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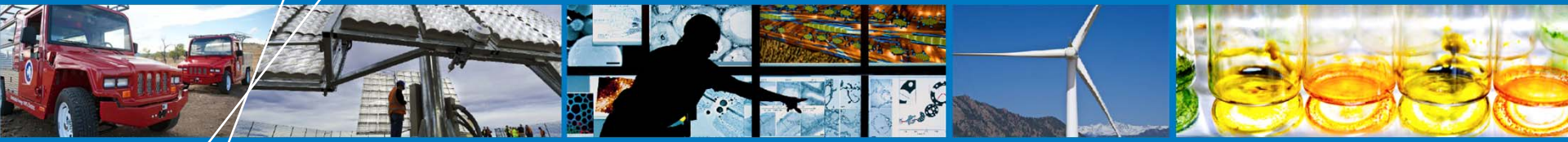
# Incentivizing Distributed Solar: Best Practices




## Lori Bird and Andy Reger, NREL


## Webinar April 18, 2013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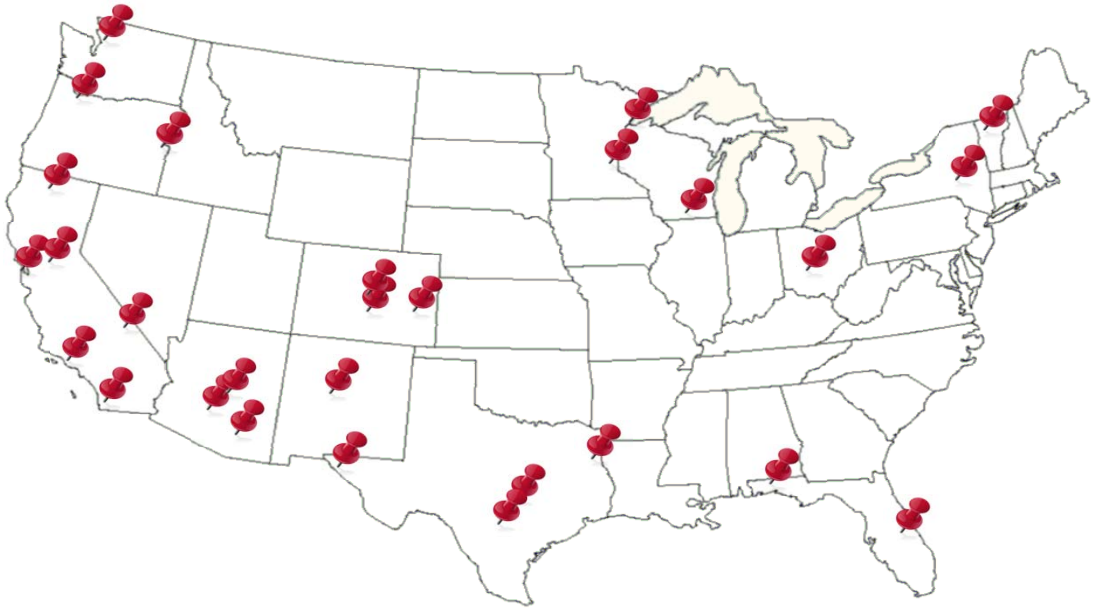
# Background

## Objective: Explore best practices in the design and administration of distributed solar incentive programs



## Method:

- Reviewed existing PV incentive programs, with focus on larger programs outside of SREC markets
- Interview utilities, administrators, regulators, and industry

# Key Challenges

- **Highly variable solar costs, difficult to predict**
  - Modifying incentive levels in response to installed solar cost changes
- **Program longevity, predictability and stability to aid solar market growth**
- **New business models (leasing, PPA)**
- **Cost-effective incentive disbursement**

Photo by Dennis Schroeder, NREL 21538

# What Defines Program Success?

- **Solar market stimulation through cost reduction**
- **Increase long-term viability of solar**
  - Market longevity and stability
  - Predictability for sustainable market growth
- **Cost-effective management of ratepayer funds**
- **Consumer protection**
- **Providing price transparency to the solar market**

Photo by Dennis Schroeder, NREL 21605

# Overview: Design Considerations

1. **Form of incentives**
   - Rebates vs. PBIs (term, level)
2. **Setting Incentive Levels**
3. **Encouraging multiple market segments**
4. **Modifying Incentive levels**
   - Step-down schedules, solicitations, or auctions
5. **Consumer Protection**
6. **Administration**

Photo by Misty Conrad, NREL 23028

# Common Solar Incentive Types

- **Up-front rebate**
  - ($/watt capacity)

| Utility | Rebate | Size |
|---|---|---|
| Austin Energy | $2.00/watt | 1kW – 20kW |
| LIPA | $1.75/watt | < 10kW |
| Gulf Power Co. | $2.00/watt | < 5kW |
| LADWP | $1.62/watt | 1kW – 1 MW |
| PG&E (CSI) | $0.20/watt | < 30kW |
| Snohomish PUD | $0.50/watt | < 100kW |

- **Performance-based Incentive (PBI)**
  - ($/kWh production)

| Utility | PBI | Length | Size |
|---|---|---|---|
| Xcel Energy (CO) | $.150/kWh | 10 years | .5kW – 10kW |
| Green Mountain | $.060/kWh | 10 years | < 250kW |
| Madison G&E | $.250/kWh | 10 years | < 10kW |
| Orlando Utilities | $.050/kWh | 5 years | < 2MW |
| PG&E (CSI) | $.025/kWh | 5 years | < 30kW |
| SMUD | $.100/kWh | 5 years | No limit |

*DSIRE – Accessed 7/10/2012

# Common Incentive Program Comparison

## Rebate Incentive

### Strengths

- Directly addresses up-front installed cost of solar
- Primarily short-term administrative burden

### Weaknesses

- Incentivizes capacity, not production; may not ensure system performance
- Requires payment in year one; can create short-term cash constraints

## Performance Based incentive

### Strengths

- Incentivizes production and system performance
- Limited near-term budgetary cash demands
- Effective with third-party ownership

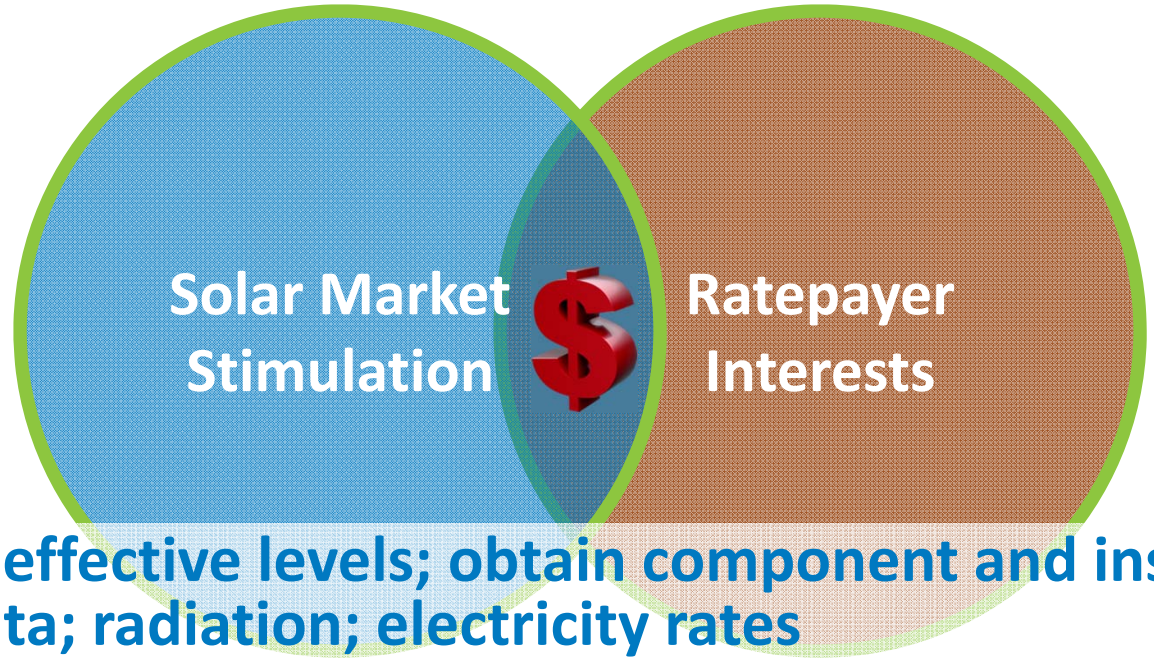
### Weaknesses

- Does not address up-front investment in solar
- Long-term administrative burden of incentive payments

# Stimulating Multiple Market Segments

- **Diversity of system sizes, customer classes may be an objective**
  - residential, commercial, industrial, third-party owned
- **Differences in barriers and cost structures across segments**
  - Residential owned systems – up-front cost
  - Larger commercial, 3rd party owned systems – access to financing
- **Competitive procurement often used with larger systems**
  - Costs can differ by size substantially
  - Accurately pricing incentives important; large payments
- **System cut-off level can affect utilization of incentives**
  - System sizes – small 0-30kW?, medium 30-100kW?, large >100kW?

# Setting the Incentive Level

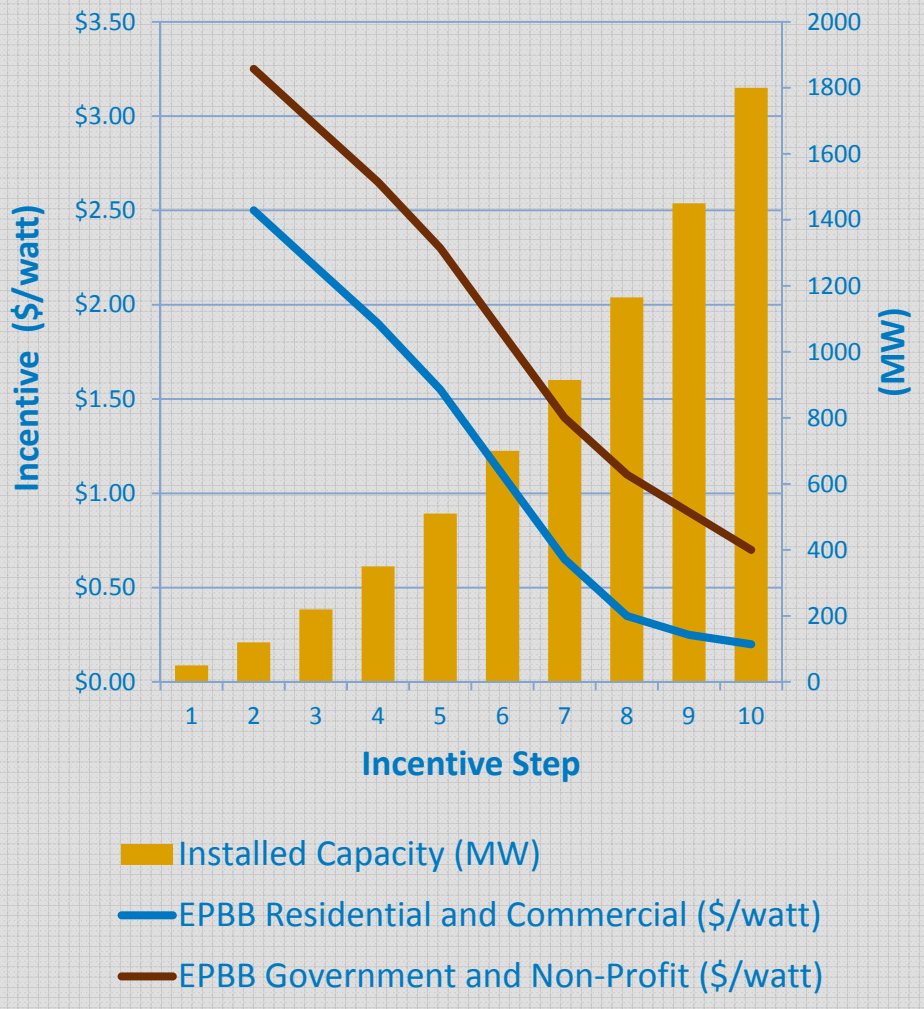



- **Model effective levels; obtain component and installed-cost data; radiation; electricity rates**
  - SAM and PV watts; data on installed costs
- **Benchmark against other programs**
- **Establish a targeted ROI/payback period for customers**
  - 10-15 year payback; incentive to cover up to 50% of cost

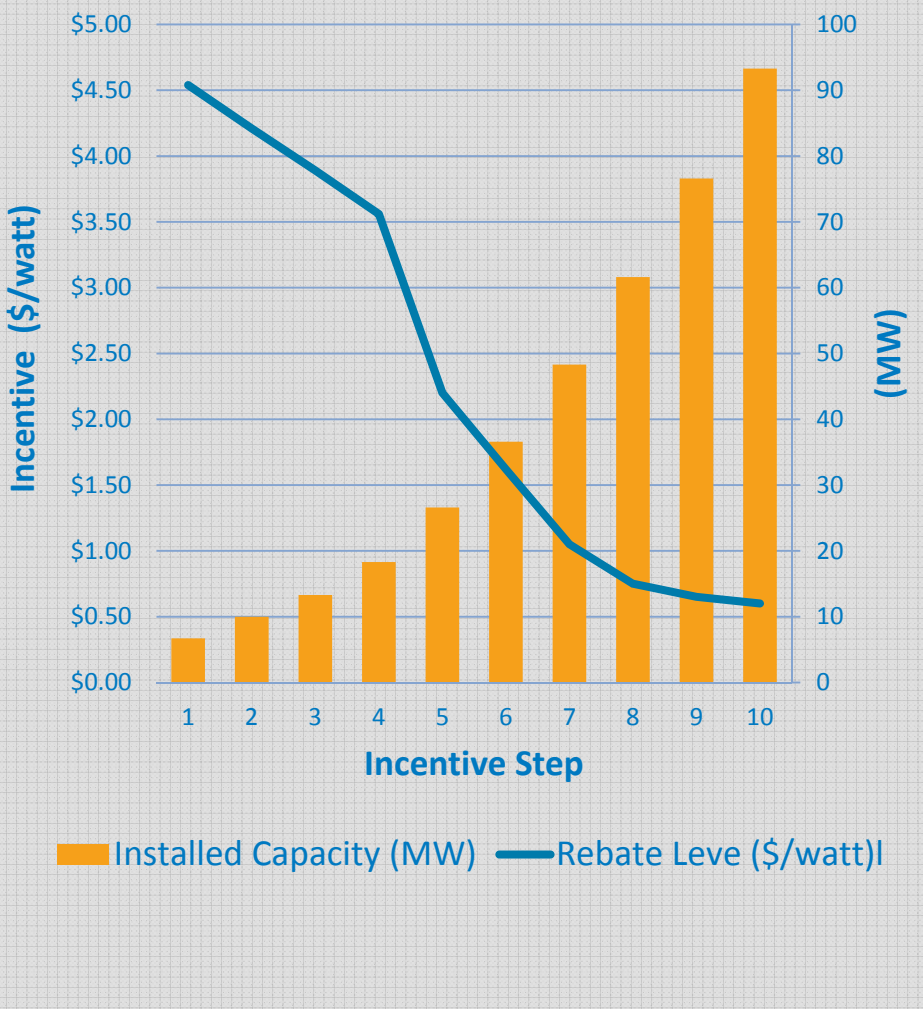
# Adjusting the Incentive Level

- **Responding to changing market conditions and solar costs**
- **Two primary methods used:**
  - **Pre-established schedules for declining incentives**
    - Planned incentive decreases along with market circumstances
  - **Auction mechanism to set market price**
    - Competitive bidding process for selecting lowest-cost solar installations

# Declining Incentives - Capacity Targets




Data Source: http://www.csi-trigger.com

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# Declining Incentives – Budgetary Timing

## Arizona Public Service – Solar Incentive Decline Schedule (2012)

| Initial 2012 Incentive Rate ($/watt) | | $0.50 |
|---|---|---|
| | **Reduction Amount** | **Incentive Rate** |
| If 75% of funds used by 4/21/2012 incentive reduced by | $0.20 | TBD |
| If 75% of funds used by 5/21/2012 incentive reduced by | $0.10 | |
| If 90% of funds used by 11/1/2012 and incentive is greater than or equal to $0.35 the incentive reduced to: | $0.20 | TBD |
| If 90% of funds used by 11/1/2012 and incentive is less than $0.35 then incentive reduced to: | $0.10 | |

# Declines: Capacity vs. Budgetary Timing

## Capacity Targets

### Strengths

- Can ensure multi-year program commitment
- Communicates the amount of installed capacity by program end

### Weaknesses

- Risks associated with unknown rate of uptake (budget/year unknown)
- Not all customers understand concept of “installed capacity”

## Budgetary Timing

### Strengths

- Ensures intra-year program commitment
- Communicates with customers in terms ($ not MW) they understand

### Weaknesses

- Uncertainty for solar market when program is adjusted annually
- Timing can be confusing or unpredictable at the year’s outset

# Reverse Auction for Adjusting Levels

## Arizona Public Service Example

1. A maximum incentive level is established by APS and communicated to prospective bidders.
2. Bidders enter system specs into the APS ranking calculator.
3. Incentive calculator determines the maximum available incentive for the system and assigns a score to the bid.
4. Scores are ranked and incentives disbursed, starting with the lowest score, until the budget for RFP has been exhausted.

# Consumer Protection Measures

- **Encourage optimal system performance**
  - Orientation, tilt, azimuth, shading, etc.
  - Most common in rebate programs; some for PBIs
- **Installer certifications and system warranties**
  - Protect customers from fly-by-night companies
- **System components CEC-listed/UL Certified**

Photo by Dennis Schroeder, NREL 21613

# Consumer Protection (cont.)

- **Encourage energy efficiency**
  - Cost-effective
  - Buy-down solar capacity needs
  - Ex: Gulf Power, SMUD, Austin Energy


- **Protecting customers from price gauging**
  - CSI informs customers when a system price is more than one standard deviation above the avg. solar price
- **REC ownership determined equitably**
  - Utility often granted the RECs in return for the incentive

# Administrative Issues

- **Make aggregated installed cost data publicly available to assert downward price pressure**
  - CA Solar Statistics allows customers to view individual system cost data by zip code, size, installer, etc.
- **Administering PBI payments**
  - On-bill crediting preferred; frequency of crediting needs to balance customer interests and admin costs
- **Inspections for performance**
  - Reduce inspection frequency after installers show that installations meet program requirements

# Application Process

## Equitable access to available incentives

- Random lottery vs. first-come-first-served; queuing systems

## Streamline process – online applications

- Don’t require all system specifics initially

## Establish administration cost caps?

- CSI limited administrative costs to 10% of program expenditures, but challenging to meet

# Summary: Key Considerations

## Program specifics vary for different markets

- Solar installed costs, electricity prices, access to financing, expected program uptake, solar irradiance, regulatory process, etc.

## Balance competing stakeholder interests

- Buy-down solar costs and increase installations
- Program longevity and predictability to decrease costs
- Cost-effective program administration

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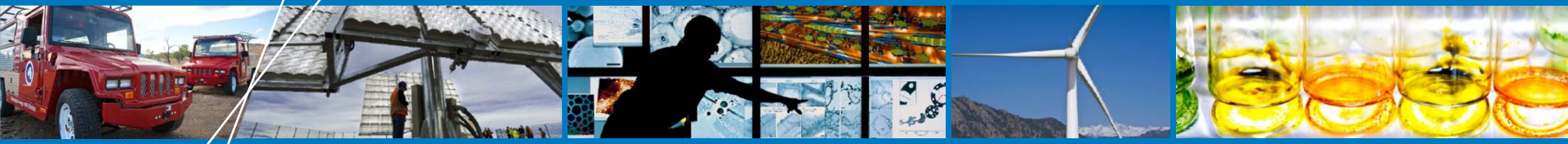
# Distributed Solar Incentive Programs: Recent Experience and Best Practices for Design and Implementation

**http://www.nrel.gov/docs/fy13osti/56308.pdf**

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