Streamlined and Standardized Permitting and Interconnection Processes for Rooftop PV in Puerto Rico

Puerto Rico Energy Affairs Administration
University of Puerto Rico-Mayaguez (ECE Department)

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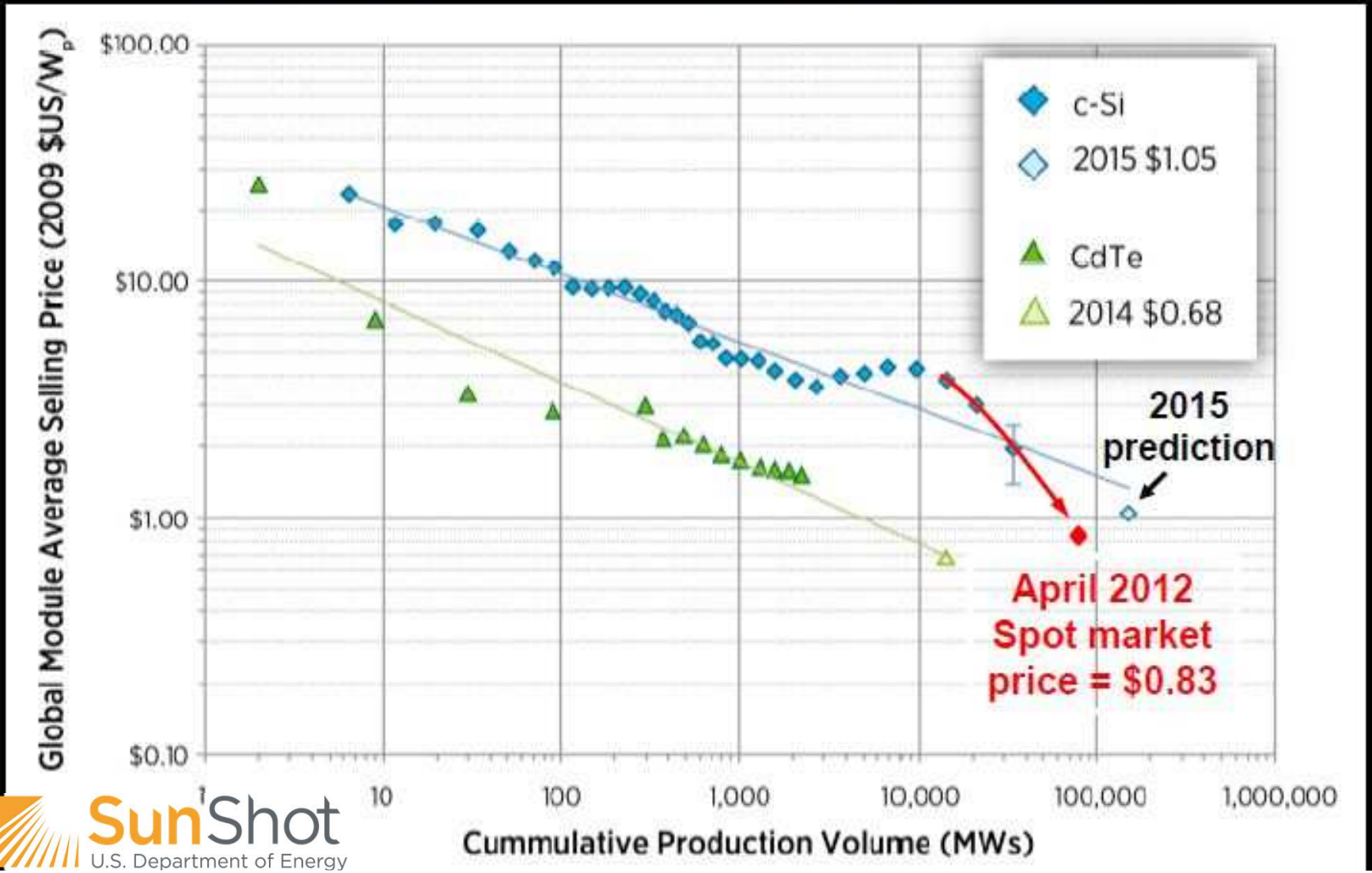
U.S. Department of Energy

Costs of PV modules are dropping below the power law experience curves

Source: DOE

Sources: (CdTe) First Solar Earnings Presentation, SEC Filings;
(c-Si) Navigant, Bloomberg NEF, NREL internal cost models



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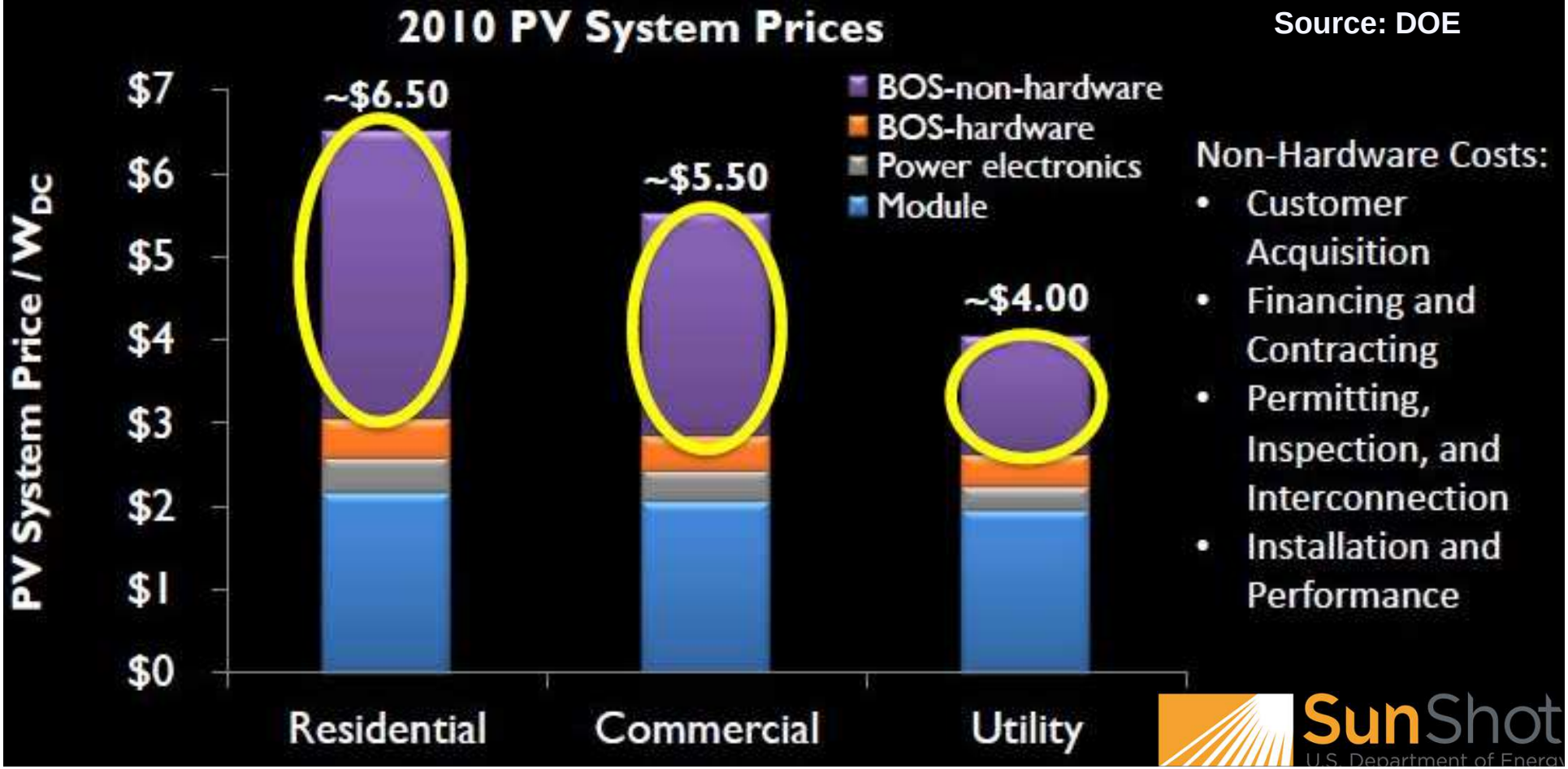
The Issue:

"Even if you paid nothing for the hardware, you'd still pay thousands of dollars to install a residential solar power system" - Secretary Chu



But Why So Pricey?

- Complicated and confusing process
- Process is different for every locale
- Unnecessarily high permit fees

  In-person application submission and inspection

- Long wait times for inspection and approval

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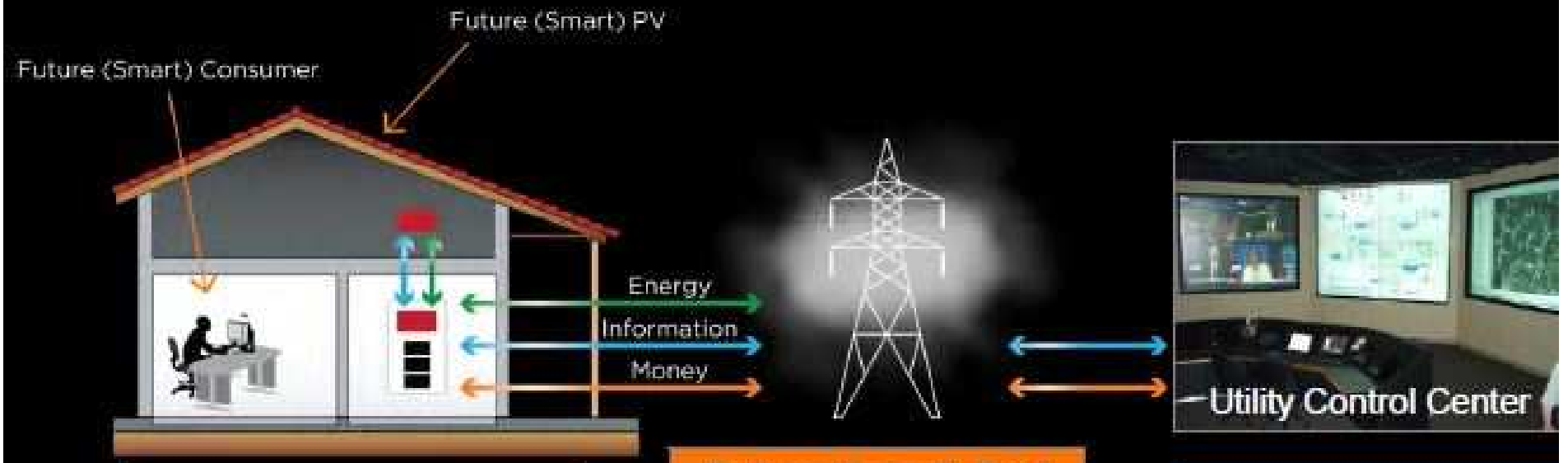
Source: DOE

Plug-and-Play

Vision : PV as an Appliance

No permitting Easy installation Seamless grid integration

Source: DOE



Future (Smart) Home

- Smart outlet
- Smart circuit
- Smart breaker panel
- Smart appliances
- Home area network (HAN)

Future (Smart) Grid

- Distributed generation
- Two-way power flow
- Communication and control
- Rich energy information and transactions
- Microgrid

Future (Smart) City

- Integrated grid and city planning

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Why should the installation of a PV system on your roof be handled like the installation of a gas water heater?

Source: DOE

Residential PV in Germany costs ~$2.50/W

Residential PV in the U.S. costs ~$6/W

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Germany's Success

As long as housing structure is built to code, no permits filed for residential PV in Germany

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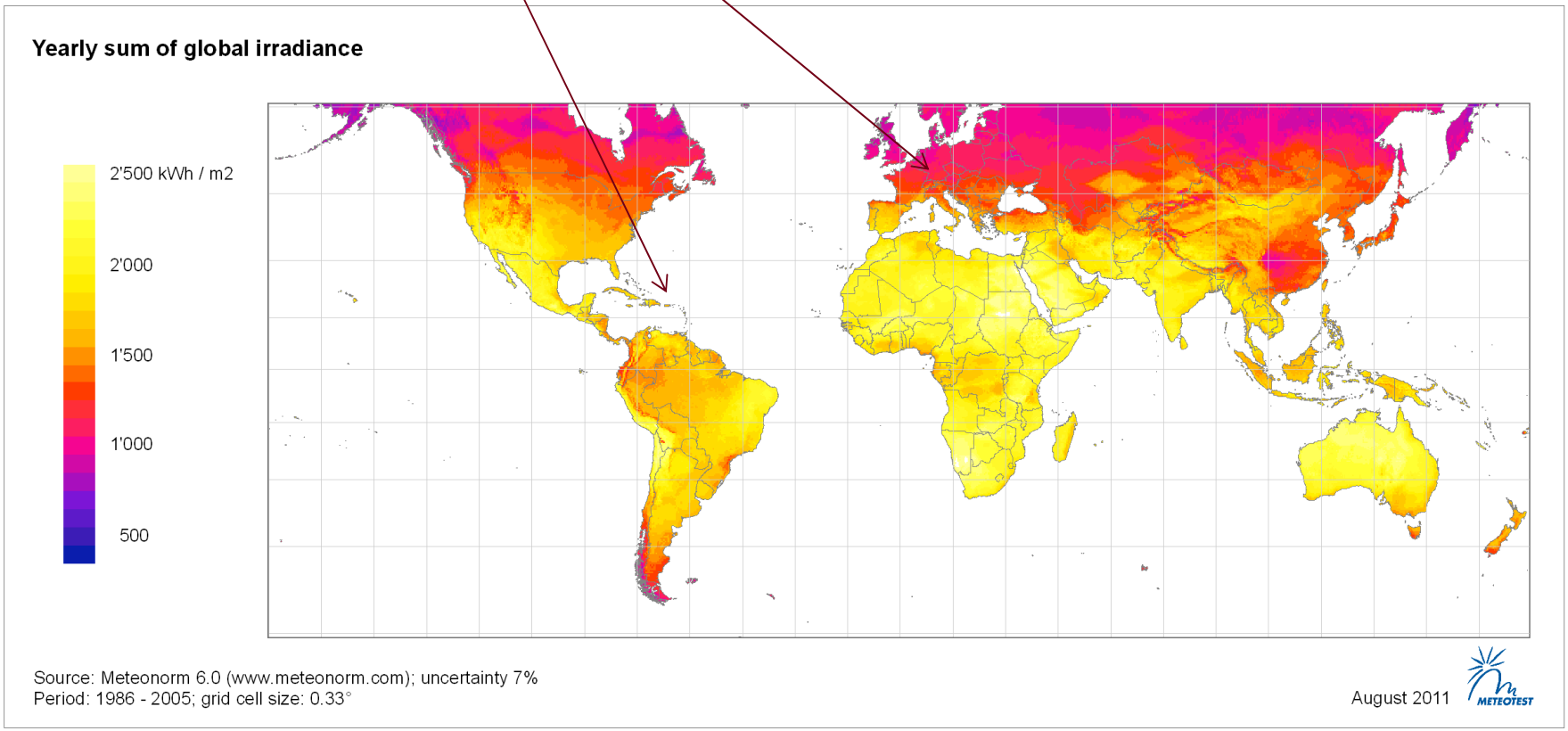
Source: DOE

Solar Irradiation World Map

Sun irradiation: Puerto Rico 2,000 kWh /(m^2) to 2,100 kWh / (m^2)

Germany 1,000 kWh /(m^2) to 1,100 kWh / (m^2)



Residential Scale Interconnection

The interconnection process in Germany follows the same general process as in California. But **no interconnection agreement or contract is required of the customer**.

Germany Interconnection Process: 1) Application, 2) Utility Review, 3) Commissioning, (Contracts are recommended, but PV system may connect to the grid with out a contract)

Grid integration issues have not been a problem for utilities in Germany.

Clear rules in place about what is required, eliminating many of the utility barriers common in the U.S.

Time Requirements to Complete Interconnection Application Process in Germany

PV Legal's survey found that residential systems (up to 5 kWp) and roof-mounted commercial and industrial systems (up to 50 kWp) averaged 2 and 4 person-hours of legal-administrative labor, respectively, to complete the grid connection process.

System Category	Min.	Avg.	Max.
Residential (up to 5 kWp)	1	2	3
Roof-Mounted Commercial and Industrial (up to 50 kWp)	2	4	6
Ground-Mounted (up to 5 MWp)	6	25	46

Source: PV Legal 2011b, PV Legal 2011g, PV Legal 2011h

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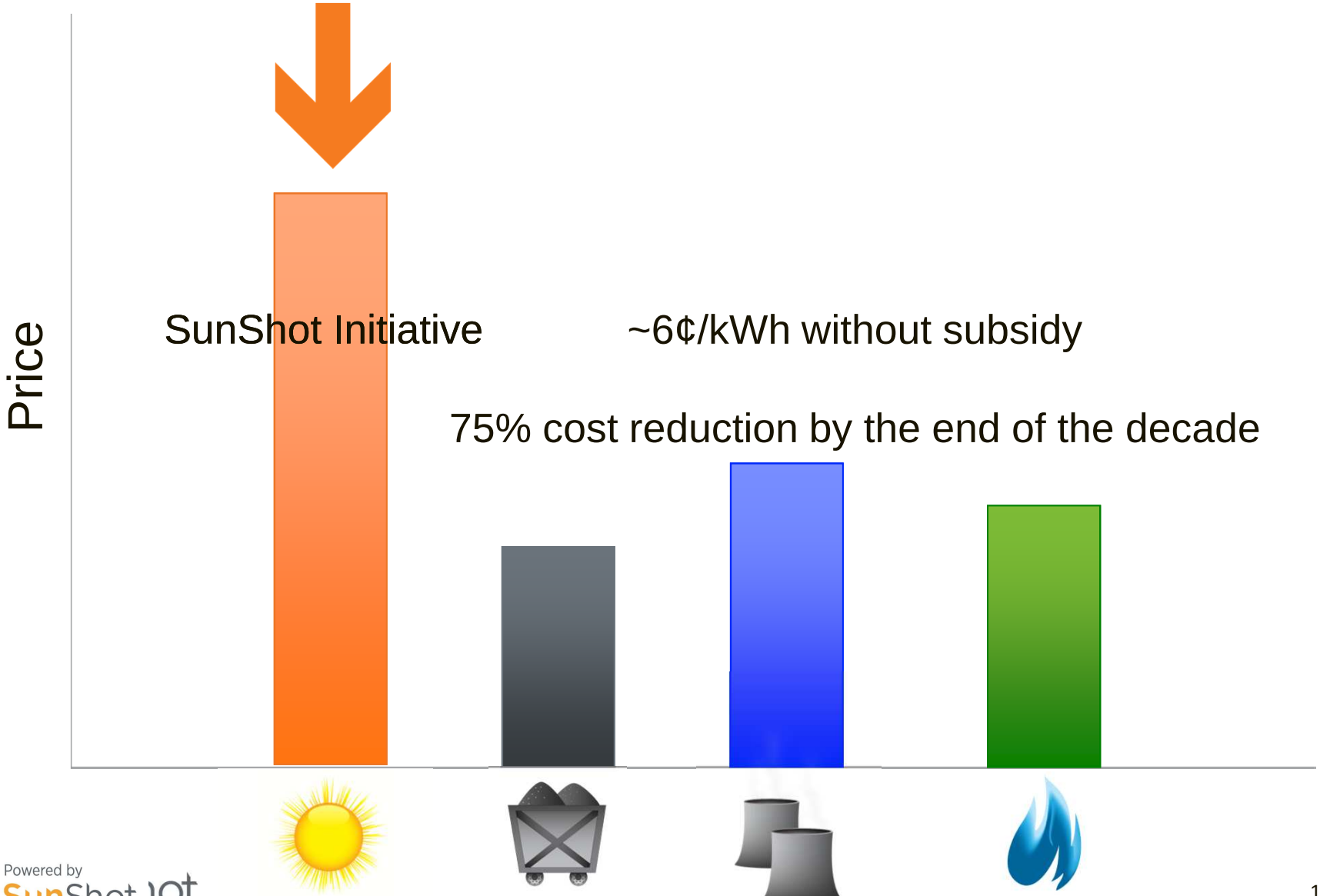
Key findings: German Utilities

- **Renewable electricity output has priority in grid management** – the system operator manages non-renewable units around the integration of renewable electricity, which has priority in the system integration.
- Customer satisfaction is important and **"customers want utilities to embrace renewables, not just accept them**."
- German utilities must interconnect all renewables to the grid and **the rules are very clear**.
- External disconnects and system inspections are not necessary.

More Key findings: German Utilities

- Ease of integration is inherent to the less litigious nature of Germany and the assignment of **no-fault as long as the specific rules were followed**.
- **Clarity and transparency** – there are no surprises or uncertainly and therefore they can plan accordingly.
- **German utilities used to require external disconnect switches** but do not any longer. Since there are so many PV systems on their grid, it would be a burden to the utility to utilize and manage them all.
- **German utilities want PV to stay on the grid during disturbances to provide grid support**.
- Large ground mount systems are a relatively small and decreasing part of the overall German solar market.
- **Theft of panels has become a problem in Europe**.

Why we're here: Big Picture



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Source: DOE

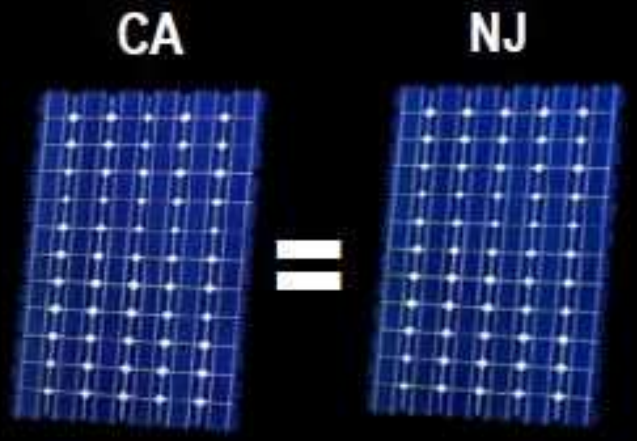
Rooftop Solar Challenge

The Problem

- **18,000+** local jurisdictions with different PV permitting requirements
- **5,000+** utilities implementing interconnection standards and net metering programs
- 50 states developing interconnection standards and net metering rules

The Solution

The Challenge invests in **22** teams comprised of jurisdictions, utilities, and local stakeholders to develop the same requirements and processes across large geographic areas (500,000+ population). The Challenge also measures each team's progress to identify approaches that work.



Uniform processes

Source: DOE

Rooftop Solar Challenge

- Partnerships among relevant stakeholders to improve market conditions for rooftop PV in major regions of the USA.
- Focus on grid-connected rooftop PV in the residential and commercial sectors
- Emphasis on streamlined and standardized permitting and interconnection processes.
- Encourage participation to ensure meaningful, measurable results.

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Source: Funding Opportunity Announcement DE-FOA-0000549

Market Evaluation Points

ACTION AREA	POINTS
Permitting Process	**460**
Application	110
Information Access	60
Process Time	110
Fee	30
Model Process	30
Inspection	80
Communication w/ Utility	40
Interconnection Process	**110**
Application	40
Information Access	20
Process Time	20
Inspection	30

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Source: Funding Opportunity Announcement DE-FOA-0000549

Market Evaluation Points (cntd)

Interconnection Standard	**100**
Net Metering Standard	**100**
Financing Options	**150**
Third Party Ownership (or equivalent)	90
Direct Finance Options	25
Community Solar	15
Other	20
Planning and Zoning	**80**
Solar Rights and Access	54
Zoning	20
New Construction	6
TOTAL POINTS POSSIBLE	**1000**

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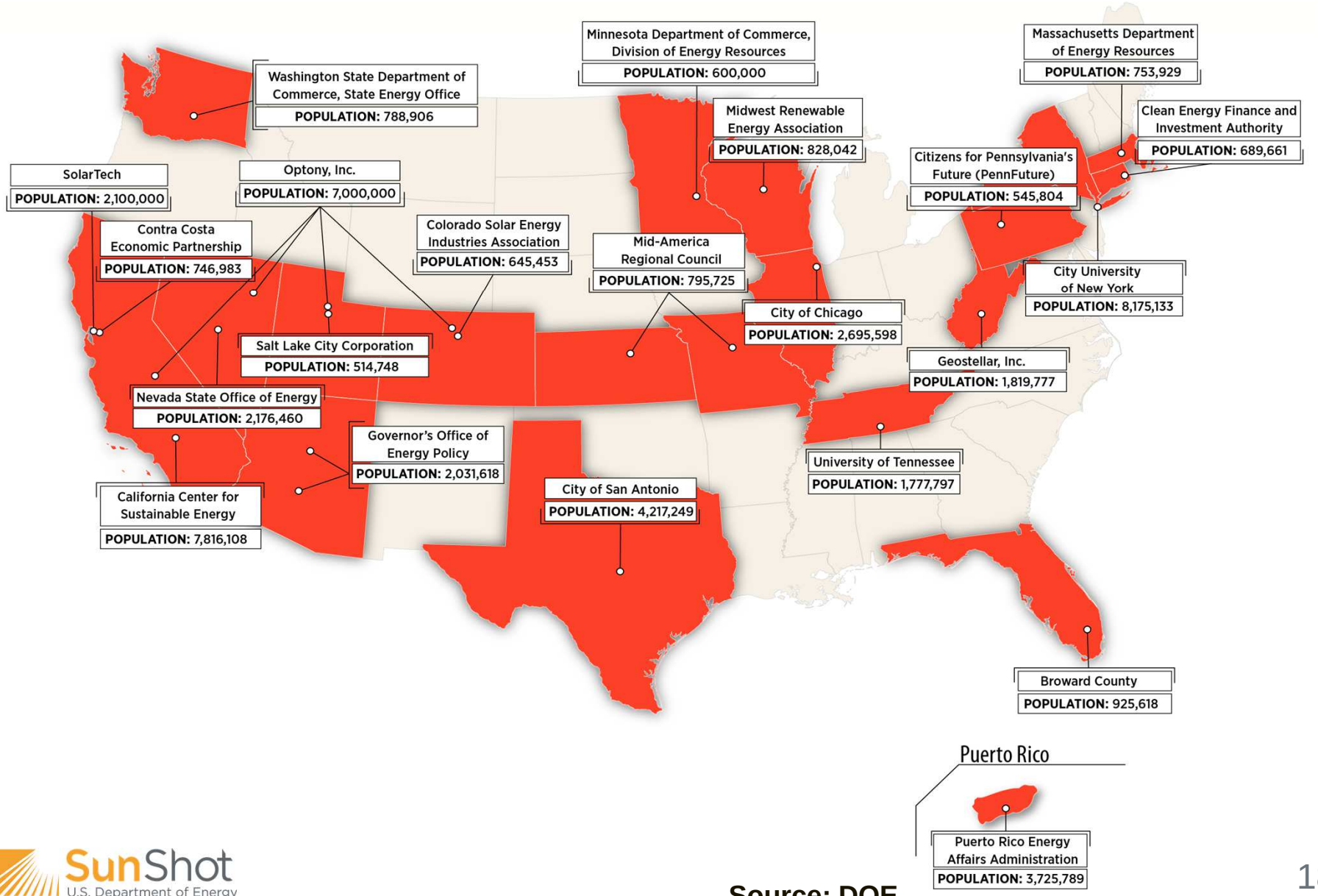
Source: Funding Opportunity Announcement DE-FOA-0000549

Who's leading the way:



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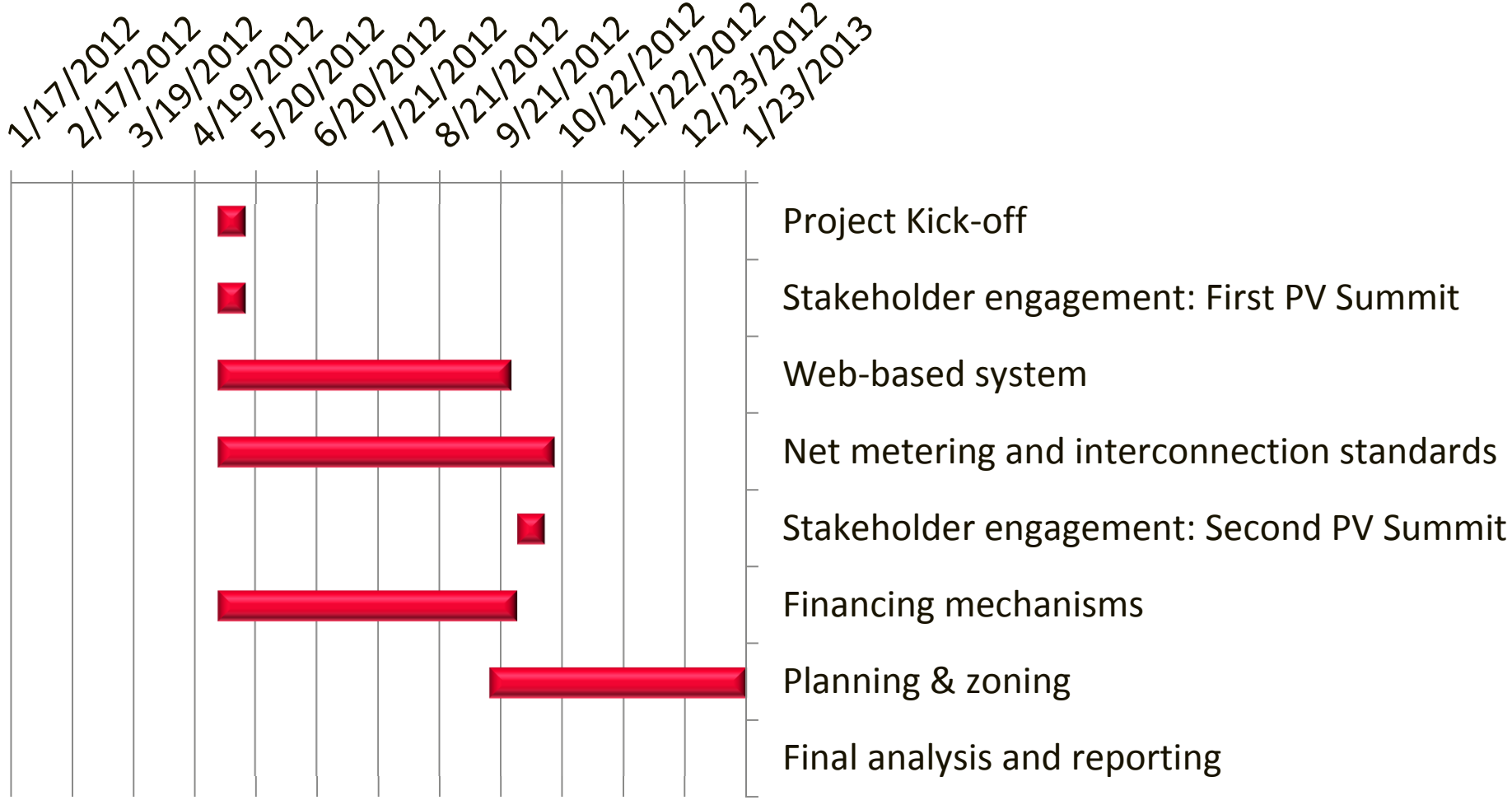
Source: DOE

Rooftop Solar Challenge to Induce Market Transformation in Puerto Rico

Objectives

- Create a standardized framework for PV deployment.
- Streamlined and organized, lean permitting and interconnection processes.
- Safely and quickly installations of residential and small commercial PV systems
- Evaluate and adopt recommendations proposed by Solar ABCS and the Network for New Energy Choices.
- Identify, analyze, and provide best practices that overcomes permitting and interconnection obstacles.
- Create a holistic framework that ensures process predictability and standardization while dealing with rooftop PV market barriers.
- Bolster the incipient PV market in the Island.

Timeline


1/17/2012
2/17/2012
3/19/2012
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6/20/2012
7/21/2012
8/21/2012
9/21/2012
10/22/2012
11/22/2012
12/23/2012
1/23/2013
Project Kick-off
Stakeholder engagement: First PV Summit
Web-based system
Net metering and interconnection standards
Stakeholder engagement: Second PV Summit
Financing mechanisms
Planning & zoning
Final analysis and reporting

AEE	2006	2007	2008	2009	2010	2011
Capacidad instalada (MW)	5,388	5,388	5,402	5,898	5,898	5,898
Demanda Pico (MW)	3,685	3,604	3,546	3,351	3,404	3,406
Energía neta generada (MWh)	23,754	24,062	22,924	21,763	22,559	21,639
Energía perdida (MWh)	3,134	3,390	3,322	3,247	3,324	3,138
Energía vendida (MWh)	20,620	20,672	19,602	18,516	19,235	18,501
Cobrado tarifa básica (Millones)	$1,166	$1,184	$1,132	$1,072	$1,121	$1,087
Compra de combustible (M)	$1,868	$1,778	$2,473	$2,162	$2,256	$2,579
Compra de energía (M)	$674	$708.906	$745.753	$752.61	$777.52	$740.26
Ingresos Totales (M)	$3,732	$3,687	$4,369	$4,007	$4,173	$4,411
Gastos totales (M)	$3,034	$3,015	$3,688	$3,378	$3,427	$3,705
Ingresos netos (M)	$698	$672	$681	$629	$746	$706
Bonos: Intereses + Principal (M)	$449	$455	$420	$435	$398	$480

Time for change, time for collaborations

- Dominant energy model
  - Need to re-think ***OUR*** electric system and consumption
  - Envision a new grid and a new way to design and operate it
- The Sun is a different energy source
  - Renewable is not the same as sustainable
- Collaborations among sectors: government, industrial, commercial and residential
  - Going from an adversarial to a collaborative relationship
  - Going from mutual distrust, to a serious and lasting commitment for the public good, for the social, environmental and economic welfare of Puerto Rico.

Stakeholder engagement is vital

- Peter Senge, *The Necessary Revolution: How Individuals and Organizations are Working Together to Create a Sustainable World,* Doubleday, 2008.
- Venkat Ramaswamy, *The Power of Co-Creation*, Free Press, 2010.
- J. Colucci, M. Fontalvo, E. O'Neill-Carrillo, "CHEM E Sustainable Energy Demos, Workshops, Town Hall Meetings and Other Stakeholder Engagement: Working the Pipeline," *Proceedings of the 2012 ASEE Annual Conference,* San Antonio, TX, June 2012.
- E. O'Neill-Carrillo, C. Ortiz-García, M. Pérez, I. Baigés, S. Minos, "Experiences with Stakeholder Engagement in Transitioning to an Increased Use of Renewable Energy Systems," *Proceedings of the IEEE International Symposium on Sustainable Systems and Technology*, Washington, DC, May 2010.

Stakeholder Engagement

- Peter Senge argues that the deep problems we face today are the result of a way of thinking whose time has passed or is near its end.
- Do we protect the ways of the past or join in creating a different future?
- Seeing the *deeper pattern that connects many different problems* is crucial if we are to move beyond piecemeal reactions and create lasting change for PV systems.
- Many collaborative initiatives can be frustrating because they produce lots of talk and little action.
- *Groups might not have exactly the same set of objectives, but there was enough of a common ground to work together*
- We have been following this, with a clear focus (rooftop PV under 300 kW).

Stakeholder Engagement

- Dr. Ramaswamy argues in favor of co-creation, developing systems, products or services through collaboration
- *Co-creation involves democratization and decentralization of value-creation*, moving it from concentration inside a few to interactions with stakeholders.
- Dr. Ramaswamy goes on to describe "social eco-systems" an environment with free flow of information, which engages people better and enable richer, fuller stakeholder interactions than traditional outreach strategies.
- For our project, the use of focus and small group meetings are the key engagement platforms supported by electronic and phone conversations with key stakeholders. It is our objective to expand those engagement platforms in ***the creation of a PV Community in Puerto Rico.***

Sharing Success Emerging Approaches to Efficient Rooftop Solar Permitting (IREC)

- Realistic and effective ways to improve solar permitting
- ***The responsibility for change should be shared***
  - Utility: Processes and requirements
  - PV Industry: complete and accurate applications
- ***Need commitment from both groups to be effective.***

Sharing Success Emerging Approaches to Efficient Rooftop Solar Permitting (IREC)

- Changes to permitting policies should benefit all involved
  - Understand PREPA's operations and services
  - Understand PV industry's challenges
- The economic conditions faced by both groups are critical
- ***The best solutions are those that benefit the broader community.***

Rules of Engagement

- Development of best practices
  - Aspirational: a vision of where the rooftop PV market could be
- Practical considerations
  - I.d. low hanging fruit, e.g., clarifications of grey areas
- Respectful dialogue
  - We will not agree on everything, but at least, try to listen and understand the other sector's perspective
- What's the value-added for my sector?

Task 1.0 Stakeholder Engagement

- Create best practices with active participations of PV stakeholders
- Kick-off activities of the project
  - May 2nd, 2012, PREAA; May 8th, 2012, Mayaguez
- Focus group meetings on processes and standards
  - May 31st, June 19th PREAA; May 30th, June 20th UPRM
- Small Group Meetings: Processes and Standards
  - July 12th, 2012, Mayaguez; July 13th, 2012, PREAA
- Focus group meetings on financing
  - July 18th, 2012, August 28th, 2012, Mayaguez
  - July 19th, 2012, PREAA
- ***Small Group Meeting: Financing***
  - ***TBA, SEPTEMBER, Mayaguez and San Juan***
- ***Focus group meetings on Planning and Zoning***
  - ***TBA, SEPTEMBER, Mayaguez and San Juan***

Task 2.0 Web-based system to improve processes

1. PERMITTING AND INTERCONNECTION PROCESSES

   Develop and implement a transparent, consistent, and expedient permitting and interconnection process for residential (less than approximately 10kW) and small commercial (less than approximately 300kW) rooftop PV systems, throughout all participating jurisdictions.

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Source: Funding Opportunity Announcement DE-FOA-0000549

Key Reference

Solar ABCS

- Report from the Solar America Board for Codes and Standards (Solar ABCs). The full report documents legal issues for solar access and solar rights. The report provides model statutes for use by state and local governments.

Important Processes Findings

- The focus group allowed the group to confirm, refine and discover action items
- Low hanging fruit identified
  - Gray areas can be clarified (e.g., 15% limit on feeder)
- Procedural challenge
  - Unforeseen problems due to transfer of responsibilities from PREAA to OGPE
    - Initial intent of consumer protection has turned into additional time and fees

Main Task for Processes

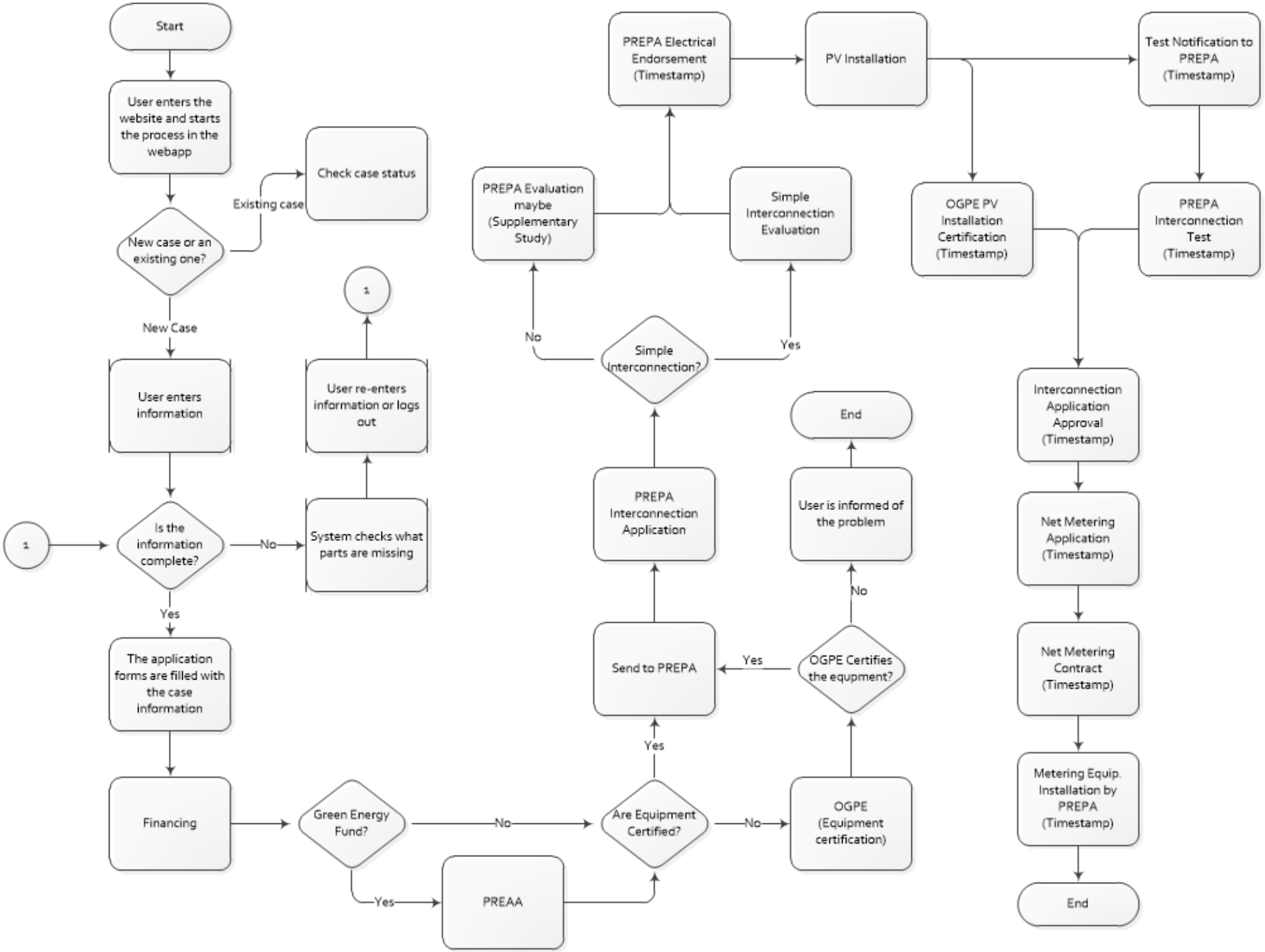
- An on-line framework is a key improvement strategy that will save time and money to all involved.
- Two approaches
  - Best practice: An Integrated Web-based Framework for Rooftop PV Systems
  - Near term: PREAA-based functions to complement processes at OGPE and PREPA

Main Task for Processes (cont.)

- Structure
  - General Information of rooftop PV in PR
  - Access to the Integrated System for Permitting and Deployment
  - The Puerto Rico Solar interface (PV Community)
  - Document Templates and Examples.
- Vision for the PV permitting functions
  - Software tools that become a one-stop shop for the PV market.
  - User inputs all the data for the proposed rooftop PV installation in once place
  - The system will automatically complete and electronically submit all forms
  - The objective is to speed up processing of rooftop PV cases to attain the recommended practice of less than a month for the whole process.

Workflow

- A workflow approach was recommended.
- The next workflow is not complete, there are some steps that need to be further clarified.
  - For example, Financing


Start
User enters the website and starts the process in the webapp
New case or an existing one?
Existing case
Check case status
New Case
User enters information
1
Is the information complete?
No
System checks what parts are missing
User re-enters information or logs out
1
Yes
The application forms are filled with the case information
Financing
Green Energy Fund?
No
Yes
PREAA
Are Equipment Certified?
No
OGPE (Equipment certification)
Yes
Send to PREPA
PREPA Interconnection Application
Simple Interconnection?
No
PREPA Evaluation maybe (Supplementary Study)
Yes
Simple Interconnection Evaluation
PREPA Electrical Endorsement (Timestamp)
PV Installation
OGPE Certifies the equpment?
Yes
No
User is informed of the problem
End
Test Notification to PREPA (Timestamp)
OGPE PV Installation Certification (Timestamp)
PREPA Interconnection Test (Timestamp)
Interconnection Application Approval (Timestamp)
Net Metering Application (Timestamp)
Net Metering Contract (Timestamp)
Metering Equip. Installation by PREPA (Timestamp)
End

Initial Tasks

- User logs in to the website.

- User enters new case information.

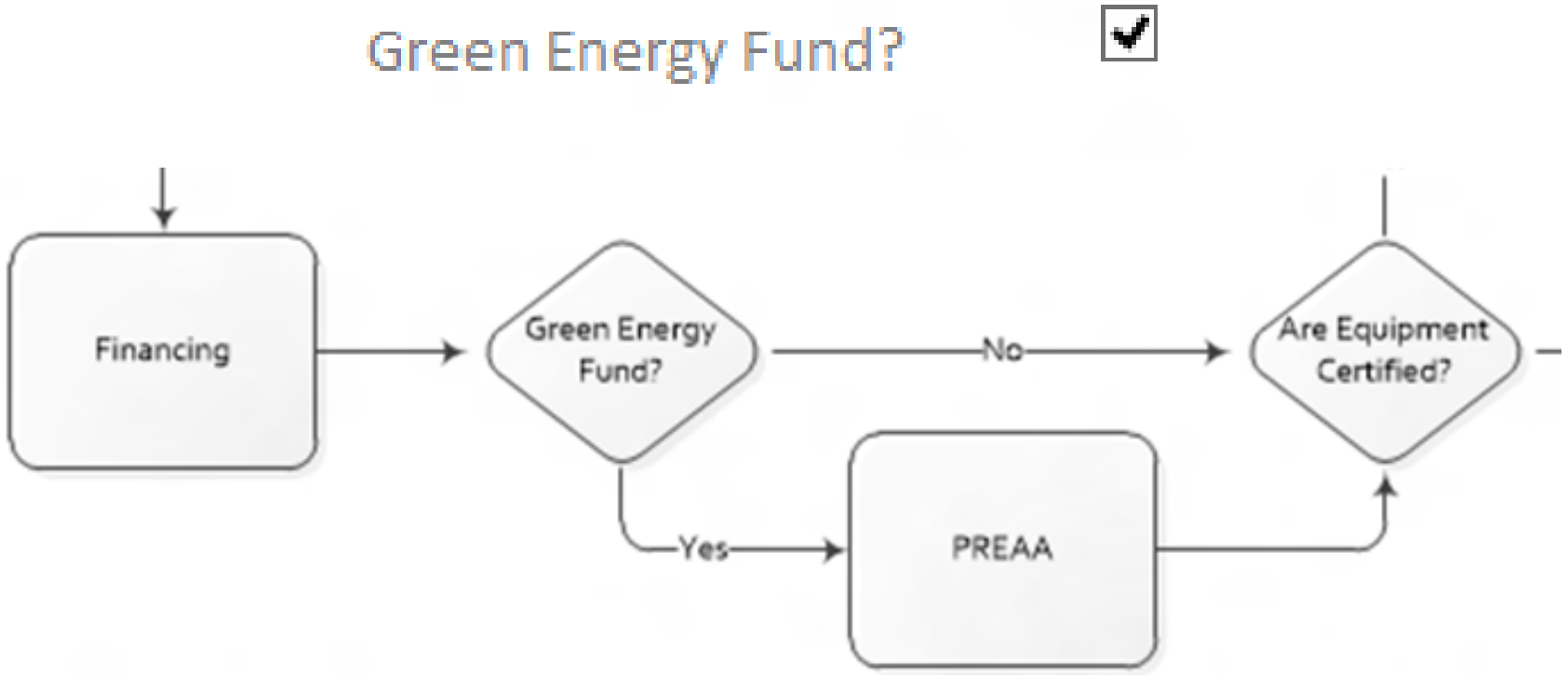
SharePoint site (web app)

- PREAA, PREPA and OGPE will have accounts in the SharePoint Site.

- Daily e-mails reminders until case is opened.
- Upload approved case or negative evaluation
- Through the process the installer/user will receive e-mails about the status of the process.

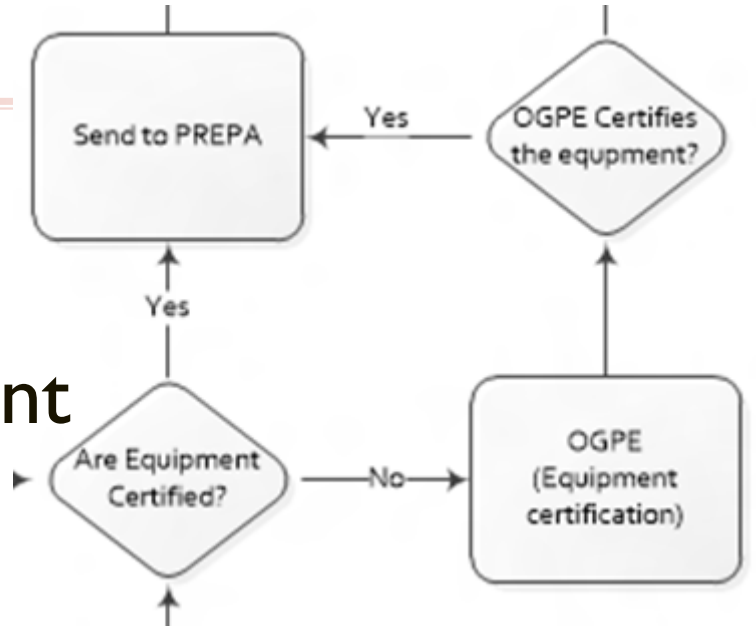
Financing options

- Financing work on-going
- If user selects Green Energy Fund, information will be given about needed steps.



Equipment

Are Equipment Certified? ☑

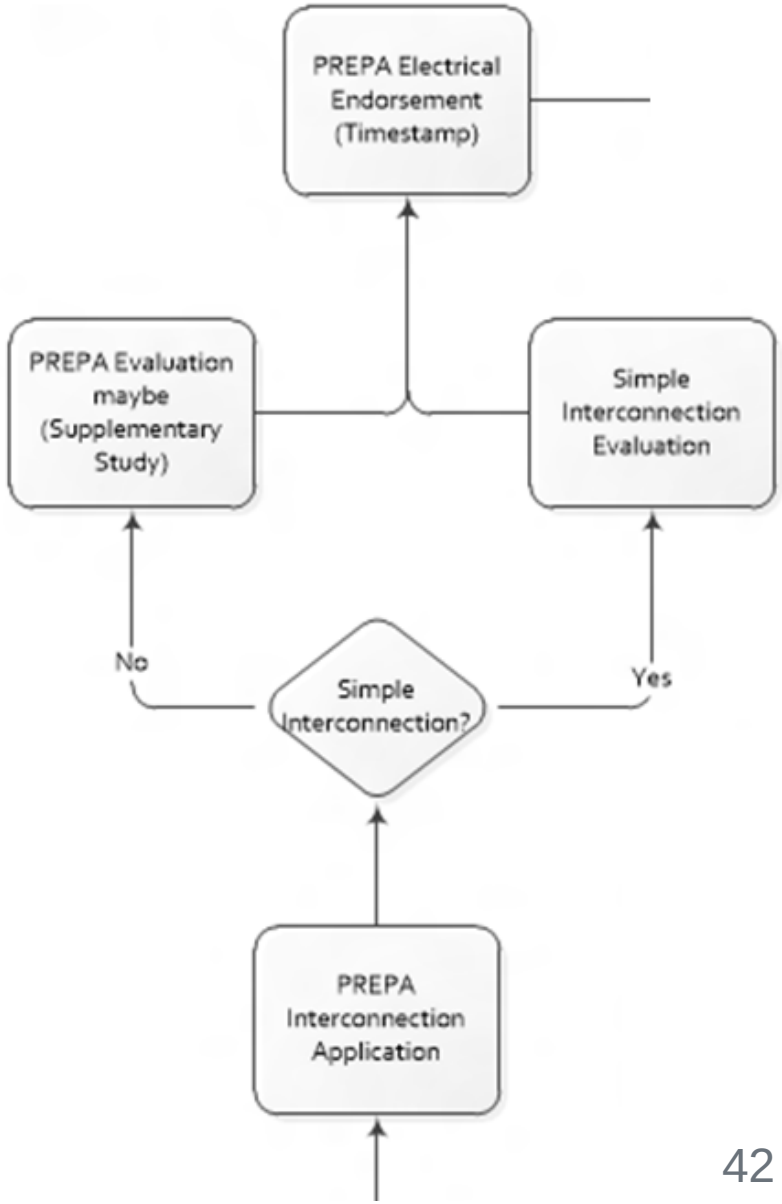


- User is taken to Database of Certified Equipment
- Else, user is taken to a screen for uncertified devices
  - OGPE certification process
  - User selects certified devices
- Once all certifications and applications are complete, case is sent to PREPA

Interconnection application

Simple Interconnection? ☐

- System checks if the installation complies with requirements for simple interconnection.
- If it is simple, the Simple Interconnection Evaluation process begins (PREPA confirms info).
- Else, PREPA evaluation process begins (check if study is needed).
- PREPA Electrical Endorsement
  - Goal: Develop an on-line tool to upload all documents and/or do as much as possible on-line



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ESTADO LIBRE ASOCIADO DE PUERTO RICO
AUTORIDAD DE ENERGÍA ELÉCTRICA DE PUERTO RICO

SOLICITUD DE EVALUACIÓN PARA LA INTERCONEXIÓN DE GENERADOR DISTRIBUIDO (GD) AL SISTEMA DE DISTRIBUCIÓN ELÉCTRICA

Nota: Esta solicitud no aplica para generadores que operen aislados del sistema de distribución de la Autoridad.

A - Información del Solicitante

Nombre: Israel J. Ramirez Sanchez

Teléfono (día): (787) 265-2859 Teléfono (noche): (787) 206-7301

Fax: (787) 265-2859 Email: israel.ramirez@upr.edu

Dirección Postal: Mayaguez PR 00680

B - Relación del Colicitante con la propiedad donde se instalaráa el GD:

Relación del Colicitante con la propiedad donde se instalaráa el GD: Alquiler

C - Información del Dueño

Nombre: Israel Ramirez

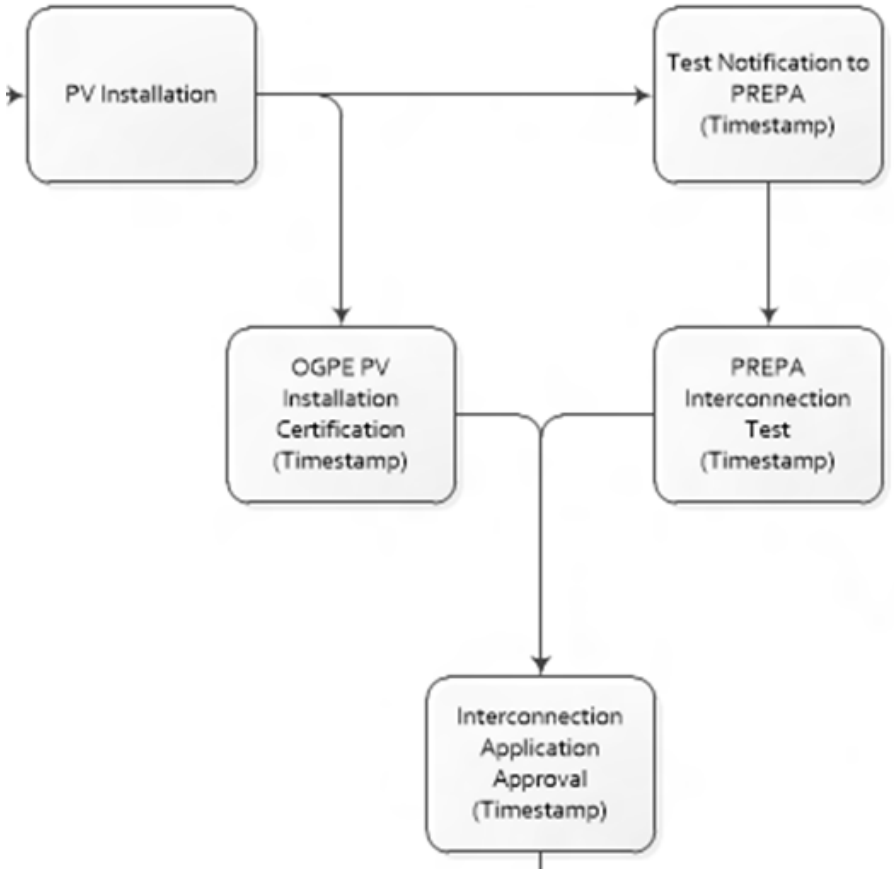
Teléfono (día): (787) 956-4656 Teléfono (noche): (979) 654-6546

Fax: Email: irsrony@gmail.com

DirecciónPostalDueno Mayaguez 00682

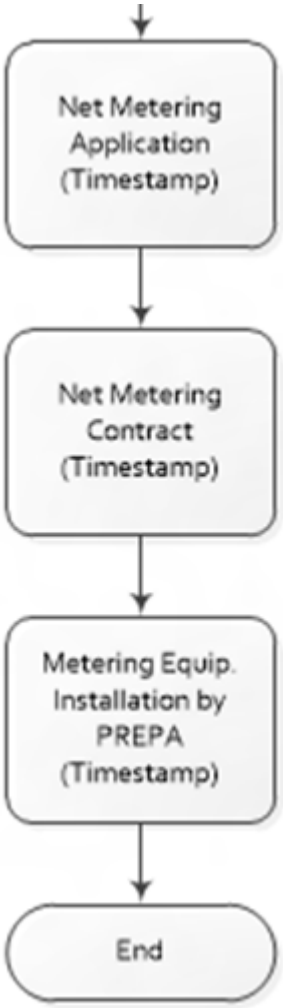
Installation and tests

- PV Installation
- Notification of test sent to PREPA
- PREPA confirms attendance to test and inspection
- Tests performed
- Submission to OGPE for installation certification
  - Goal: On-line process should speed up response
- Interconnection Application Approval.

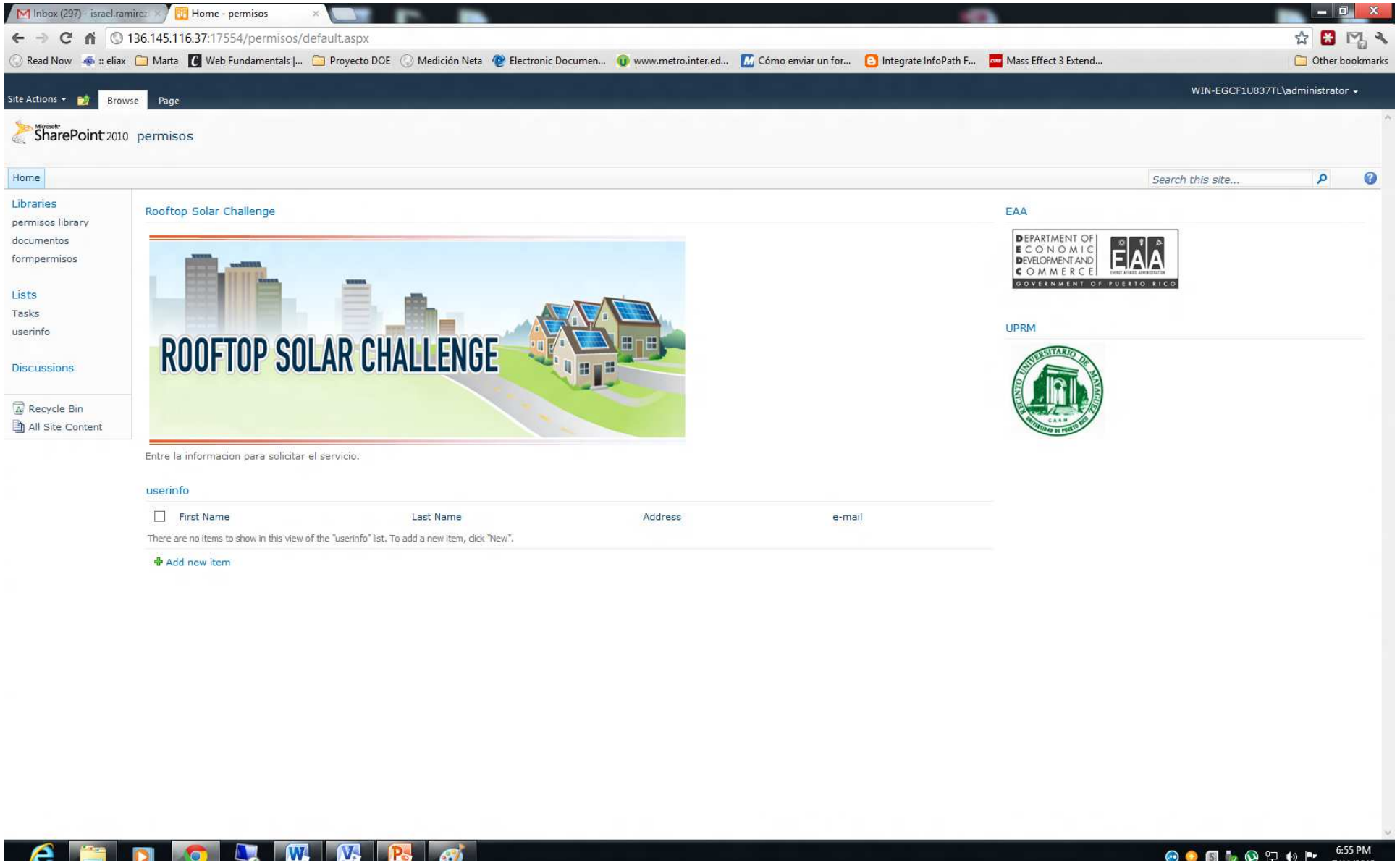


Net Metering

- Submission of application
- PREPA evaluation
  - Goal: Evaluation and decision made on-line
- User signs contract on-line
- Automatic generation of PREPA actions



Case Database



Task 3.0 Evaluate and improve standards

2. NET METERING AND INTERCONNECTION STANDARDS

Improve interconnection and net metering standards, as evaluated by the Network for New Energy Choices grading scheme, for the primary load-serving utility in each participating jurisdiction.

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Source: Funding Opportunity Announcement DE-FOA-0000549

Key Reference

Network for New Energy Choices

- Network for New Energy Choices promotes environmentally responsible energy policies and technologies through in-depth reports and web content.

- Freeing the Grid (2011) - Best Practices in State Net Metering Policies and Interconnection Procedures.

- Performed detailed analyses of best practices from NNEC. May 2012 (*Freeing the Grid* report)

What is the Freeing the Grid Report?

- *Freeing the Grid* report explains in details all the best and worst practices in PV systems.
- The report shows PV systems practices in two types: 1) *net metering* and 2) *interconnection*.
- This two type of practices are graded with different letters such as A, B, C, D, and F where A is the best and F is bad practice.
- Finally, the report provide recommendations to the States to improve their practices.

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Common mistakes: net metering and interconnection

- Limiting program eligibility based on the size of individual renewable energy systems.
  - Potential solution for Puerto Rico: The size of a system should be determined only by a customer's load and by the nature of the grid (the point of interconnection).
- Capping the total combined capacity of all customer-sited generators.
  - Potential solution for Puerto Rico: Limit must be set based on engineering criteria in a way that does not affect the grid's reliability.
- Requiring unreasonable, opaque or redundant safety measures, such as an external disconnect switch.
  - Potential solution for Puerto Rico: Do not require external disconnect for inverter-based systems.

Common mistakes: net metering and interconnection

- Creating an excessively prolonged or arbitrary process for system approval.
  - Potential solution for Puerto Rico: Create a mechanism to ensure the interconnection application takes the least amount of time possible.
- Failing to promote the program to eligible customers.
  - Potential solution for Puerto Rico: Encourage rooftop PV among residential customers

Which States have the best practices? *Net Metering*

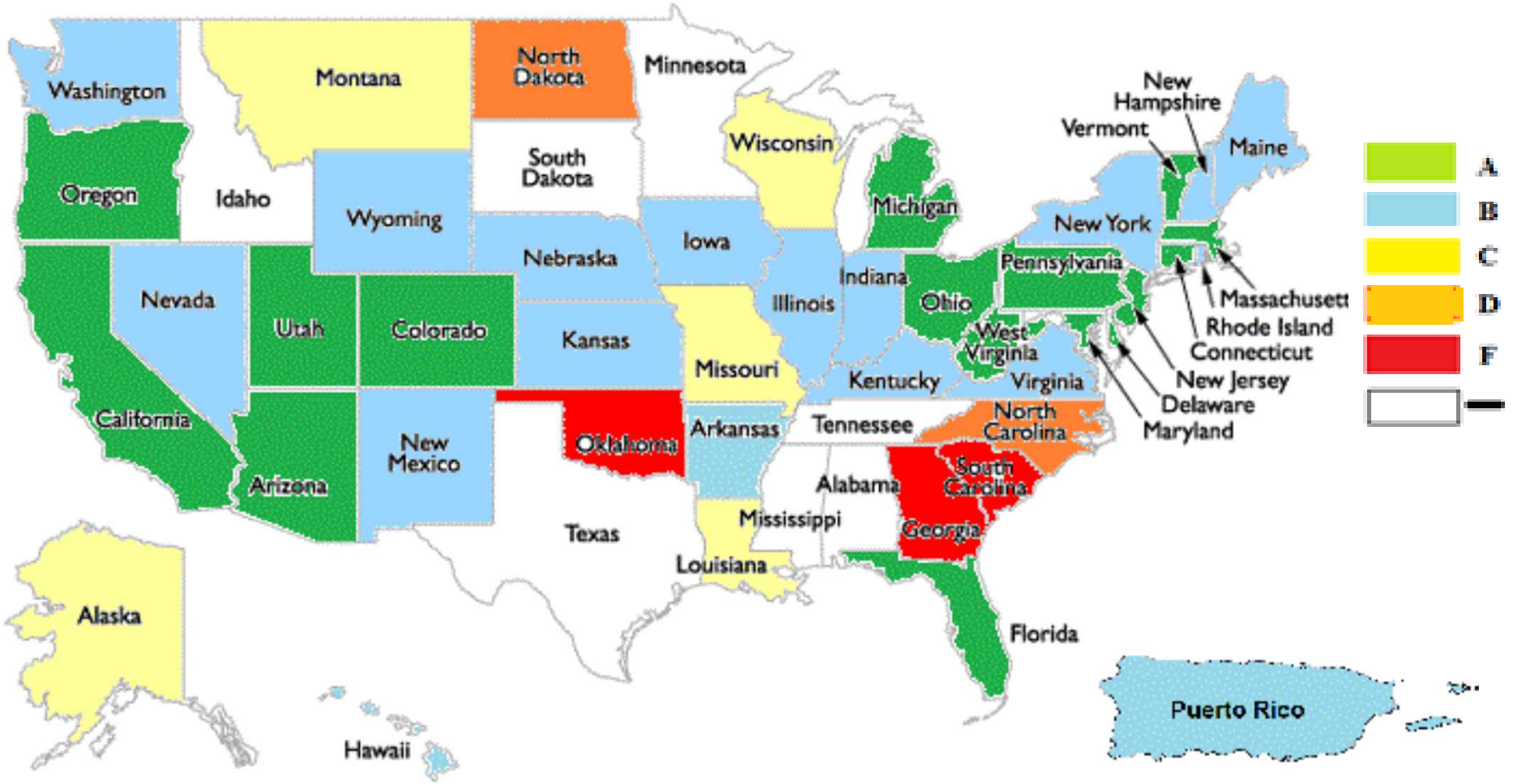

Fig. 1 Net-Metering: Map of United States including Puerto Rico .
Courtesy of Ms. Vivian Rodriguez, UPRM ECE Undergraduate Student

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Best Net Metering Practices (for all States)

1. adopt safe harbor language to protect customers-generators from extra unanticipated fees,
2. remove systems size limitations to allow customers to meet all on-site energy needs,
3. increase overall enrollment to at least 5% of peak capacity,
4. specify that customers-generators own their RECs, and more others.

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Revise net metering using *Freeing the Grid* 2010

- Allow net metering system size limits to cover large commercial and industrial customers' loads as systems at the 2 MW level are no longer uncommon.
  - Best practice: Increase size allowed to 2 MW for systems connected to 13 kV feeders
  - Near term: Preliminary study of potential users of 1-2 MW systems at 13 kV
- Do not arbitrarily limit net metering as a percent of a utility's peak demand.
  - Best practice: Change law to include language more flexible on capacity limit
  - Near term: Determine rational limits

Revise net metering using *Freeing the Grid* 2010

- Allow monthly carryover of excess electricity at the utility's full retail rate (unlimited).
  - Work in progress (Financing)
- Allow customer-sited generators to retain all renewable energy credits for energy they produce.
  - Work in progress (Financing)
- Protect customer-sited generators from unnecessary and burdensome red tape and special fees.
  - Best practice: Web-based system implemented will help reduce red tape.
  - Near term: Clarify all gray areas. Strict compliance with Law 114.

Which States have the best practices? *Interconnection*

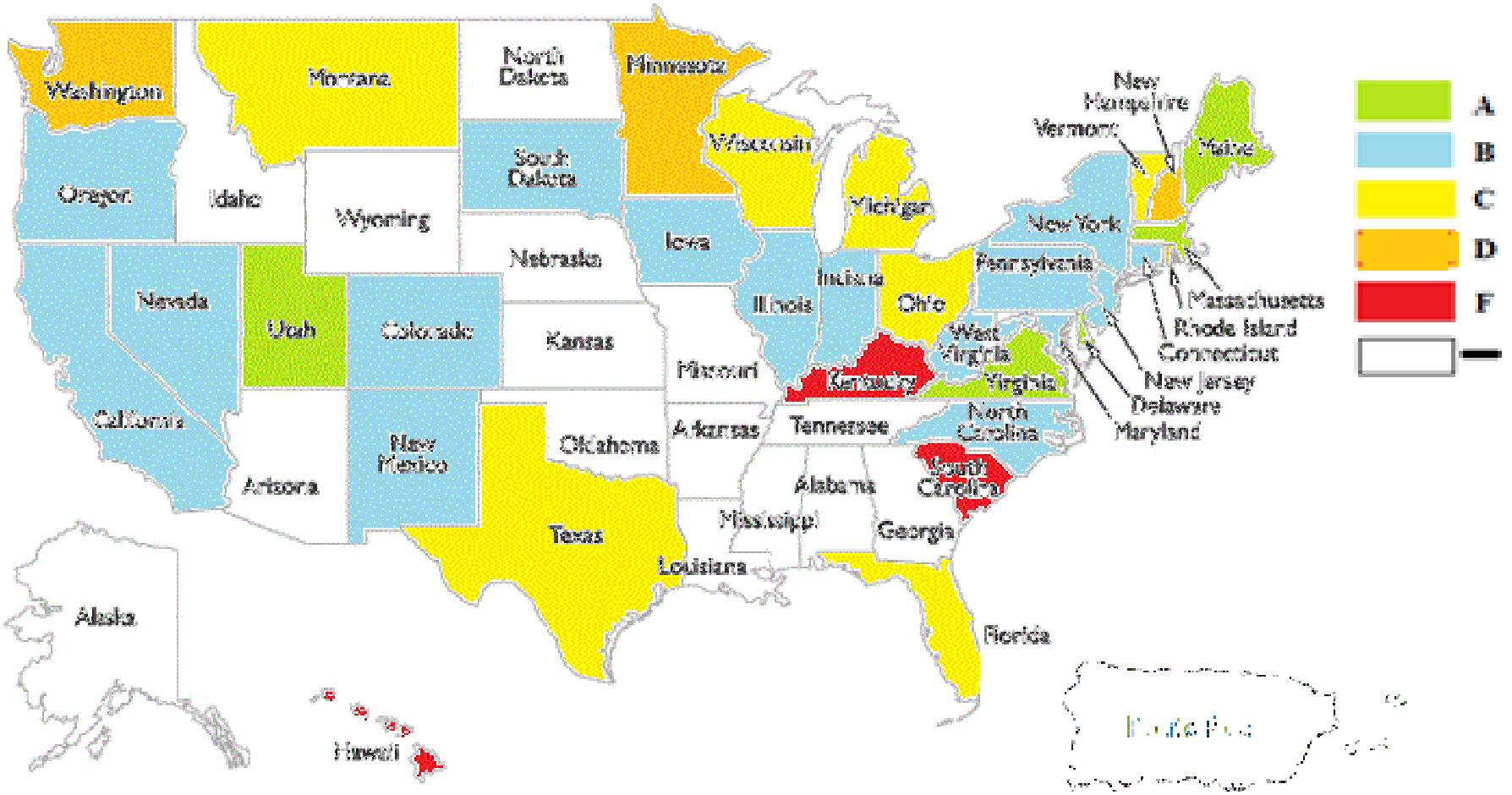

Fig. 2 Interconnection: Map of United States including Puerto Rico . Courtesy of Ms. Vivian Rodriguez, UPRM ECE Undergraduate Student

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Best Interconnection Practices (for all States)

1. remove system size limitations to allow customers to meet all on-site energy needs,
2. provide more clarification on the dispute resolution process, prohibit the use of redundant external disconnect switch,
3. prohibit requirements for additional insurance,
4. prohibit external disconnect switch requirements for all inverter-based system.

Revise Interconnection Procedures using *Freeing the Grid*

- Set fair fees that are proportional to a project's size.
  - Best practice: No fees for processes done on-line. Begin an Island-wide effort to characterize feeders, so that number of supplementary studies are minimized (begin with 13 kV feeders?).
  - Near term: OGPE/PREAA making available a certification database (no charge for on-line copies), accept National Labs certification for new equipment with minimum evaluation (no charge or minimum). PREPA should publish details and costs of needed studies.
- Ensure that policies are transparent, uniform, detailed and public
  - Best practice: Web-based system will strive to comply with these characteristics

Revise Interconnection Procedures using *Freeing the Grid*

- Prohibit requirements for extraneous devices, such as redundant disconnect switches. Apply existing relevant technical standards, such as IEEE 1547 and UL 1741.
  - Best practice: Do not require external disconnect for all rooftop PV Systems below 300 kW
  - Near term: Do not require external disconnect for systems below 25 kW (including small commercial systems)

Revise Interconnection Procedures using *Freeing the Grid*

- Do not require additional insurance.
  - Best practice: Do not require for all residential systems and small commercial systems (XX kW)
  - Near term: Ensure the existing order is included in the PREPA regulation
- Process applications quickly; a determination should occur within a few days. Standardize and simplify forms.
  - Best practice: Web-based system will be developed to this end. Ideally everything should occur within a month (interconnection & net metering).
  - Near term: PREAA-based system, OGPE and PREPA use tools

Revise Interconnection Procedures using *Freeing the Grid*

- Screen applications by degree of complexity and adopt plug-and-play rules for residential- scale systems and expedited procedures for other systems.
- Best practice: Four levels listed for interconnection:
  - Level 1 Screening Criteria and Process for Inverter-Based Generating Facilities Not Greater than 25 kW
    - Plug-and-play rules for residential-scale systems below 10 kW
    - PREPA, OGPE and OIGPE
  - Level 2 Screening Criteria and Process for Generating Facilities Not Greater than 2 MW
  - ~~Level 3 Screening Criteria and Process for Non-Exporting Generating Facilities Not Greater than 10 MW~~
  - ~~Level 4 Process for All Other Generating Facilities~~

Source: *Model Interconnection Procedures* and *Model Net-Metering Rules, IREC*

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Other activities

- Webpage development

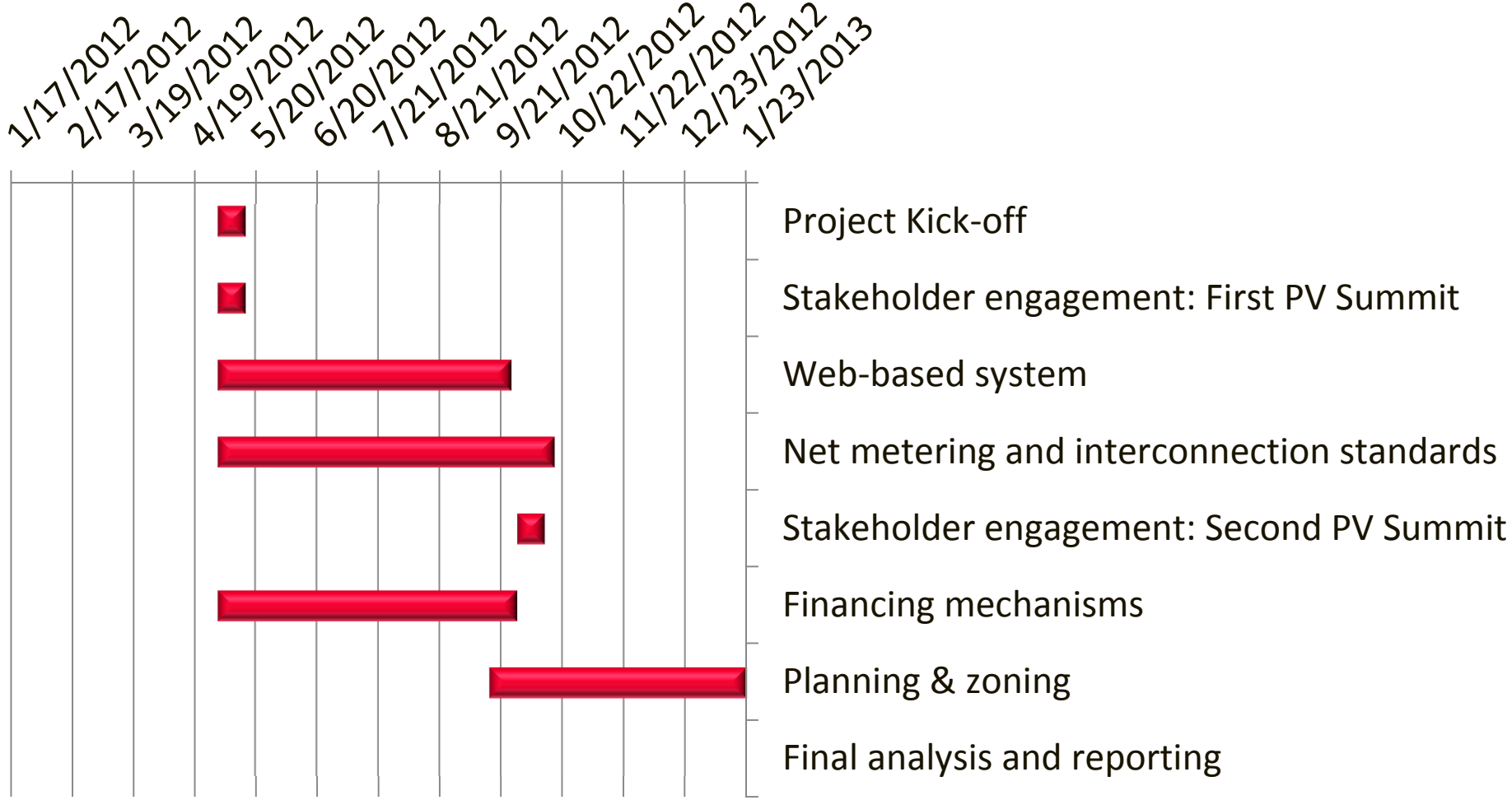
http://prsolar.ece.uprm.edu/

- Send your photos

Project's status

- Successful PV stakeholder engagement
- Combined processes and standards work
  - Web-based system begun
  - Identified low-hanging fruit, gray areas that can be improved, and major, longer-term obstacles
  - Perform detailed analyses of best practices from NNEC.
  - Discussed PV Market Assessment with Stakeholders
- ***PV Summit October 2012: Mayaguez and Metro Area***
- Work on Financing (Dr. Agustin Irizarry, Armando Figueroa)
  - Stakeholder meetings: Cooperatives, commercial banking, appraisers, insurance companies
  - ***Small Group Meeting TBA, SEPTEMBER***
- Zoning and Planning work to begin towards the end of September

Timeline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Project Kick-off
Stakeholder engagement: First PV Summit
Web-based system
Net metering and interconnection standards
Stakeholder engagement: Second PV Summit
Financing mechanisms
Planning & zoning
Final analysis and reporting

Rooftop Solar Challenge to Induce Market Transformation in Puerto Rico

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    - Dr. Efrain O'Neill – Project's Principal Investigator

- We invite you to visit the following websites for more info:
  - www.eere.energy.gov/solar/sunshot/rooftop_challenge.html
  - **http://prsolar.ece.uprm.edu/**