# Policy, Technical, and Market Options for Electricity System Needs

National Academies Electric Vehicles Workshop (Day 3)

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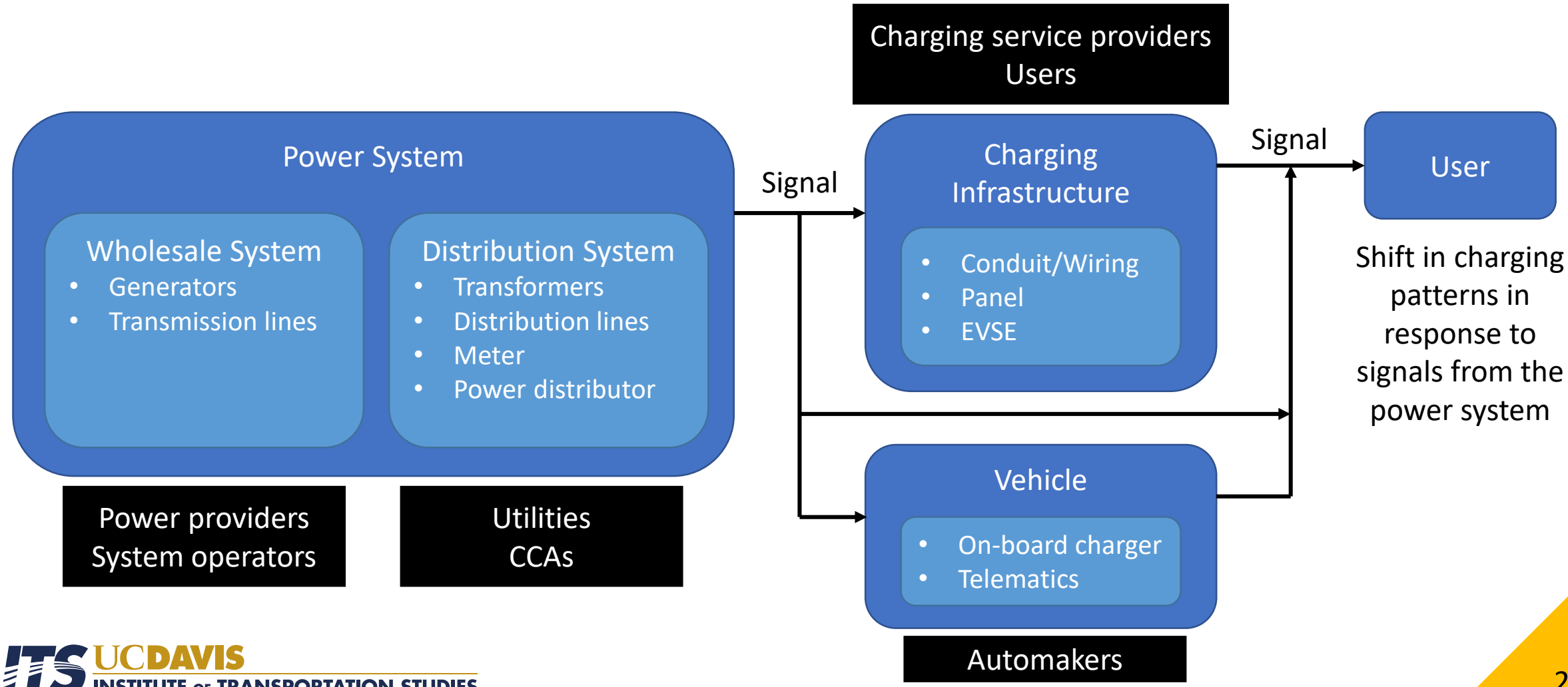
# Landscape of Vehicle Grid Integration (VGI) & Stakeholders



# Existing policy and future policy needs

| Regulatory Policy | Description |
|---|---|
| AB 2514/No. R. 10-12-007 (**CPUC**) | EVs can count towards IOU procurement targets for storage (behind the meter) |
| **FERC** 784 | Payment for VGI services |
| **FERC** 792 | Interconnection rules for small storage |
| R.07-01-041 (**CPUC**) | Platform for EV participation in DR and how to bid into the wholesale market |
| Rule 24 (**CPUC**) | Participation in wholesale markets (direct vs aggregator) |
| Rule 21 (**CPUC**) | Interconnection requirements for VGI |
| Docket No. ER11-2977-000 (**CPUC**) | Tariffs for energy transfer between CAISO and utilities/customers |
| Docket No. R.08-12-009 (**CPUC**) | Development of smart grid strategies including VGI |
| SB 676/R.18-12-006 (**CPUC**) | Strategies and metrics to further VGI and fulfill obligations of SB 676 |

**Existing Standards**: SAE J2836/(1-6), SAE J2847/(1-6), SAE J2931/(1,4-6), ISO 15118, National Institute of Standards and Technology's reliability and cybersecurity protocols

## Policy Development Framework

### Technology
- Develop enabling requirements
- Improving performance
- Signals and messaging

### Market
- Measure impacts
- Determine value of VGI
- Support business models
- Signals and messaging

### Adoption
- VGI products and programs
- Eligibility requirements
- Settlement and payment mechanisms

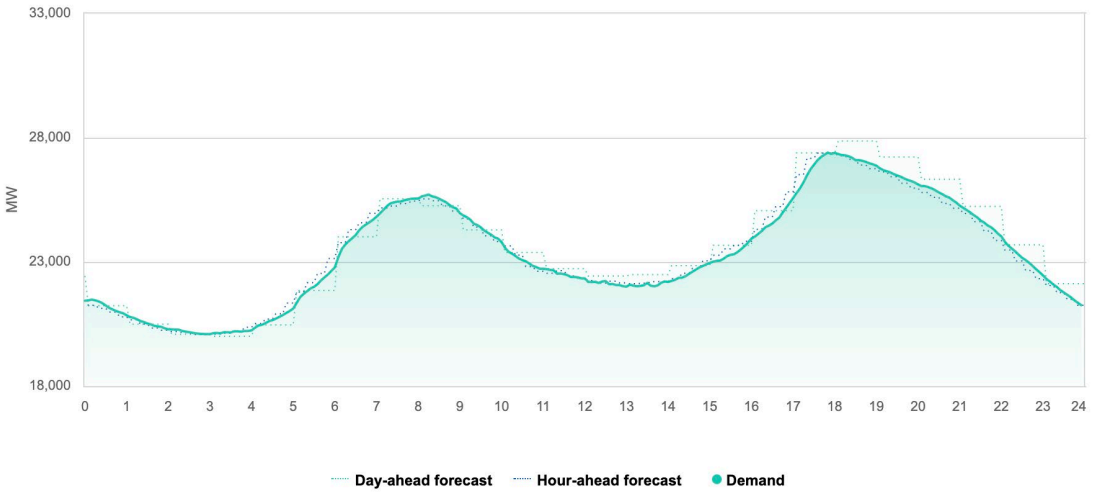
## Examples of necessary future policies:

**Standards**
- Onboard vs offboard 2-way inverter
- WDAT-based interconnection vs retail level interconnection
- Consistent standards with existing EV and VGI standards (filling gaps)

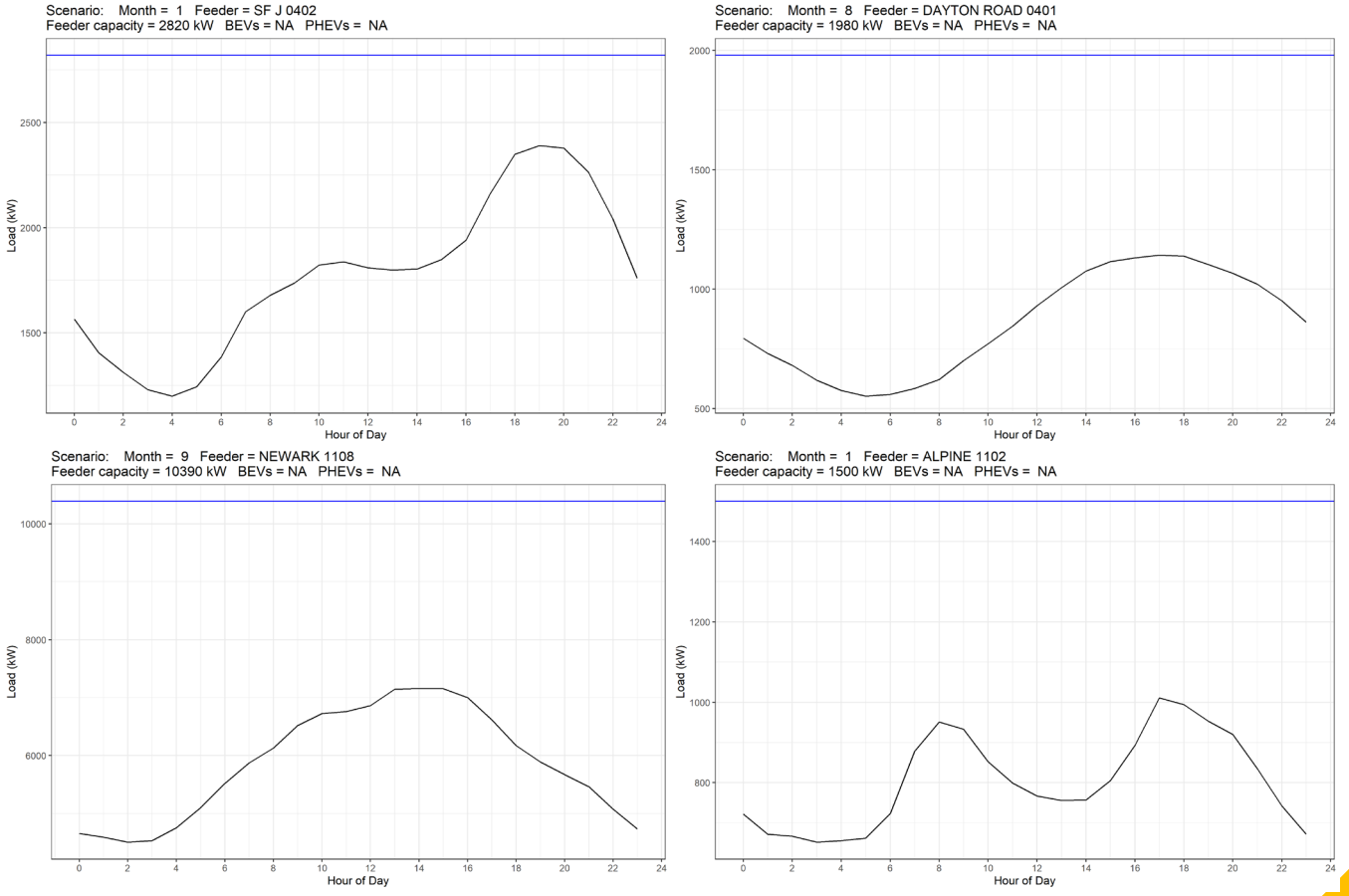
**Payment policies**
- Process of payment
- New products/programs depending on VGI capabilities
- Enrollment and eligibility
- Codification of benefits for customers

**Signals and messaging**
- Processes for signaling
- Integration with DER
- Standardization across products and entities

# Key question: wholesale vs distribution systems



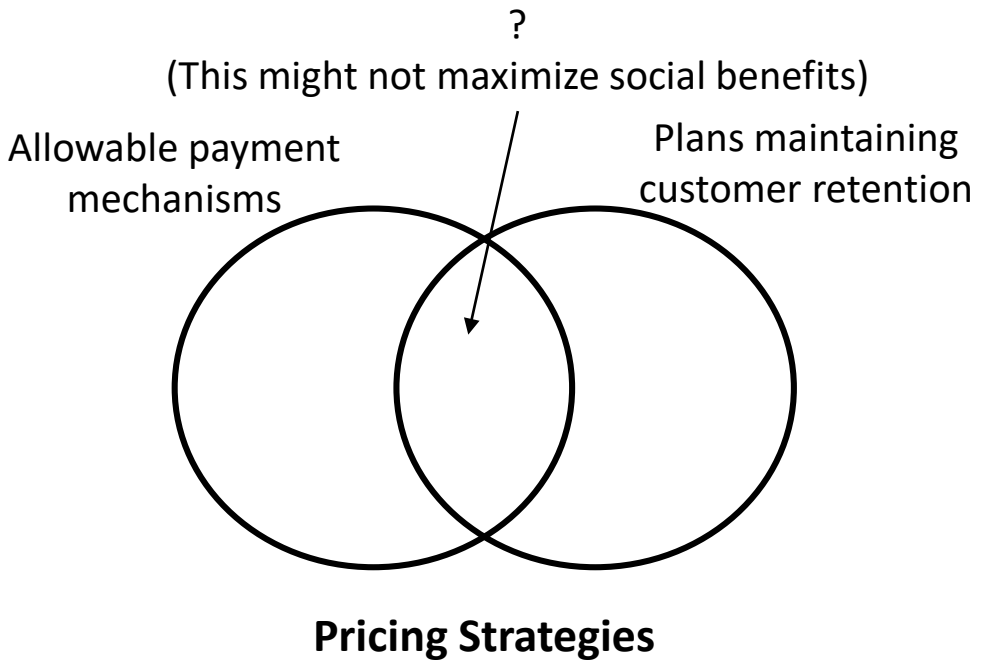

CA-ISO daily load profile in January 2021




Assorted distribution feeder daily load profiles in January 2021

# Key question: customer participation

- Technological implementation and feasibility is much farther along than the “human” aspect
- Substantially more work needed to understand user acceptance




- Recruitment and knowledge
- Individual actors versus aggregators
- Active versus passive participation
- Infrastructure availability
- Reliability issues

# Future considerations

- Abundance of pilot projects throughout the world; better coordination needed to facilitate lessons learned between programs
- How do users “see” the value of mitigating capacity infrastructure through VGI?
- To what extent can existing infrastructure accommodate VGI practices?  Will an overhaul of current EVSE be needed in the future?