owned utility distribution service territories represented

Participating utilities: Phase 1 and 2



- ➔ 12 sponsors
- ➔ 15 distinct survey activities
- ➔ 30 investor-owned utility distribution service territories represented

Phase 3

- ➔ We received support from DOE to partner with NRECA to survey select rural cooperatives across the U.S.
- ➔ One utility in the West
- ➔ Recruiting ongoing

Surveying approach and results

Valuation approach

Residential Customers	Non-residential Customers
Willingness-to-pay for hypothetical backup service*	Direct cost = value of lost production + interruption related costs – interruption related savings
Residential costs are often related to inconvenience. However, potential tangible costs include: ● Relocation costs ● Buying supplies ● Going out to eat ● Inability to work	Interruption-related costs: ● Labor costs to make up any lost production (which can be made up) ● Labor costs to restart the production process ● Material costs to restart the production process ● Costs resulting from damage to input feed stocks ● Costs of re-processing materials (if any) ● Cost to operate backup generation equipment
	Interruption-related savings: ● Savings from unpaid wages during the interruption (if any) ● Savings from the cost of raw materials not used because of the interruption ● Savings from the cost of fuel not used ● Scrap value of any damaged materials

*One-and-one-half-bound dichotomous choice contingent valuation (Cooper, Hanemann, and Signorello 2002)

Survey overview

- ❑ Three different customer surveys: residential, small/medium non-residential (SMNR), and large non-residential (LNR)
- ❑ Four interruption durations: momentary (up to 5 min), 2 hours, 8 hours, and 24 hours
- ❑ Four interruption scenarios: season, day of week, time of day, and advanced warning
- ❑ One longer duration (3 days) scenario question (not used to updated the ICE Calculator)
- ❑ Target responses per survey: 250 residential, 250 SMNR, and 67 LNR
- ❑ Stratified sample of customers in each class based on usage

Example set of interruption scenarios for a respondent

Scenario	Season	Time of Week	Onset Time	Advance Warning	Duration	Pivot
A	Summer	Weekday	2:00 PM	No	5 minutes or less	Weekend
B	Summer	Weekday	2:00 PM	No	2 hours	Weekend
C	Summer	Weekday	2:00 PM	No	24 hours	Weekend

Phase 1 survey response

Segment	Customer Population	Customers Sampled	Response Target	Total Responses	Overall Response Rate	Validated Responses*	Validated Response Rate
Residential	22,276,695	35,743	2,750	3,316	9.3%	3,026	8.5%
Non-residential	2,141,558	90,464	3,487	4,579	5.1%	3,874	4.3%

*Initial responses were screened for invalid, illogical, or outlier responses

Validated survey responses

Utility	Validated Residential Responses	Validated Non-residential Responses
AEP East	314	342
AEP West	263	301
ComEd	259	369
Duke Energy Carolinas	270	404
Duke Energy Florida	267	367
Duke Energy Midwest	280	384
DTE Electric	271	351
Dominion Energy	281	288
Exelon	270	294
National Grid	275	350
PSE	276	424
Total	**3,026**	**3,874**

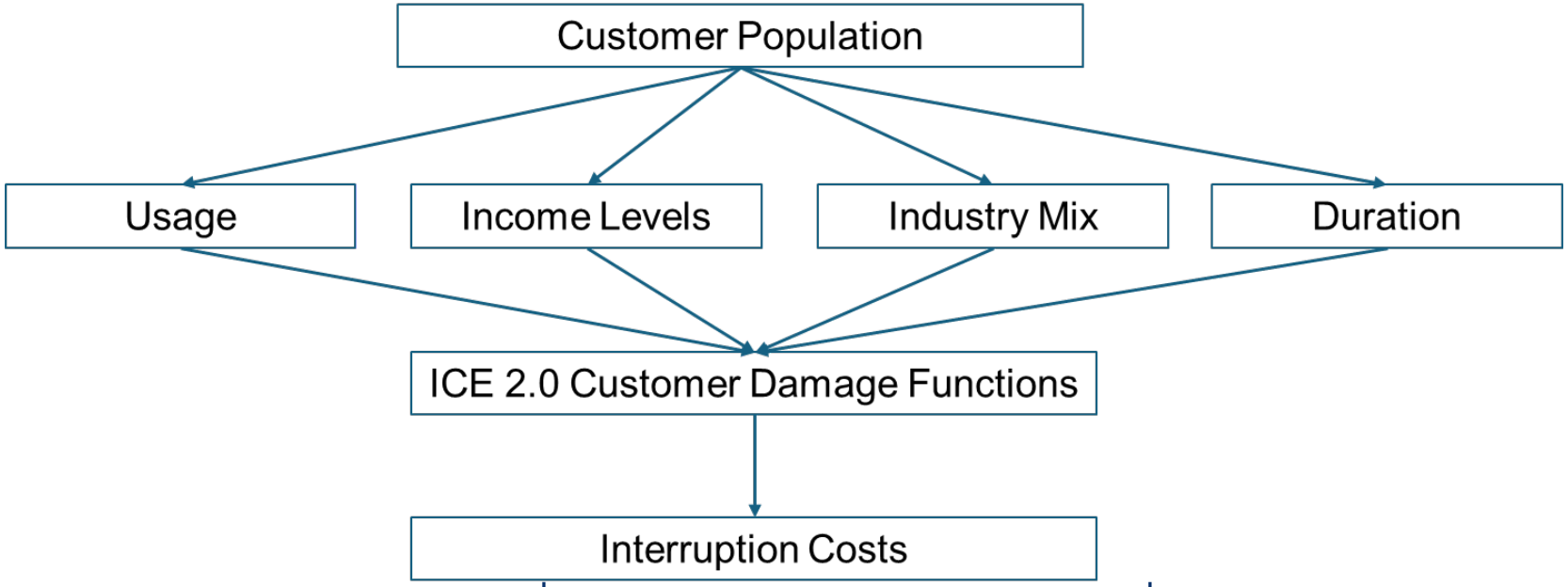
Survey status for California IOUs (Phase 2)

Utility	Survey Status	Responses completed
PG&E	Surveying - complete Utility specific report finalized in April 2025	Residential: 324 (130%) SMNR: 311 (124%) LNR: 85 (127%)
SCE	Surveying - complete Utility specific report finalized in April 2025	Residential: 320 (128%) SMNR: 299 (120%) LNR: 40 (60%)
SDG&E	Surveying - completed in June Utility specific report expected in Sept 2025	Residential: 305 (122%) SMNR: 304 (122%) LNR: 77 (115%)

Modeling approach and results

Goal: Develop “customer damage functions” (CDFs)

- RI processed the survey responses and developed customer damage functions
- These equations correlate interruption costs to a range of explanatory variables
  - Duration, electricity consumption, income, industry types, and more
- The customer damage functions allow users to estimate interruption costs for specific customer populations
  - For example, costs could be estimated at the circuit level if the characteristics of the customers served on that specific circuit are known



Residential model selection: Potential and selected explanatory variables

Potential Model Variables

Continuous Variables

- Interruption duration (in minutes)
- Annual electricity usage (in kWh)
- GDP per kWh (collected at the state level)

Categorical Variables

Interruption Onset Time
- Morning
- Midday
- Evening

Season
- Summer
- Winter

Day of Week
- Weekday
- Weekend

Advance Warning
- Yes
- No

Previous Interruption in Last 12 Months
- Yes
- No

Persons in Household
- 1-2 people
- 3+ people

Ownership of Backup Generation
- Yes
- No

Work from Home
- Yes
- No

Age of Respondent
- Under 40 years
- 40-70 years
- 70+ years

Total Household Income
- Under $50,000 per year
- $50,000-$100,000 per year
- $100,000-$150,000 per year
- Over $150,000 per year

Housing Type
- Apartment/Condominium
- Attached Single-Family
- Detached Single-Family
- Mobile Home
- Unknown/Other

Model Selection →

Final Model Variables

Continuous Variables

- Interruption duration (in minutes)
- Annual electricity usage (in kWh)

Categorical Variables

Season
- Summer
- Winter

Ownership of Backup Generation
- Yes
- No

Work from Home Status
- Yes
- No

Total Household Income
- Under $50,000 per year
- $50,000-$100,000 per year
- $100,000-$150,000 per year
- Over $150,000 per year

Non-Residential model selection: Potential and selected explanatory variables

Potential Model

Continuous Variables

- Interruption duration (in minutes)
- Annual electricity usage (in kWh)
- GDP per kWh (collected at the state level)

Categorical Variables

Interruption Onset Time
- Morning
- Midday
- Evening

Season
- Summer
- Winter

Day of Week
- Weekday
- Weekend

Advance Warning
- Yes
- No

Previous Interruption in Last 12 Months
- Yes
- No

Ownership of Backup Generation
- Yes
- No

Industry
- Accommodation and Food Services
- Administrative and Support and Waste Management and Remediation Service
- Agriculture, Forestry, Fishing and Hunting
- Arts, Entertainment, and Recreation
- Construction
- Educational Services
- Finance and Insurance
- Health Care and Social Assistance
- Information (e.g., Data Centers)
- Management of Companies and Enterprises
- Manufacturing
- Mining, Quarrying, and Oil and Gas Extraction
- Other Services
- Professional, Scientific, and Technical Services
- Public Administration
- Real Estate and Rental and Leasing
- Retail Trade
- Transportation and Warehousing
- Utilities
- Wholesale Trade

Model Selection →

Final Model

Continuous Variables

- Interruption duration (in minutes)
- Annual electricity usage (in kWh)

Categorical Variables

Advance Warning
- Yes
- No

Day of Week (Probit Only)
- Weekday
- Weekend

Industry (GLM Model Only)
- Health Care and Social Assistance
- Manufacturing

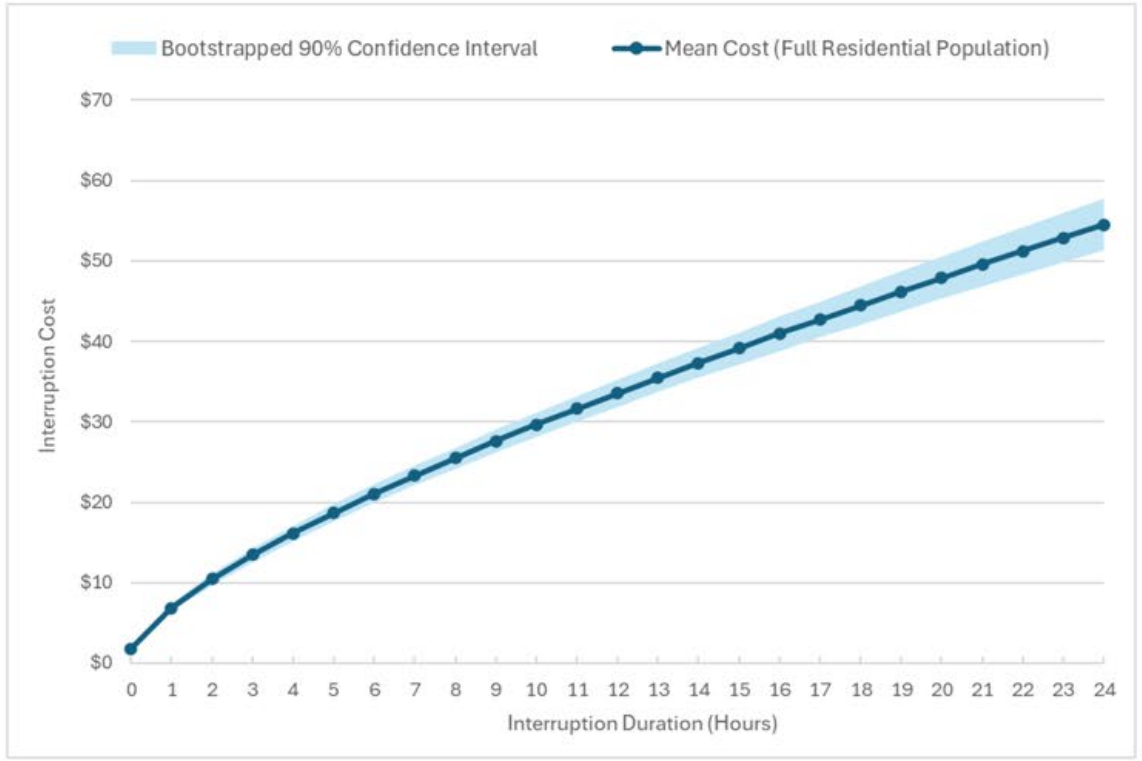
➔ For modeling purposes, the SMNR and LNR responses were combined into one non-res segment

➔ The single non-res model can estimate costs for all customer segmentations, regardless of size

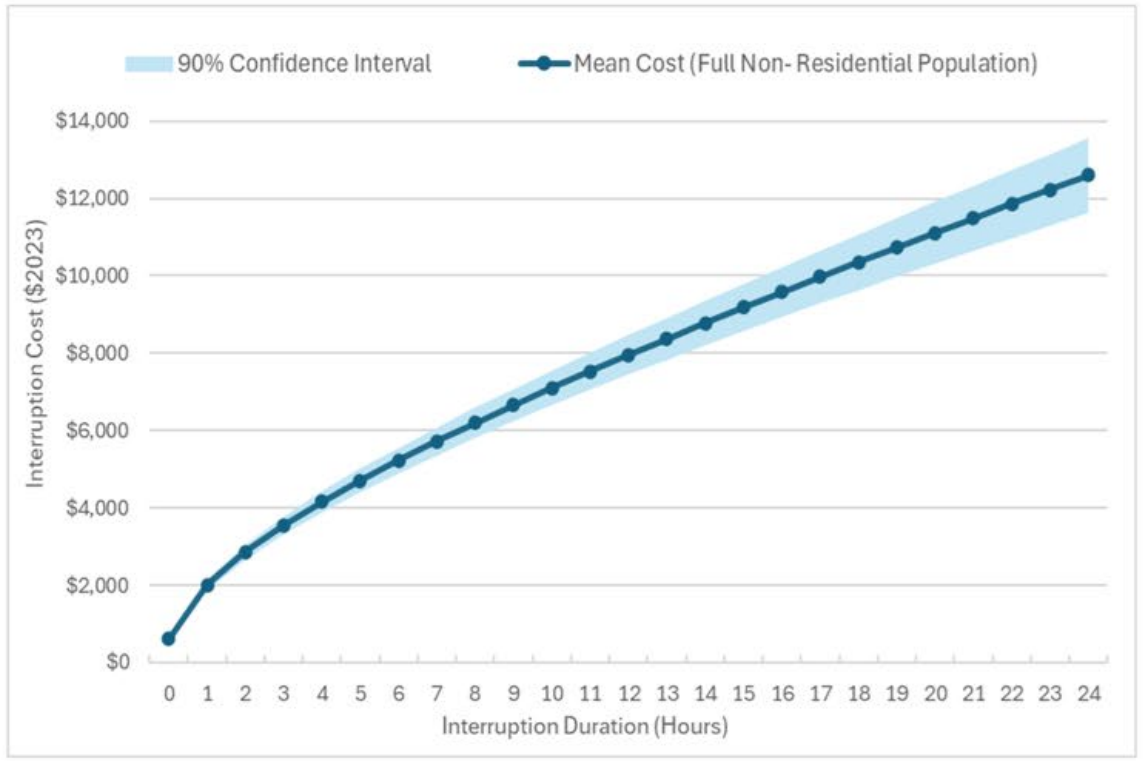
➔ **Users can input usage values into the tool that align with their jurisdictions definition of "small", "medium", or "large" customers**

Predicted interruption costs by duration (default values; 90% confidence)

Residential

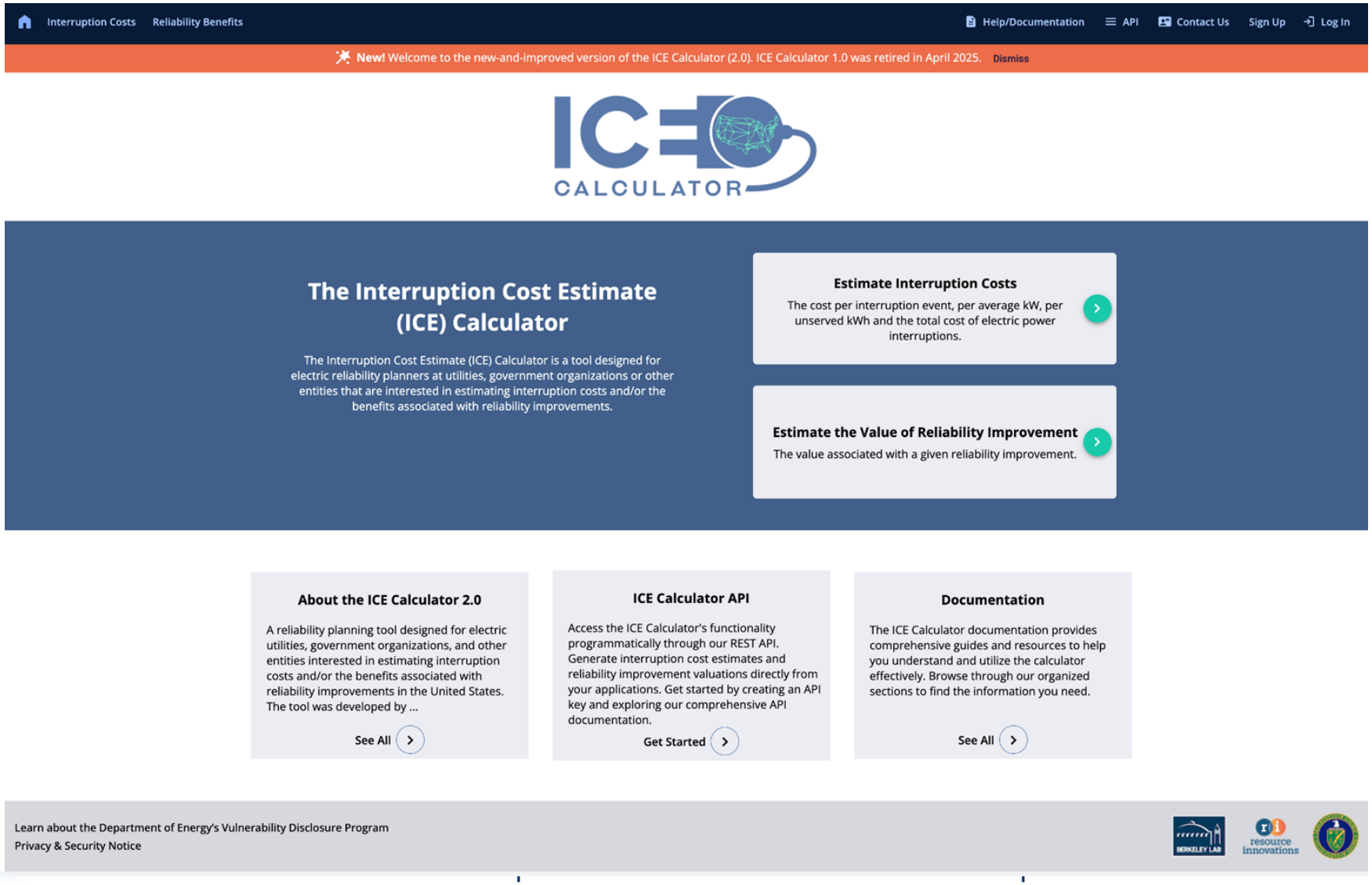


Non-Residential

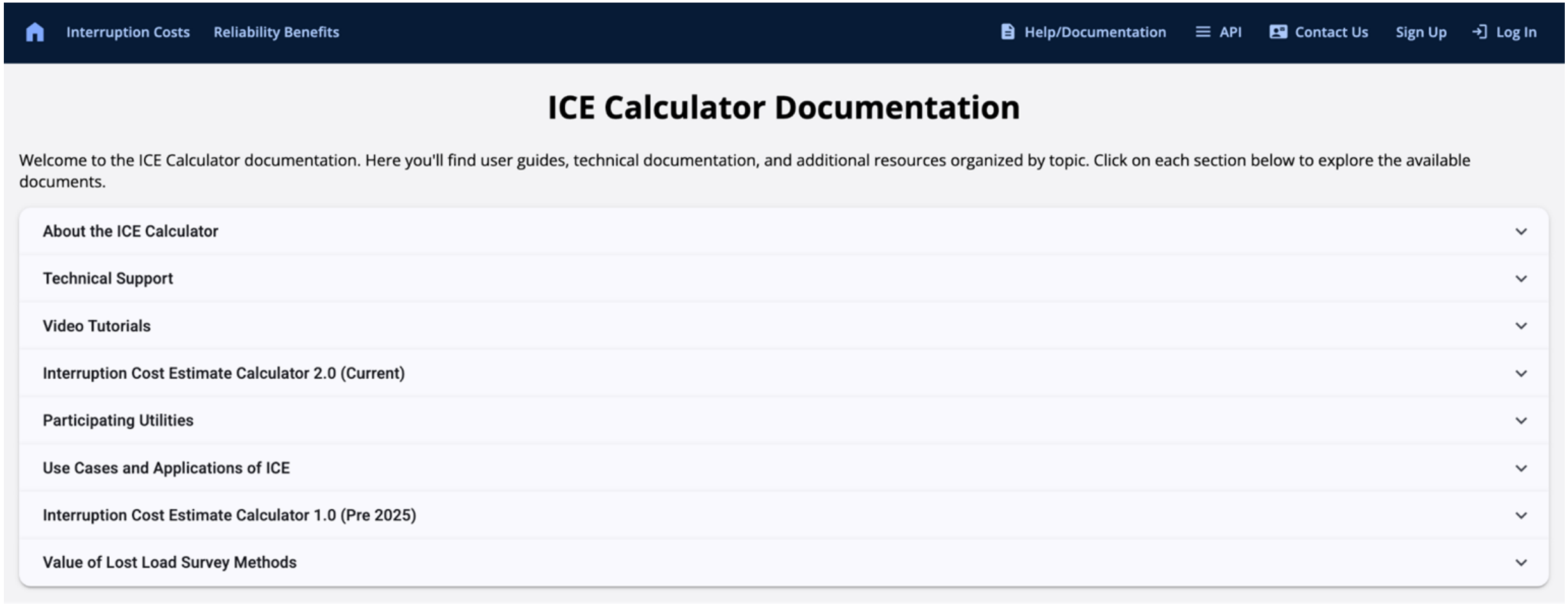


ICE Calculator website and API

ICE 2.0 website: https://icecalculator.com/

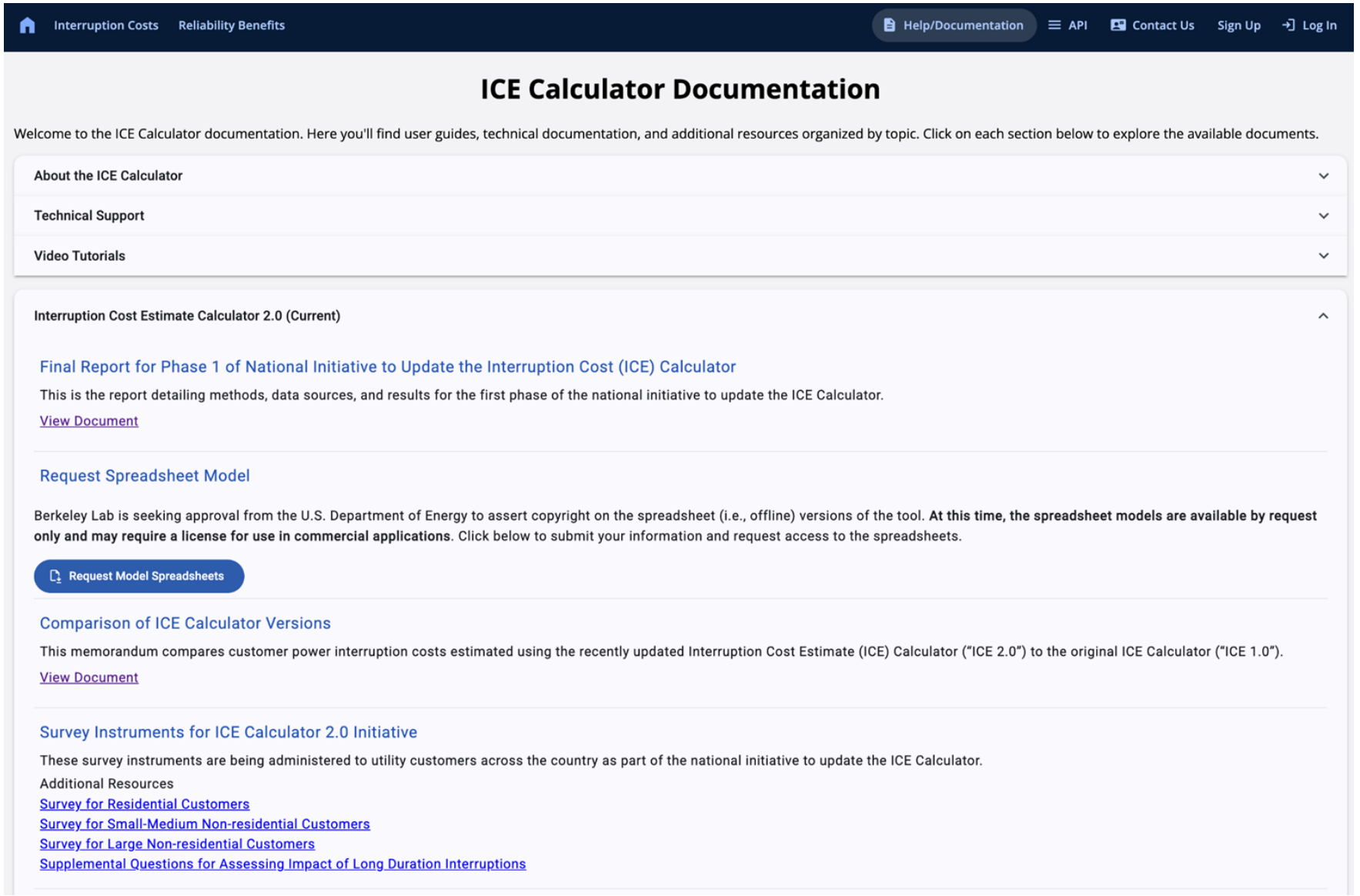


Documentation page



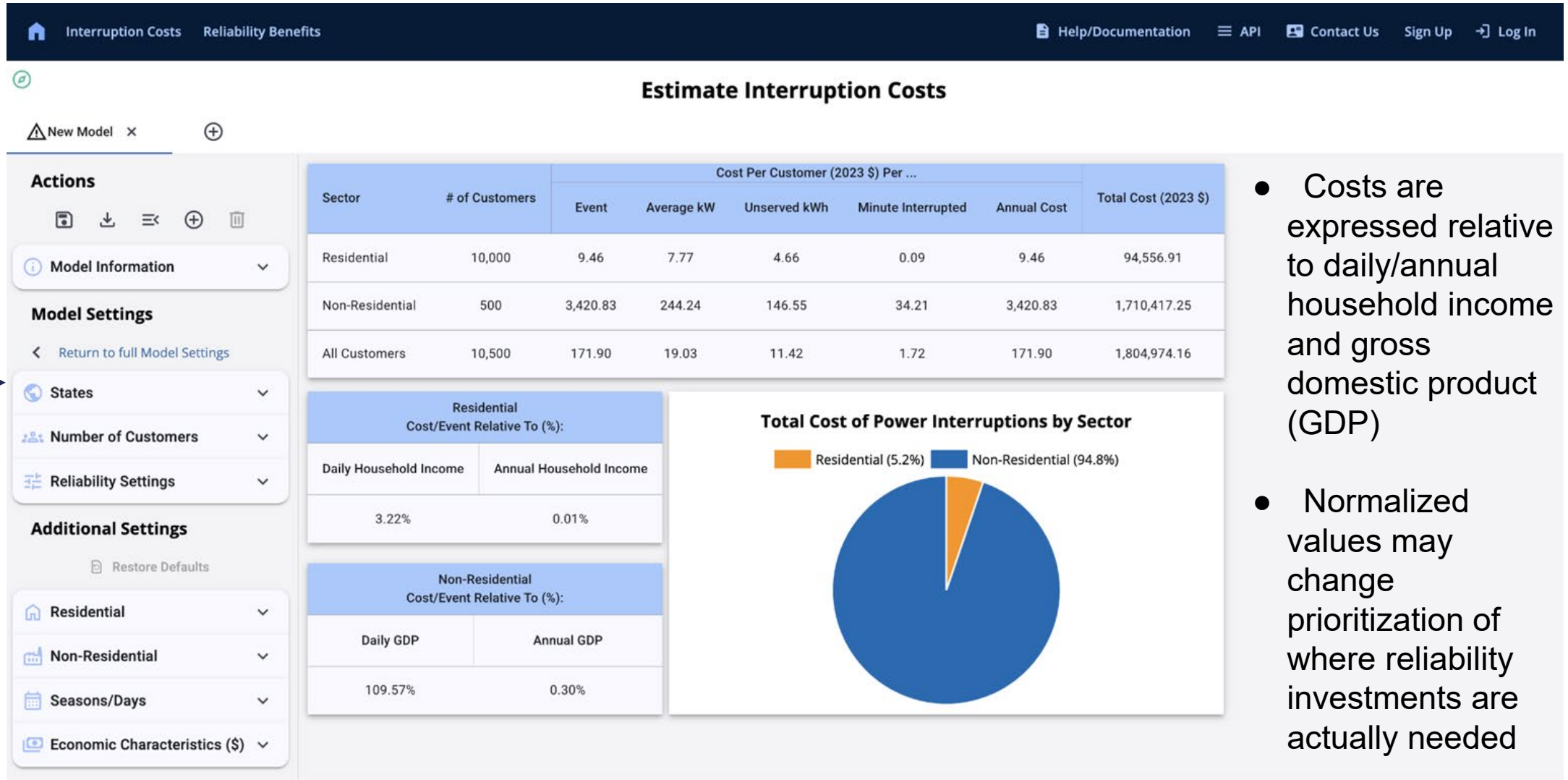
Request spreadsheet model (non-commercial use only)

- Users can request spreadsheet-based version of ICE 2.0
- We are sharing these on a case-by-case basis
- Spreadsheets will be made available if not shared outside of organization and not used for commercial purposes
- ICE 1.0 spreadsheet is freely-available on new website



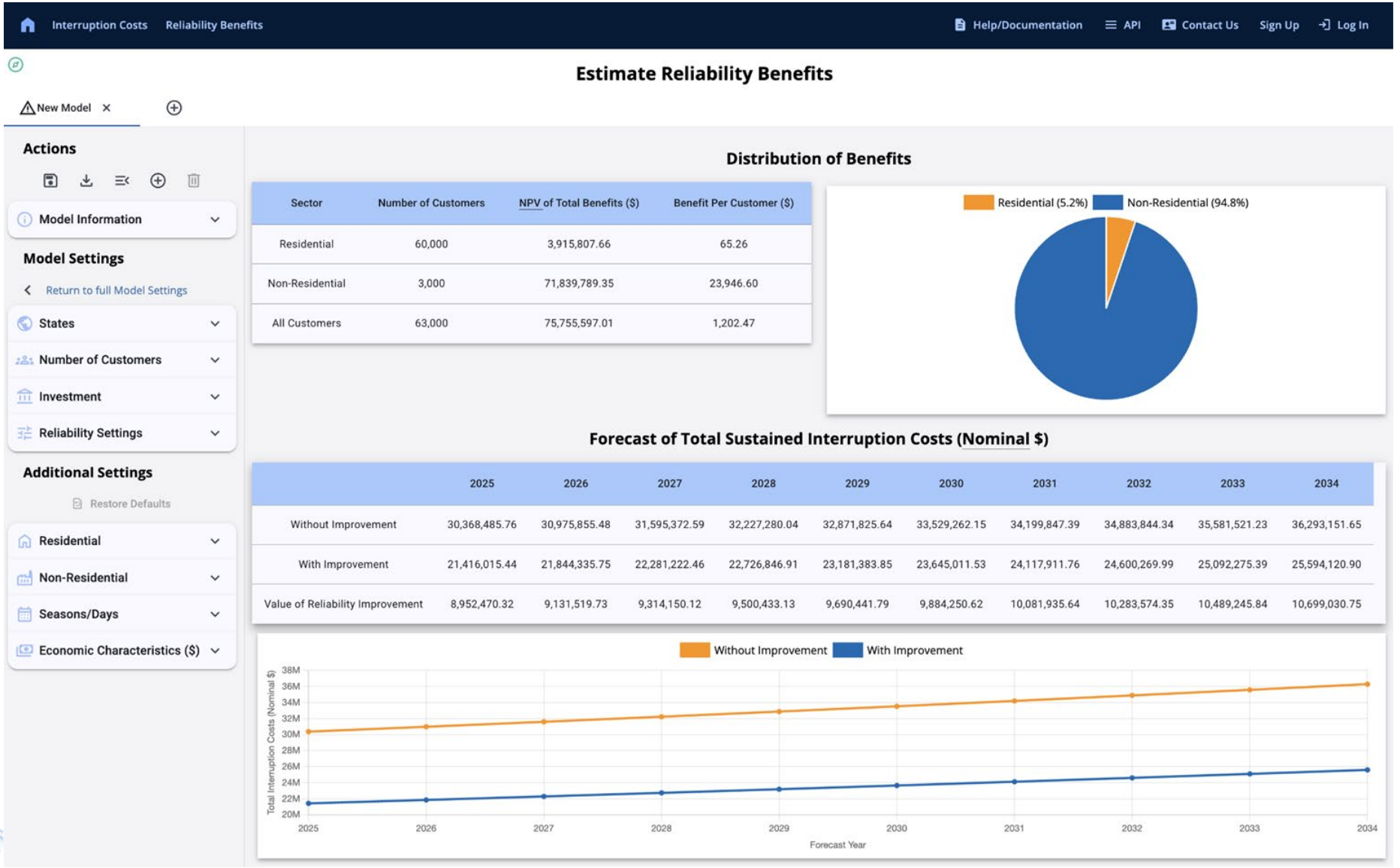
Estimate interruption costs

Customize model inputs →

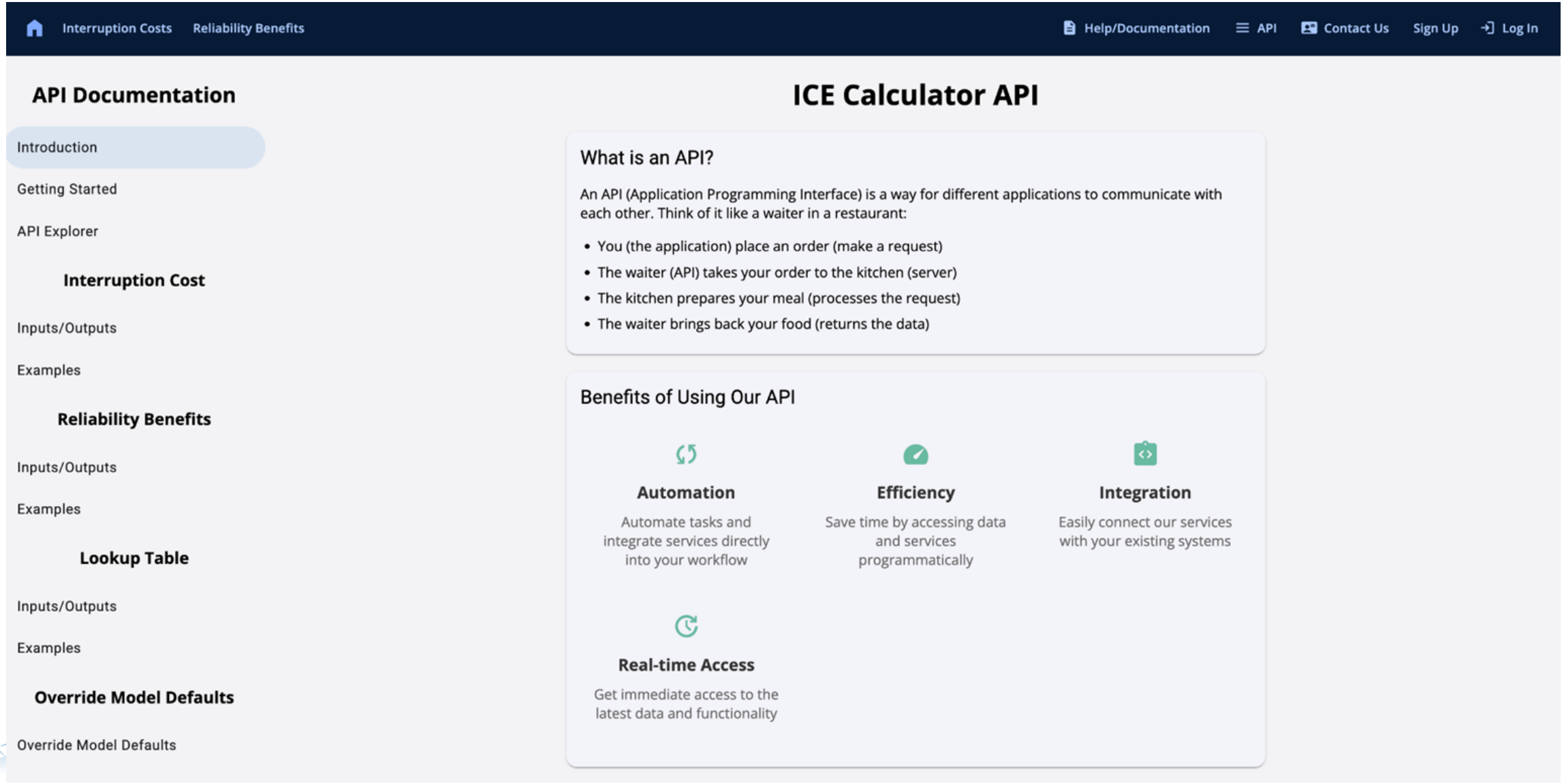


- Costs are expressed relative to daily/annual household income and gross domestic product (GDP)
- Normalized values may change prioritization of where reliability investments are actually needed

Estimate reliability benefits of proposed investment



Application programming interface (API)



Comparison of ICE 2.0 to 1.0

Summary of differences between ICE 1.0 and 2.0

	ICE 1.0	ICE 2.0
Surveys Conducted (Years)	• 1989-2012	• 2022-2024
Survey Approach	• Administered independently • Information on sample designs and recruitment procedures not available • Different surveys with different questions	• LBNL/Resource Innovations (RI) administered in a fully coordinated manner • Consistent sample designs and recruitment procedures • Identical set of survey questions • One-and-one-half-bound dichotomous choice contingent valuation (residential)
Geographic Coverage	• 15 distinct surveying efforts conducted across 10 utility service territories • Mostly conducted in western and southeastern U.S.	• 11 distinct survey activities conducted across 24 utility service territories • Eastern and midwestern U.S. as well as the pacific northwest (future phases will include more regional representation)
Interruption Durations Considered	• Varied and generally limited to 12 hrs or less	• Momentary (lasting up to 5 min), 2 hrs, 8 hrs, and 24 hrs
Customer Damage Functions	• Residential • Small non-residential • Medium/large non-residential	• Residential • Non-residential

Contact Information

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ICE CALCULATOR

ICE 2.0: Technical Support (link)

ICE 2.0: National Report Documenting Phase 1 (link)

Comparison of ICE 2.0 to 1.0 (link)

Q&A for LBNL

1:35 pm – 2:00 pm

Break

2:00 pm – 2:10 pm

Using the ICE 2.0 Calculator in the 2027 Test Year General Rate Case

Presenter: Pacific Gas and Electric (PG&E)

2:10 pm – 2:40 pm

USING THE ICE 2.0 CALCULATOR IN PG&E'S 2027 TEST YEAR GENERAL RATE CASE (GRC)

CPUC Technical Working Group

SB 884 Project List Data Requirements Guideline

June 24, 2025

Presentation Topics

1. How did PG&E disaggregate its monetized value of electric reliability for the Test Year 2027 GRC?
    a. How did that change the inputs to the ICE 1.0 Calculator that PG&E presented in the initial 2027 GRC submission?
        i. What new inputs did PG&E include in order to use the ICE 2.0 Calculator?
        ii. What old inputs did PG&E remove in order to use the ICE 2.0 Calculator?
    b. What were the results of the disaggregation ($/CMI for each region)?
    c. Which risks has this impacted in the 2027 GRC submission?
        i. How has this impacted the wildfire ignition risk?
        ii. How has this impacted the outage program risk?
    d. Has this changed PG&E's wildfire system hardening strategy in the 2027 GRC? Explain.

- **PG&E Topic:** ICE data fields in SPD TWG tables

Q1 – Disaggregated value of electric reliability

1. How did PG&E disaggregate its monetized value of electric reliability for the Test Year 2027 GRC?

- In PG&E's 2024 Risk Assessment & Mitigation Phase (RAMP 2024), PG&E used Lawrence Berkeley National Laboratory's (LBNL) Interruption Cost Estimator (ICE) v1.0 calculated system-wide average value of $3.17/Customer Minutes Interrupted (CMI).

- On 4/22, Administrative Law Judge (ALJ) Ruled that by 6/20, PG&E shall:
  - Provide parallel reliability cost calculations using the disaggregated approach recommended in the [Safety Policy Division] SPD Evaluation Report. PG&E may opt to replace its systemwide average approach with this suggested method or present both approaches in the GRC [General Rate Case].

- For the purposes of this approach, disaggregation entailed deriving two discrete $/CMI for Residential and Non-Residential customers. The service-point level count of each customer class was added up to the tranche-level to derive a tranche-level percentage of each customer class, which then multiplied by these discrete values of $/Residential-CMI and $/Non-Residential-CMI to get to the tranche-level $/CMI for modeling.

Q1 - Methodology Illustration A: Tranche Level Percentage of Residential Customers and $/CMI Calculations

- This is an illustrative example to show how tranche level percentage of residential customers and $/CMI are calculated based on circuit segment level data.
- Assumptions:
  - There are six circuit segments in the tranche
  - $/CMI is 0.08 and 23.11 for residential customers and non-residential customers, respectively.

			D = B / C	*E = 0.08 * D + 23.11 * (1 - D)*
A	B	C	D	E
Circuit Segment Name	**Residential Customers**	**Total Customers**	**% Residential Customers**	**$/CMI**
CS_1	5	24	20.8%	18.31
CS_2	4	5	80.0%	4.69
CS_3	369	430	85.8%	3.35
CS_4	33	34	97.1%	0.76
CS_5	70	70	100.0%	0.08
CS_6	0	1	0.0%	23.11
Aggregated	**481**	**564**	**85.3%**	**3.47**

Q1a – Changes to ICE 1.0 calculator inputs (1)

a. How did that change the inputs to the ICE 1.0 Calculator that PG&E presented in the initial 2027 GRC submission?
   i. What new inputs did PG&E include in order to use the ICE 2.0 Calculator?
   ii. What old inputs did PG&E remove in order to use the ICE 2.0 Calculator?

PG&E does not "include" or "remove" inputs from the ICE 2.0 Calculator. LBNL's ICE 2.0 calculator has different set of inputs that are used in the model compared to ICE 1.0.

Input Type	Input Variable	ICE 1.0 GRC
Number of Accounts by Rate Class	Residential	4,991,827
	Small C&I	468,585
	Medium and Large C&I	163,316
Annual Usage per Customer (MWh)	Residential	5.2
	Small C&I	15.2
	Medium and Large C&I	244.93
Median HH Income	2016 USD	56,862
Number of Residents Per Household of Age	0-6 Years Old	0.3
	7-18 Years Old	0.52
	19-24 Years Old	0.24
	25-49 Years Old	1.09
	50-64 Years Old	0.41
	65+ Years Old	0.3
Type of Housing	Detached	58.30%
	Attached	7.00%
	Apartment / Condo	30.70%
	Mobile homes	3.90%
	Manufactured Housing	0.00%
	Other or Unknown	0.10%

Input Type	Input Variable	ICE 2.0	Source
Number of Customers by Class	Residential	4,973,630	PG&E internal data
	Non-Residential	641,920	PG&E internal data
Residential Usage (kWh)	Annual kWh per customer	5,156	PG&E internal data
Non-Residential Usage (kWh)	Annual kWh per customer	74,612	PG&E internal data
Residential Mean HH Income	2023 USD	134,491	ICE Calculator provided value
Percentage of Residential Customers by Annual Income	Under $50,000	26.60%	ICE Calculator provided value
	Above $50,000 and Under $1	25.40%	ICE Calculator provided value
	Above $100,000 and Under $	17.80%	ICE Calculator provided value
	Above $150,000	30.30%	ICE Calculator provided value
Residential BUGs	Percentage of Customers wi	17.70%	ICE 2.0 Survey of PG&E Customers
Residential Work from Home	Percentage of Customers wi	36.94%	ICE 2.0 Survey of PG&E Customers

Purple: Used to convert ICE Calculator outputs to weighted average $/CMI
Yellow: Used in ICE Calculator Model

Q1a – Changes to ICE 1.0 calculator inputs (2)

Input Type	Input Variable	ICE 1.0 GRC
Industry Percentages - Small C&I	Agriculture, Forestry and Fishing	0.20%
	Mining	0.10%
	Construction	9.50%
	Manufacturing	6.70%
	Transportation, Communication & Utilities	4.70%
	Wholesale & Retail Trade	18.80%
	Finance, Insurance & Real Estate	10.80%
	Services	50.80%
	Public Administration	0.00%
	Unknown Industry	0.20%
	Backup generation or Power Conditioning	26.20%
	Backup generation and Power Conditioning	3.40%
Industry Percentages - Medium and Large C&I	Agriculture, Forestry and Fishing	0.10%
	Mining	0.30%
	Construction	2.00%
	Manufacturing	12.40%
	Transportation, Communication & Utilities	8.20%
	Wholesale & Retail Trade	20.00%
	Finance, Insurance & Real Estate	7.60%
	Services	44.60%
	Public Administration	0.00%
	Unknown Industry	0.20%
Regional Characteristics - Medium and Large C&I	2016 GDP ($ Millions)	2,622,731
	2016 Non-residential Usage (MWh)	168,535,566
Power Interruption Timing	Morning	34.40%
	Afternoon	26.70%
	Evening	20.90%
	Night	18.00%
	Summer	29.00%
	Weekday	71.40%
	Advanced Warning	0.00%
Reliability Inputs	SAIFI	1
	SAIDI	132
	CAIDI	132
CPI for All Urban Consumers (CPI-U)	CPI Multiplier (2016 to 2023 $)	1.306999379

Purple: Used to convert ICE Calculator outputs to weighted average $/CMI

Yellow: Used in ICE Calculator Model

Input Type	Input Variable	ICE 2.0	Source
Industry Percentages	Manufacturing	12.40%	PG&E internal data
	Health Care and Social Assistance	5.40%	PG&E internal data
GDP Per Non-Res Account	2023 USD	1,985,036	ICE Calculator provided value
Event Details	Summer	28.60%	PG&E internal data
	Weekend	28.57%	ICE Calculator provided value
Non-Residential Advanced Warning	Percentage of Customers with Warning	0.00%	ICE Calculator provided value
Reliability Inputs	SAIFI	1	PG&E internal data
	SAIDI	132	PG&E internal data
	CAIDI	132	PG&E internal data
CPI for All Urban Consumers (CPI-U)	CPI Multiplier (2023 to 2024 $)	1.02949	PG&E internal data

Q1b – Results of disaggregation

b. What were the results of the disaggregation ($/CMI for each region)?

Table 1: *$/CMI by residential and non-residential customers*

	$/Residential CMI	$/Non-Residential CMI	$/CMI
ICE 1.0	0.05	29.17	3.33
ICE 2.0	0.08	23.11	2.72

Table 2: *$/CMI by HFRA/HFTD and non-HFRA/HFTD for all customers*

HFTD/HFRA Assignment	Non-Res Customers	Res Customers	Total Customers	Res Customers Percent	$/CMI (ICE 1.0)	$/CMI (ICE 2.0)
Non-HFTD/HFRA	595,484	4,506,326	5,101,810	88%	3.45	2.77
HFTD/HFRA	46,436	467,304	513,740	91%	2.68	2.16
All	641,920	4,973,630	5,615,550	89%	3.38*	2.71

*Aggregated 3.38 $/CMI is slightly different than $3.33/CMI used as ICE1.0 aggregated used for the GRC because the former is estimated using the latest SPIDs data for total customer count whereas the latter was developed using total customer count from Rates at the time.

Table 3: *Weighted $/CMI by HFRA Tier & Division for Distribution 'Overhead' Customers*

Division	ICE 2.0 Weighted Value of Service						
	HFTD Zone 1 - HHZ	HFTD Tier 2 - Elevated	HFTD Tier 3 - Extreme	HFTD Overall No Zone 1	HFTD Overall	Non-HFTD Overall	Overall
MISSION		$1.93	$5.00	$2.63	$2.63	$1.49	$1.53
DIABLO		$1.35	$1.66	$1.42	$1.42	$1.83	$1.79
YOSEMITE		$2.07	$1.51	$1.88	$1.88	$5.98	$4.69
EAST BAY		$1.06	$0.96	$1.03	$1.03	$1.56	$1.52
SACRAMENTO		$2.51	$3.23	$2.57	$2.57	$5.05	$4.96
HUMBOLDT	$11.60	$2.44	$2.16	$2.41	$2.41	$3.12	$2.88
SIERRA	$1.89	$1.59	$1.25	$1.47	$1.47	$3.00	$1.97
DE ANZA		$1.67	$2.05	$1.84	$1.84	$1.33	$1.37
SONOMA		$2.53	$1.70	$2.04	$2.04	$2.59	$2.45
CENTRAL COAST		$3.11	$1.61	$2.26	$2.26	$2.89	$2.78
LOS PADRES		$3.90	$4.36	$3.95	$3.95	$3.23	$3.35
PENINSULA		$1.83	$2.58	$1.93	$1.93	$1.74	$1.75
STOCKTON	$1.52	$2.74	$1.27	$2.11	$2.11	$3.96	$3.58
NORTH BAY		$5.30	$4.68	$4.94	$4.94	$2.92	$3.06
FRESNO		$2.21	$3.54	$2.24	$2.24	$4.88	$4.77
NORTH VALLEY		$1.97	$1.56	$1.85	$1.85	$4.23	$3.50
KERN		$8.95		$8.95	$8.95	$4.07	$4.09
SAN FRANCISCO		$23.11		$23.11	$23.11	$1.42	$1.42
SAN JOSE		$3.10	$3.27	$3.12	$3.12	$1.79	$1.82
Overall	$2.11	$2.24	$1.69	$2.05	$2.05	$2.80	$2.69

Large disparities in $/CMI values between Residential and non-residential customers can lead to vastly different results depending on the granularity of the analysis and thus can result in unintended consequences.

Q1c – Impacted risks in 2027 GRC

c. Which risks has this impacted in the 2027 GRC submission?
   i. How has this impacted the wildfire ignition risk?
   ii. How has this impacted the outage program risk?

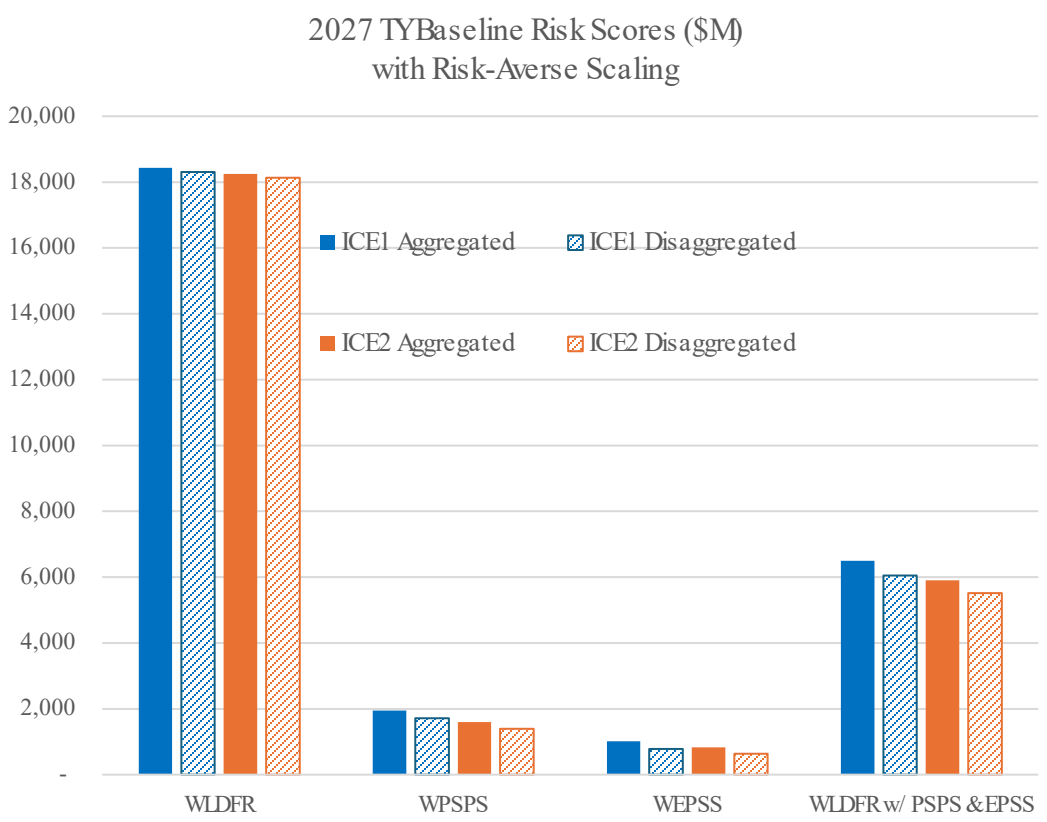
- All electric reliability risks in 2027 GRC submission have been impacted.
- Note these results are based on the risk models and associated data at the time of the GRC filing.
- The results were produced in a relatively short timeframe to comply with the requirements of the ruling.
- PG&E expects the risk models and approaches taken will continue to evolve.

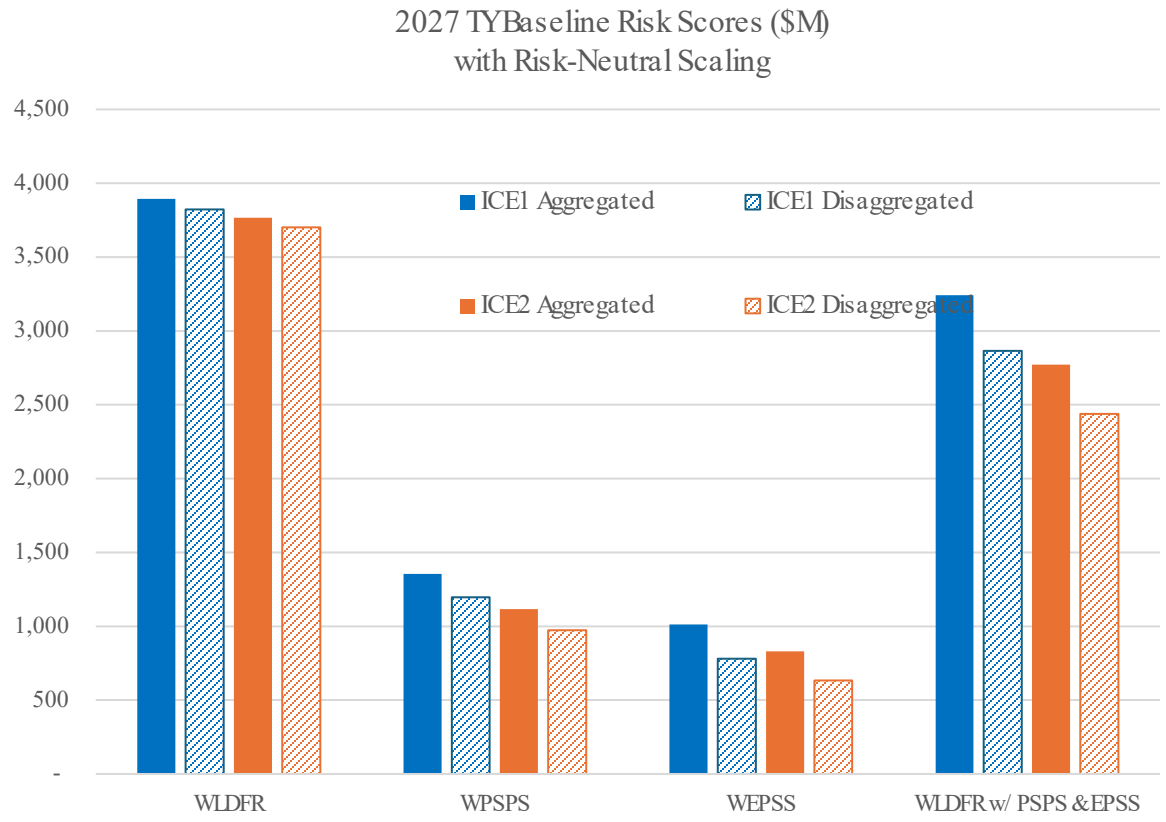
2027 TY Baseline Risk Score / Risk ID	Risk-Averse Scaling						Risk-Neutral Scaling					
	ICE1			ICE2			ICE1			ICE2		
	Aggregated	Disaggregated	*% Change*	Aggregated	Disaggregated	*% Change*	Aggregated	Disaggregated	*% Change*	Aggregated	Disaggregated	*% Change*
Wildfire pre-PSPS/EPSS	18,436	18,309	*-1%*	18,246	18,132	*-1%*	3,894	3,822	*-2%*	3,768	3,701	*-2%*
PSPS	1,944	1,715	*-12%*	1,600	1,393	*-13%*	1,355	1,196	*-12%*	1,116	972	*-13%*
EPSS	1,013	781	*-23%*	831	634	*-24%*	1,013	781	*-23%*	831	634	*-24%*
Wildfire with PSPS and EPSS	6,496	6,051	*-7%*	5,907	5,511	*-7%*	3,242	2,865	*-12%*	2,772	2,438	*-12%*

Note: PG&E stands by using risk-averse scaling and a system-wide aggregated electric reliability values for the TY 2027 GRC CBR values.

Q1c – Impacted risks in 2027 GRC

c. Which risks has this impacted in the 2027 GRC submission?
   i. How has this impacted the wildfire ignition risk?
   ii. How has this impacted the outage program risk?





Q1d – Impact to SH strategy in 2027 GRC

d. Has this changed PG&E's wildfire system hardening strategy in the 2027 GRC? Explain.

- The overarching System Hardening strategy in the GRC will not change given the GRC has already been filed.
- PG&E's selection of System Hardening projects in the GRC was based on WDRM v4 wildfire risk rank; therefore, the reevaluation of reliability using ICE 2.0 will not impact the selection of these projects.

Expected Outcome from June 24 TWG

The SPD agenda indicated that at the June 24 TWG workshop attendees will discuss whether the SPD should consider adjusting Tables in the SB 884 Project List Data Requirements Guideline to reflect changes in ICE 2.0

- PG&E recommends that utilities be given the choice to report the reliability risk information that corresponds to the version of the ICE calculator they are using in their risk analysis.

For utilities using the ICE 2.0 calculator

- PG&E recommends reporting information in Table 6 only at the system level and not at the operational division or HFTD tier level.
  - Running the ICE 2.0 calculator at the operational division or tier level introduces bias into the modeling results because higher cost per minute (CMI) outage values would be assigned to residential customers in certain divisions or tiers based on income level.
  - Running the ICE 2.0 calculator at the system level, without distinguishing by operational division or HFTD tier, does not exacerbate inequity.

Q&A for PG&E

2:40 pm – 3:00 pm

Break

3:00 pm – 3:10 pm

General Discussion: ICE 2.0 Calculator

3:10 pm – 4:00 pm

Thank you!

Amin Emrani

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