



Solar Energy: Can Technology Create a Win-Win for Utilities and Customers?

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US SOLAR MARKET

- » Over 29 GW of total solar capacity installed, Generates enough electricity to power 5.7 million homes
- » 7.5 GW of solar installed in 2015
- » Solar prices dropped 3% in 2015 from 2014
 - Price drop accelerated in Q1 2016, down 12% year over year
 - Prices have dropped over 70% since 2006
 - Utility-scale PPAs now signed for \$0.03 - \$0.05/kWh
- » In Q1 2016, U.S. hit 1 million solar installations. Will hit 2 million installs in just 2 more years
<http://www.seia.org/research-resources/solar-industry-data>
- » Itron systems measure output from more than 170,000 rooftop solar
- » We deliver real-time, weather-based solar load forecasting to mitigate intermittency

MARKET DRIVING MONITORING

A photograph of a house with a dark tiled roof covered in blue solar panels. A brick chimney is visible on the roof. In the foreground, a large yellow flower is in focus, and green foliage is visible at the bottom. The sky is clear blue.

- » Monitor, manage installed solar assets (utility-owned, third-party owned, consumer-owned)
- » Provide revenue-grade measurement accuracy
- » Improve load forecasting of renewable assets for generation planning, improved distribution operations, regulatory reporting
- » Identify net exports from PV and PV ramp rates associated with weather

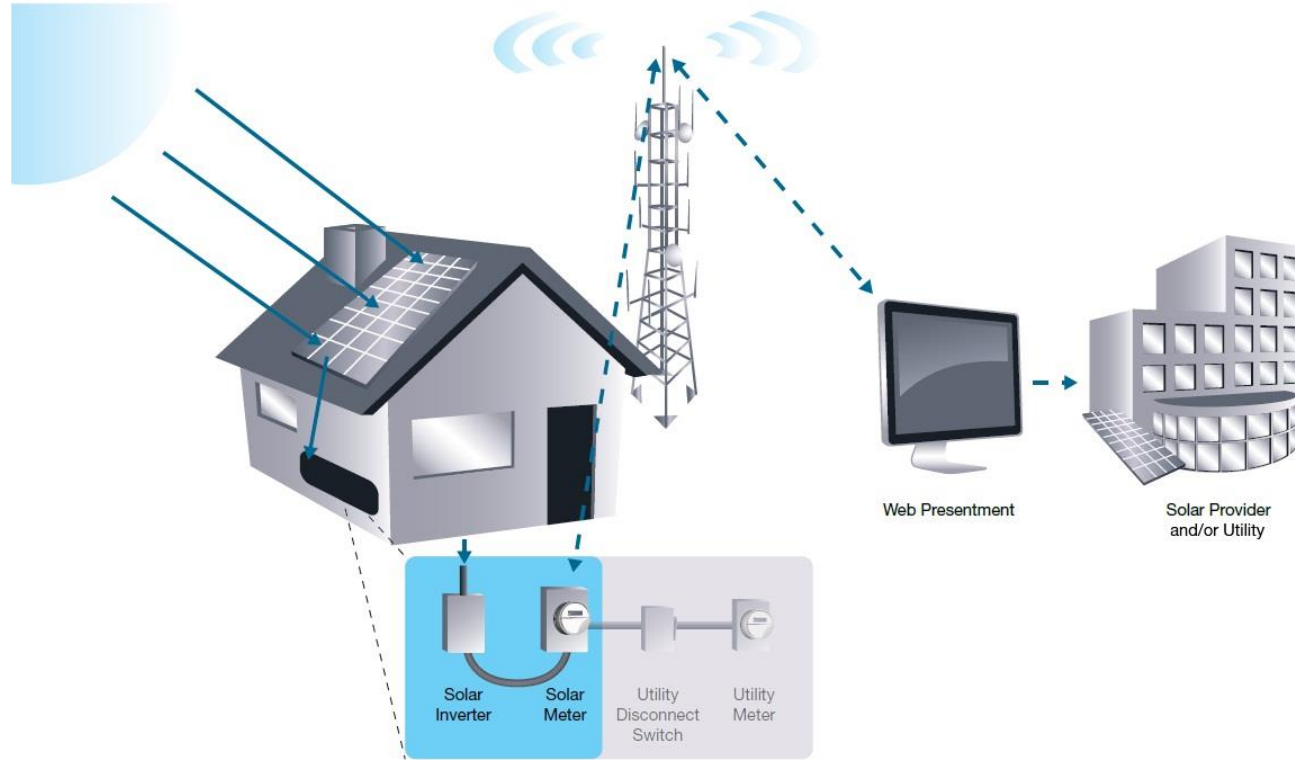
CURRENT MONITORING REQUIREMENTS



» Value propositions

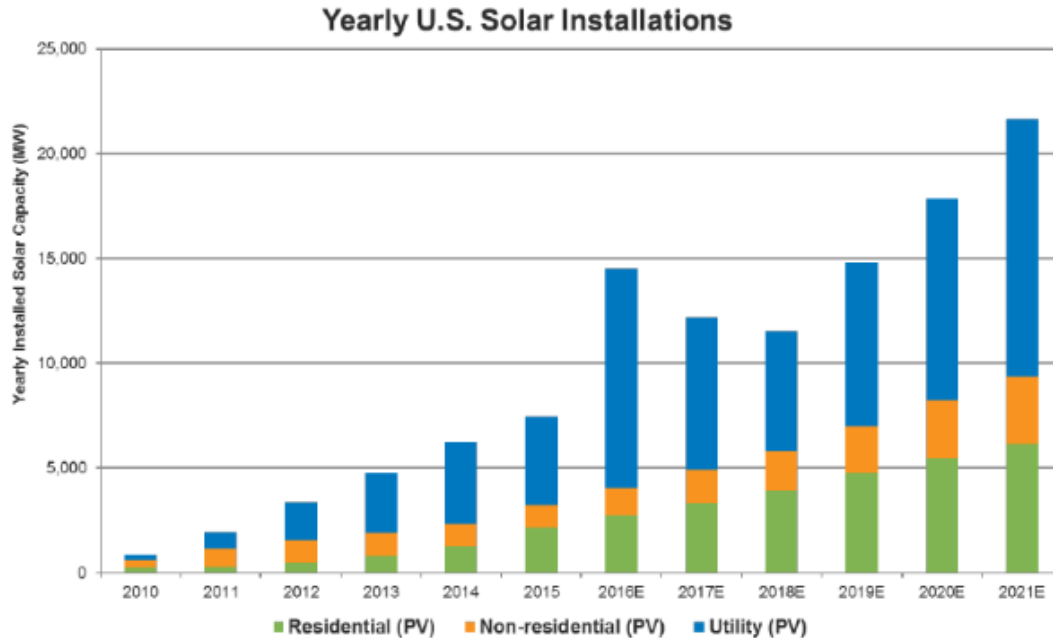
- Accurately measure production – basic feature
- Utilize interval data to ensure system efficiency
- Measure usage – informs consumers how much they save
- Provide measurement regardless of inverter type
- Remote disconnect for non-payments
- Low cost and dependable
- Ease of installation/ commissioning
- C12.20
- UL certified

CURRENT SOLAR MONITORING ARCHITECTURE



How it Works Smart Meter communication over cellular networks

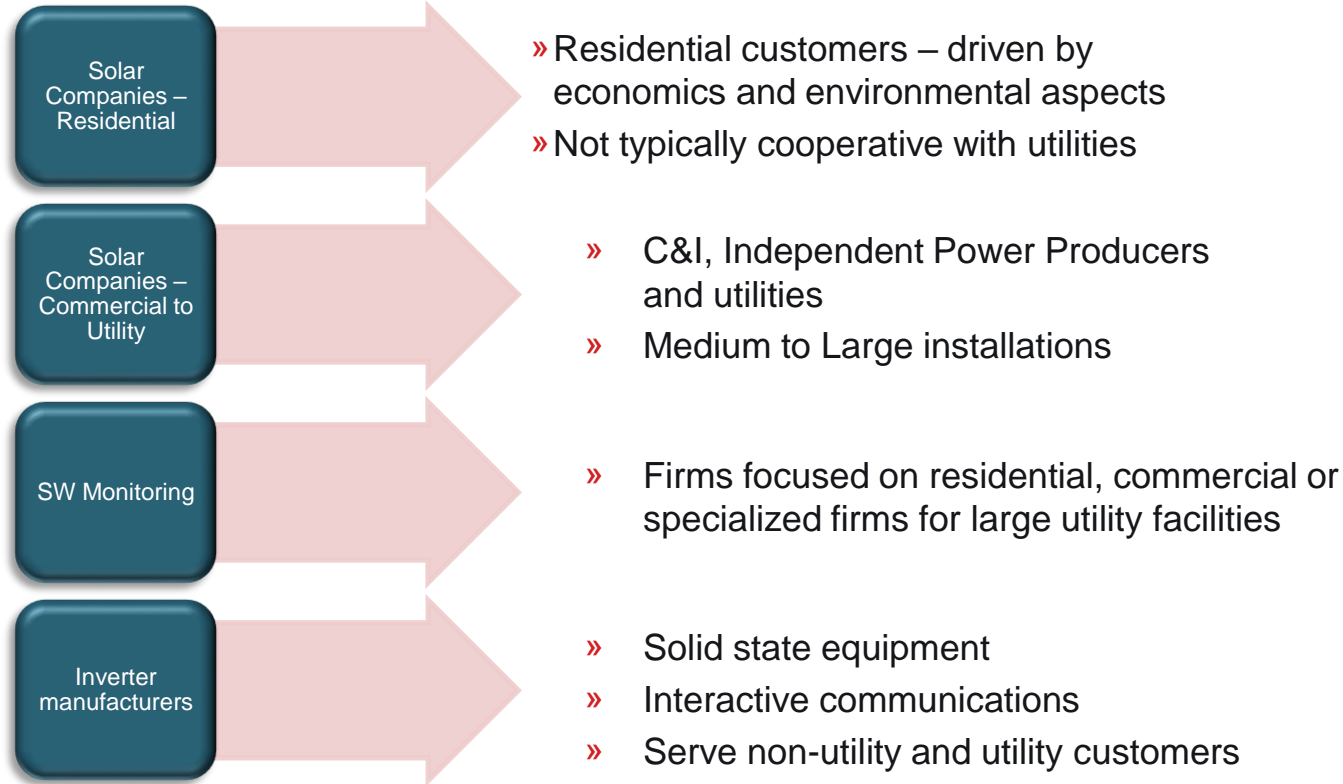
ANNUAL US GROWTH BY SECTOR



- » The U.S. solar industry is expected to install 14.5 GW of capacity by the end of 2016, which is nearly double the amount installed in a record-breaking 2015.
- » Through the end of this decade, there will be robust growth across all three market segments, eventually reaching a 20 GW annual solar market.

<http://www.seia.org/research-resources/solar-industry-data>

MULTIPLE STAKEHOLDERS



REQUIREMENTS SHIFTING

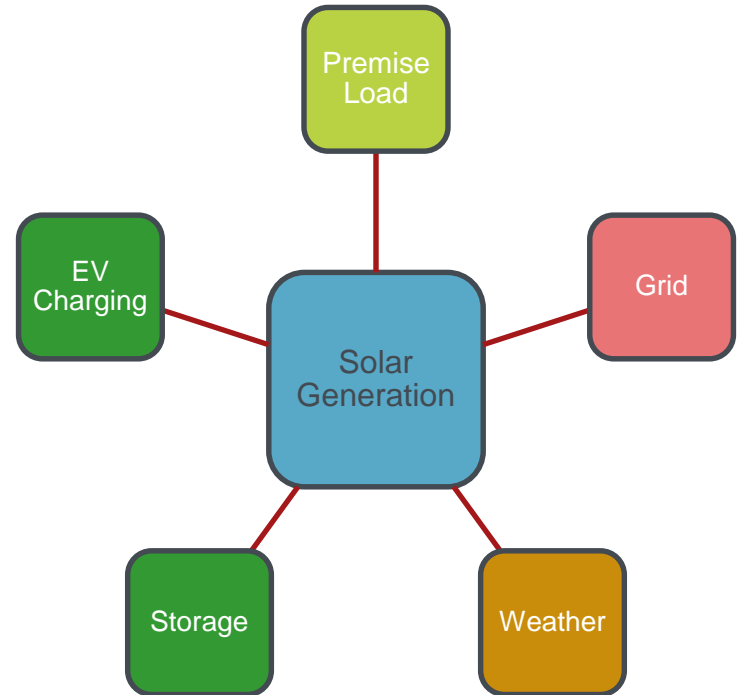


» Value propositions

- Interact with multiple devices-
 - Diagnose panel's health to reduce maintenance cost
 - Divert overproduced energy to devices in the home (storage, EV charger, etc)
- Visibility of customer owned generation
- Application to aggregate and forecast
- Use for future services from utility to customers
- Advanced features for grid stability and scalability (control)
- Network and system level security
- Insight into citywide energy consumption and CO2 reductions

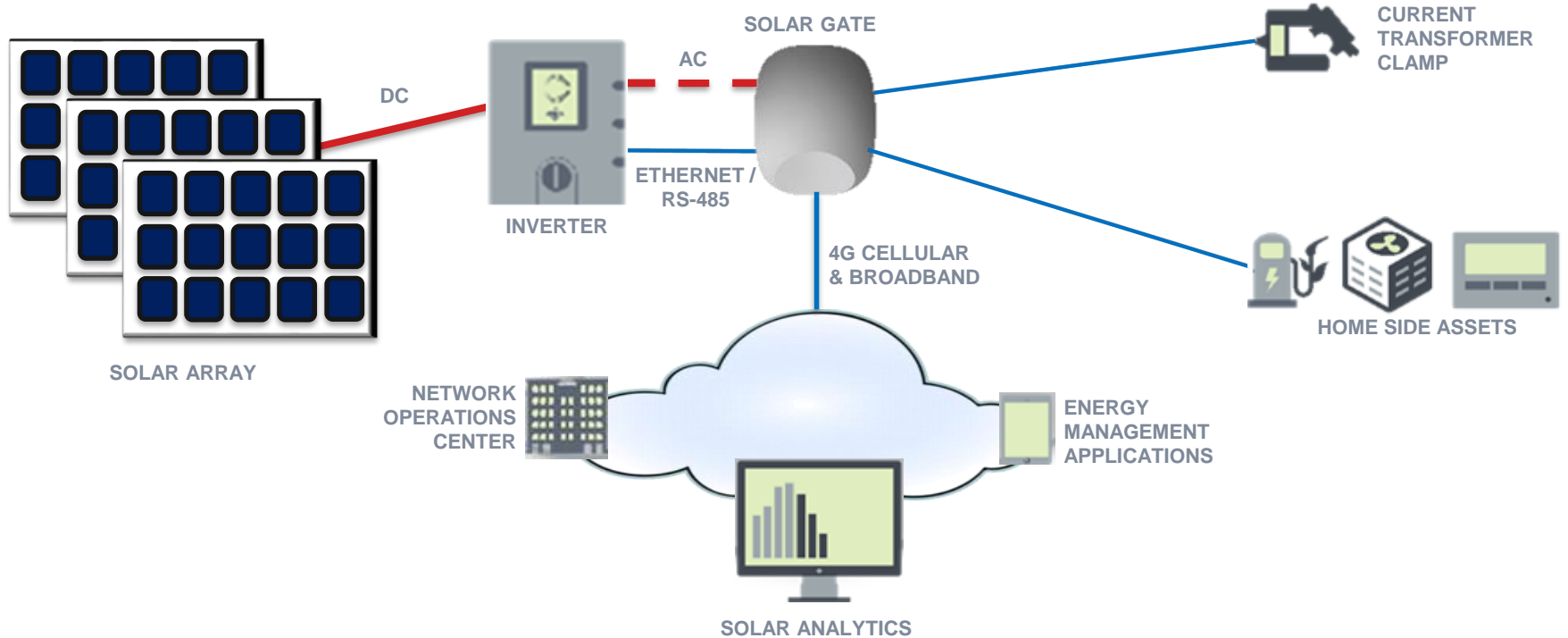
TRANSITION TO IOT - AN INTERCONNECTED WORLD

- » Ecosystem interoperability a key - California Rule 21
- » IOT machine to machine platform brings solar ecosystem together
 - Platform to correlate generation to demand
- » Software analytics for customer, solar company, and machines
- » Distributed intelligence will handle energy transactions at the edge
 - Transact excess solar to neighbors, utility or storage



Solar Ecosystem

SOLAR GATE FUNCTIONAL OVERVIEW



ITRON SOLAR GATE – An Itron RIVA Internet of Things Communications Gateway

THANK YOU



www.itron.com