



TREEDC Annual Conference 2016

Creative Solar Opportunities

Community Solar Gardens

Presentation 12/16/2016

T V A E
Tennessee Valley Alternative Energy

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a joint venture of



VIS SOLIS
... the power of the sun

Powered by the power of the sun, VIS SOLIS is a developer and integrator of world-class solar electric generating systems, including financing, engineering, procurement, construction and operation.

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- “Vis Solis” is Latin for: “The Power of the Sun”
 - Established in Franklin, TN in August 2010
- New business structure since beginning of 2016
 - Vis Solis = focusing on PV Project Planning, Development, Financing, Consulting, and Asset Management
- We consolidated the EPC and O&M business into a new joint venture partnership with an old partner, Brown Construction, Fayetteville, TN under the name:

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- TVA E = EPC (Engineering, Procurement, Construction) + O&M (Operations & Management) of PV Solar Projects
- TVA E is NOT related with TVA – Tennessee Valley Authority!

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With the 3 MW installed in TN in 2011, we made the Community of Fayetteville, TN a “**Community Market Leader**” nationwide!

First Joint Project
between Vis Solis
and Brown
Construction in
2011



The Community of Fayetteville, TN became the **3rd biggest Solar City** in the USA in terms of kW PV installed per capita, tracked by SEPA.

Solar Zone of UA Tech Park, Tucson AZ



SEPA Conference
in Solar Zone of
UA Tech Park

6.1.MW Amorphous Si Thin-Film
Project installed in the designated Solar Zone
of the University of Arizona in Tucson

Tucson Electric Power (TEP) was
elected by SEPA “Utility of the Year”



TVAE member VS
completed project
management, which
included structuring,
financing, installing,
commission, marketing

International Public Private Partnership with dena Vis Solis “built bridges” in Oak Ridge 2013



Transatlantic Climate Bridge



Supported by:



Federal Ministry
of Economics
and Technology

on the basis of a decision
by the German Bundestag



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Tennessee Valley Alternative Energy Creating Community Leadership in Oak Ridge



1 MW Oak Ridge
Solar Powerhouse
Installed in 2015

1 MW Solar Plant at Heritage Center,
Oak Ridge honored with Sustainability
Award as one of two nationwide
recognized projects with 2016 Energy
Sustainability Award by U.S.
Department of Energy.



Innovative
Tracker Project
installed in 2013
adjacent to the 1
MW site

With the two installations, Vis Solis
assisted the Heritage Center in 2013
and 2015 to meet its goals for the
DOE's Oak Ridge Environmental
Program.

1/3/2017

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VW TN - 9.5 MW Behind the Meter



TVAE member
Brown Construction
was Sub-contractor
for mechanical
installation

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Recent project activities of TVAЕ in TN:

- 1 MW Rockwood, Plateau Park (10/16)
- 1 MW Mascot, Eastbridge Park (12/16)
- 1.36 MW EPB Community Solar (3/17)
- 1 MW Loudon Sugarlimb Park (4/17)
- 1 MW Cookeville Highlands Park (5/17)

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What is Community Solar?

- Community solar, also referred to as “community share solar” or “community solar gardens” are plants that allow utility customers who either cannot own individual systems or cannot access their rooftops to own a portion of a central-station array located near their power supplier’s distribution system.
- Between 2010 and 2016, community solar installations grew rapidly, reaching over 100 megawatts , and this business model has even greater potential. The National Renewable Energy Laboratory (NREL) estimates community solar could make up half of the distributed PV market in 2020.

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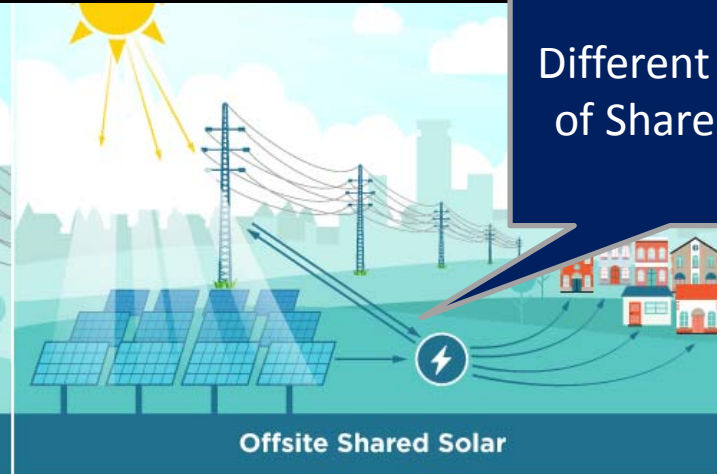
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- In April 2015, the U.S. Department of Energy published a report that projected the U.S. would add 11 GW of community solar by 2020. Policy makers, utilities, and the solar industry took notice of this huge customer base and addressable market.
- To date, only 100+ MW of community solar capacity have been installed in the entire U.S. Clearly, significant innovation and creativity, particularly with program efficiencies, is required to allow for rapid scaling.

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<http://energy.gov/eere/sunshot/community-and-shared-solar>

Different Models
of Shared Solar

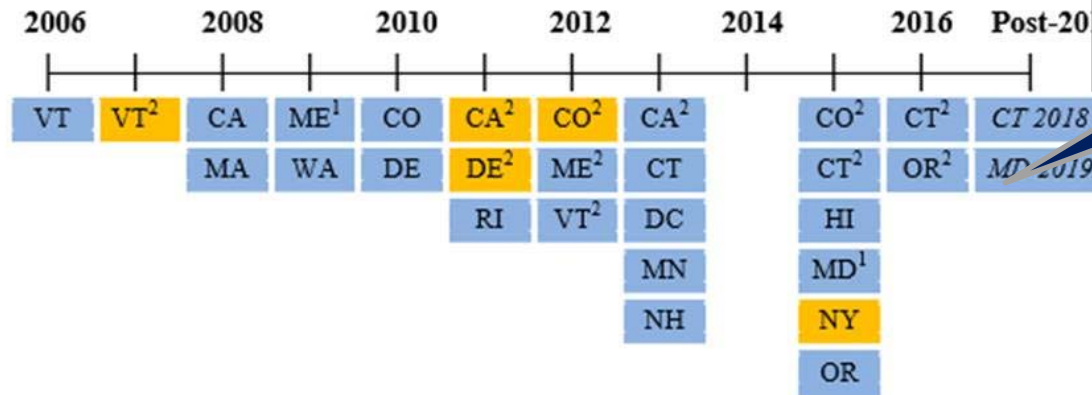


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<http://www.utilitydive.com/news/keep-it-simple-states-community-solar-developers-say-complex-regulations/428471/>

Timeline of States Adopting Community Solar Programs



It may be worth noting that TN is not listed on this chart ...

KEY: Law Commission Order

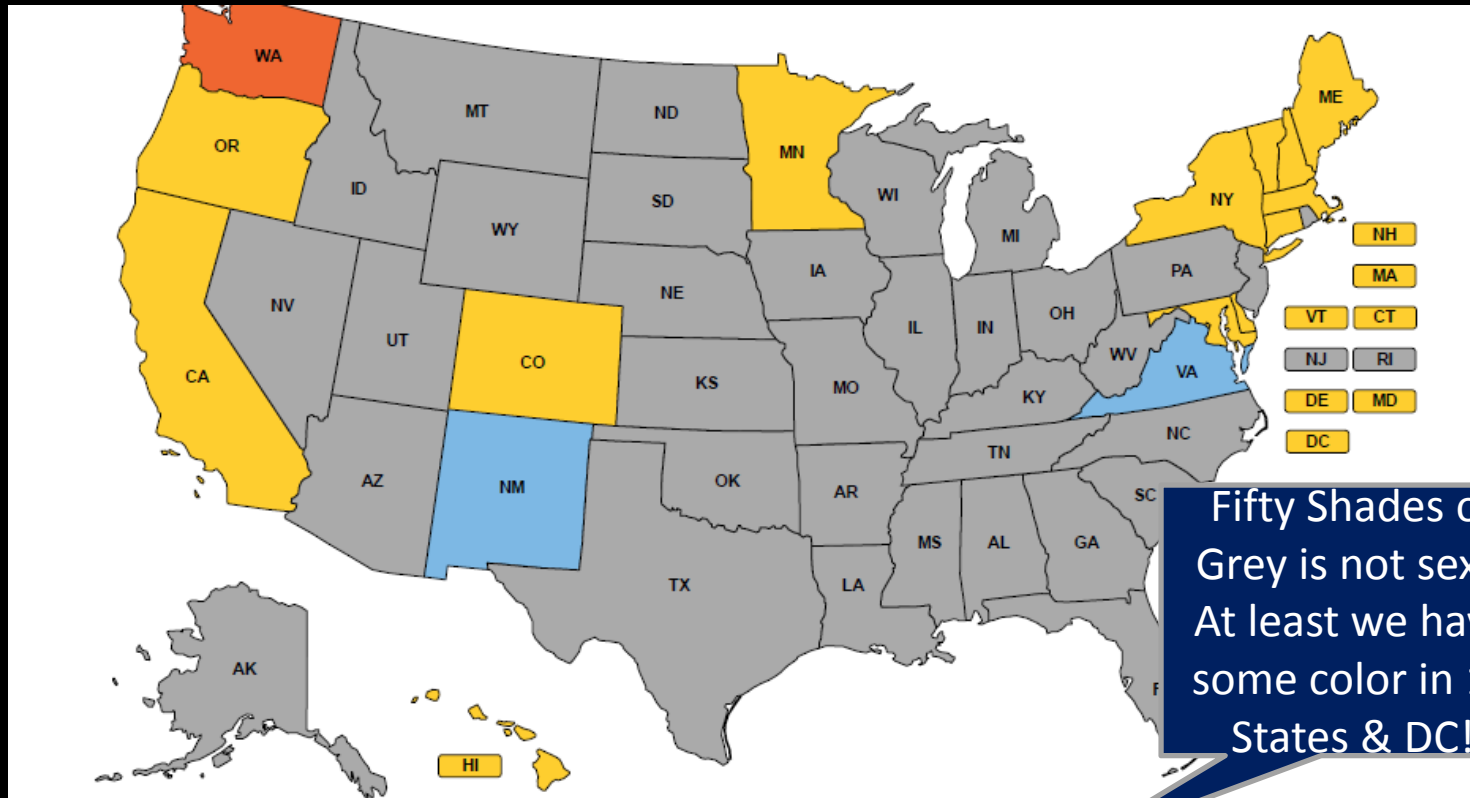
Notes: ¹ Pilot program
² Indicates additional state legislative or regulatory actions, subsequent to the enabling laws or rules.

Source: Authors' construct using sources listed in Table 1, plus DSIRE 2016, IREC 2015, Durkay 2014, and Stanton and Phelan 2013.

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<http://www.sharedrenewables.org/community-energy-projects>



Fifty Shades of Grey is not sexy. At least we have some color in 14 States & DC!

14 STATES & D.C.

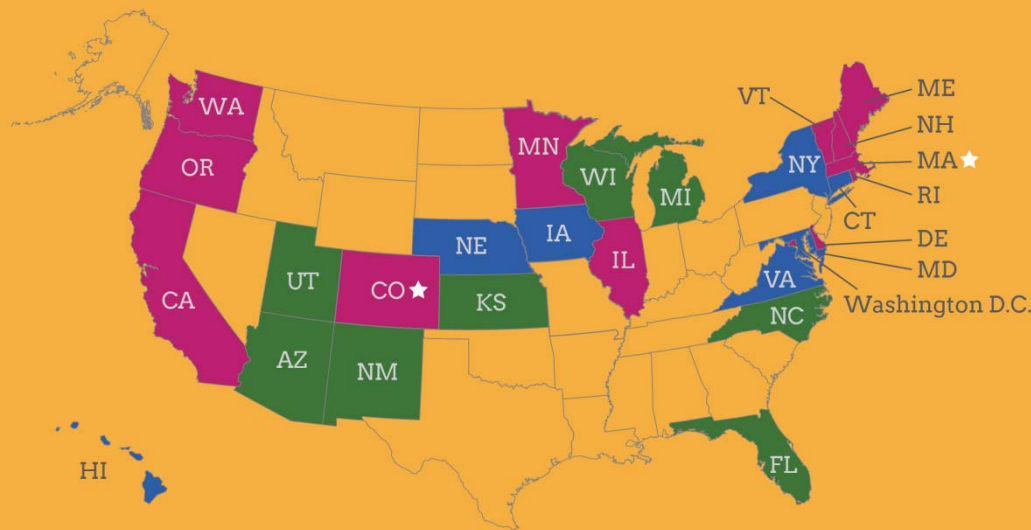
Over the past several years, shared renewables has grown quickly into a mainstream movement. Today, 14 states and the District of Columbia have shared renewables policies in place, and many more are considering programs to expand consumer access to clean energy.

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http://news.energysage.com/wp-content/uploads/2014/11/6_CS_map_states-to-watch.png

Community Solar: States to Watch



- States with policies supporting community solar projects
 - ★ Some customers in Massachusetts and Colorado already have a choice between two or more community solar providers
- Legislation introduced but not yet passed
- At least one community solar garden, no state-wide policy

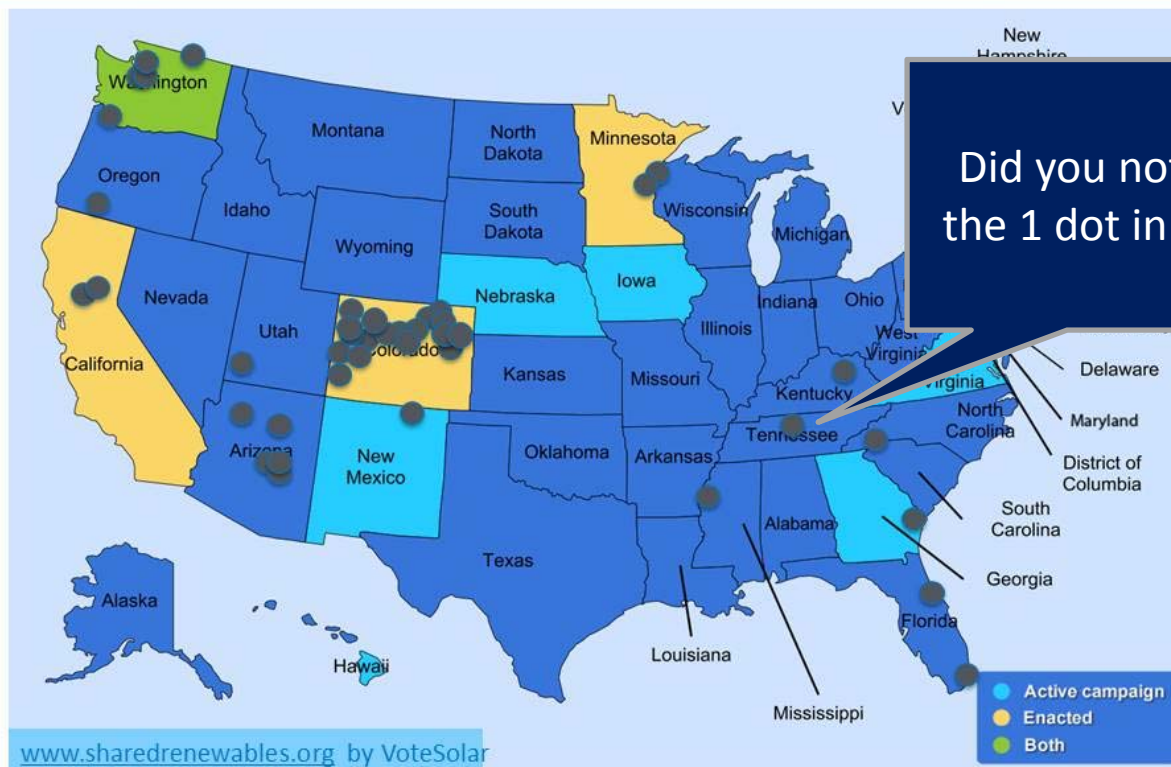
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<http://www.sharedrenewables.org/>

Programs Active Around the Country



NATIONAL RENEWABLE ENERGY LABORATORY

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The 2012 ribbon-cutting event for a community solar project at the Duck River Electric Membership Cooperative in Shelbyville, Tenn. (Photo courtesy of Duck River EMC.)

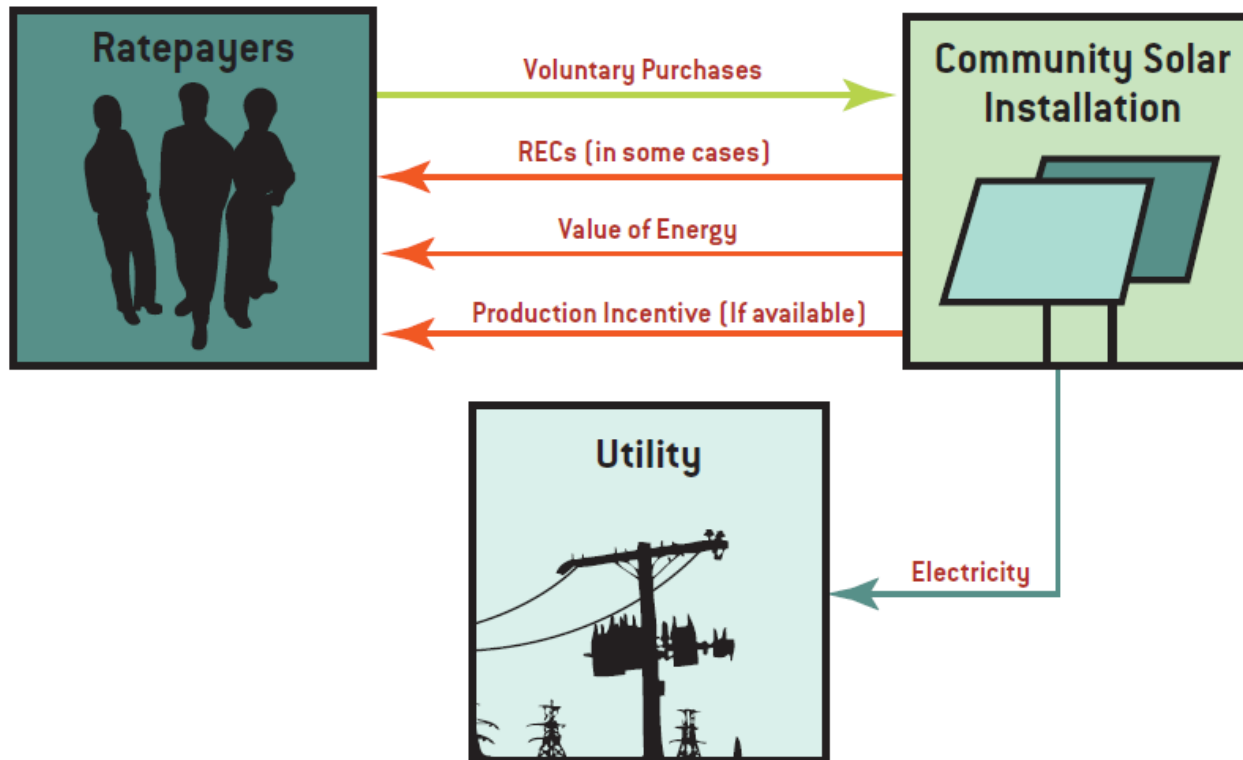
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... and then,
there was 4 years
NOTHING, until

- TVA launched and supports two *Community Solar* Projects in a pilot program, called Solar Share
- #1 Appalachian Electric Cooperative (AEC) and contractor ARiES Energy broke ground for the first of the two TVA funded community solar projects on August 1, 2016. It has a 1.35 MW capacity and is under construction. AEC started marketing the new concept to its customers recently
- #2 Energy Power Board (EPB) and the fully licensed and bonded solar contractor **TVAENERGY LLC** going to break ground on February 16th, 2017 for the 1.35 MW project. “Community solar projects like Solar Share are a great way for people to come together in supporting the development of additional sources of sustainable power generation. EPB is working to finalize the details for how customers can participate in Solar Share”. - EPB in a *press release*.
- It remains to be seen whether these two pilot project are the first ones of many community-based solar deployments to follow.

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UTILITY-SPONSORED PROJECT

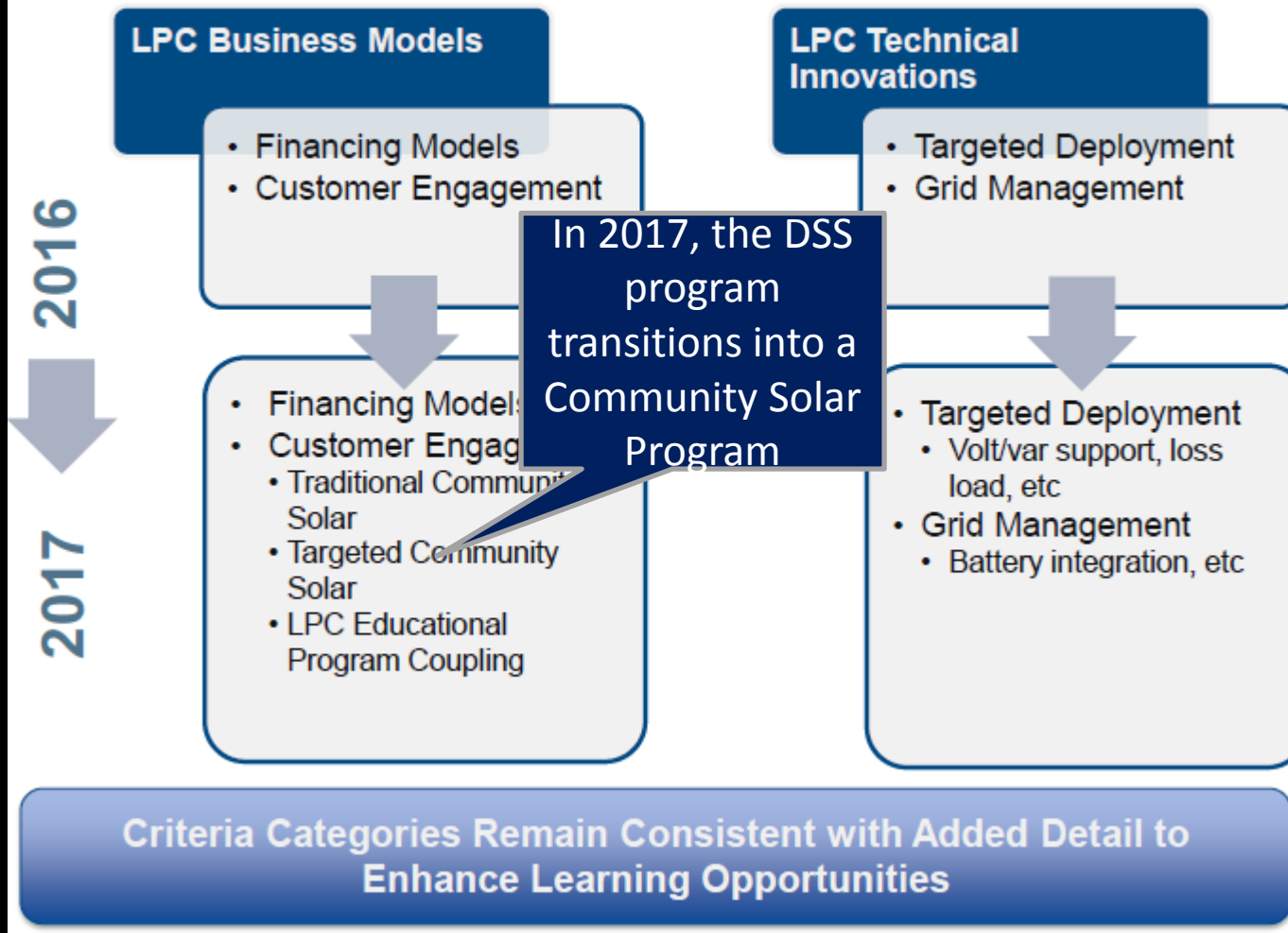


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- In January 2016, Tennessee Valley Authority and Tennessee Valley Public Power Association rolled out the community-focused DSS pilot. LPCs, in partnership with developers, began submitting their applications for solar projects that ranged from 1 megawatt to 5 megawatts. TVA reviewed 11 proposals and is awarding a total of 16.7 megawatts in the following LPC service areas:
 - Chickasaw Electric Cooperative 2.72 MWdc
 - East Mississippi Electric Power Association 5.0 MWdc
 - Joe Wheeler Electric Membership Corporation 4.1 MWdc
 - Johnson City Power Board 5.0 MWdc
- “Thanks to the immense interest in Distributed Solar Solutions, the program is now full. TVA will not be accepting new applications through the rest of calendar year 2016. Program details regarding CY17 will be announced in the coming months, so check back often.” - *TVA on their website under DSS.*

2017 DSS Criteria Considerations



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2017 DSS Program Parameters

Capacity: 10 MWs

Price: Avoided Cost + Premium of 2.73 cents/kWh

Comparing the simple average of the 20-year rate (p + premium), the 2017 average is 16% lower than the 2016 average

Reduce max project size from 5 MW to 2 MW to focus on Community Solar (matches DSS survey input)

Award capacity to LPC directly – giving them the flexibility in developer / partner selection

... but the offered capacity of DSS remained the same as in 2016, despite the huge interest from LPC's and end customers!

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- 2017 DSS Program Parameters (TVA published 11/30/16)
- Capacity: 10 MWs for 2017 for TVA`s Service Territory
 - **Note #1: TVA`s generation capacity is over 37,000 MW!**
- Price: Avoided Cost + Premium of 2.73 cents/kWh
 - **Note #2: DOE Sunshot Initiative just released their 2030 target being \$0.03 per kWh for Solar Electricity. TVA is 14 years ahead!**
- Comparing the simple average of the 20-year rate (base + premium), the 2017 average is 16% lower than the 2016 average . Escalator reduced from 5% to 3%
- Reduce max project size from 5 MW to 2 MW to focus on Community Solar (matches DSS survey input)
- Award capacity to LPC directly – giving them the flexibility in developer / partner selection

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Summary thoughts for Panel Discussion:

- Community Solar is the most significant growth market in the USA. It generates jobs in distributed generation which cannot be exported. Clean, inexpensive, reliable energy from the most abundant energy resource (sun), without toxic and radioactive waste for health and environment.
- Community Solar can also include arrays developed for a single off-taker (a city, utility, or corporation)
- Change TN state regulation and unbundle status quo to allow fair competition in energy generation! Implement Virtual Net Metering, Virtual PPA's, Remote Net Metering) and you will reveal the true economic cost and benefit of solar versus any other energy fuel
- **Listen to your customer what they really want:**
 - It is a fact: **Americans love Solar** (new SEPA Study "*What the Community Solar Customer Wants*")
 - There is a reason why the LPC's want more DSS Solar than TVA does offer.

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Thank you much
for your attention!

Call or write us if
you need help to
develop or build
your PV project!

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