DOCKETED	
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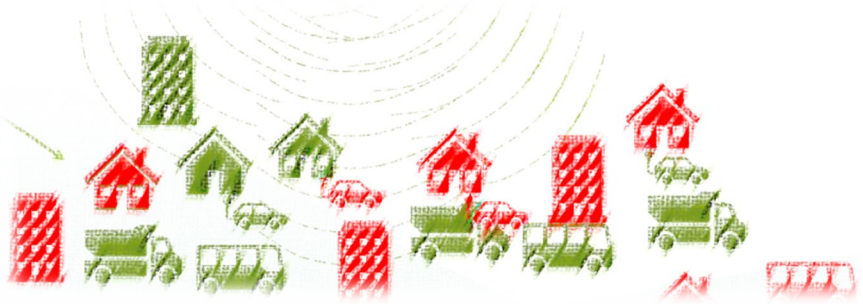
Project Title:	Load Management Rulemaking
TN #:	237439
Document Title:	Presentation - 2021-04-12 LMS Workshop (2 - Proposal - KHerter)
Description:	CEC staff proposal summary presentation for the April 12, 2021 staff workshop.
Filer:	Gabriel Taylor
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	4/13/2021 4:49:33 PM
Docketed Date:	4/13/2021

Proposed Amendments to the Load Management Standards



Draft Staff Analysis

April 12, 2021

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Energy Commission Specialist III
Efficiency Division, California Energy Commission

Chapter 1: Introduction

California Context

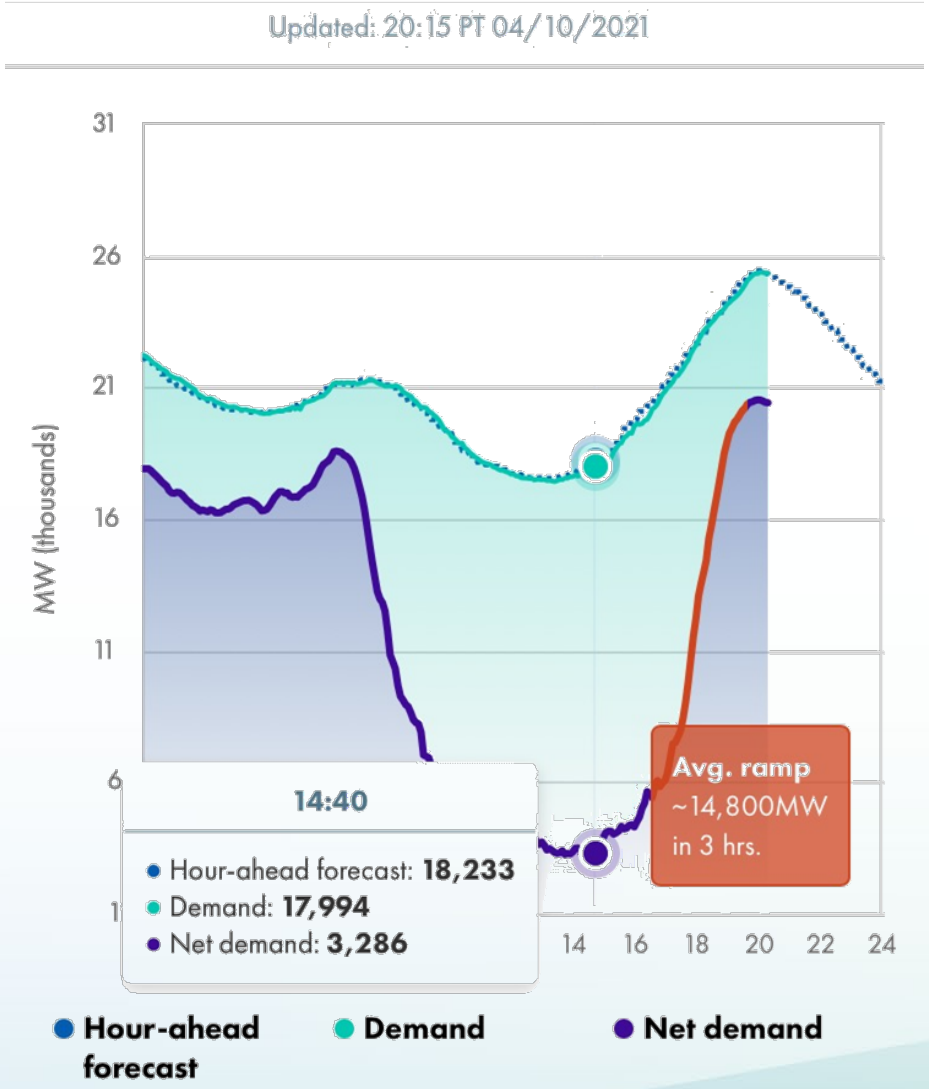
Goals

- 100% emissions-free vehicles by 2035
- 100% carbon-free grid by 2045

Status

- Most load management today: payment for load shed
- Carbon-free supplies tend to be inflexible

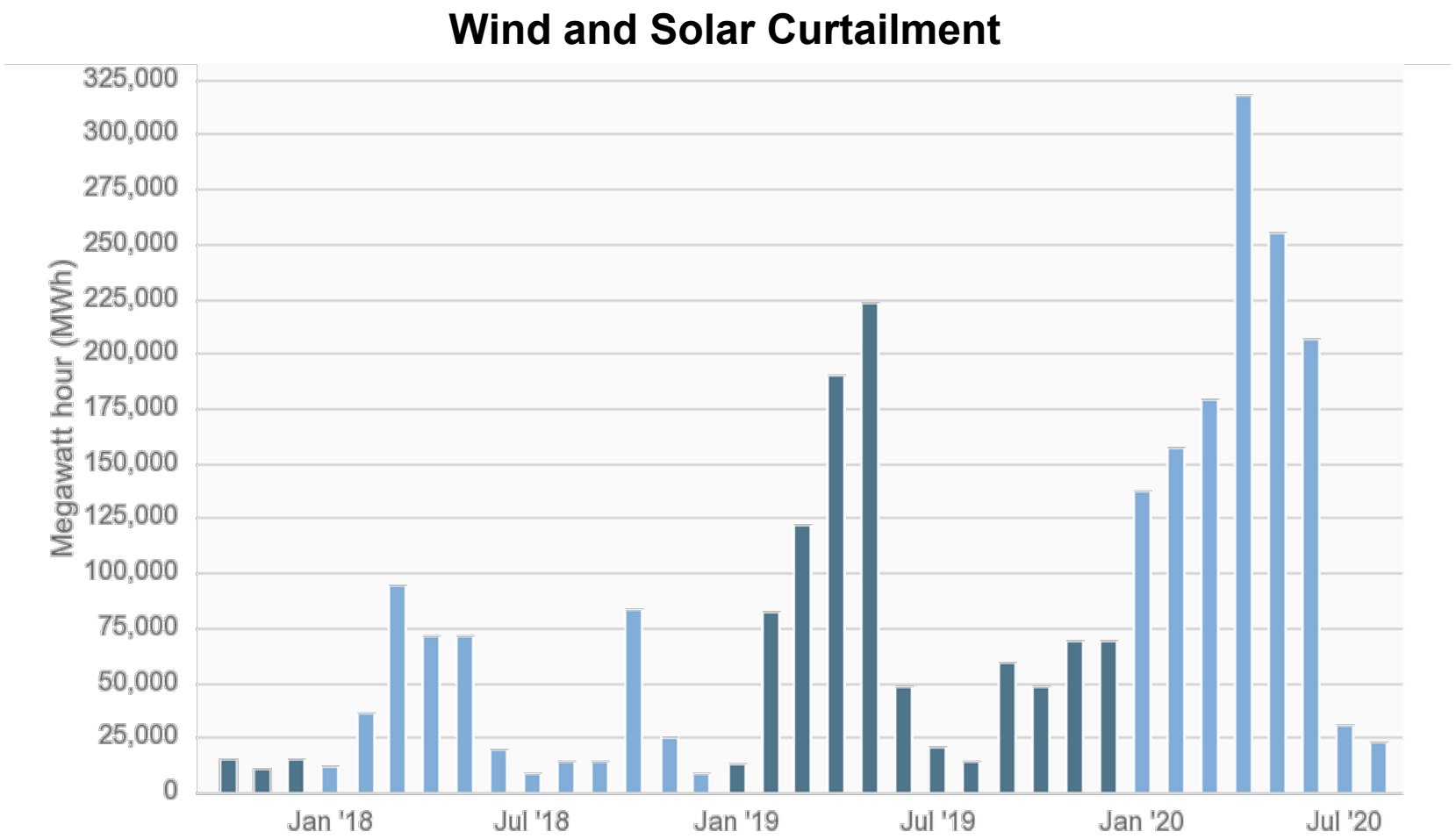
California Context



California ISO

- Peak: 6-8 pm
- Ramp: 15 GW in 3 hours

California Context

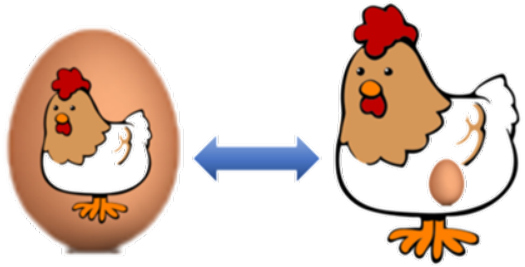


Source: CAISO 2021

California Context

Challenges

- Lack of statewide standards for response to granular grid signals
- Lack of automation to justify signals
- a.k.a. the chicken and egg problem



Opportunities

- Greenhouse gas signals and electricity prices every 5 minutes[1]
- CEC Load Management Standards authority applies to the entire state

[1] via API from the CAISO, CPUC Self-Generation Incentive Program (SGIP)

System and Utility Benefits

Reduce peak demand

- Avoid fires and blackouts
- Reduce consumption of fossil fuels
- Avoid construction of storage and generation capacity
- Reduce need for conventional DR programs
- Reduce use of high-polluting peaking plants
- Avoid transmission & distribution congestion
- Reduce electricity use when generation costs are high

Increase off-peak demand

- Improve grid reliability
- Maximize utilization of carbon-free renewable energy
- Enable electrification through resource optimization
- Maintain electrical services while decarbonizing consumption

Customer Benefits

Customers can

- Choose a time-dependent rate or program (or not)
- Choose their own automation technology (or not)
- Regulate their own comfort-convenience-cost tradeoffs
- Reduce customer bills by avoiding peak rates
- Contribute to GHG reductions
- Lower system costs → Lower rates

Equity and fairness

- Any customer can participate (not just the well-off)
- Efficient customers are rewarded (not the largest curtailable loads)
- Customers with grid-friendly load shapes are compensated appropriately (In the context of RTP, the term “free rider” is a dysphemism)

Market Benefits

- Standardization → Innovation in technology markets

Chapter 2: Recommendations

1	Rate Database	• Maintain the accuracy of existing and future time-varying rates in the publicly available and machine-readable MIDAS rate database.
2	Third-Party Services	• Develop a standard rate information access tool to support third-party services (RateID/RIN)
3	Hourly Rates	• Develop and submit locational rates that change at least hourly to reflect marginal wholesale costs.
4	Customer Education	• Integrate information about new time-varying rates and automation technologies into existing customer education and outreach programs.

Chapter 3: Statutory Authority

Adopt standards by regulation for a program of electrical load management for each utility service area, considering:

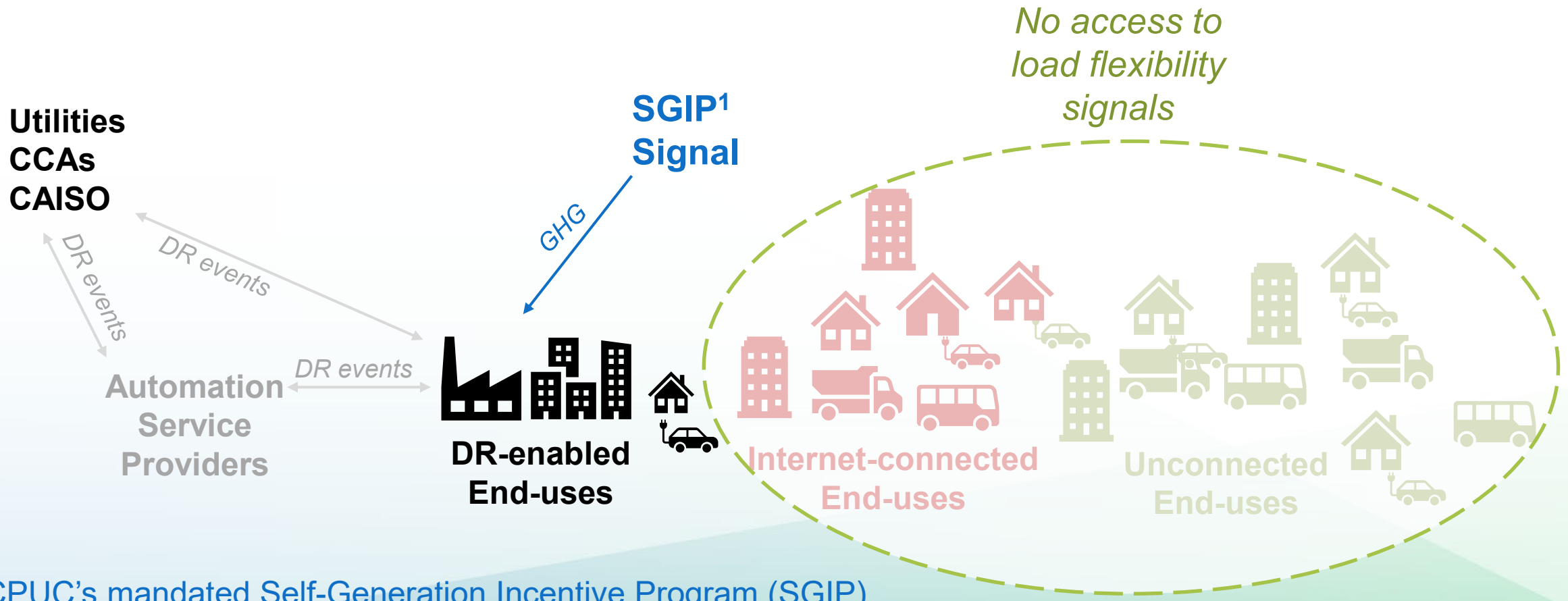
1. Rate structure
2. Storage systems
3. Automatic devices and systems

- Warren Alquist Act, 1974

Chapter 4: History

- 1970 – Energy crisis
- 1974 – Warren Alquist Act
  - Established the California Energy Commission
  - Established Appliance, Load Management and Buildings Standards
- 1979 – First Load Management Standards
  - Marginal cost rates → TOU for large customers
  - Residential AC and water heater load control programs
- 2003 – California Loading Order
- 2003-2004 – Statewide Pricing Pilot
- 2009-2013 – Advanced Metering and Time-varying Rates

Chapter 5: Load Management Today



[1] The CPUC's mandated Self-Generation Incentive Program (SGIP)

Chapter 6: CEC Efforts

- Statewide Standards
  - Load Management Standards
  - Flexible Demand Appliance Standards
  - Appliance Efficiency Standards
  - Building Energy Efficiency Standards
- Research and Development
  - EPIC Research and Demonstration Projects
  - Fuels and Transportation Demonstration Projects

Chapter 6: CEC Efforts

- Data and Analysis
  - Hourly Electric Load Modeling
  - Interval Meter Database
  - MIDAS Rate Database
- Reporting
  - Integrated Energy Policy Report (IEPR)
  - California Energy Efficiency Action Plan
  - Building Decarbonization Assessment (AB 3232)
  - SB 100 Joint Agency Report

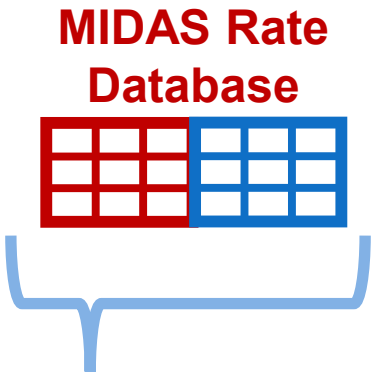
Chapter 7: Proposed Amendments

1	Rate Database	• Maintain the accuracy of existing and future time-varying rates in the publicly available and machine-readable MIDAS rate database.
2	Third-Party Services	• Develop a standard rate information access tool to support third-party services (RateID/RIN)
3	Hourly Rates	• Develop and submit locational rates that change at least hourly to reflect marginal wholesale costs.
4	Customer Education	• Integrate information about new time-varying rates and automation technologies into existing customer education and outreach programs.

Proposed Amendment #1

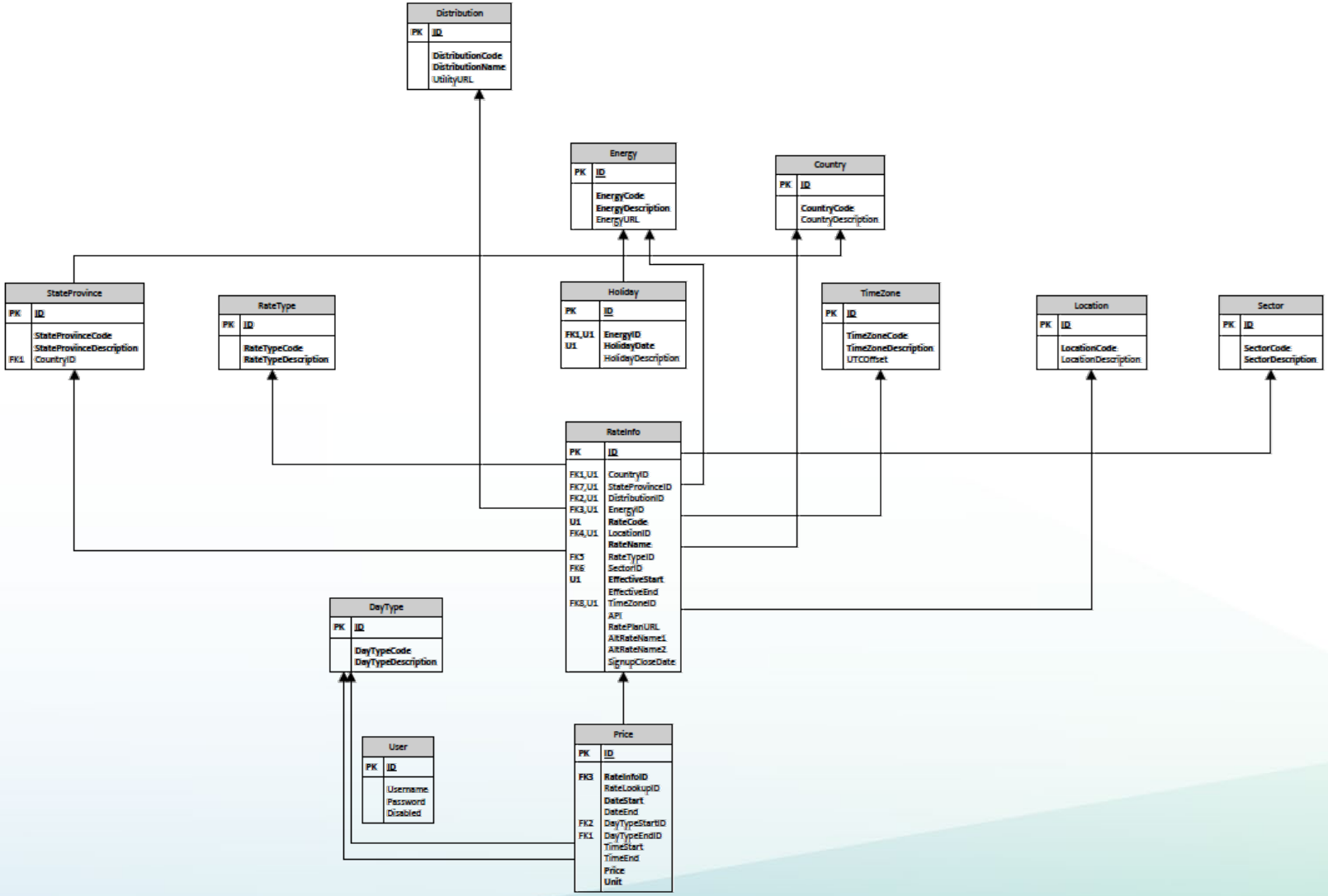
1	Rate Updates	• Maintain the accuracy of existing and future time-varying rates in the CEC's publicly available and machine-readable MIDAS rate database.
2	Third-Party Services	• Develop a standard rate information access tool to support third-party services (RateID/RIN)
3	Hourly Rates	• Develop and submit locational rates that change at least hourly to reflect marginal wholesale costs.
4	Customer Education	• Integrate information about new time-varying rates and automation technologies into existing customer education and outreach programs.

Standard MIDAS Data Model



- Vetted by stakeholders: CPUC, WattTime, utilities
- Beta version implemented with 40+ rates
- Real-time GHG signal integration in progress

Rate Database Structure



- **2 major tables**
  - RateInfo
  - Price
- **11 minor tables**
  - Country (US)
  - StateProvince (CA)
  - Distribution (utility)
  - Energy (utility or CCA)
  - Location
  - TimeZone
  - Sector
  - RateType
  - DayType
  - Holiday
  - User

RateInfo Table

20 columns x 42 lines

CountryCode	StateProvinceCode	DistributionCode	EnergyCode	RateCode	LocationCode	RateName	RateTypeCode	SectorCode	EffectiveStart	EffectiveEnd	RatePlanURL
US	CA	PG	PG	AGCP	0000	AG-C Primary	T-D	CIA	10/1/2020	12/12/9999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_AG.pdf
US	CA	PG	PG	B19S	0000	B-19 Secondary	T-D	CIA	10/1/2020	12/12/1999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_B-19.pdf
US	CA	PG	PG	B6SP	0000	B-6 Single Phase	TOU	CIA	10/1/2020	12/12/9999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_B-6.pdf
US	CA	PG	PG	BEV1	0000	BEV-1	TOU	CIA	10/1/2020	12/12/9999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_BEV.pdf
US	CA	PG	PG	EV2A	0000	EV2-A	TOU	Res	12/1/2020	12/12/1999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_EV2%20(Sch).pdf
US	CA	PG	PG	TA1B	0000	A-1	TOU	CIA	11/1/2020	12/12/9999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_A-1.pdf
US	CA	PG	PG	TA6B	0000	A-6	TOU	CIA	11/1/2019	12/12/9999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_A-6.pdf
US	CA	PG	PG	E19S	0000	E-19 Secondary	T-D	CIA	4/19/2020	12/12/9999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_E-19.pdf
US	CA	PG	PG	TOUC	0000	ETOUC Tier1	TOU	Res	12/1/2020	12/12/1999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_E-TOU-C.pdf
US	CA	PG	PG	TOUD	0000	ETOUD	TOU	Res	12/1/2020	12/12/1999	https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_SCHEDS_E-TOU-D.pdf
US	CA	SC	SC	T013	0000	TOU-PRIME	TOU	Res	3/1/2019	3/1/2019	https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/sche
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US	CA	SD	SD	TOU8	0000	EV-TOU	TOU	REV			http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_EV-TOU.pdf
US	CA	SD	SD	TOU9	0000	EV-TOU-2	TOU	REV			http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_EV-TOU-2.pdf
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US	CA	SD	SD	TOU1	0000	TOU-DR1	TOU	Res	6/1/2020	12/12/9999	https://www.sdge.com/whenmatters#plans
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Price Table

12 columns x ~600 lines

RateLookupID	DateStart	DateEnd	DayTypeStart	DayTypeEnd	TimeStart	TimeEnd	Price	Unit	PriceName
USCA-PGPG-AGCP-0000	06/01/21	9/30/2021	1	8	0:00:00	16:59:59	0.14048	kWh	Summer Off-Peak
USCA-PGPG-AGCP-0000	06/01/21	9/30/2021	1	8	17:00:00	19:59:59	17.6900	kW	Max Peak Demand Summer
USCA-PGPG-AGCP-0000	06/01/21	9/30/2021	1	8	17:00:00	19:59:59	0.17992	kWh	Summer Peak
USCA-PGPG-AGCP-0000	06/01/21	9/30/2021	1	8	20:00:00	23:59:59	0.14048	kWh	Summer Off-Peak
USCA-PGPG-AGCP-0000	10/1/2021	5/31/2022	1	8	0:00:00	16:59:59	0.12644	kWh	Winter Off-Peak
USCA-PGPG-AGCP-0000	10/1/2021	5/31/2022	1	8	17:00:00	19:59:59	0.15213	kWh	Winter Peak
USCA-PGPG-AGCP-0000	10/1/2021	5/31/2022	1	8	20:00:00	23:59:59	0.12644	kWh	Winter Off-Peak
USCA-PGPG-B19S-0000	3/1/2021	5/31/2021	1	8	9:00:00	13:59:59	0.07125	kWh	Winter Super Off-Peak
USCA-PGPG-B19S-0000	3/1/2021	5/31/2021	1	8	14:00:00	15:59:59	0.11416	kWh	Winter Off-Peak
USCA-PGPG-B19S-0000	3/1/2021	5/31/2021	1	8	21:00:00	8:59:59	0.11416	kWh	Winter Off-Peak
USCA-PGPG-B19S-0000	06/01/21	9/30/2021	1	8	14:00:00	15:59:59	5.3500	kW	Max Part-Peak Demand Summer
USCA-PGPG-B19S-0000	06/01/21	9/30/2021	1	8	14:00:00	15:59:59	0.13529	kWh	Summer Part-Peak
USCA-PGPG-B19S-0000	06/01/21	9/30/2021	1	8	16:00:00	20:59:59	25.9500	kW	Max Peak Demand Summer
USCA-PGPG-B19S-0000	06/01/21	9/30/2021	1	8	16:00:00	20:59:59	0.16504	kWh	Summer Peak
USCA-PGPG-B19S-0000	06/01/21	9/30/2021	1	8	21:00:00	22:59:59	5.3500	kW	Max Part-Peak Demand Summer
USCA-PGPG-B19S-0000	06/01/21	9/30/2021	1	8	21:00:00	22:59:59	0.13529	kWh	Summer Part-Peak
USCA-PGPG-B19S-0000	06/01/21	9/30/2021	1	8	23:00:00	13:59:59	0.11424	kWh	Summer Off-Peak
USCA-PGPG-B19S-0000	10/1/2021	5/31/2022	1	8	16:00:00	20:59:59	1.7700	kW	Max Part-Peak Demand Winter
USCA-PGPG-B19S-0000	10/1/2021	5/31/2022	1	8	16:00:00	20:59:59	0.14614	kWh	Winter Peak
USCA-PGPG-B19S-0000	10/1/2021	2/29/22	1	8	21:00:00	15:59:59	0.11416	kWh	Winter Off-Peak
USCA-PGPG-B6SP-0000	3/1/2021	5/31/2021	1	8	0:00:00	8:59:59	0.22755	kWh	Winter Off-Peak
USCA-PGPG-B6SP-0000	3/1/2021	5/31/2021	1	8	9:00:00	13:59:59	0.21113	kWh	Winter Super Off-Peak
USCA-PGPG-B6SP-0000	3/1/2021	5/31/2021	1	8	14:00:00	15:59:59	0.22755	kWh	Winter Off-Peak

API Output

```
<?xml version="1.0"?>
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  - <PriceInformation>
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        <DateStart>2021-06-01</DateStart>
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        <DayStart>Monday</DayStart>
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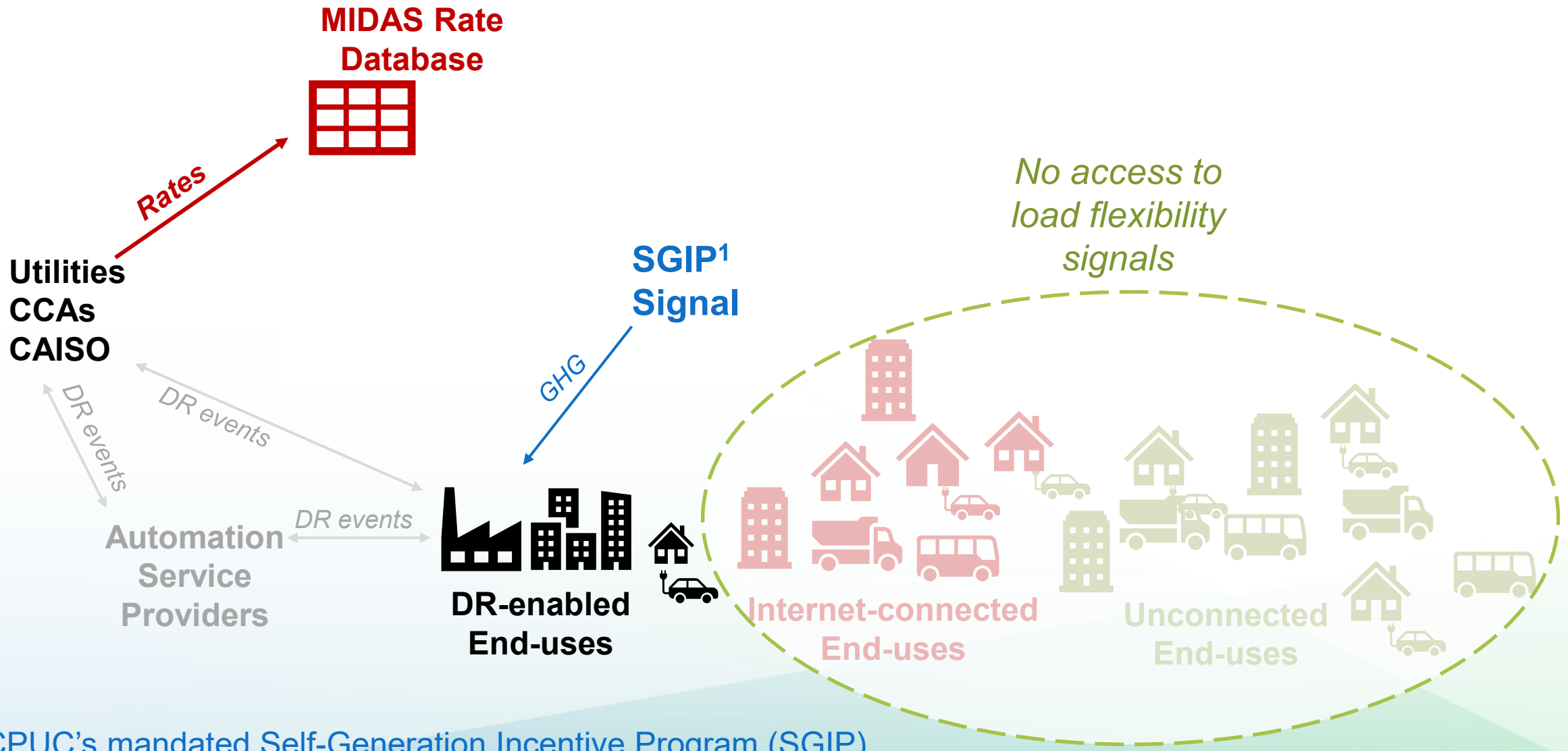
PG&E EV2-A rate (XML)

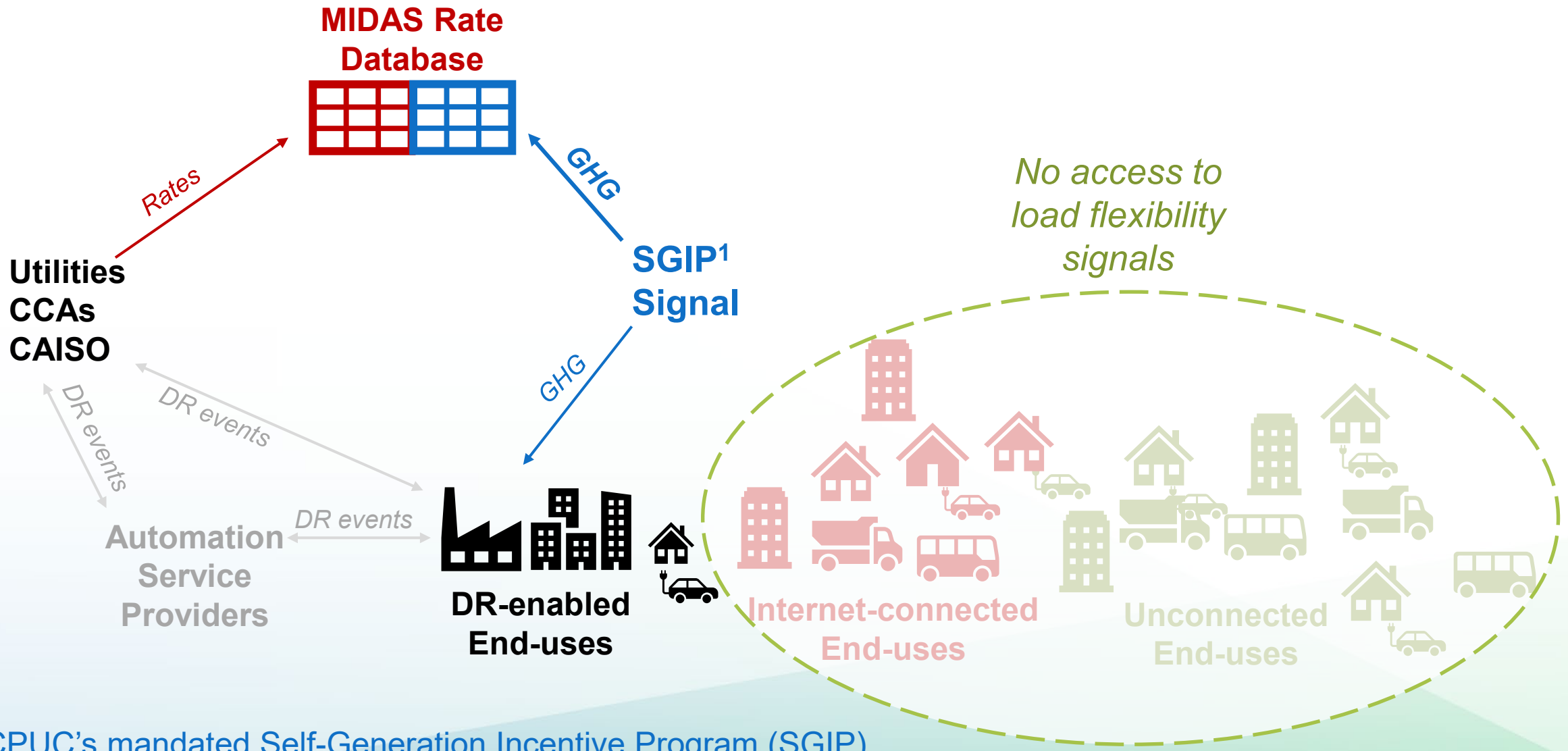
* On CEC Intranet only at http://MIDAStest

MIDAS



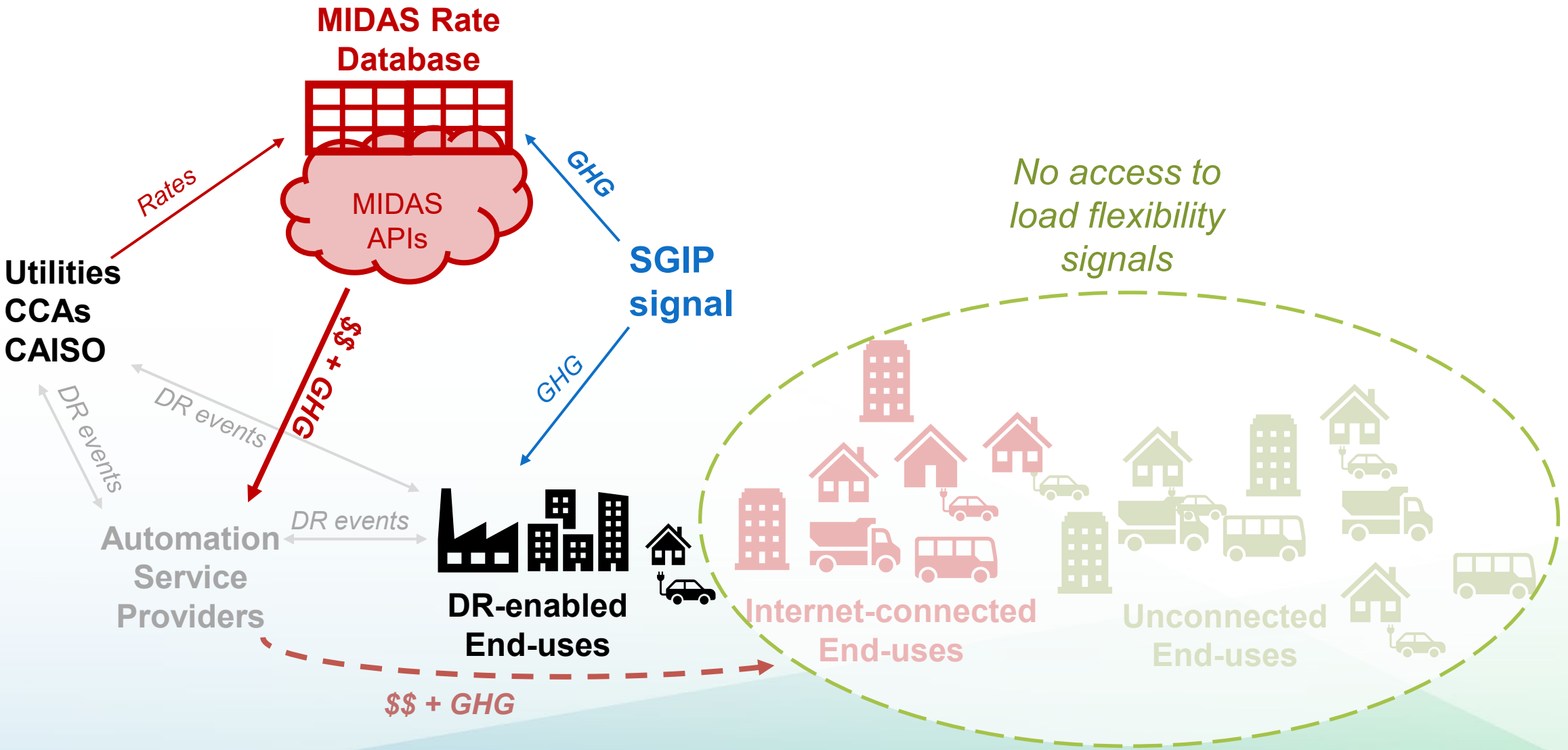
[1] The CPUC's mandated Self-Generation Incentive Program (SGIP)

MIDAS



[1] The CPUC's mandated Self-Generation Incentive Program (SGIP)

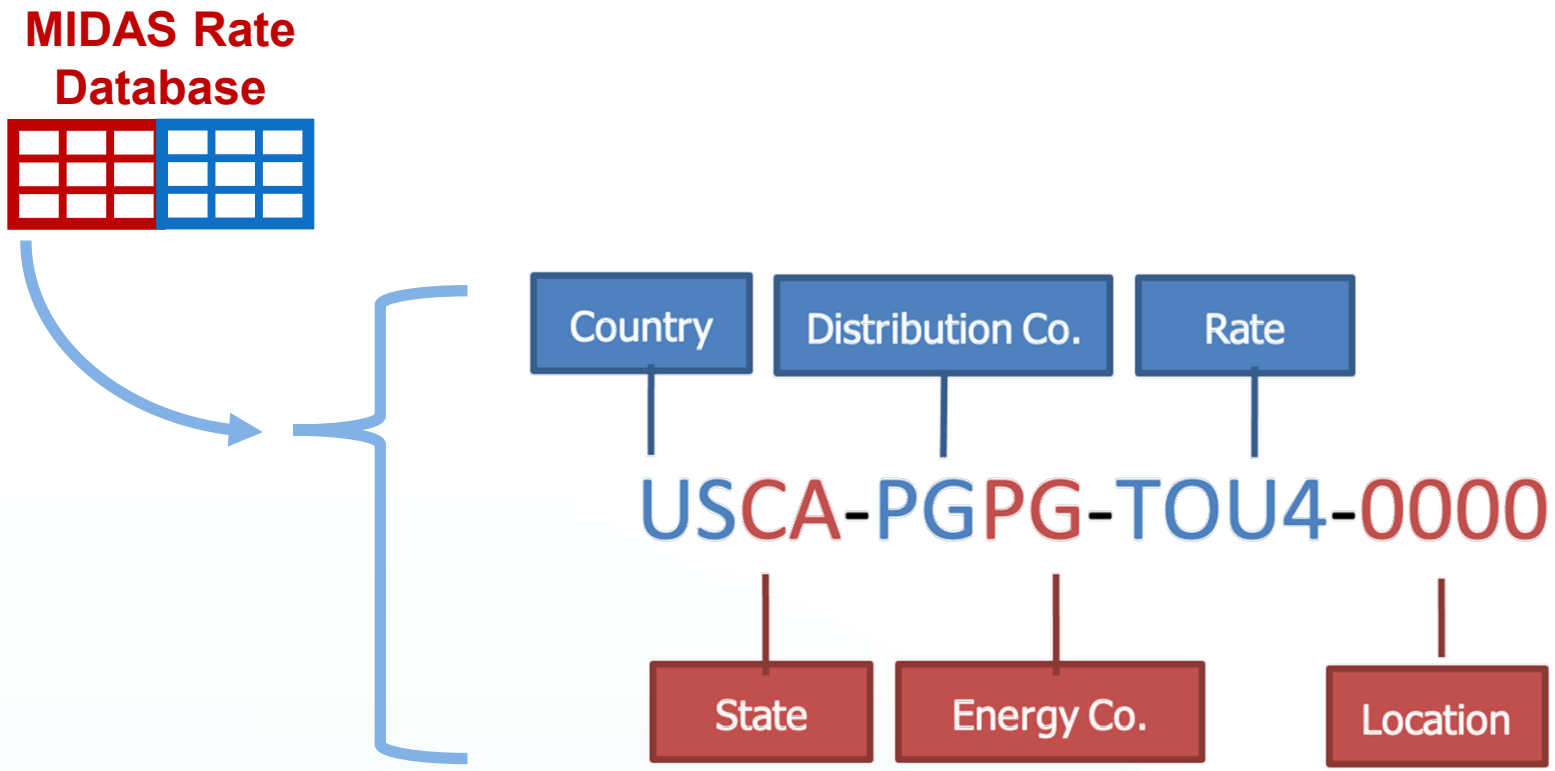
MIDAS


MIDAS Rate Database
MIDAS APIs
Rates
GHG
SGIP signal
Utilities
CCAs
CAISO
$$ + GHG
DR events
DR events
GHG
DR events
Automation Service Providers
DR-enabled End-uses
$$ + GHG
No access to load flexibility signals
Internet-connected End-uses
Unconnected End-uses

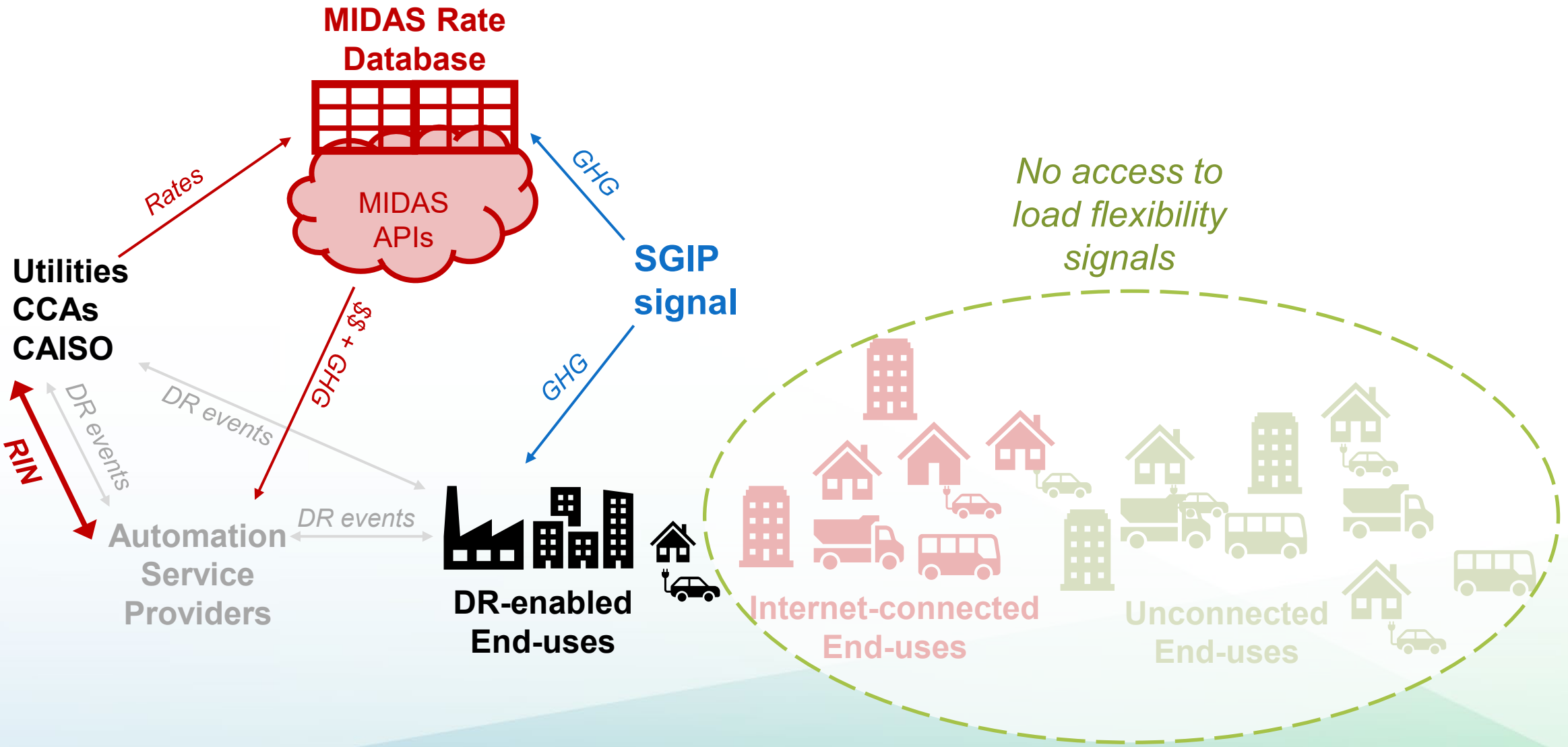
Proposed Amendment #2

1	Rate Updates	• Maintain the accuracy of existing and future time-varying rates in the publicly available and machine-readable MIDAS rate database.
2	**Third-Party Services**	• Develop a standard rate information access tool to support third-party services (RateID/RIN)
3	Hourly Rates	• Develop and submit locational rates that change at least hourly to reflect marginal wholesale costs.
4	Customer Education	• Integrate information about new time-varying rates and automation technologies into existing customer education and outreach programs.

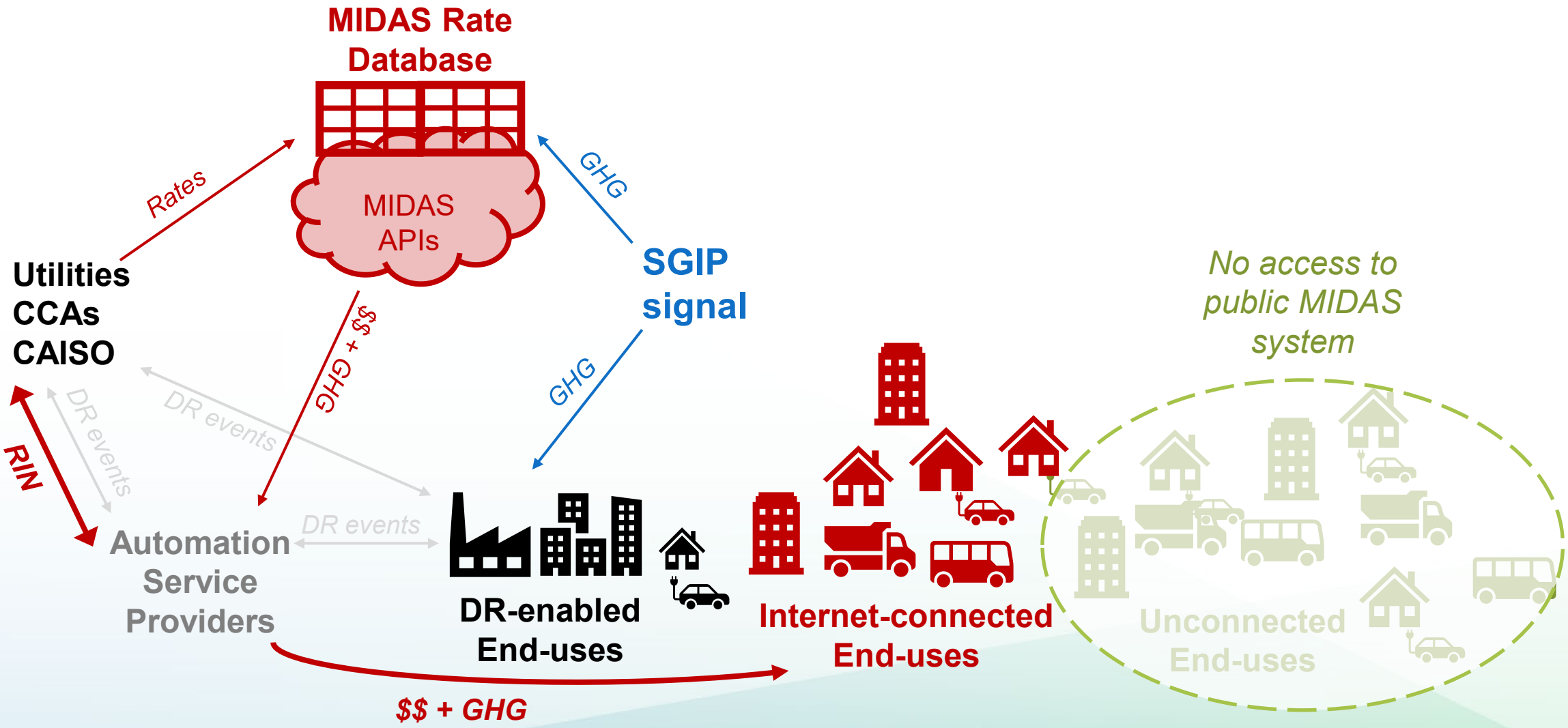
Rate Identification Number (RIN)



RIN Access Tool



RIN Access Tool



Proposed Amendment #3

1	Rate Updates	• Maintain the accuracy of existing and future time-varying rates in the publicly available and machine-readable MIDAS rate database.
2	Third-Party Services	• Develop a standard rate information access tool to support third-party services (RateID/RIN)
3	**Hourly Rates**	• Develop and submit locational rates that change at least hourly to reflect marginal wholesale costs.
4	Customer Education	• Integrate information about new time-varying rates and automation technologies into existing customer education and outreach programs.

Proposed Amendment #4

1	Rate Updates	• Maintain the accuracy of existing and future time-varying rates in the publicly available and machine-readable MIDAS rate database.
2	Third-Party Services	• Develop a standard rate information access tool to support third-party services (RateID/RIN)
3	Hourly Rates	• Develop and submit locational rates that change at least hourly to reflect marginal wholesale costs.
4	**Customer Education**	• Integrate information about new time-varying rates and automation technologies into existing customer education and outreach programs.

Chapter 9: Feasibility

MIDAS

1. MIDAS Rate Database – **complete**
2. Rate Data Retrieval API – **complete**
   - Current price or future schedule in XML or JSON
3. Utility Rate Data Upload Tool – **May 2021**
   - XML schema for automated uploads from utilities
4. Automation Service Provider download tool (API): **June 2021**
5. Enable real-time data streams for GHG and LMP – **July 2021**
6. Enable real-time data streams for Flex Alerts – **August 2021**

Automation Implementation

- Customer participation supported by Automation Service Providers (ASPs)
  - Demand Response aggregators
  - Smart thermostat manufacturers
  - Smart water heater manufacturers
- ASPs need access to customer Rate Identification Number (RIN)
  - Green Button process already in place for meter data
  - Customer RIN is a smaller lift and so feasible

Real-Time Pricing (RTP)

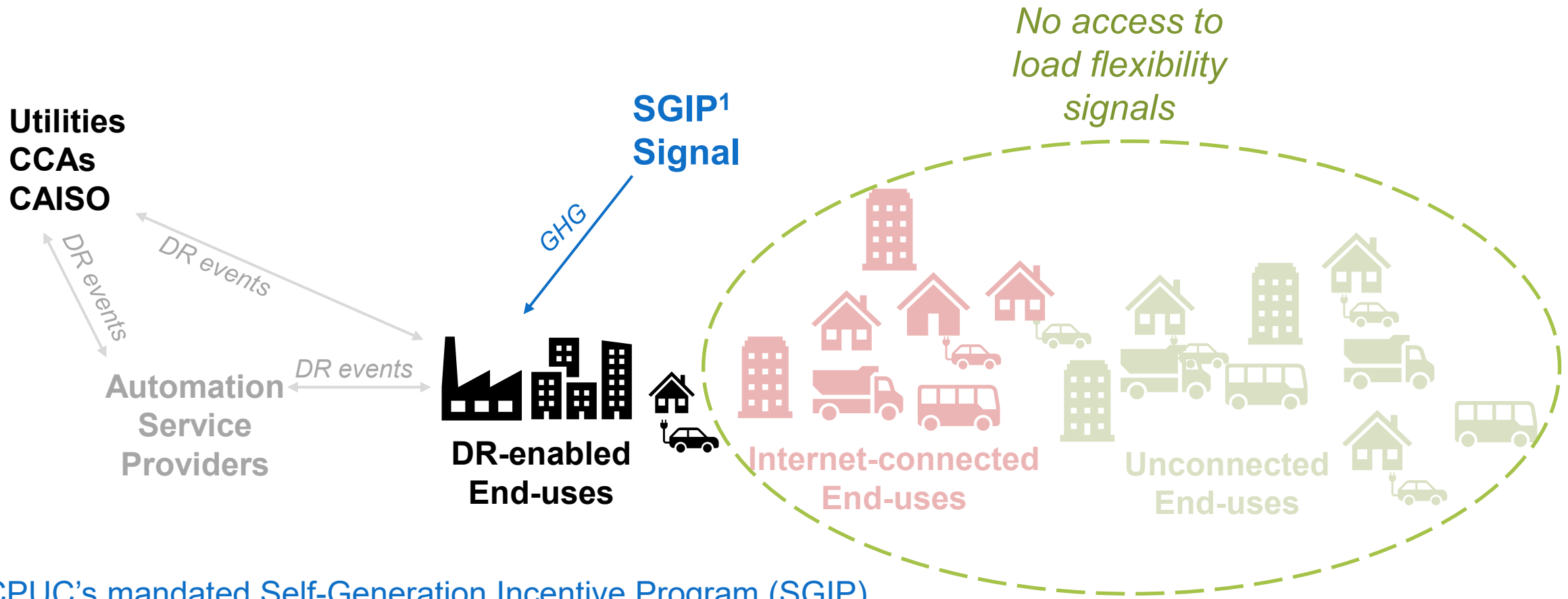
- RTP in the field
  - SCE's experimental Subscription Transactive Tariff (STT) for the Retail Automated Transactive Energy System (RATES) project
  - SDG&E's Power Your Drive hourly rate
- RTP Proposed
  - SCE's two-part RTP
  - PG&E's Application 19-11-019
    - Public hearing Nov 6, 2021

Load Management Timeline

Year	Milestone
2021	MIDAS rate data available for registered ASPs
2022	Load Management Standards go into effect
2023	Flexible Demand Appliance Standards go into effect
2024	Locational hourly or sub-hourly rates proposed
2025	Programs for granular time/space price/GHG response

Chapter 10: Alternatives

Do nothing



[1] The CPUC's mandated Self-Generation Incentive Program (SGIP)

For more information

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Links to CEC Standards

- 2020 Load Management Rulemaking website
- Load Management Standards: CCR Title 20 §1621-1625
- Flexible Demand Appliance Standards: PRC 25402
- Warren-Alquist Act: PRC 25403.5