NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Project Financing, Policy, and Incentives

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City and County Solar PV Training Program
Module 4

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The data, results, conclusions, and interpretations presented in this document have not been reviewed by technical experts outside NREL or the Solar Energy Technologies Office.

This presentation was recorded as part of NREL's City and County Solar Photovoltaics Training Program.

To hear the recording, please visit: https://www.nrel.gov/technical-assistance/local-governments.html

PV Project Implementation Process

Module 1:

Develop your goals and team

Module 2:

Identify Sites and Screen

Module 3:

Complete Detailed Site Evaluation

Module 4:

Decide on a Financial Model and Use all Available Incentives

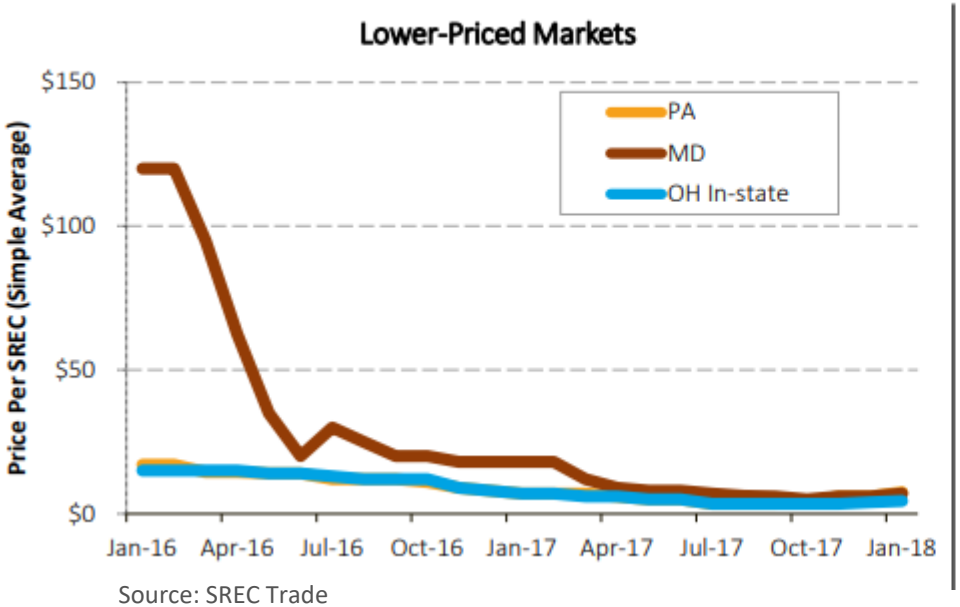
Module 5:

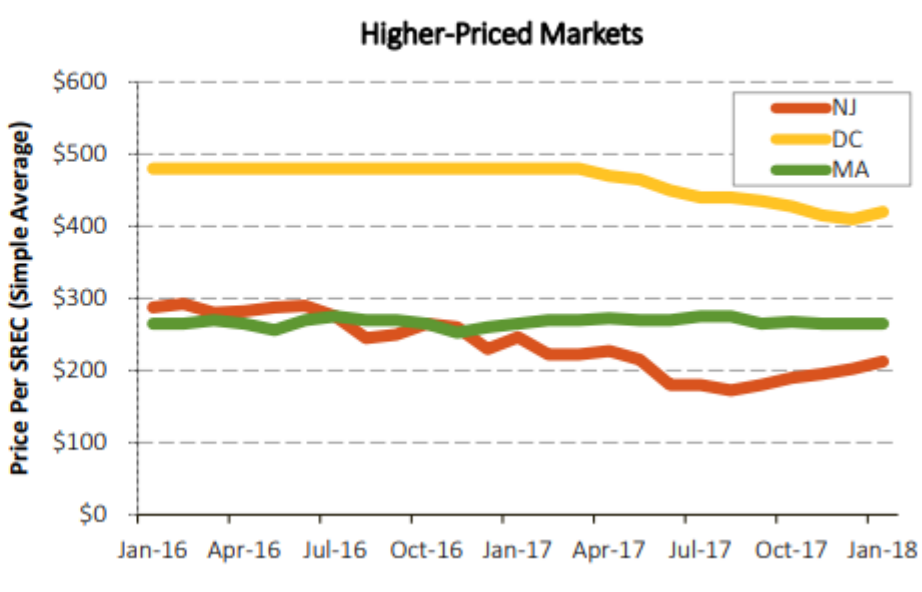
Issue a request-for-proposals

Policies and Incentives

Renewable Portfolio Standards

Solar Renewable Energy Certificates Recent Price Trends



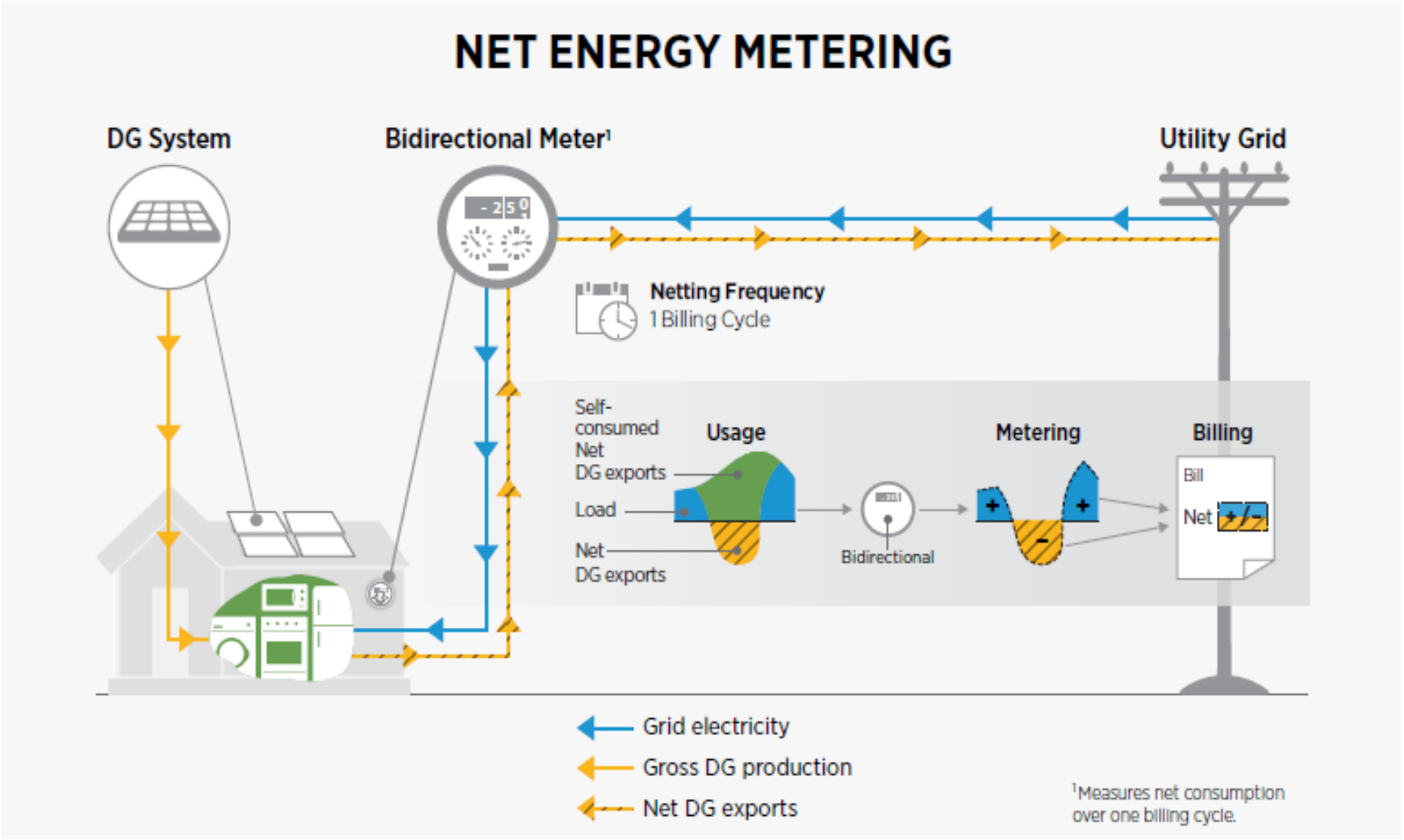


Source: SREC Trade

Checklist

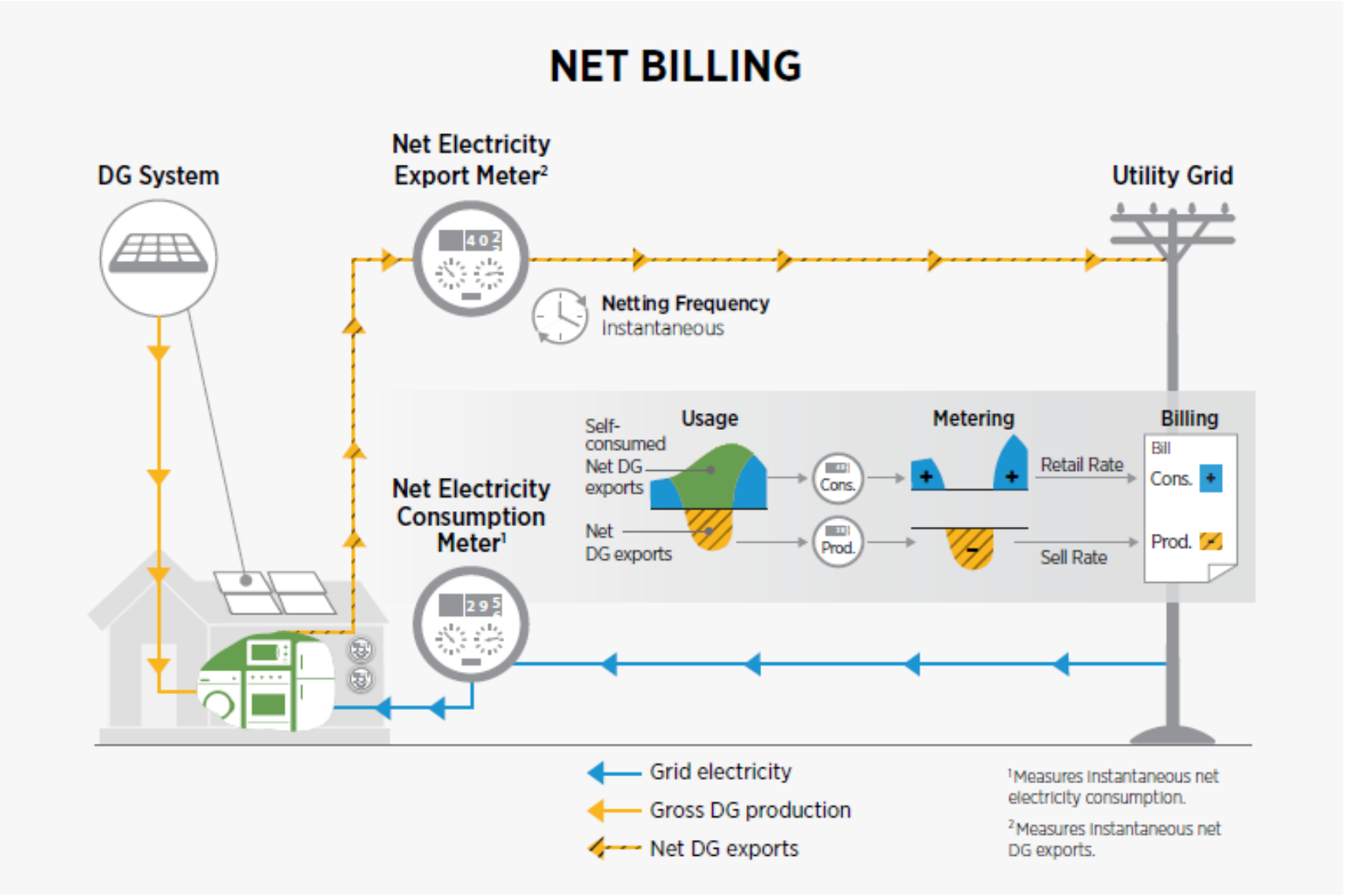
- ✓ Availability of REC or SREC market
- ✓ Decision to sell RECs
- ✓ Eligibility for solar or distributed generation multiplier or factor

Net Metering



Source: NREL (2017). https://www.nrel.gov/docs/fy18osti/68469.pdf

Net Billing



Source: NREL (2017). https://www.nrel.gov/docs/fy18osti/68469.pdf

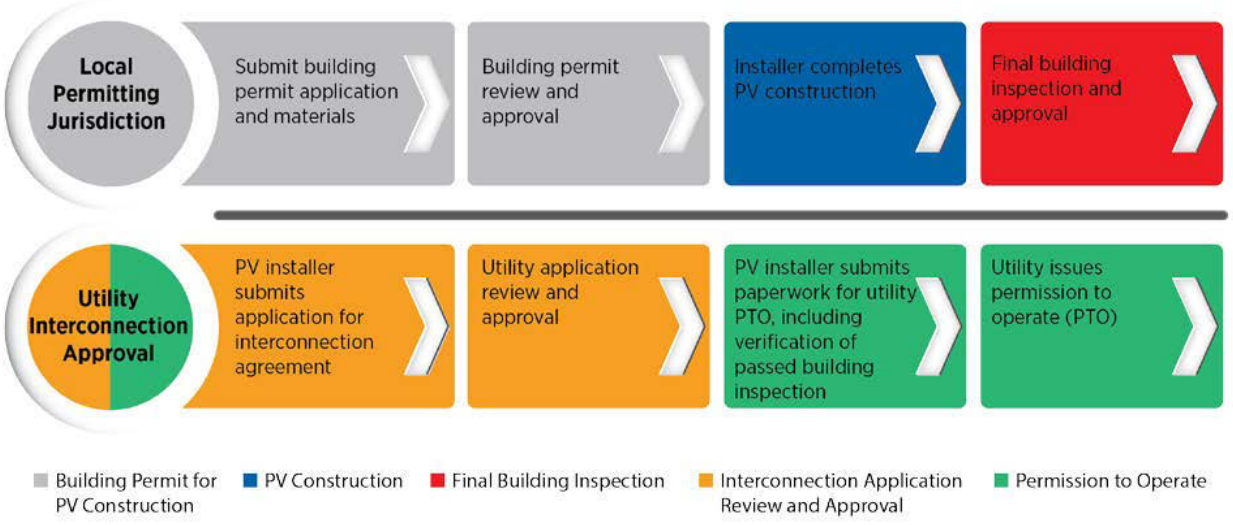
Net Metering and Billing

Checklist

- ✓ System size under consideration is eligible for the program
- ✓ Ensure rates are favorable to project economics
  - User fees: customer fixed charges, demand charges, standby rates
- ✓ Aggregate capacity limit
- ✓ Ownership of RECs
- ✓ Meter aggregation

Interconnection

Permitting and Interconnection Process



Associated Costs

Interconnection fees, application fees, metering charges, equipment fee, feasibility study, impact study

Permitting fees, engineering and inspection fees, electrical permit fees, zoning permit fees, building permit fees

Interconnection

Checklist

- ✓ Availability of standardized interconnection for small generators:
  - System size limits
  - Net metering requirement
- ✓ Availability of online application portal
- ✓ Qualification for fast-track or expedited interconnection
- ✓ Insurance requirements:
  - Liability insurance requirements
  - Utility as additional insured party
- ✓ Safety equipment:
  - External disconnect switch

Financial Incentives

Rebates/grants: Direct up-front payment to solar investors. Rebate and grant programs may be administered at both the state- and utility-level.

Performance-based incentives: Similar to rebates/grants except that the payment amount depends on the output of the solar system.

Loan programs: Facilitate the financing of solar projects without making a direct payment. Loan programs may be administered at both the state and utility level.

Tax incentives: Exemption of solar project investments from property, sales, and/or income taxes. Some states also provide tax credits for solar project investments.

Financial Incentives

Checklist

- ✓ System eligibility:
  - System size caps
  - Sector
  - Levels of incentive
  - Total funds or capacity available
- ✓ State and local tax considerations:
  - Net income tax
  - Sales and use tax
  - Property tax
- ✓ REC ownership

Community Solar

Types of models

Utility-sponsored model: Utilities own and operate a project and offer multiple retail customers the option to purchase solar electricity from a shared facility.
Nonprofit model: Donors contribute to a shared solar installation owned by a nonprofit organization.
On-bill crediting special purpose entity model: Commercial and/or residential entities jointly invest in a portion of a shared solar through a special purpose entity.

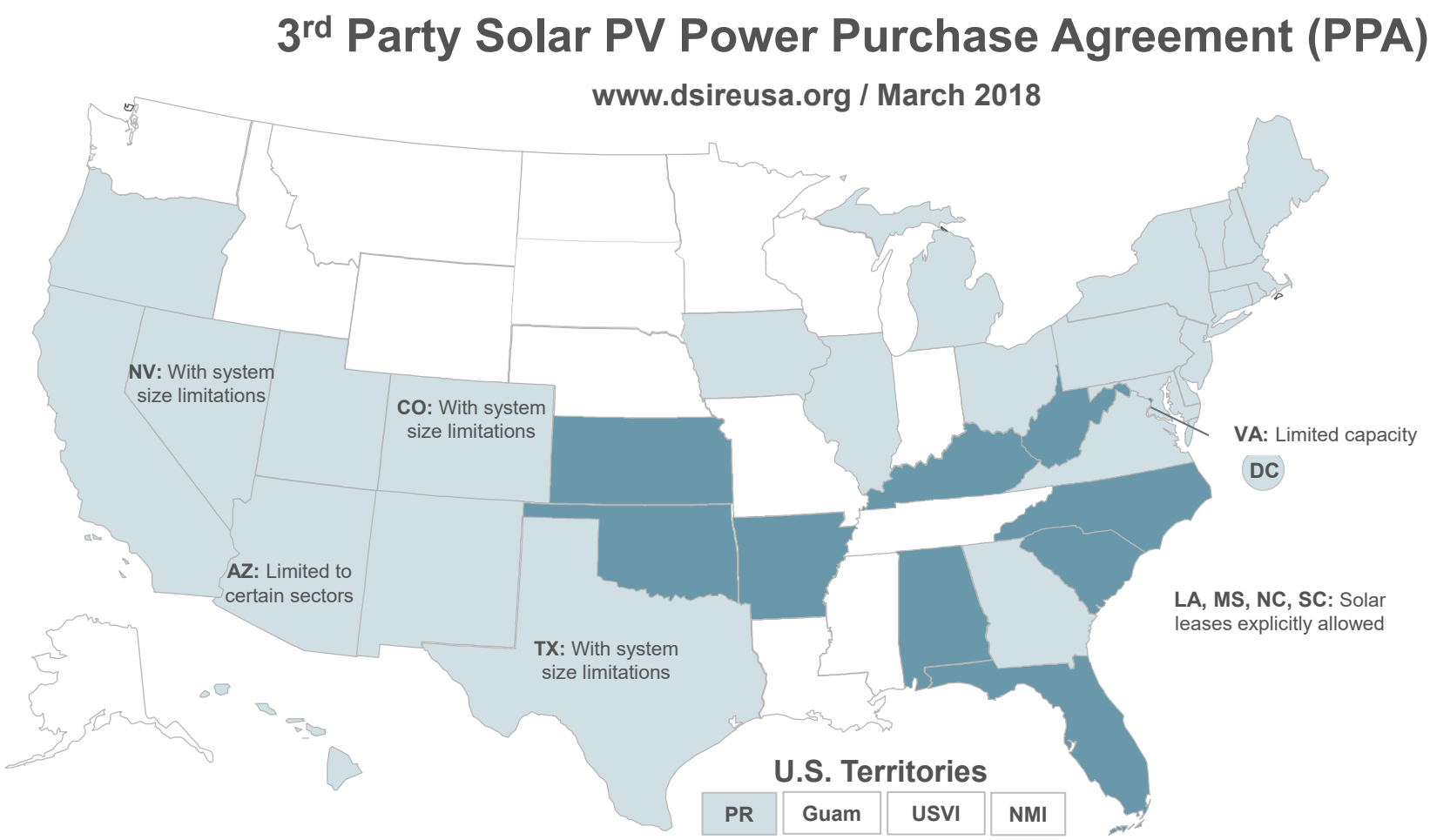
	Utility	Special Purpose Entity	Nonprofit
Owned By	Utility or third party	SPE members	Nonprofit
Financed By	Utility, grants, ratepayer subscriptions	Member investments, grants, incentives	Memberships, donor contributions, grants
Hosted By	Utility or third party	Third party	Nonprofit
Subscriber Profile	Electric rate payers of the utility	Community investors	Donors, members
Subscriber Motive	Offset personal electricity use	Return on investment; offset personal electricity use	Return on investment; philanthropy
Long-term Strategy of Sponsor	Offer solar options; add solar generation (possibly for Renewable Portfolio Standard)	Sell system to host; retain for electricity production	Retain for electricity production for life of system

Community Solar

Checklist

- ✓ Availability of billing credit mechanisms
- ✓ Check for system size eligibility
- ✓ Transferability
- ✓ Check for ownership models and evaluate suitability of model
- ✓ Allocation of benefits from participation:
  - Electricity from solar system
  - Renewable Energy Credits
  - Federal tax credits and deductions
  - Accelerated depreciation
  - State and utility rebates and incentives

Third Party Ownership



Third Party Ownership

Checklist

- ✓ Existing policy on Third Party Ownership
- ✓ PPA model's compatibility with state incentives
- ✓ Ownership of RECs

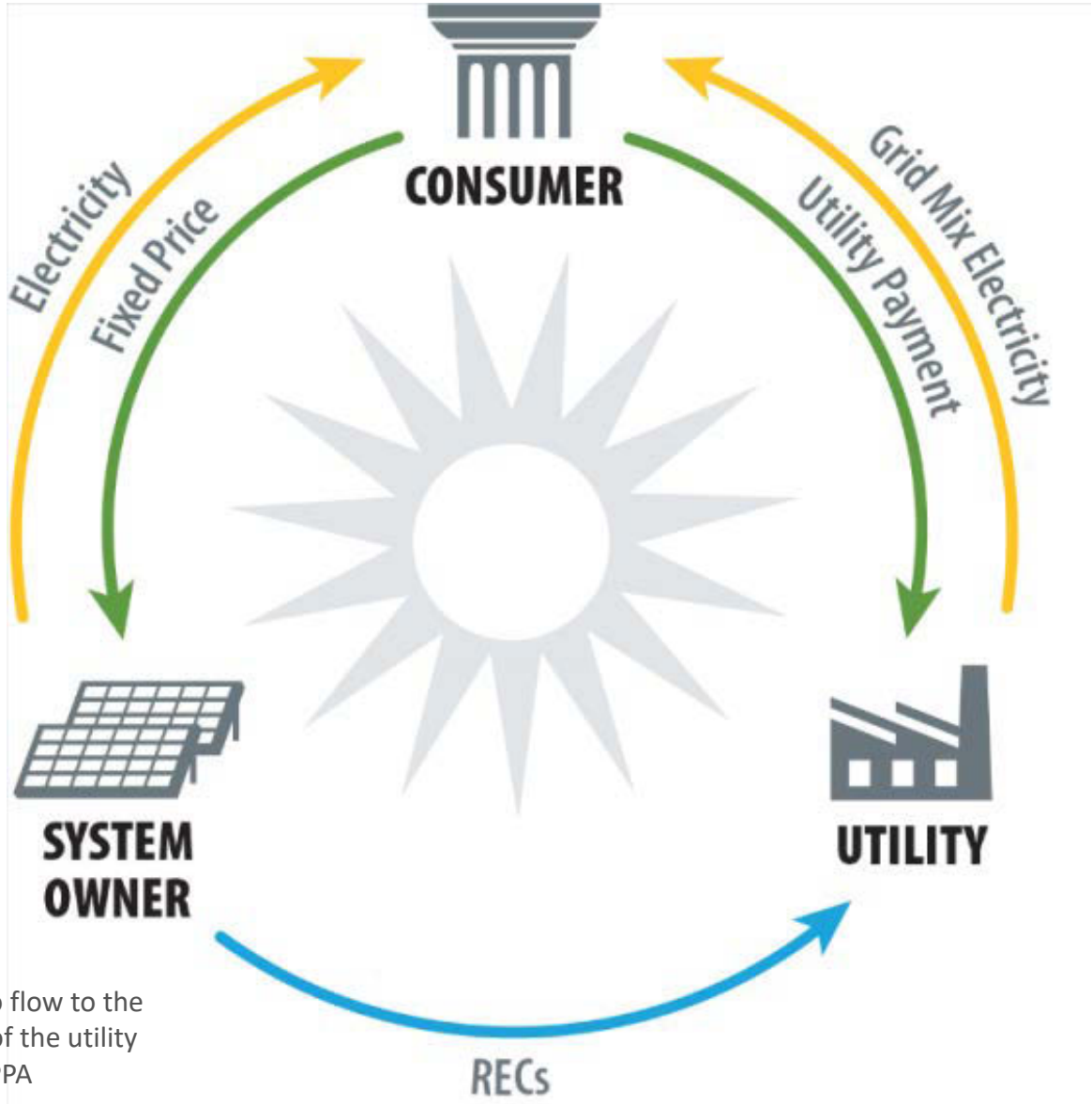
Knowledge Check

- Which of these may be PV financial incentives offered by state governments? (check all that apply)
  - Interconnection standards for small inverter-based systems (false)
  - Rebates based on system size (true)
  - Property tax exemption (true)
  - Community solar development guidelines (false)

Financing Structures

Subtitle or additional text

Third Party Financing Model

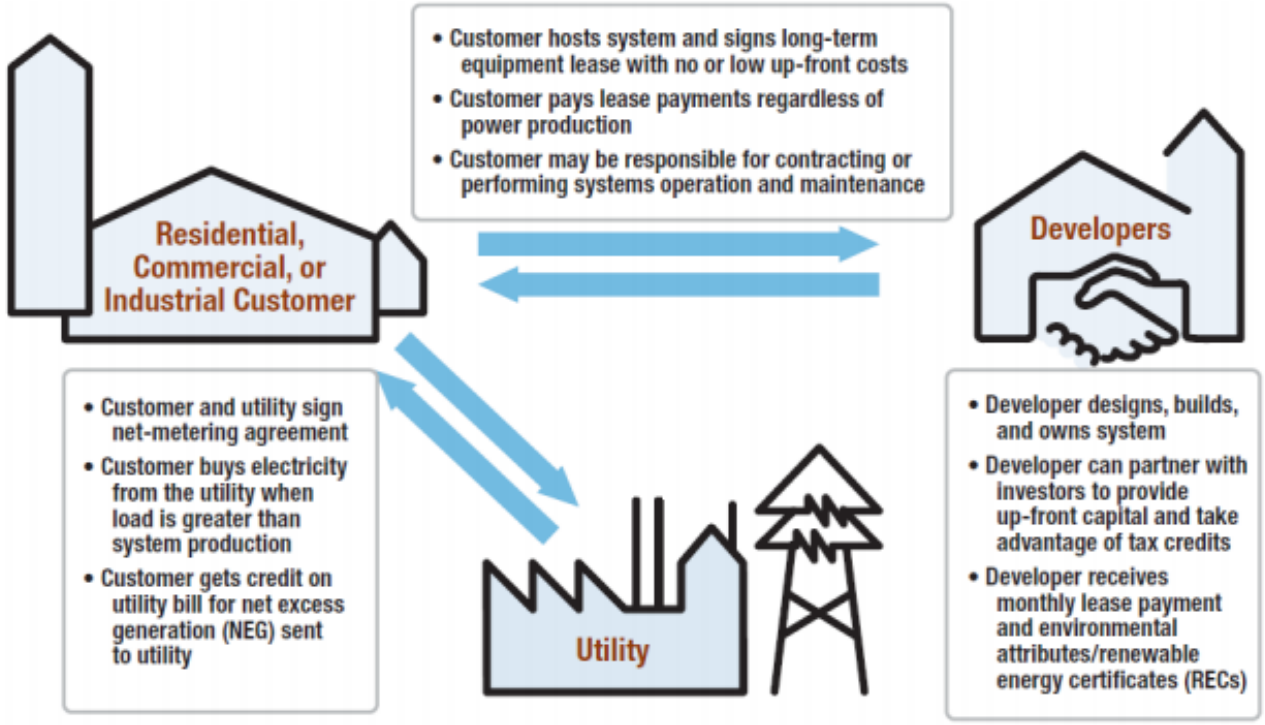


Note: RECs can also flow to the consumer instead of the utility depending on the PPA structure

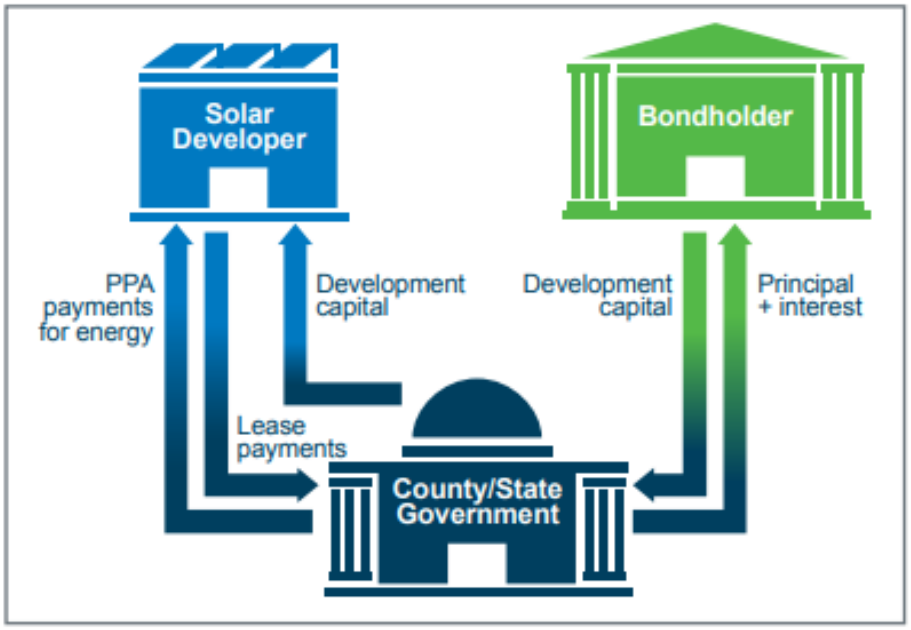
Alternatives to PPA Model

- Solar Leases
- Utilities as Contractual Intermediaries
- Utility Ownership
- Clean Renewable Energy Bonds (no longer available)

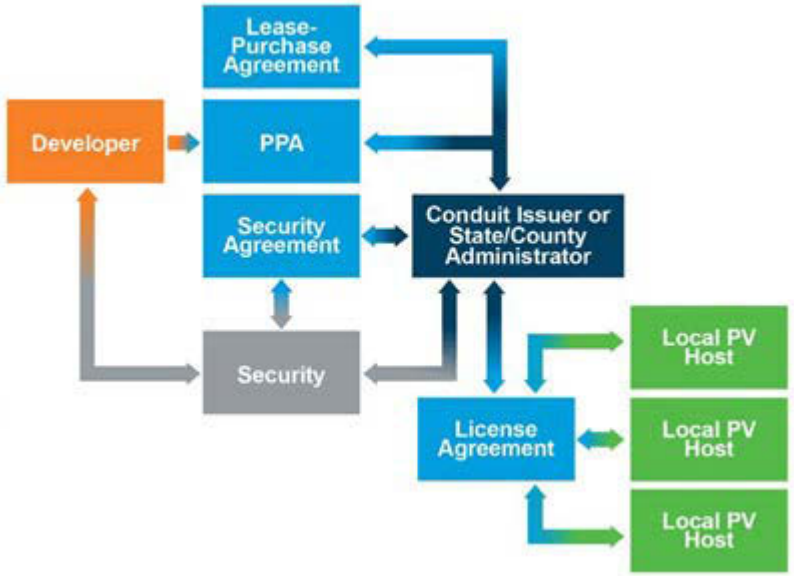
Solar Lease Structure



Bond-PPA Hybrid Model



Money transfers in the hybrid model



Contract arrangements in the hybrid model

Third Party vs Self Ownership

	Third-Party PPA	Self-Ownership
Advantages	• No or low upfront capital • Ability for tax-exempt entity to benefit from savings passed on from federal tax incentives • Predetermined electricity price for 15–25 years • No operating and maintenance responsibilities • Path to ownership (if included as an option in PPA)	• Access to cheap public debt • Full control over a project: design, operations, and risks • Ability to decide on ownership of renewable energy attributes generated by the project
Challenges	• The process of negotiating a PPA can be lengthy and burdensome • Public entity has limited control over project design, operations, and risks • PPA pricing may be sub-optimal (developer could receive most of the financial benefits)	• The public entity cannot monetize the value provided by federal renewable energy tax incentives • Need expertise to navigate potential revenues from renewable-portfolio-standard-driven subsidies • Debt issues and limitations could prohibit the projects

Knowledge Check

- What is an advantage for a public entity or nonprofit to own its own solar PV system on its facilities instead of entering a PPA agreement with a third-party?
  - Ability to capture savings from federal ITC (false)
  - Full control over a project: design, operations, and risks (true)
  - Predetermined long-term electricity price (false)