



Conference

SÃO PAULO | 23 DE OUTUBRO DE 2019

THE ELECTRICITY SECTOR & NEW GLOBAL FRONTIERS

O Setor Elétrico e as Novas Fronteiras Globais



FEREIDOON SIOSHANSI
Menlo Energy Economics

**How consumer stratification will
disrupt utility business model?**
THE CONSUMER OF THE FUTURE



THE CONSUMER OF THE FUTURE

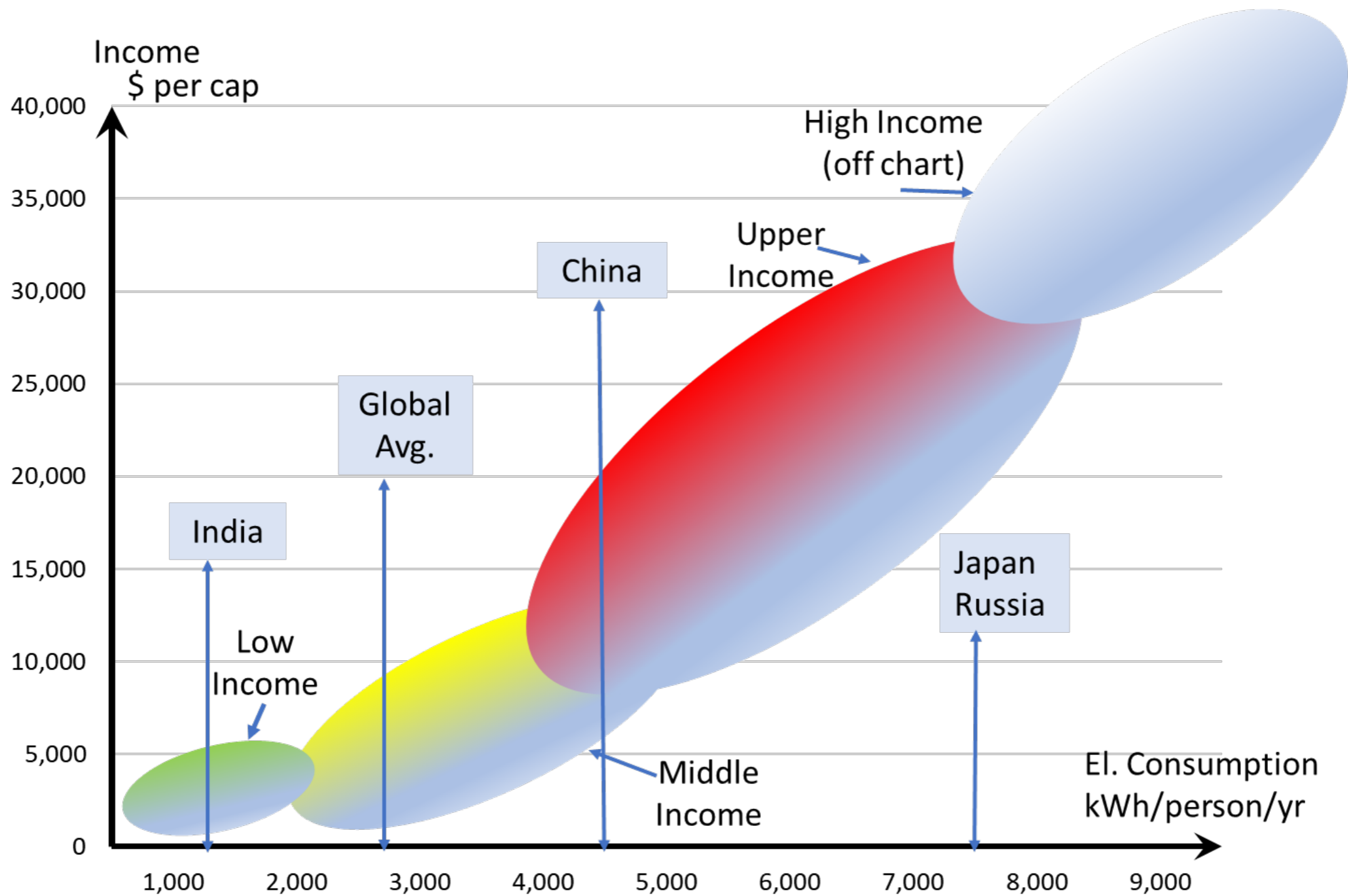
Thank you!

- To the organizers for the invite
- Opportunity to share insights
- Look forward to panel discussion
- Two caveats:
 - Silicon Valley centric
 - Some of what I say may or may not be applicable

Outline

- A few words of introduction
- Highlight 3 important trends
 - Consumer stratification
 - Stand-alone devices & zero-net energy technologies
 - Enablers & new business models
- Implications?

One size does not fit all



EEnergy Informer

The International Energy Newsletter

October 2019

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Amazon Burning

Trump skips the climate meetings: he's? surprised?

By the end of the G7 summit in late August in Biarritz, France, the world's most powerful nations had agreed to a joint declaration on climate change. The declaration, which received wide publicity in the days after the summit, was a landmark moment in the fight against climate change. It was a moment that had been longed for by many, and it was a moment that had been longed for by many. It was a moment that had been longed for by many, and it was a moment that had been longed for by many. It was a moment that had been longed for by many, and it was a moment that had been longed for by many.

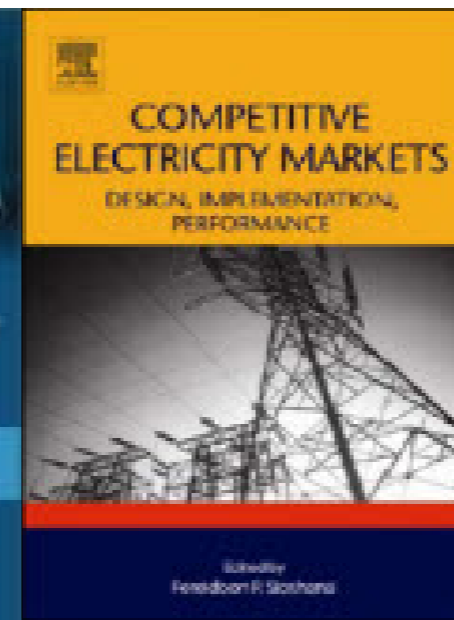
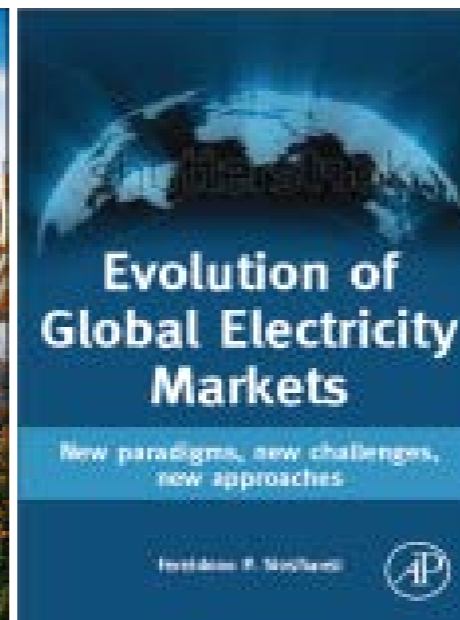
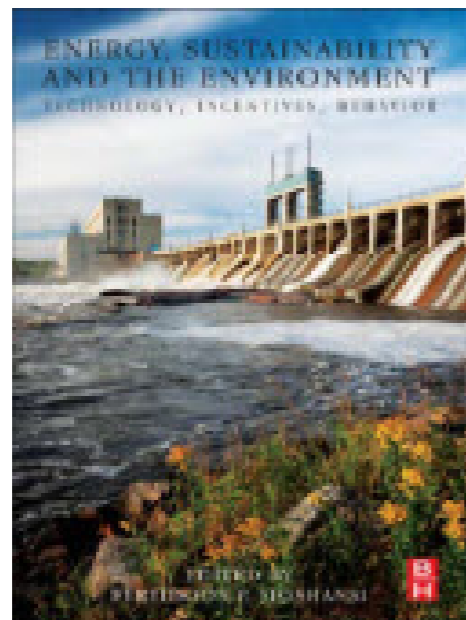
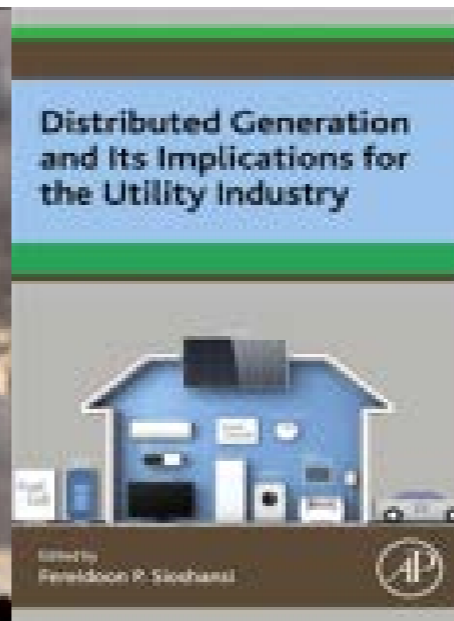
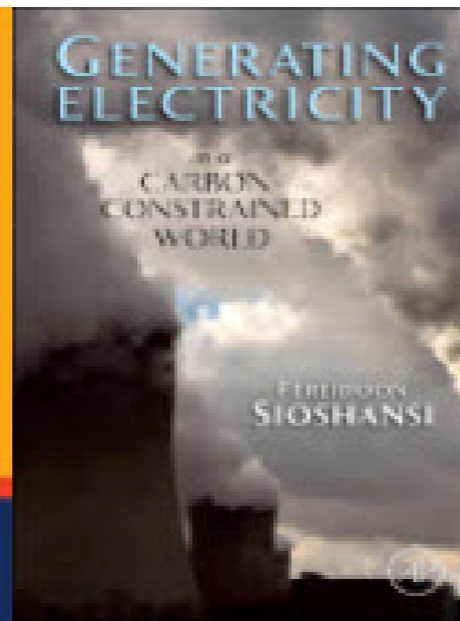
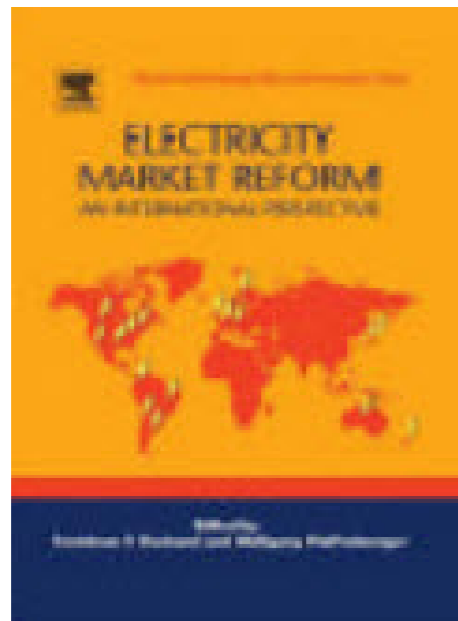
Bolsonaro was even further by firing the head of INPE, Brazil's space research agency, whose satellite images of the fires showed the world what Bolsonaro did not want them to see. It was a classic.

As is usually the case at such summits, as much was accomplished, as there is to be. The summit was a success, which they had repeatedly enjoyed. You might wonder who picked up the tab for lunch?

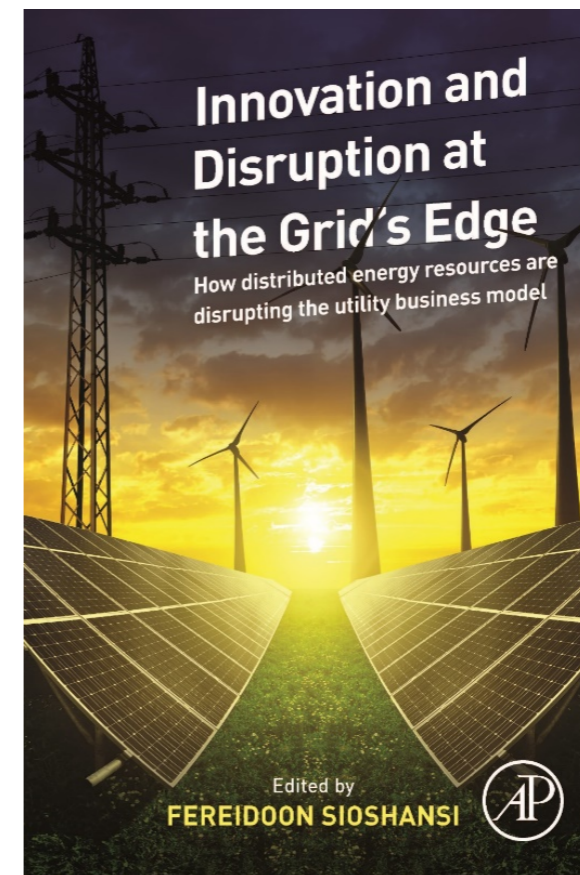
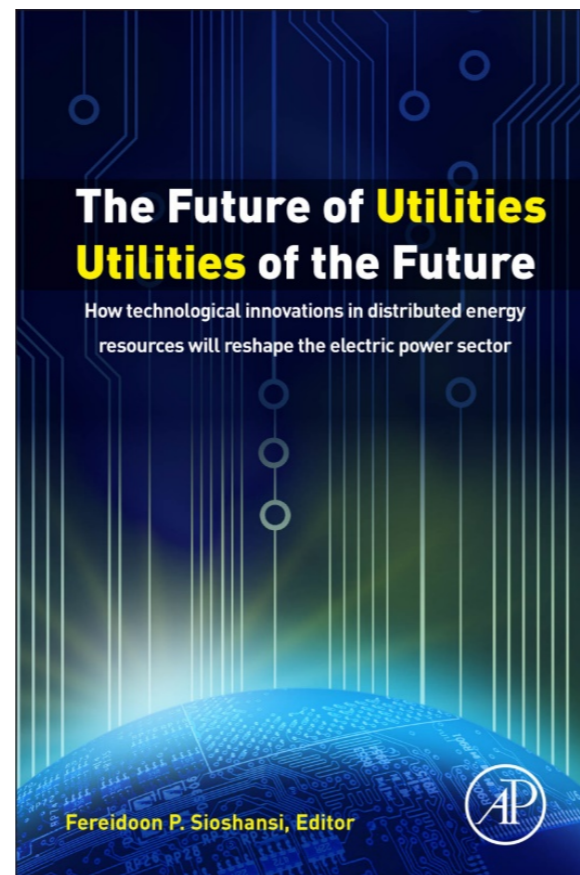
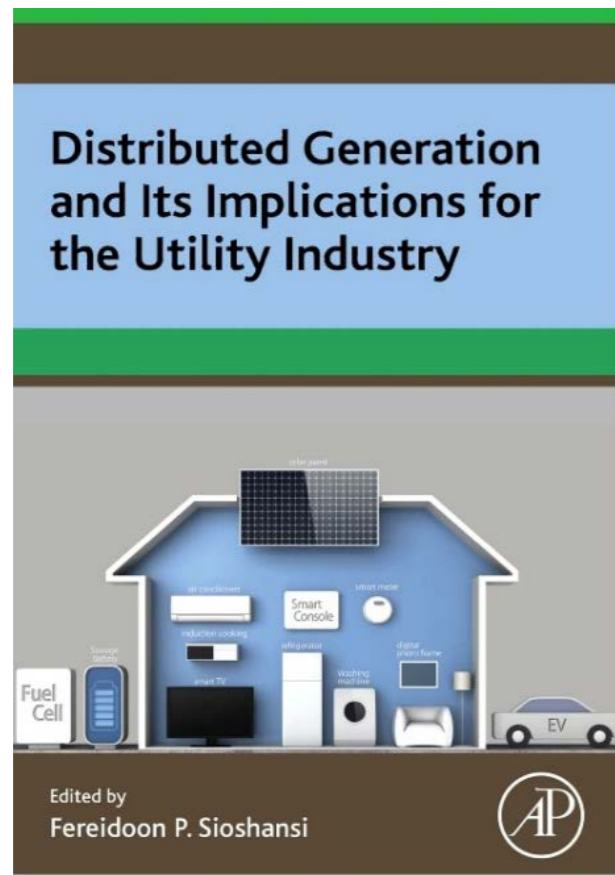
Amazon burning



Source: <https://www.fox.com/news/High-Temp-Afternoon-Temperature-For-Week-That-Is-Not-So-Good>



Last 3 Volumes – Relevant to today's discussions



Consumer, Prosumer, Prosumager

How service innovations will
disrupt the utility business model



Edited by
Fereidoon Sioshansi



BEHIND AND BEYOND THE METER

DIGITALIZATION, AGGREGATION,
OPTIMIZATION, MONETIZATION



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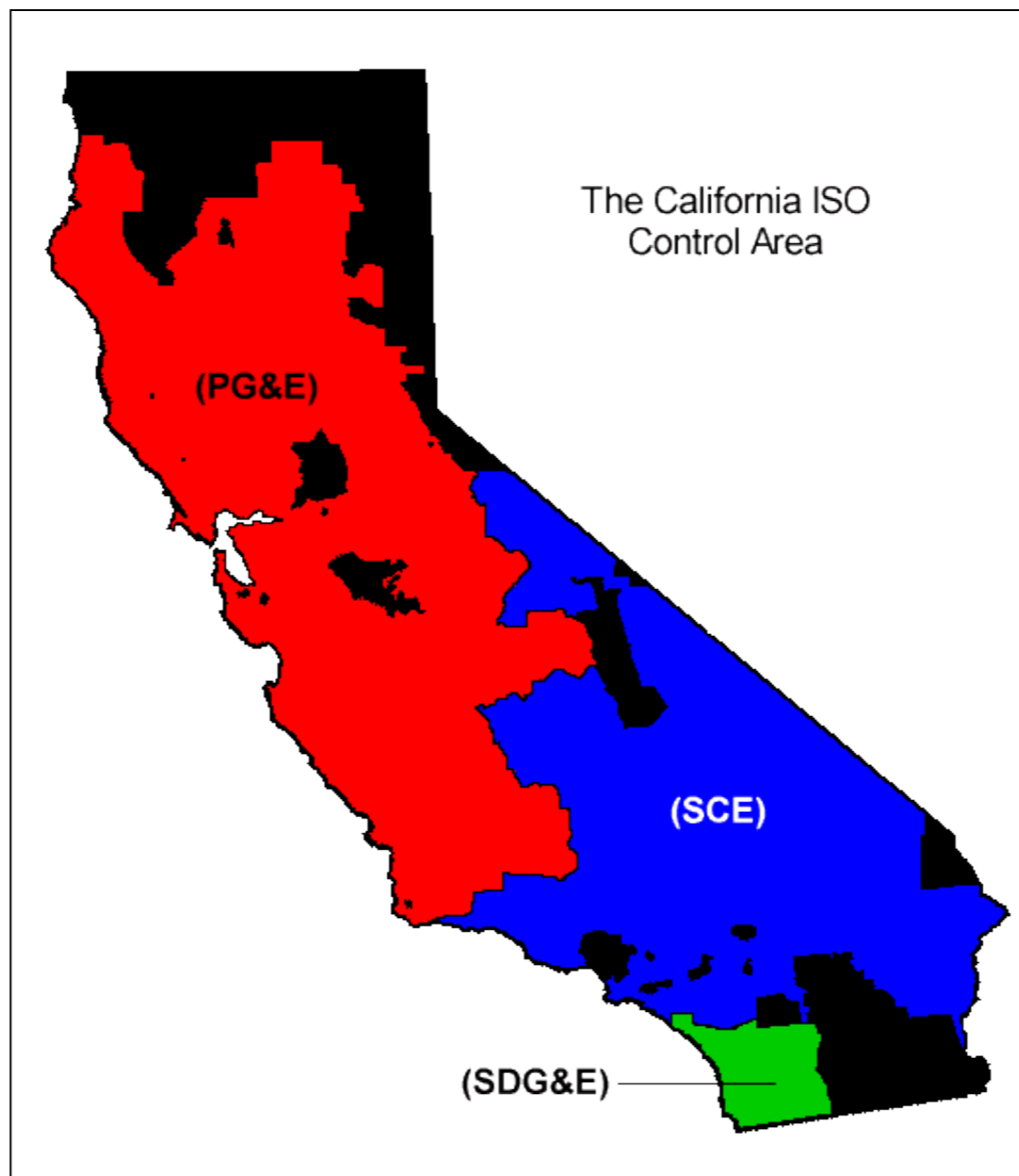
Behind-the-meter

- What's behind-the-meter & why it matters?
 - Dist. Gen, mostly PVs
 - Dist. storage – not just batteries
 - EVs & E-mobility
- Trading, aggregation & optimization
 - Trading platforms, P2P trading, blockchain
 - Virtual Power Plants (VPPs)
 - Micro-grids, grid-parallel, grid-assisted
 - Integrated energy services

Significant trends

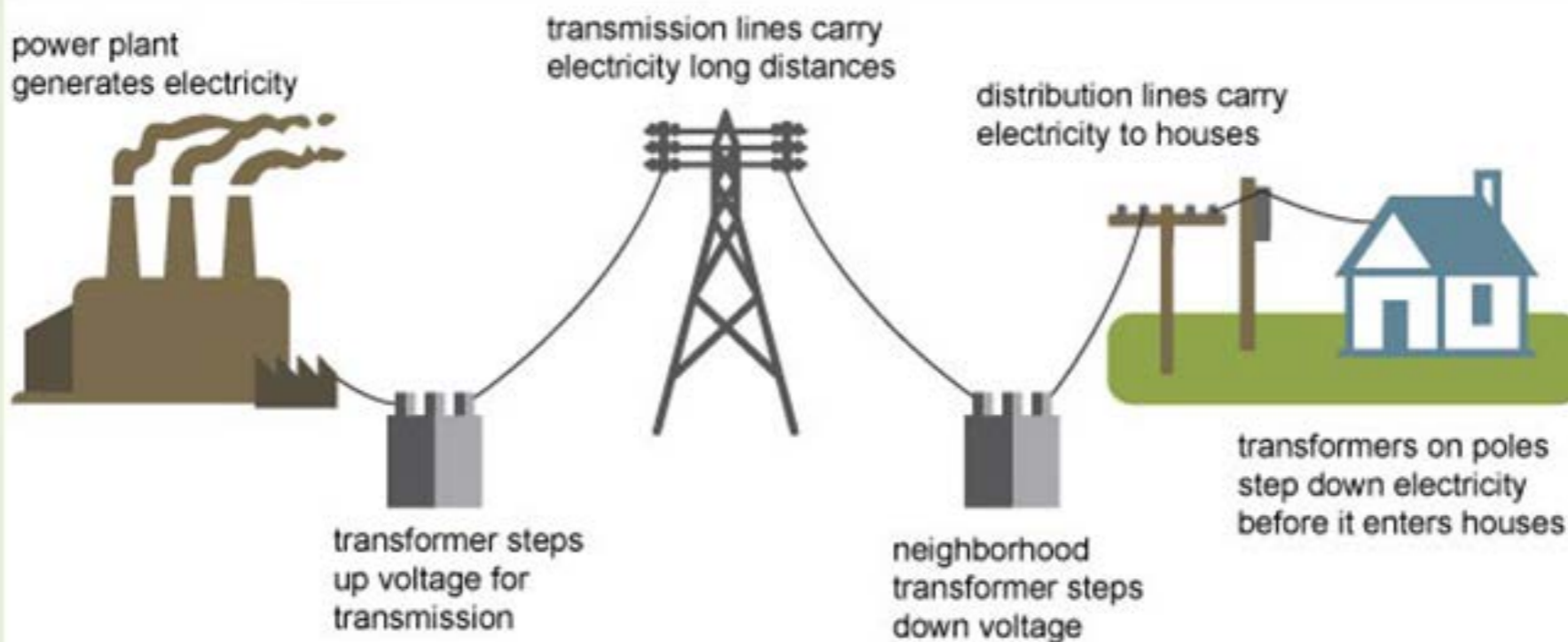
- **Consumer stratification**
- Stand-alone devices & zero-net energy technologies
- Enablers & new business models

When utilities “owned” customers



Bundled regulated tariff: You get & pay for the entire network, no ifs or buts

Electricity generation, transmission, and distribution



Source: Adapted from National Energy Education Development Project (public domain)

Consumers have **options**

■ They can...

- Use less -----→ Efficient homes/lighting/appliances
- Self-generate -----→ Solar PVs
- Store -----→ Batteries, water tanks, EVs
- Trade -----→ Across the fence or the country

■ Enabled by

- Aggregators -----→ Optimize portfolio of assets
- Artificial Intelligence -----→ Platforms, VPPs
- Micro-grids -----→ Energy community, blockchain

Distributed generation

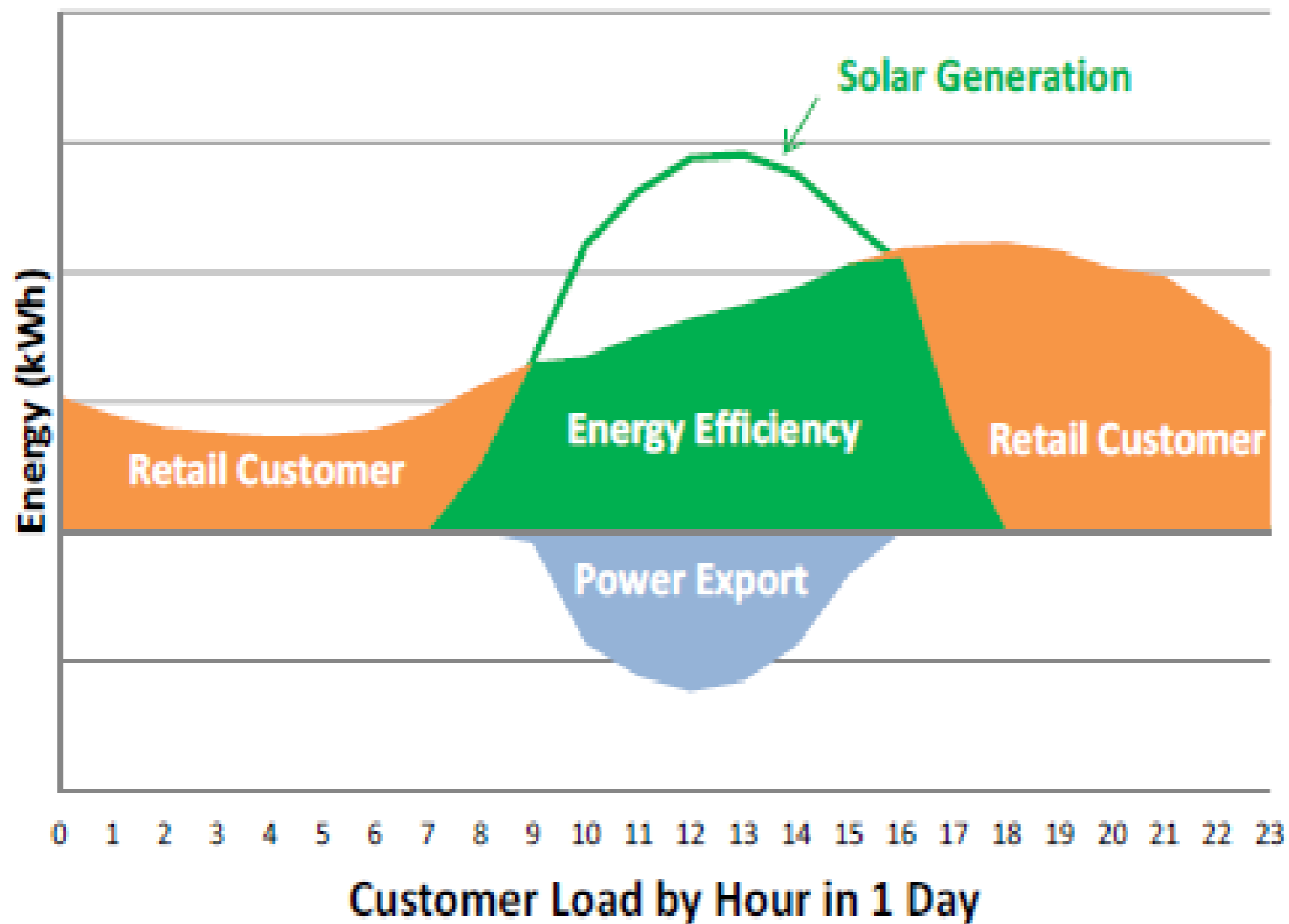
1 million solar homes in CA, 2+ million in Australia



Rooftop power plants: Definitely BTM



Consumer => Prosumer



Source: Evaluating the benefits and costs of NEM laws in California, prepared for Vote Solar, Jan 2013

Prosumer => Prosumager



Source: Tesla

No gas hookups in Berkeley: Starting 2020 no more gas hookups allowed



You want a building permit? Mayor of Lancaster, CA: 2 Watts per sq. ft.



Source: <https://www.eenews.net/stories/1059977514>

California wild fires



Source: <https://news.softpedia.com/news/Higher-Than-Average-Temperatures-Up-Forest-Fire-Risk-in-the-Amazon-359816.shtml>

How many Powerwalls? CA leads the way



Source: PG&E Blackout Plan Energizes Rivals, The Wall Street Journal, 16 Jul 2019

<https://www.wsj.com/articles/pg-e-braces-for-power-cuts-and-rival-providers-see-an-opening-11563193150>

Significant trends

- Consumer stratification
- Stand-alone devices & zero-net energy technologies
- Enablers & new business models

Generate, store, consume: Self-contained bus stop in Zaragoza, Spain



Source: Onyx Solar newsletter, Nov 2018

Stand-alone light pole: The only viable option in Kampala



Stand-alone parking meter



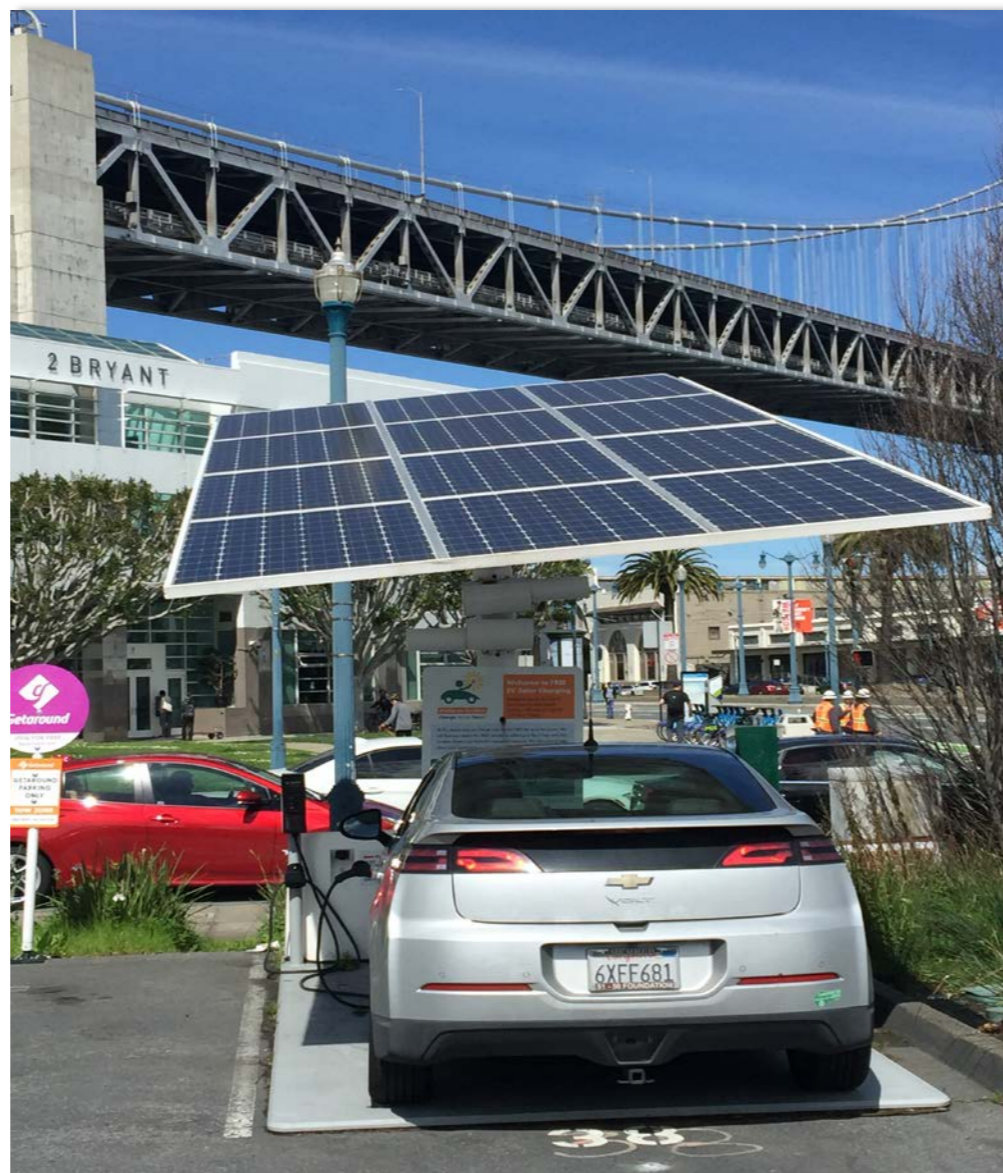
House boat



Charge it from the sun: BTM?



Free solar EV charger



EV charging: No network?



Window with IP address? Does that count as BTM asset

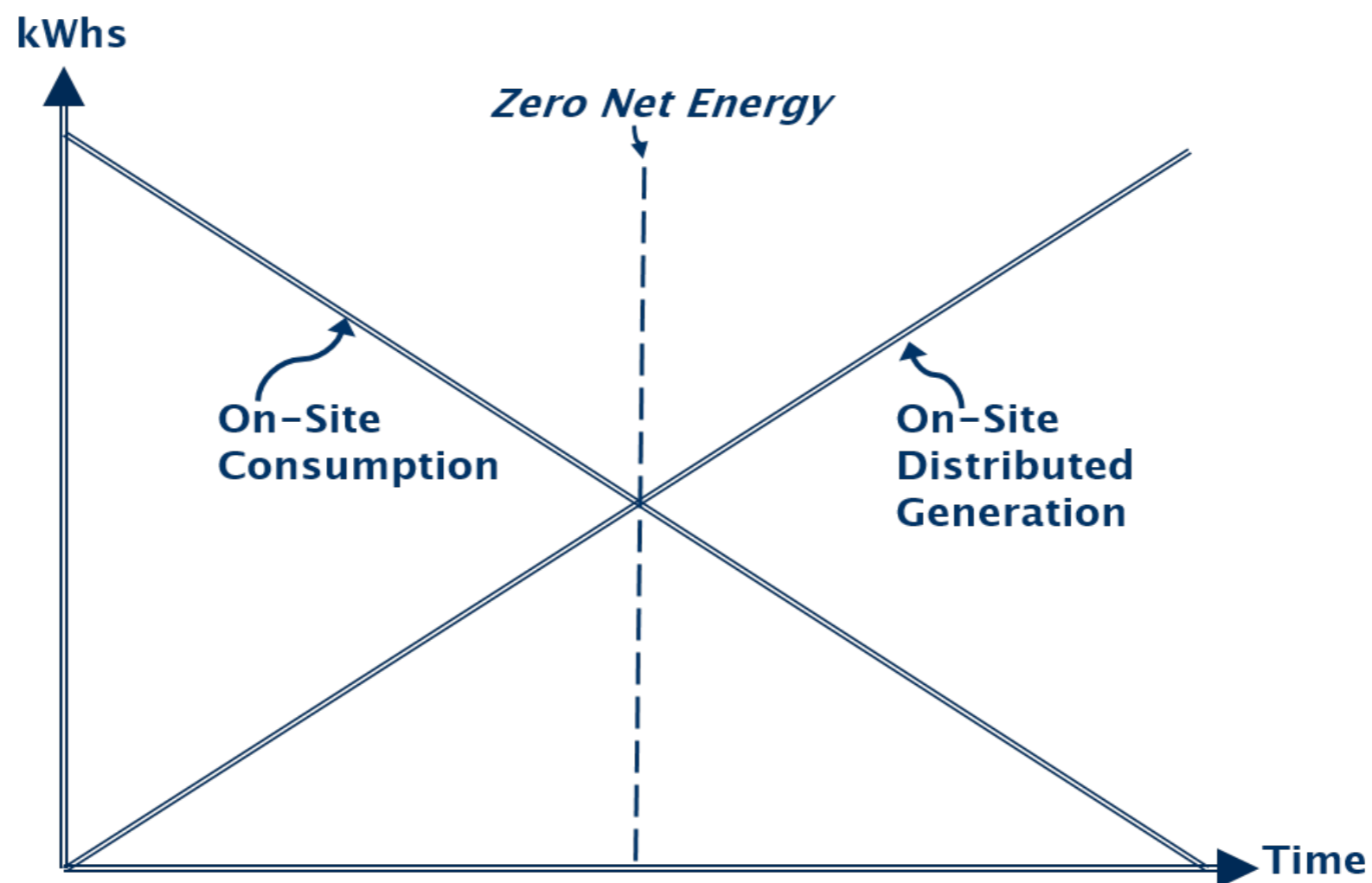


Totally off grid “nonsumer”



Source: Off Grid Electric

Zero Net Energy: California building code starting 2020



Ben Schlesinger's ZNE home

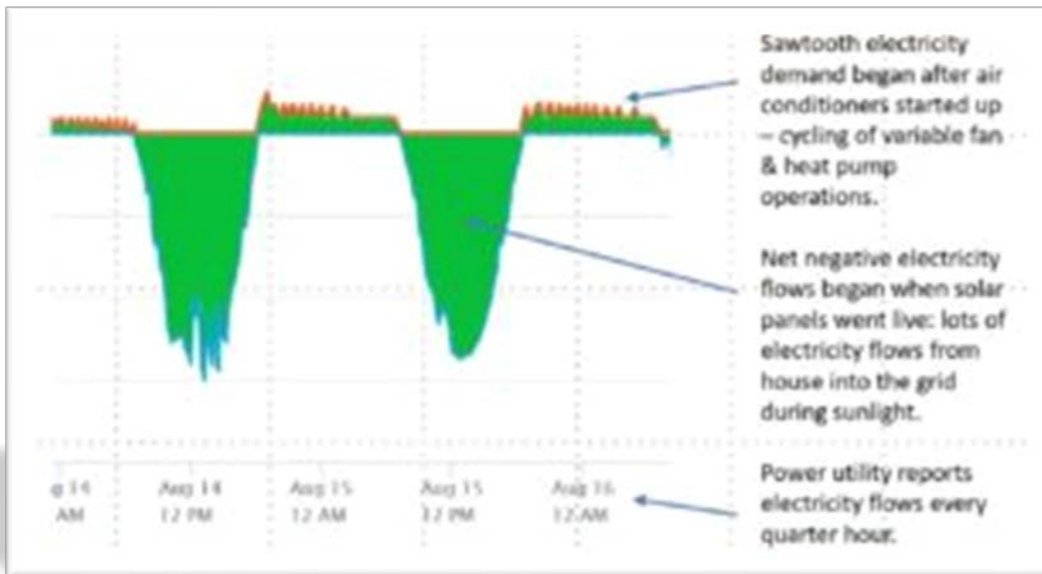
- Goal: Affordable low carbon lifestyle
 - Ground source heat pump
 - 18 kW of rooftop solar
 - 3 Tesla Powerwall batteries
 - 2 Tesla Evs
 - Plus thousands in HVAC, lighting, appliances

- Charge Evs from the sun
- More on website <http://bsaenergy.com/wordpress1/>



What makes it ZNE?

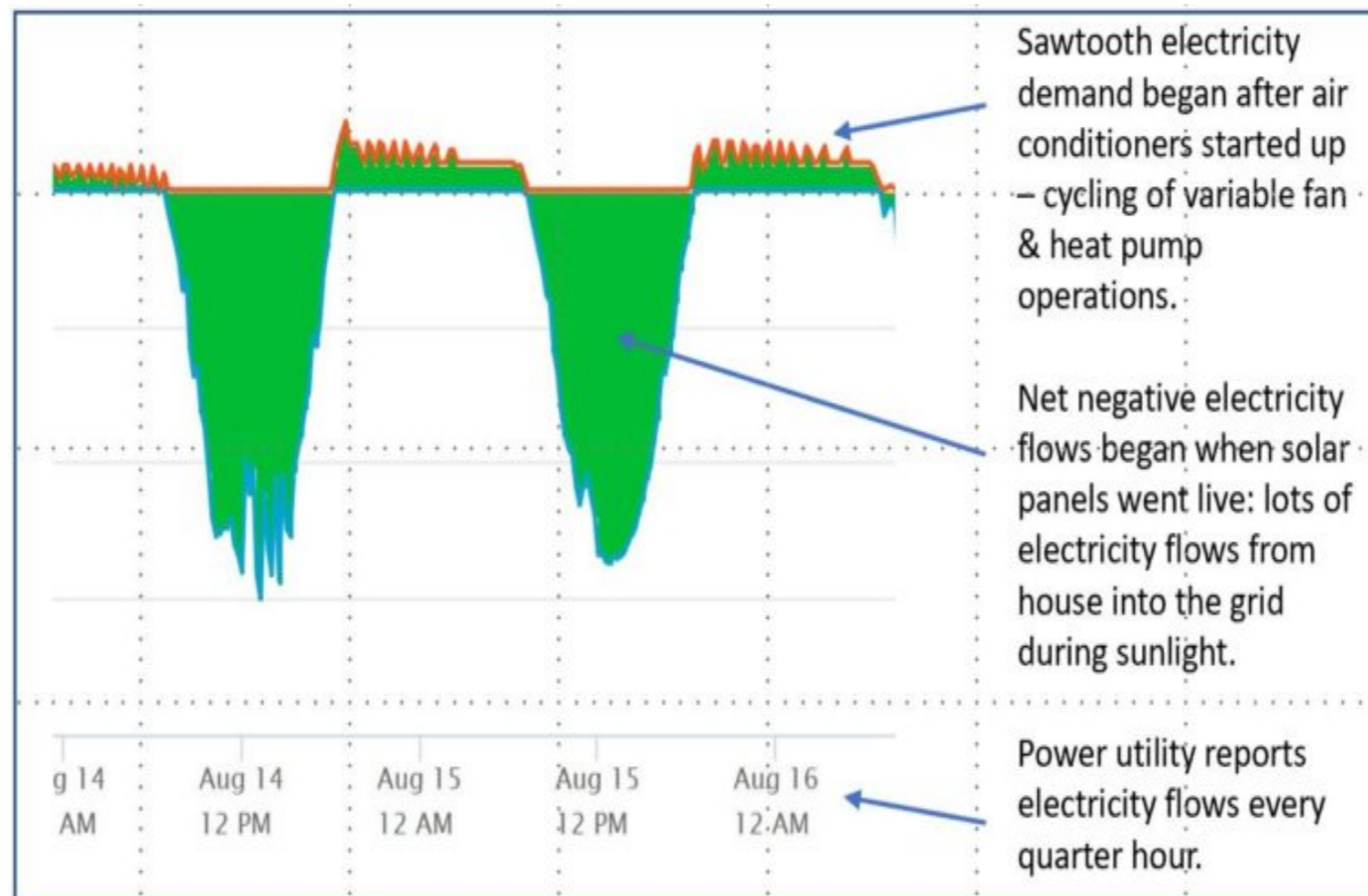




2 Teslas & 3 Powerwalls

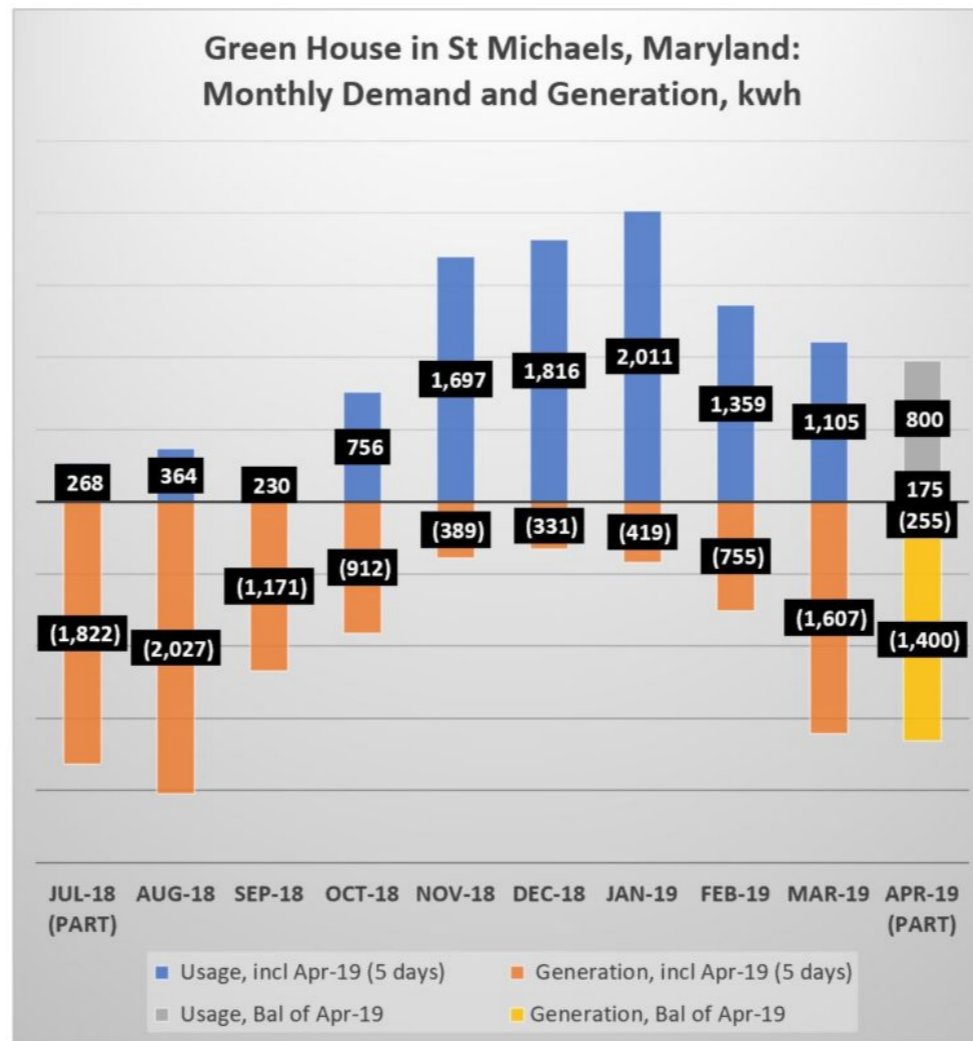


Beyond ZNE: Net load centers



Source: <http://bsaenergy.com/wordpress1/>

Prosumer most of the time



Source: Choptank Electric Cooperative

Integrated? Tesla energy: Generation, storage, consumption + mobility



Source: Tesla unveils residential solar roof and new Powerwall battery, Utility Dive, 28 Oct 2016

Significant trends

- Consumer stratification
- Stand-alone devices & zero-net energy technologies
- **Enablers & new business models**

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“My EV, your PV?”: Any solar roof can be an EV charging point



Power sharing: Micro-grids: Higher reliability & lower cost



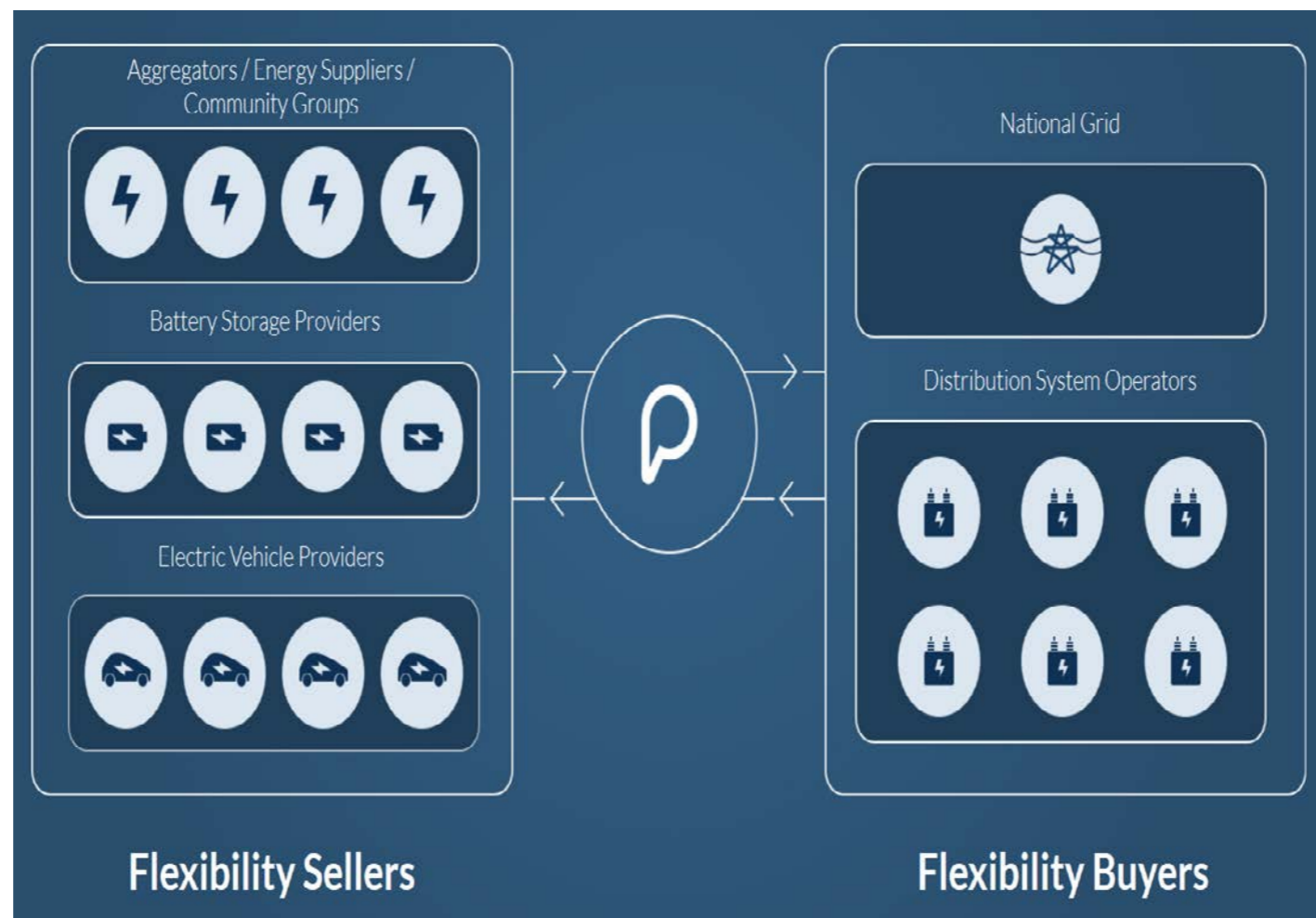
What makes platforms valuable? Creating an electronic marketplace



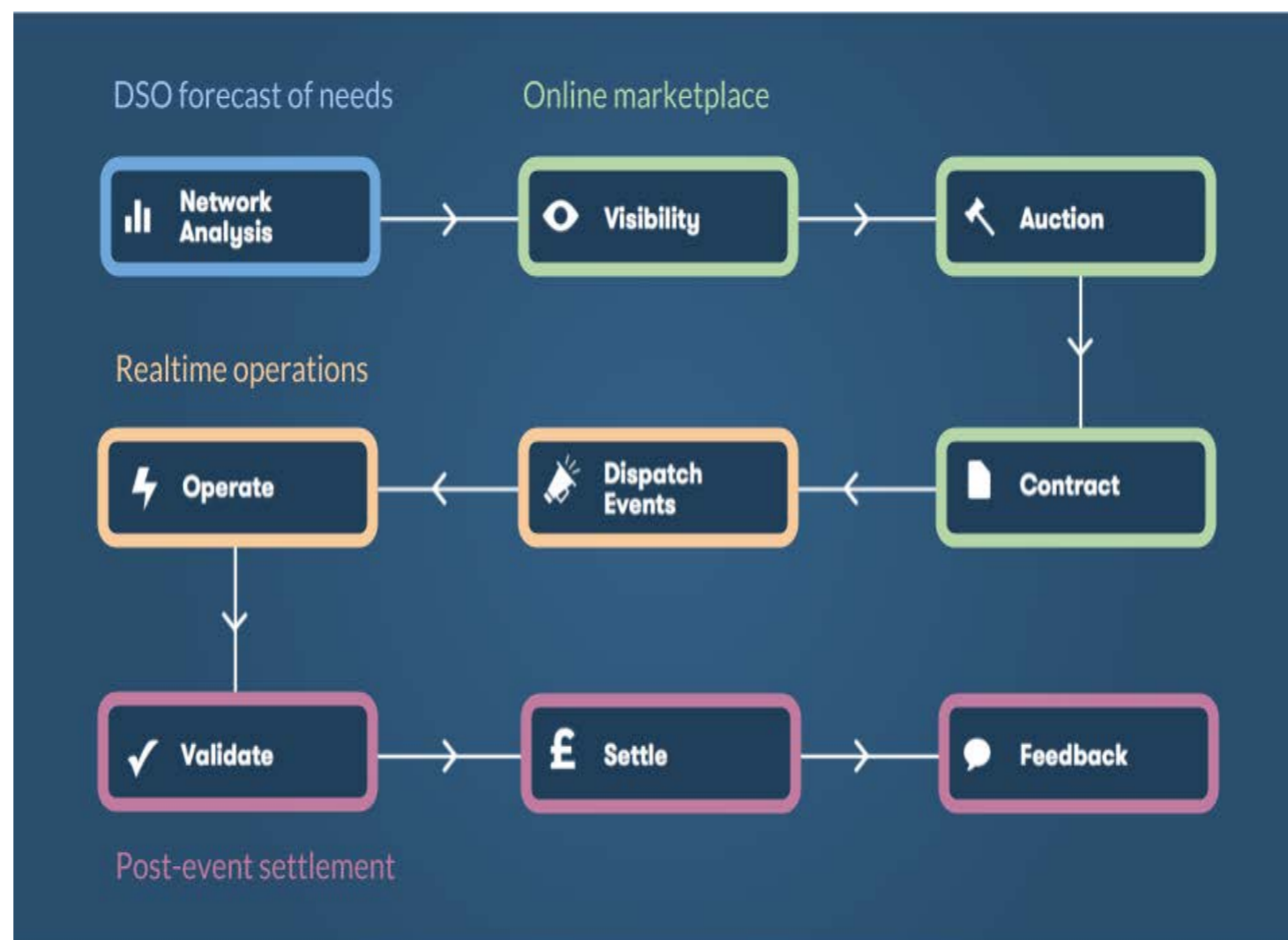
Value is in the platform: 25-30% profit margin in flower order business



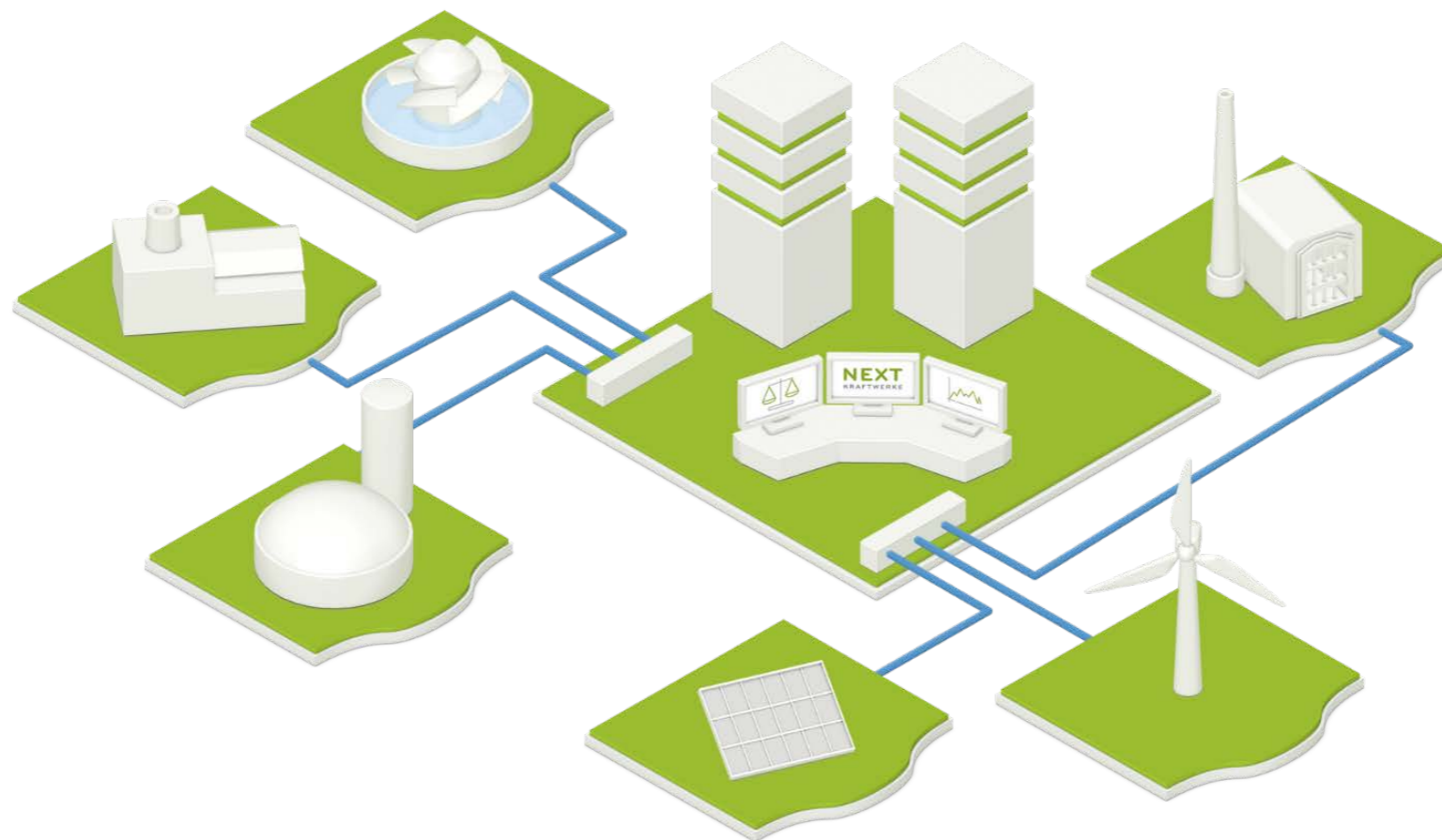
Bring buyers & sellers together: Piclo's platform allows trading of flexibility services



Streamline tedious transactions: No hassle, no paper, no middleman

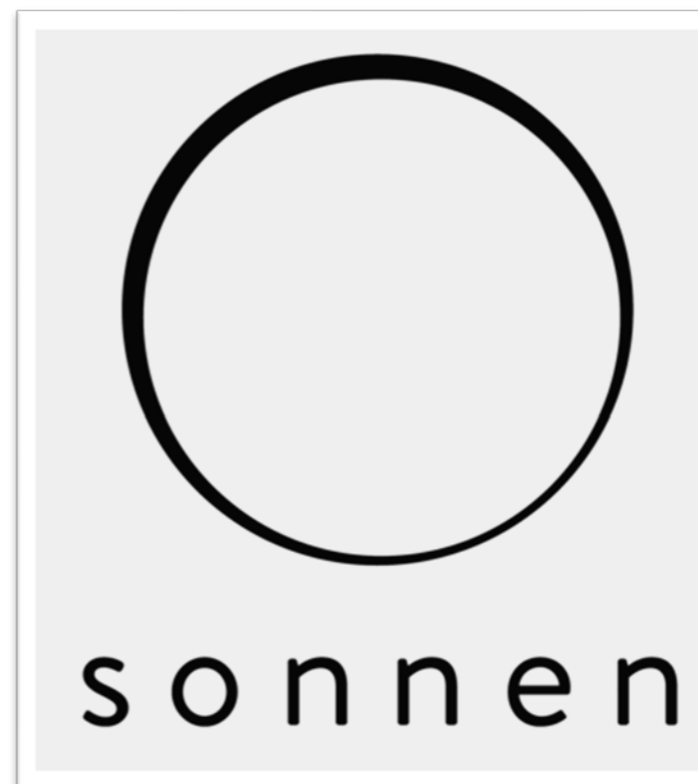


Virtual power plants: Germany's Next Kraftwerke: 4.5 GW, 5,400 participants



Source: Next Kraftwerke

Who is in this space today?



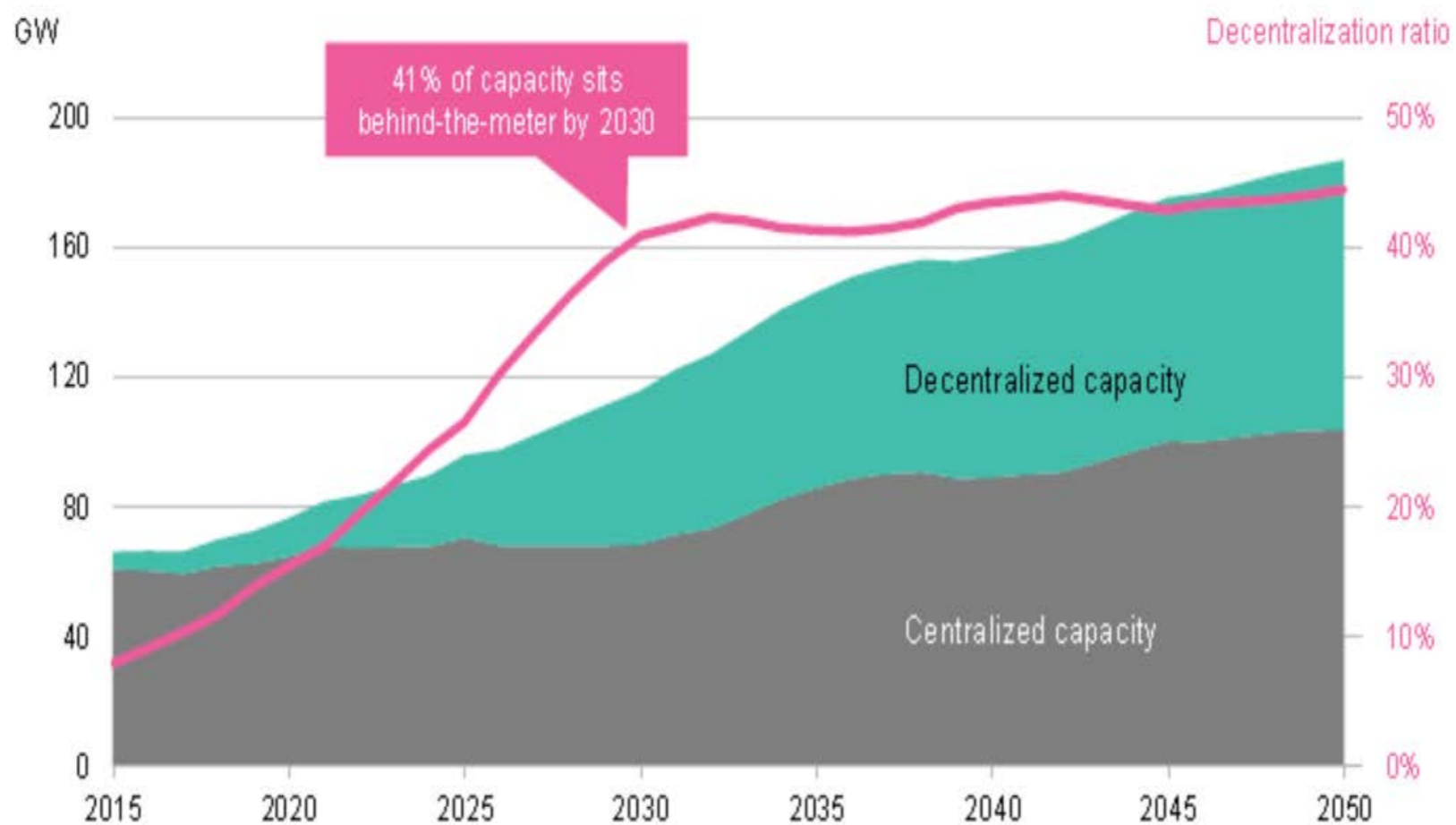
Advanced Microgrid Solutions

stem

Implications

- First
 - Second
 - Third
 - Fourth
 - Fifth
- Already happening
- One size does not fit all
- Who pays for what?
- Altered relationships
- Options for stakeholders

2+ million Australian solar roofs



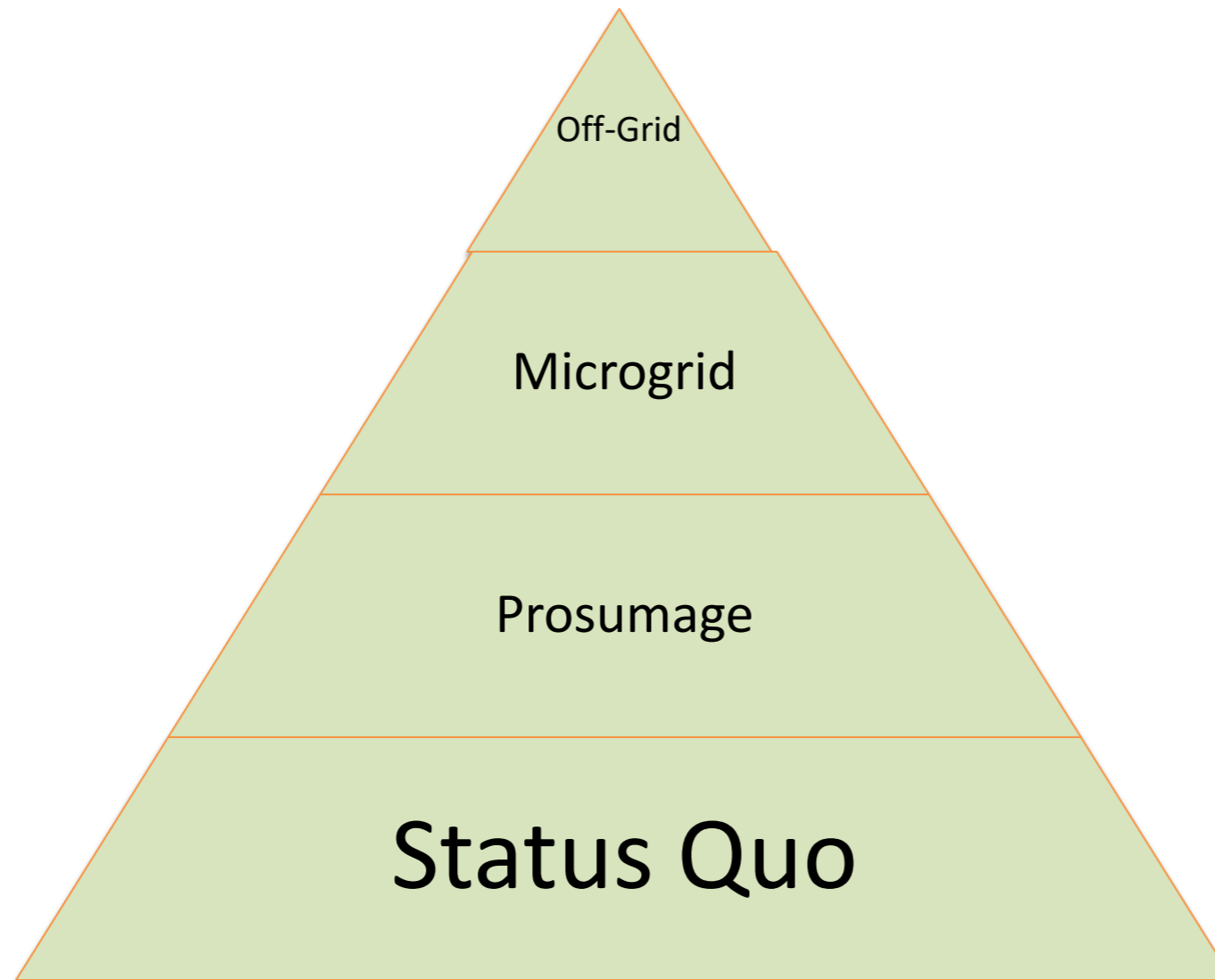
Source: Annabel Wilton, BNEF, presented at Australian Clean Energy Summit, Sydney, July 2018

Sales not same as consumption

- California Energy Commission's demand forecast for California

	2018	2019
Consumption	260,000 GWHs	340,000
Sales	260,000	290,000

Customer stratification: Over time, consumers will self-select what works best



One size does NOT fit all

Consumers

All kWhs bought thru existing network.
Bundled, regulated tariffs

Prosumers

Fewer net kWhs from network.
Mostly need back up power & balancing service

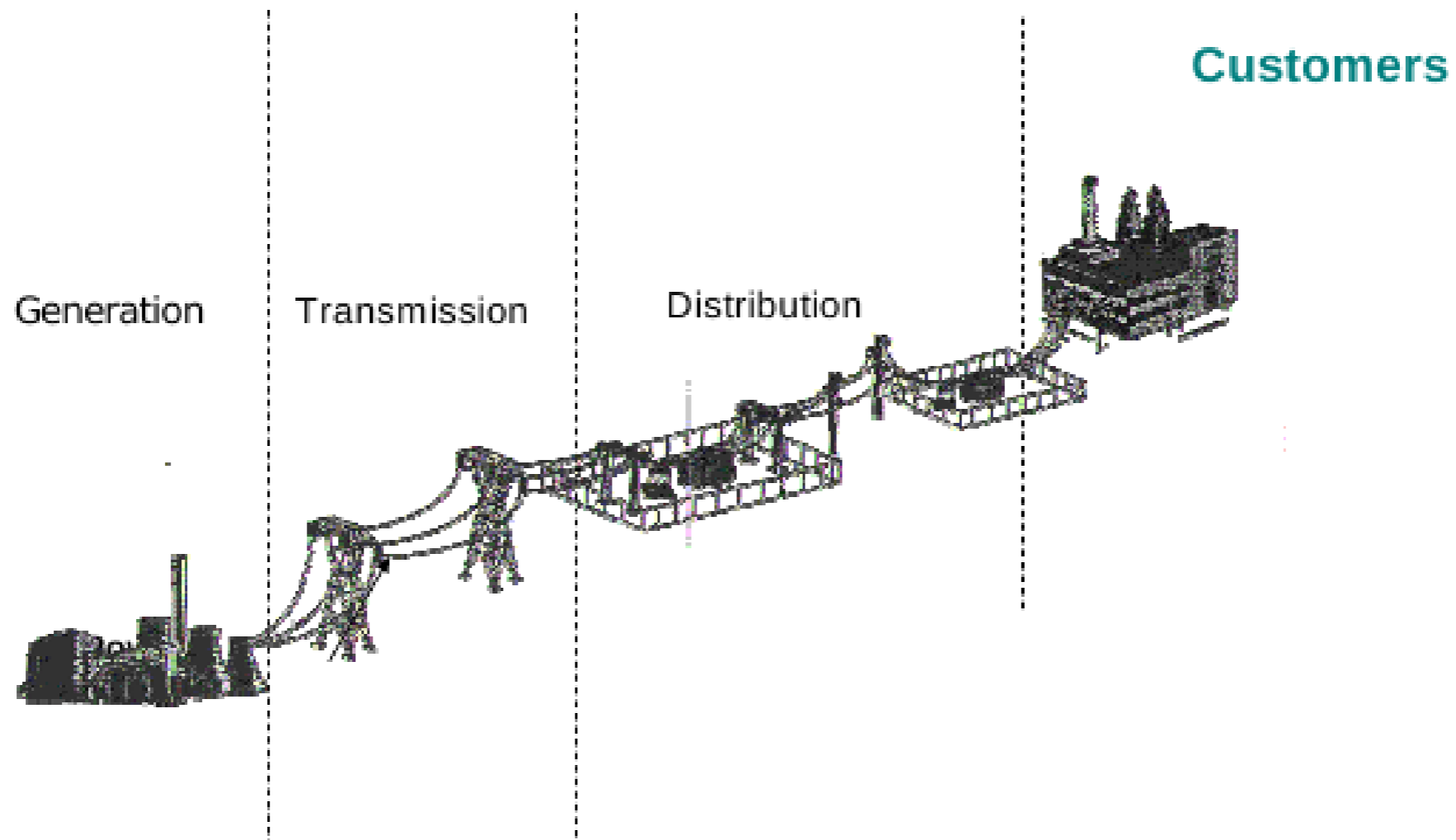
Prosumagers

Even fewer net kWhs
Even less reliance on the network

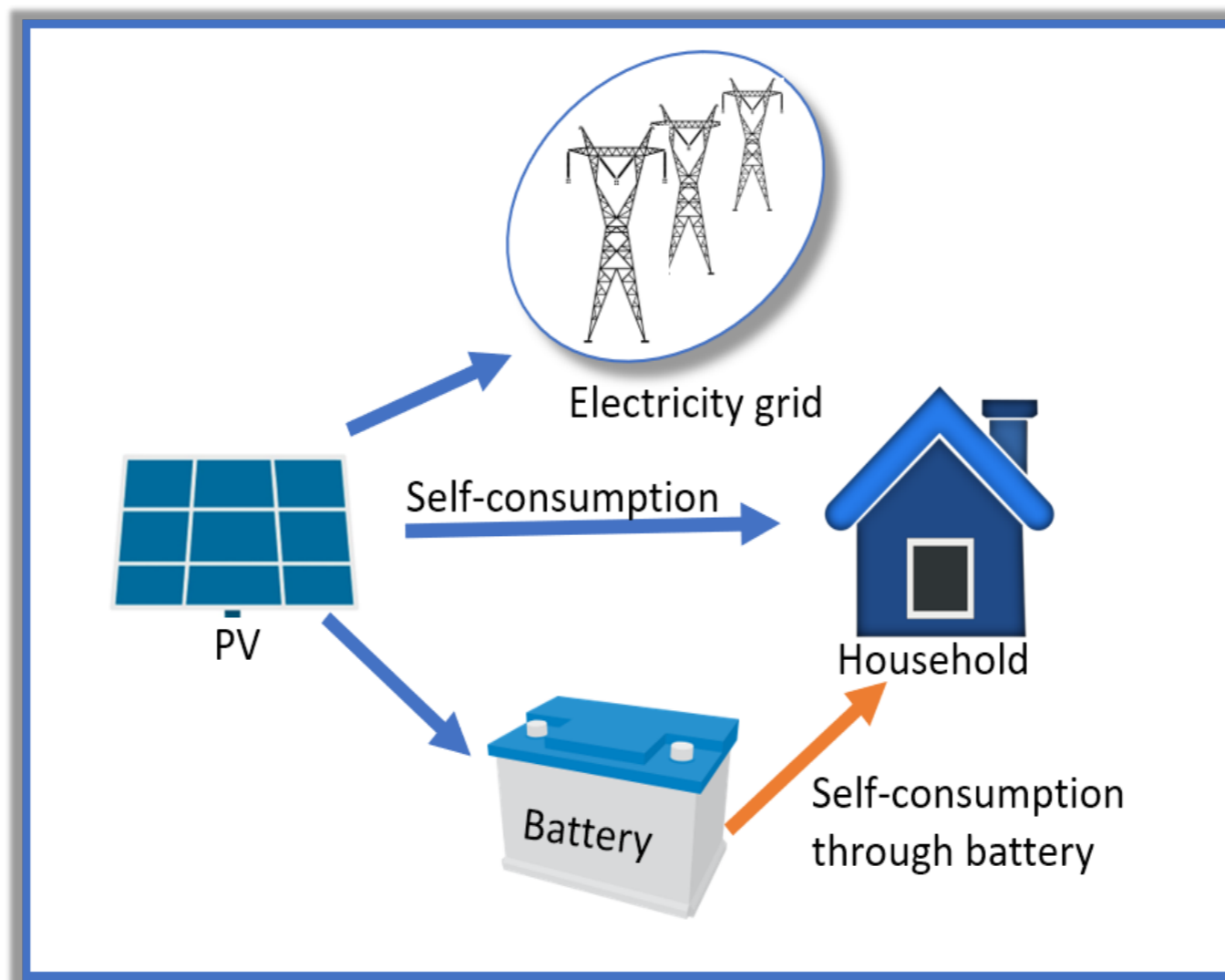
More exotic?

Communities of “nonsumers” enabled by
intermediaries

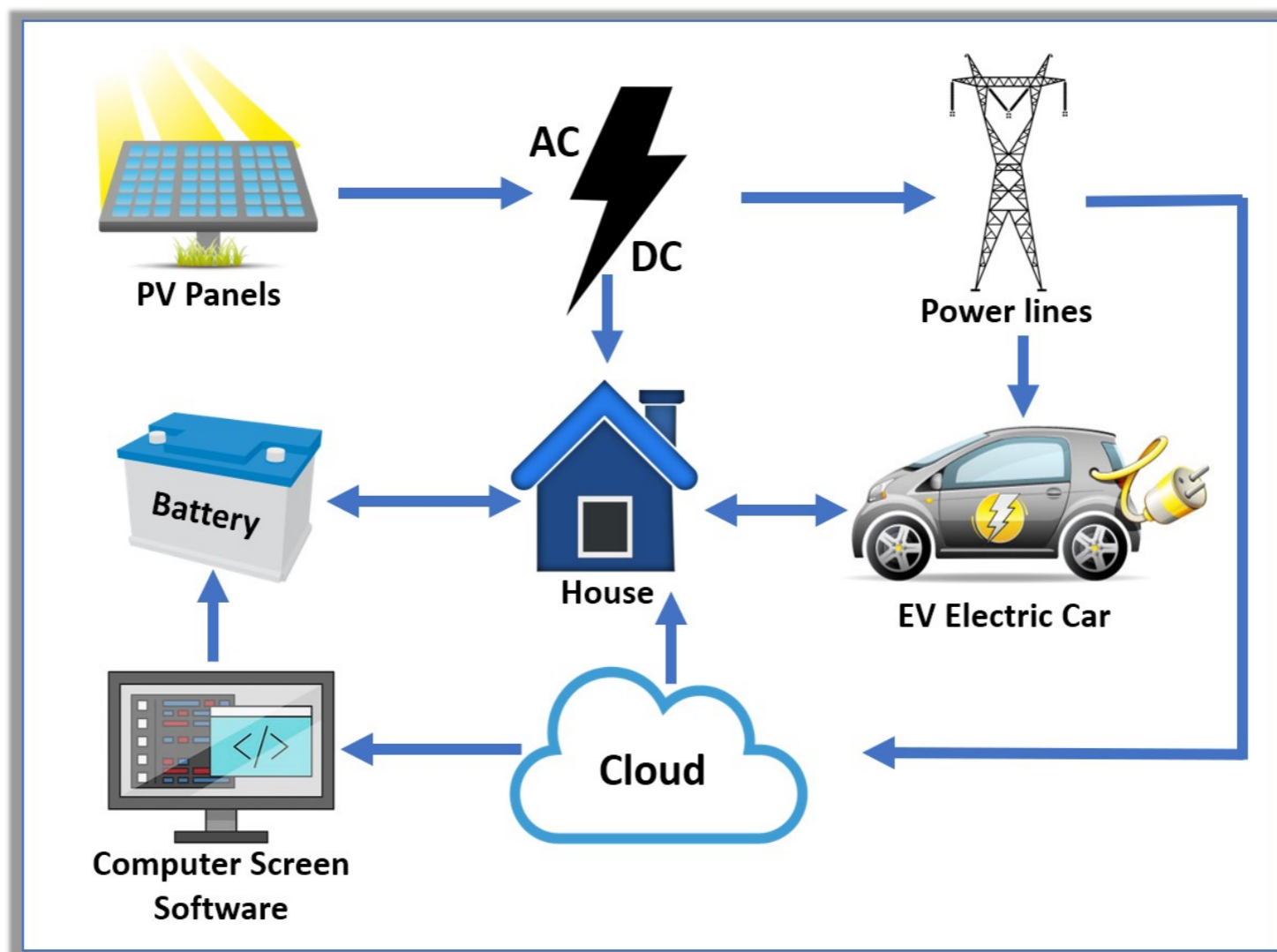
Who pays for what? Dawn of ala carte menu based on services received



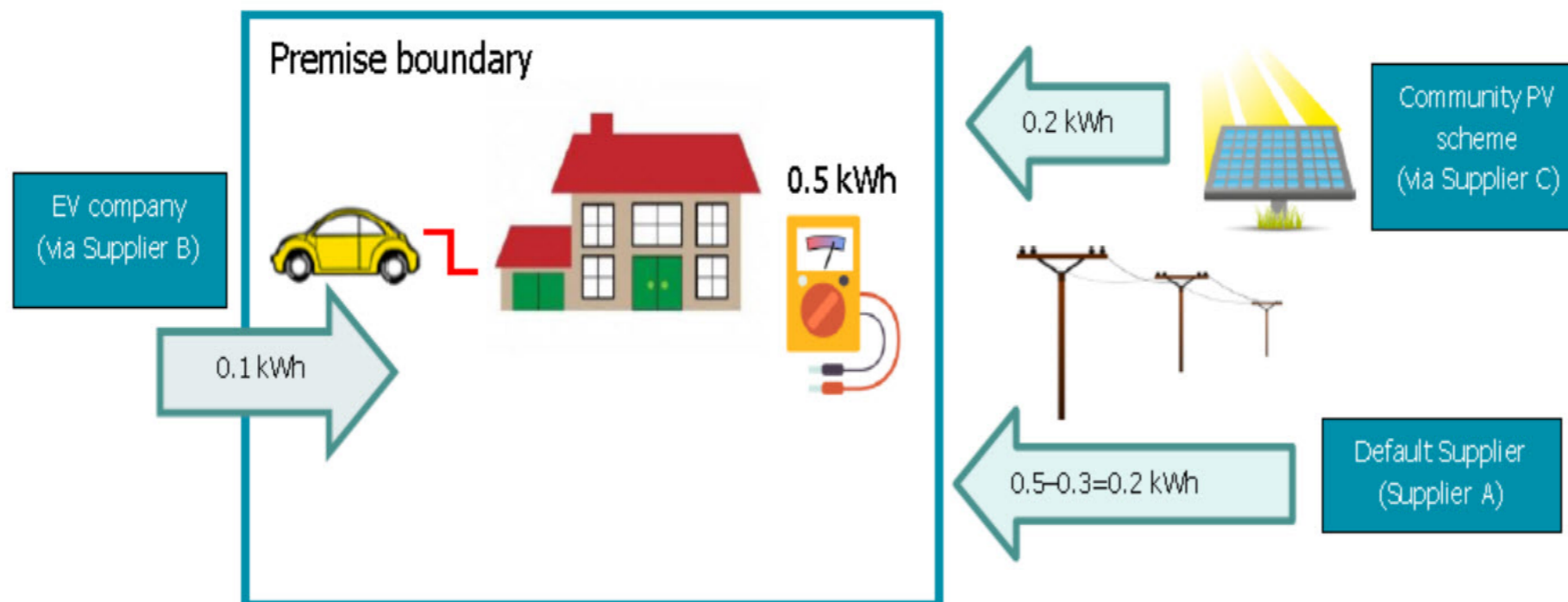
Prosumers are different



Prosumers more exotic



...buying from multiple suppliers?

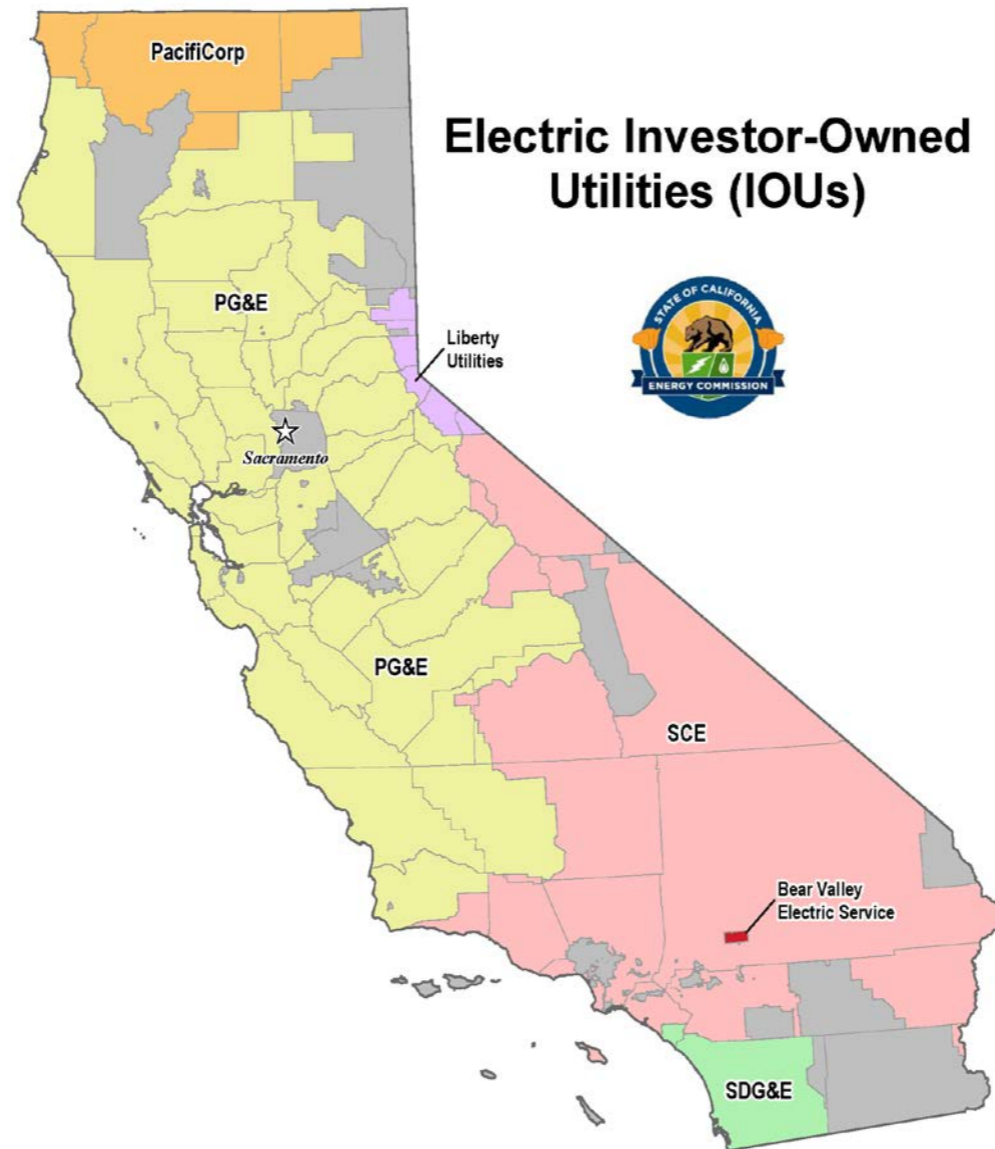


Source: Elexon

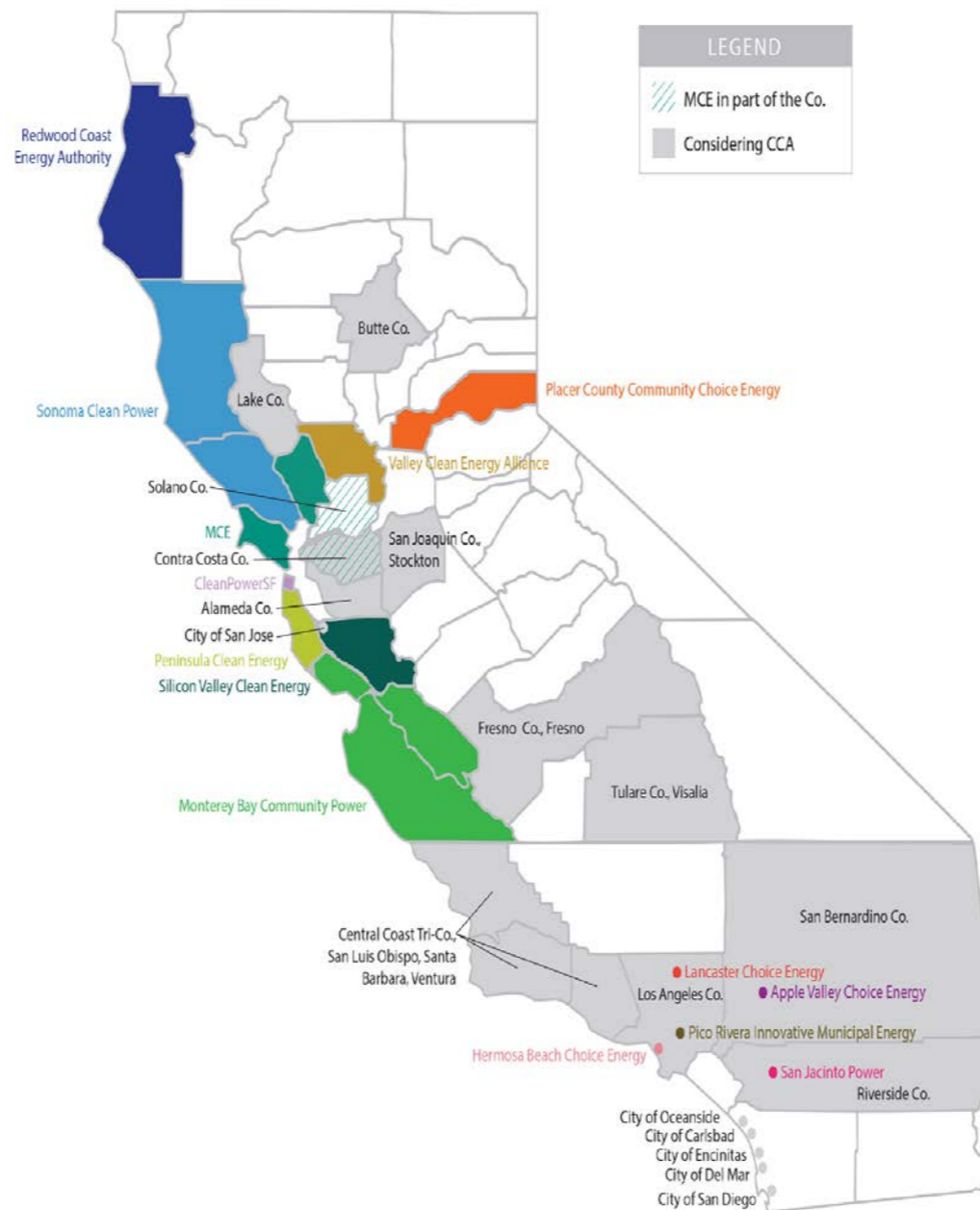
Options for stakeholders

- Low-cost “gentailer”
- Differentiated retailer
- Passive “poles & wires only” company
- “Community energy”
- Diversified

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Franchise service areas
No longer protected



Community Choice Aggregation: 50-85% of customers may defect



Source: California Community Choice Association

Implications

- Consumers: One size does NOT fit all
- From Prix fixe to a la carte menu
- Who wants what from the “network?”
- Regulators must decide
 - How/who will pay for the network?
 - Minimizing cross-subsidies
 - Not stifling innovation

New electric company: Your home: Wall Street Journal 21 Jan 2015









Brazil Energy
Frontiers
2019

REALIZAÇÃO:



patrocínio ouro:



patrocínio prata:



patrocínio bronze:

