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Community Solar: Overview of an Emerging Growth Market

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Introduction – Why Community Solar?

Rooftop Solar Offers Customers a Choice

- Rooftop solar provides residential customers an option to use locally sited renewable technology as an alternative to grid-supplied electricity
- Customers pursuing rooftop solar value the environmental benefits of the technology and the financial value of directly offsetting their electricity use
- However, residential solar can be an expensive proposition as the price per watt is roughly twice the cost of a utility system
- In addition, more than 80 million of the over 100 million households in the United States are unable to install rooftop solar because of limitations ranging from home ownership (e.g., rental) to an unsuitable rooftop (e.g., orientation or shading)

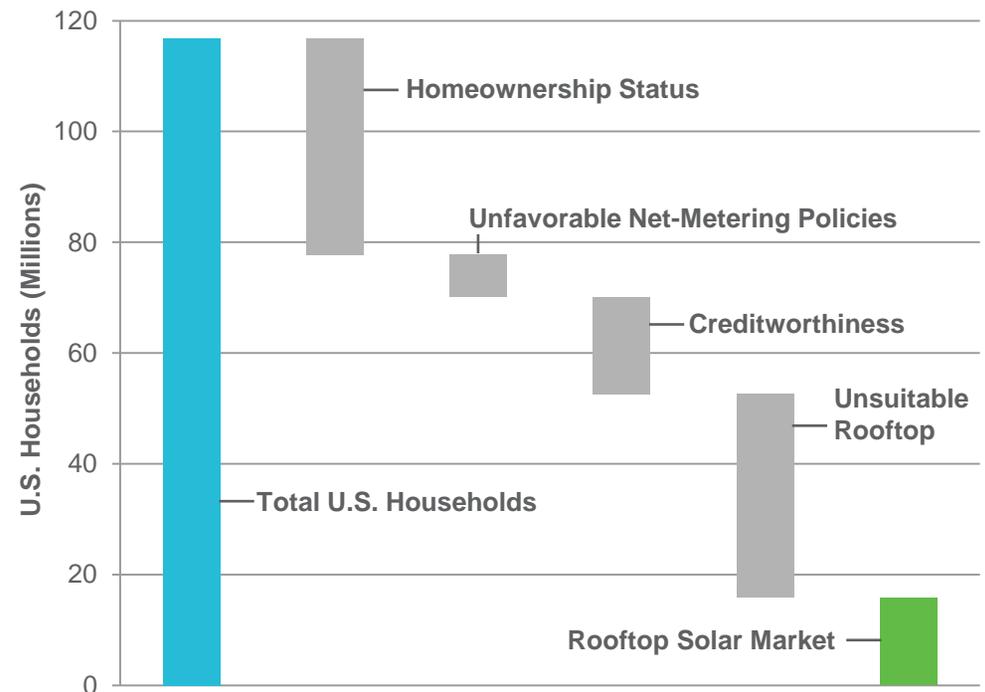
Utility Solar Provides Economies of Scale

- In contrast to rooftop solar, utility solar can be sited and designed for optimal performance with connections to the transmission or distribution system
- Improved output, coupled with economies of scale, provide utility solar a significant cost advantage over residential rooftop solar
- However, utility solar is typically built to service all customers and lacks the personal connection found with rooftop system

Community Solar: The Best of Both Worlds

- Community solar is a rapidly emerging model that combines the value of direct customer “ownership” of rooftop solar with the flexibility and economic advantages of utility-scale solar

Residential Solar Rooftop Limitations and Market



Sources: GTM Research, Vox

Defining the Scope and Scale

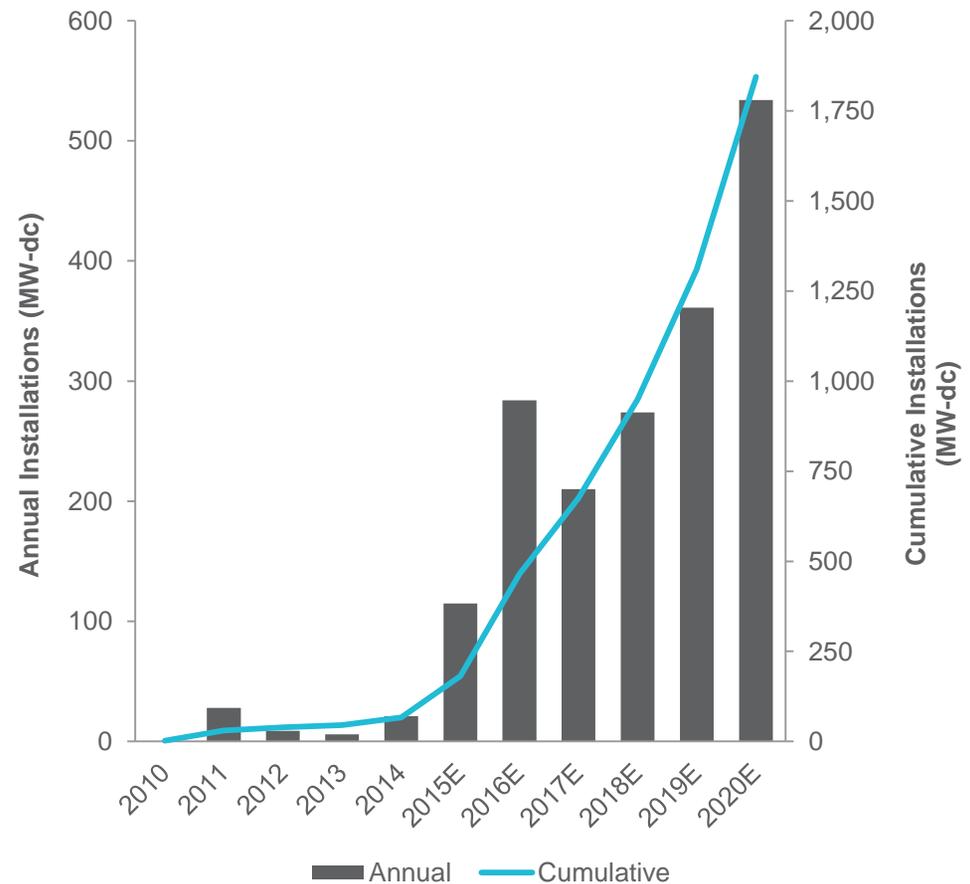
What exactly is “community solar”?

- While there is no standard industry definition, a community solar project is often characterized by:
 - Multiple end users or subscribers purchase a portion of the capacity (MW) or output (MWh) produced from a solar PV facility and receive the benefit on their electric bill
 - The solar project is typically located near the end customer or within the energy provider’s jurisdiction
 - The term generally does not apply to group purchases or off-bill payments in return for an investment in the project

Community solar is a rapidly growing market segment

- GTM Research forecasts cumulative community solar installations will increase from 67 MW-dc in 2014 to more than 1,800 MW-dc in 2020
- A key growth driver is community solar's ability to vastly increase the addressable market of solar customers
- Customers facing rooftop limitations can often participate in community solar projects
- In addition, community solar can offer a unique value proposition to a variety of stakeholders
 - Electric utilities provide distributed solar options while avoiding direct competition with rooftop solar providers
 - Customers receive simplified access to solar generation and benefit from the economies of scale of larger projects
 - Developers benefit from an increase in demand for commercial and small utility-scale projects

Community Solar Installations, 2010–2020



Source: GTM Research

How It Works – Community Solar Models and Design Elements

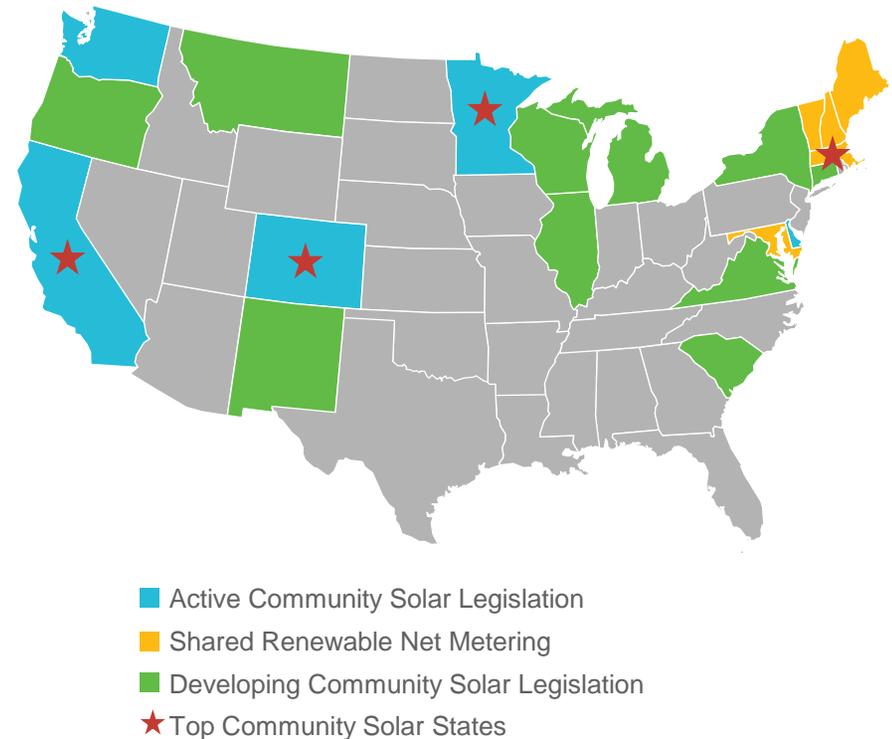
The community solar market currently lacks a “representative” program design. Instead, state policy and/or specific utility objectives drive key program design elements. Within this context, community solar programs are often based on an “up-front payment” or “ongoing payment” model. Key program design elements for each model are described below.

Design Elements	Model #1: Up-Front Payment	Model #2: Ongoing Payment
Description	<ul style="list-style-type: none"> Customer provides up-front payment to purchase or lease panel(s) 	<ul style="list-style-type: none"> Customer provides ongoing monthly payments to access solar capacity or output
Program Administrator	<ul style="list-style-type: none"> Utility or third party 	
Customer Class	<ul style="list-style-type: none"> Programs can be designed for specific customers (e.g., residential) or open to all customer classes 	
Restrictions	<ul style="list-style-type: none"> Programs often allow customers to offset 50% to 150% of average annual consumption 	
REC Ownership	<ul style="list-style-type: none"> RECs may be retired for RPS compliance, transferred to customer, or sold in open market 	
Program Duration	<ul style="list-style-type: none"> Community solar programs can range from five years (e.g., pilot) to the lifetime of the PV system (e.g., 20+ years) 	
Payment Structure	<ul style="list-style-type: none"> Customer receives kWh bill credit from utility based on actual system output and proportional ownership share Bill credit is at retail rate or partial retail rate 	<ul style="list-style-type: none"> Customer subscribes to capacity or output blocks: Capacity blocks (kW) = variable output each month at fixed price per kWh or fixed payment per block Output blocks (kWh) = guaranteed output each month at fixed payment per block Customer pays community solar program administrator for output and receives bill credit from utility at retail rate or partial retail rate Customers often pay a premium for solar output but receive hedge against future rate increases as costs are often locked for the duration of term
Additional Considerations	<ul style="list-style-type: none"> Up-front payments mimic the initial capital cost of installing and owning a rooftop solar system Large up-front payment can look less attractive to customers compared to ongoing payment 	<ul style="list-style-type: none"> Ongoing payments mimic the regular payments and credits of a rooftop lease model (e.g., SolarCity) Programs administered by utility can list monthly payments and credits as separate line items on a single bill

Where Is Community Solar Happening?

- Twenty-four U.S. states have at least one community solar project on-line. Meanwhile, 20 states have or are in the process of enacting community solar legislation (see map)
- Despite this widespread geographic activity, GTM Research anticipates 80% of installations over the next two years will come from four states: Colorado, California, Minnesota, and Massachusetts
- Public policy is a critical driver of community solar growth in each of these markets:
 - **Colorado** – Legislation passed in 2010 allows the creation of community solar gardens up to 2 MW in the service territory of investor owned utilities (IOUs). In addition, IOUs are required to purchase power from community solar gardens as part of compliance with the state’s renewable portfolio standard
 - **California** – Legislation passed in 2013 authorized The Green Tariff Shared Renewable Program which allows customers to receive 50% to 100% of consumption from solar. Statewide enrollment is capped at 600 MW. PG&E, SCE, and SDG&E are expected to offer programs to their customers by 2016
 - **Minnesota** – Legislation passed in 2013 allows subscribers to purchase or lease interests of a solar garden system developed by a garden operator. Xcel Energy must credit subscribers for generation at retail rates. Potential projects and regulations are still being reviewed by Xcel Energy and regulators
 - **Massachusetts** – Shared renewable policy allows participating net-metered systems to allocate monthly excess generation to one or more customers within a distribution company’s service territory. In addition, community solar projects also receive SREC credit under Massachusetts’s SREC-II program

Status of Community Solar in the United States



Sources: GTM Research, Vox

Sources: Greentech Media, GTM Research, California PUC, Vox, Shared Renewables HQ, DSIRE

Community Solar Case Studies

The community solar case studies outlined below highlight the diversity and customization found within community solar programs design.

	Gardenia Community Solar Farm	Bright Tucson Community Solar	SunWatts Sun Farm
Electric Utility			
Program Administrator	<ul style="list-style-type: none"> Utility 	<ul style="list-style-type: none"> Utility 	<ul style="list-style-type: none"> Utility
Program Design	<ul style="list-style-type: none"> Customers subscribe to capacity blocks ranging from 1 kW to 5 kW Customers pay monthly for actual solar output 	<ul style="list-style-type: none"> Customers subscribe to energy blocks offered in 150 kWh increments Customers pay monthly for guaranteed solar output 	<ul style="list-style-type: none"> Customers pay up front to fully or partially lease capacity from a 270 W solar panel Customers receive fixed monthly bill credits
Program Financials	<ul style="list-style-type: none"> Customers pay a one-time \$50 fee during signup (refunded after two years in program) Customers pay \$0.13/kWh for solar energy (approx. \$0.025/kWh above retail rates) Solar rate is fixed for up to 25 years 	<ul style="list-style-type: none"> Customers pay \$3/block resulting in \$0.02/kWh premium over retail rates Blocks are credited against the following bill components: variable generation, RE surcharge, fuel and power purchase surcharges 	<ul style="list-style-type: none"> Customers receive 36 kWh bill credit for every panel owned Bill credit is guaranteed and not fixed to output of system Payback period for first-year participants is estimated at 15 years
System Details	<ul style="list-style-type: none"> 400 kW online in 2013 Third-party owned system; energy sold to OUC via PPA 	<ul style="list-style-type: none"> >22 MW beginning in 2011 Combination of utility-owned and PPA systems 	<ul style="list-style-type: none"> 227 kW system online in 2011 System directly owned by utility

Implementation Issues: ScottMadden Has Capabilities to Help

Successfully implementing a community solar program is not simple and requires a coordinated approach to successfully enter the market. There are some critical issues that must be addressed:

- Program design
 - What policy drivers exist to support or hinder community solar?
 - Who should be the administrator of a community solar program?
 - What are the impact and implications of securities regulations?
 - Who owns the rights to renewable energy certificates?
 - Where must community solar facilities be located relative to participating customers?
- Customer motivations
 - What motivates customers to participate in a community solar project?
 - What are customers willing to pay in administrative fees and premiums over regular retail rates?
 - Are customers willing to make long-term commitments to a project?
 - How much consumptions are customers interested in offsetting?
- Financial implications
 - How cost competitive is solar PV in my region?
 - What are the long-term cost trends for solar PV?
 - How does community solar impact the rooftop solar market?
 - How does the rate structure support or hinder adoption?

ScottMadden has assisted clients directly with the development and evaluation of community and rooftop solar programs

- **Business Case for Community Solar** – ScottMadden worked with an IOU to develop a financial model to examine the business case for community solar in deregulated markets
- **Community Solar Program Design** – ScottMadden partnered with the Solar Electric Power Association (SEPA) to assist an IOU with focus groups and customer surveys crafted to inform community solar program design
- **Solar Rate Design** – ScottMadden worked with a large municipal utility to refine the strategy and rate structures for customer-owned rooftop solar generation
- **Solar Program Implementation** – ScottMadden worked with an IOU to prepare for the launch of their residential rooftop solar program for their customers. ScottMadden helped develop the high-level plan and the detailed processes to launch and maintain the program into the future

Our deep understanding of utility businesses has helped us assist in implementing new technologies for utilities from rooftop solar to electric vehicles.

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