



Energy+Environmental Economics

DER Portfolio Optimization

National Council on Energy Policy Annual Meeting

December 7th, 2020

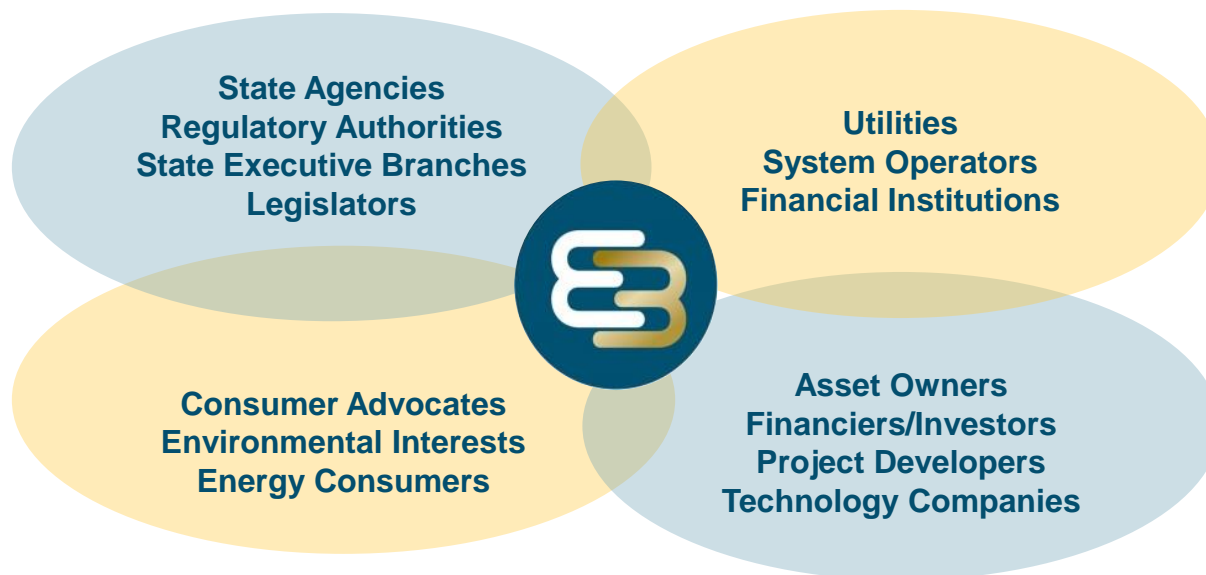
Snuller Price, Sr. Partner



About Energy and Environmental Economics

- + **Founded in 1989, E3 is a North American consultancy in the electric power sector**
- + **Focus on energy transition and dedication to evidence-based analysis**
- + **E3's project scope and breadth is unmatched for a firm of its size**
 - We complete over 250 projects a year across the energy sector
 - Constant innovation and in-house development of best-in-class tools

Client Types





Why Focus on Optimizing DER Now?

+ Low Energy Costs (\$/kWh)

- Energy efficiency cost-effectiveness challenges

+ Higher Capacity Costs (\$/kW)

- Coal, nuclear, and OTC retirements
- Low growth on distribution

+ Anticipated Rate Pressure

- Low sales during global COVID-19 pandemic
- Low growth rate generally
- Scrutiny on DER spending and ratepayer value

+ Emerging market opportunities, FERC 2222

- Better business models for dynamic DER?
- Dropping cost of communication and controls

Rebalance portfolio between energy and capacity resources

Raises the bar on the rigor needed on DER spending

Creates new opportunities that our frameworks may not properly value



How are we comparing DER resources?

Standard Practice Manual Approach

Deploy all cost-effective DER

Benefits = Avoided Costs

Generation capacity

Transmission capacity

Distribution capacity

Energy

Losses

Other elements depending on the state priorities and history (CO₂, DRIPE, A/S)

Integrated Resource Planning Approach

Develop least cost integrated portfolio to achieve goals and balance risks and outcomes

Typical goals

Reliability, Cost, Environment

Emerging GHG goals

GHG < X by 2030

“Least-cost Best-fit”

Additional Goals

Equity and low-income

Air quality improvement

Technology development

COVID-recovery and jobs

Mitigate climate change

Higher reliability

... many others as well

Questions

Do we need to rebalance our spending to maximize ratepayer value?

Do we have consistent treatment across all DER types, or are we siloed?

Do we have the right primary cost-effectiveness perspectives?

How much ratepayer money should we spend to achieve additional goals?



What is on the list of DER options?

+ Traditional DER Measures

+ Budgeted

- Energy efficiency
- Demand Response
 - DR Shed (System capacity focus)
- AMI deployment

+ Not budgeted (typically)

- Time-of-use rates & rate design
- Solar rooftop systems
 - Driven by Net Energy Metering rate

+ Growing DER Opportunities

+ Dynamic response

- Smart controls, e.g. thermostats
- Demand response
 - DR Shed (System capacity focus)
 - DR Shift
 - DR Shimmy
- Smart EV charging & VGI
- Battery storage

+ GHG Reduction

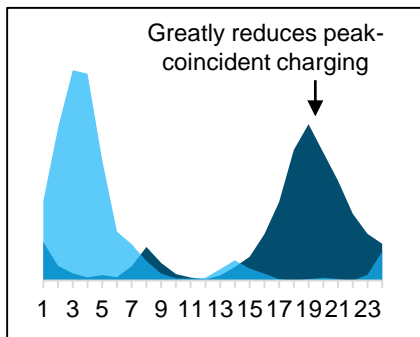
- Building electrification
- Vehicle electrification



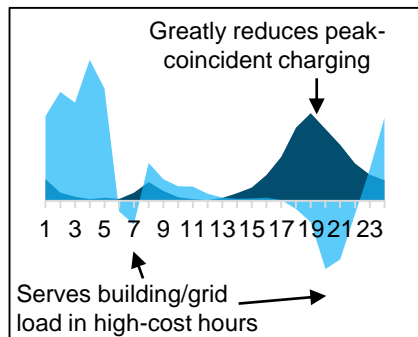
Diversity of Loads That Can Be Managed with Communication and Controls



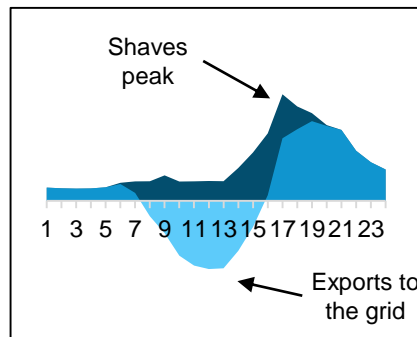
V1G



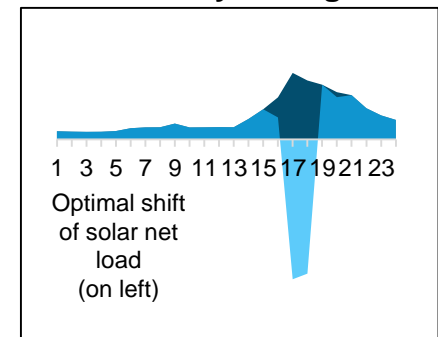
V2G



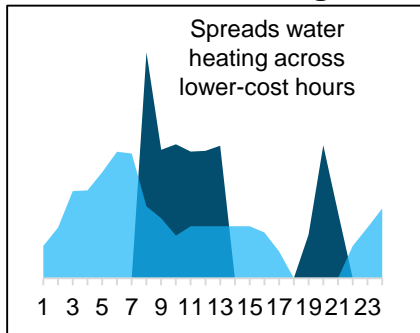
Solar PV



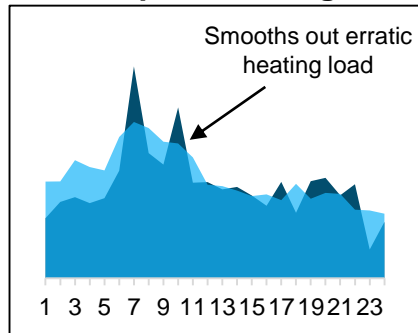
Battery Storage



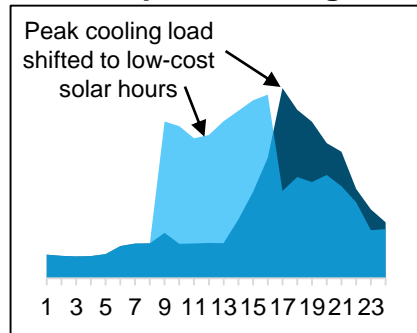
Water Heating



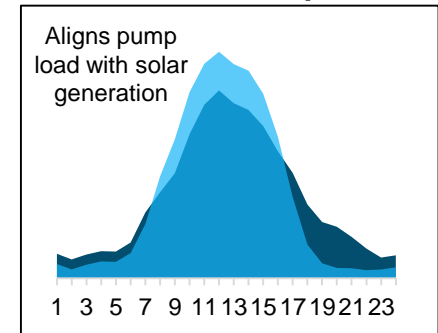
Space Heating



Space Cooling

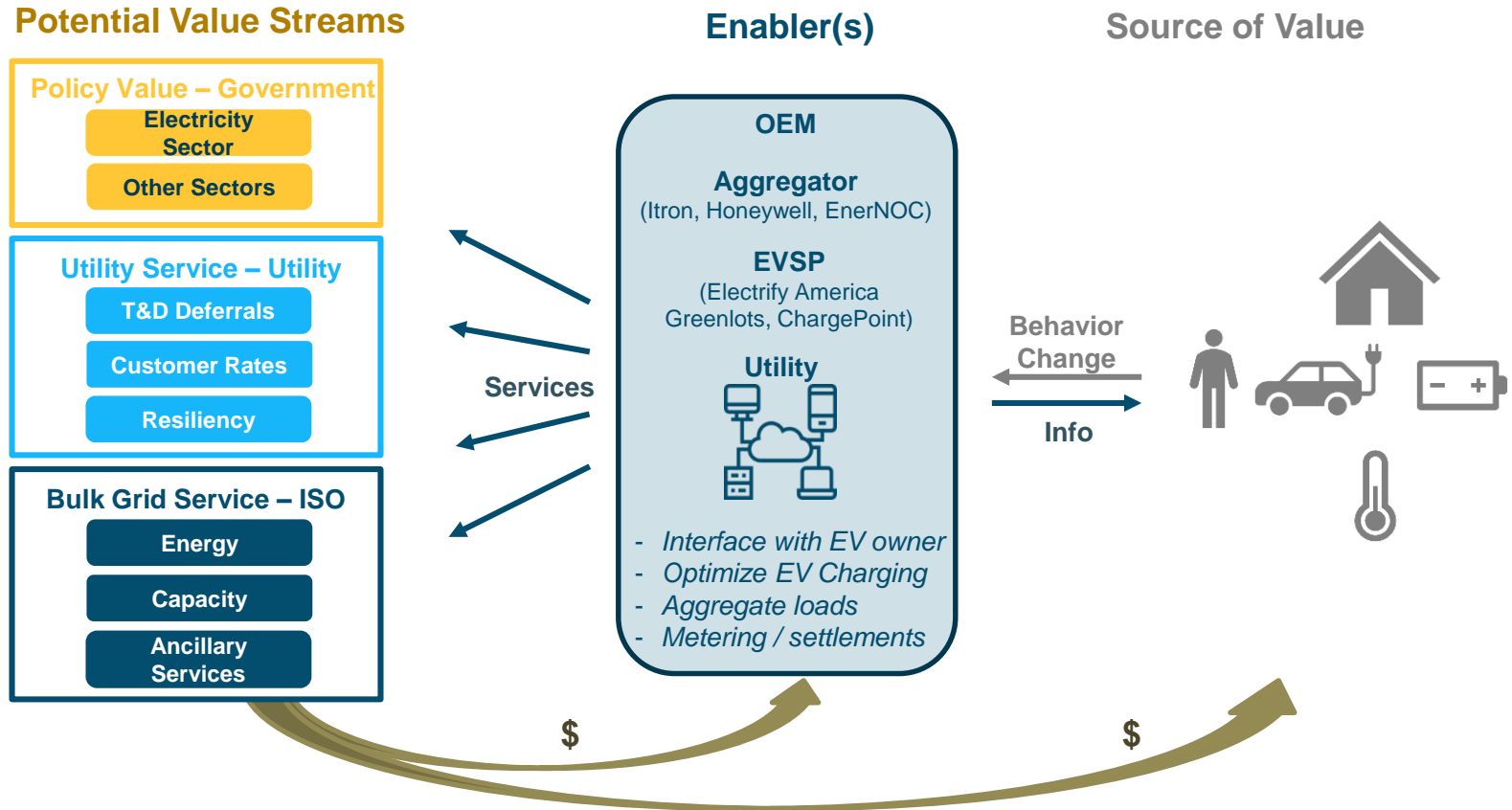


Pool Pump



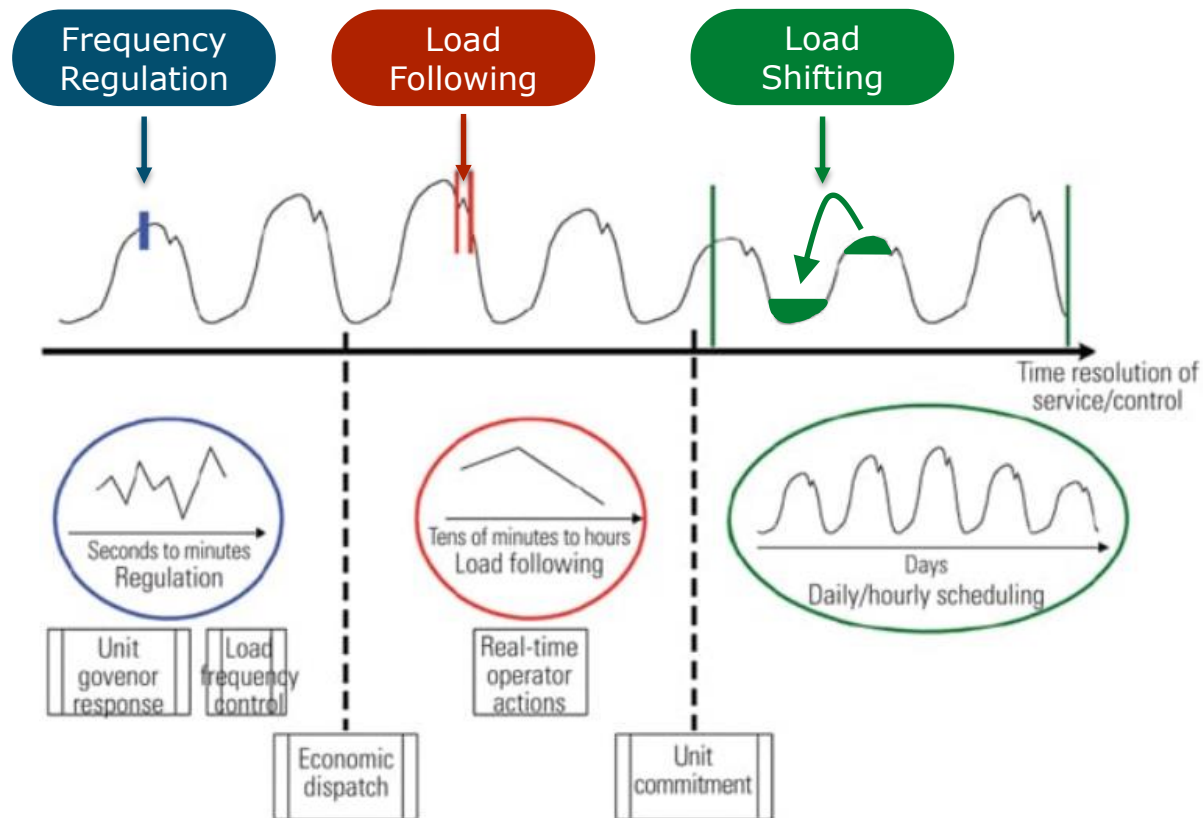


Multiple players between consumer and revenue sources seek to tap VGI value





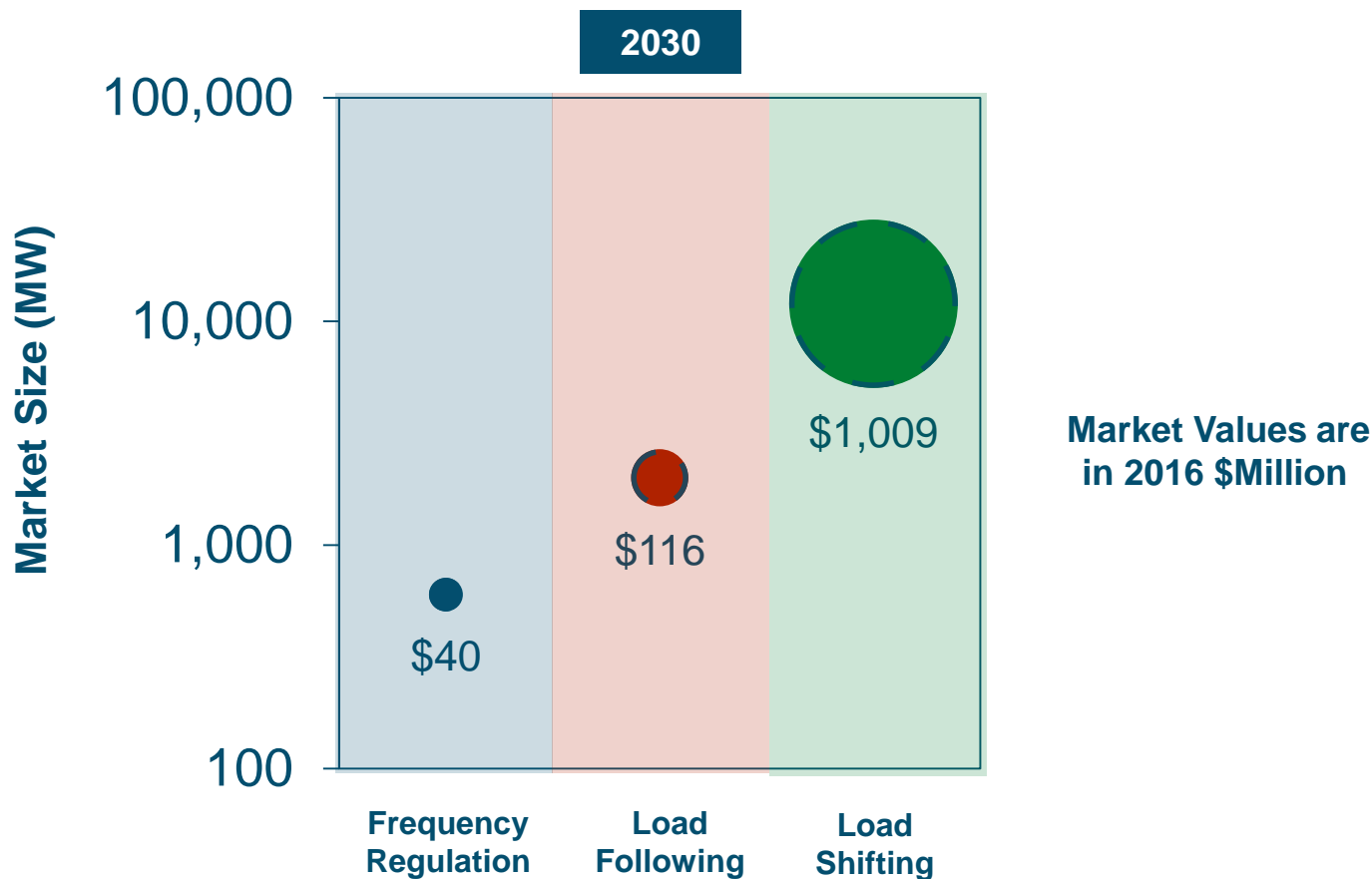
Which VGI services have the highest value?



<https://www.powermag.com/getting-bulk-storage-projects-built/?pagenum=3>



Load shifting will have the largest value in high renewables systems – CA Example



2018 CPUC IRP (CA 2018-2030 levelized value, 2016 \$/kW-yr.)



Summary – Regulators and Regulated Utilities are Critical to DER Evolution

Regulatory actions

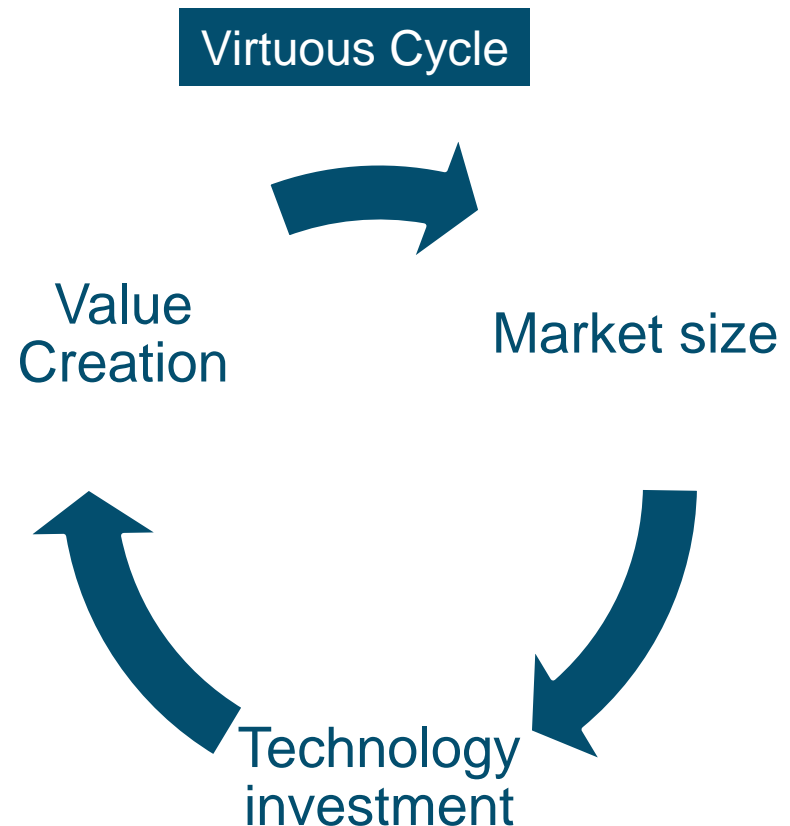
- Rebalance DER portfolios
- Integrate dynamic value streams for measurable capacity resources

Support investment in emerging DER technology

- Business models for aggregators, enablers are essential

Wholesale market coordination through FERC 2222

- Opportunity for scale, standardization, rigor, and DER & system operations
- Needs a strong DER proponent to be workable and practical





Energy+Environmental Economics

Thank You

Snuller Price, Senior Partner

415-391-5100 x306

snuller@ethree.com

