Webinar Series:

Energy Efficiency and Conservation Loan Program

With Experts from the U.S. Departments of Agriculture and Energy

Webinar #1 of 6:

Energy Efficiency and Conservation Loan Program Overview and Cost Effectiveness

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U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Energy Efficiency and Conservation Loan Program (EECLP)

Rural Utilities Service
Electric Program
US Department of Agriculture

The Electric Program

PRINCIPLES:

- Low interest funding
- Area coverage
- Cooperative principles - "owned by those we serve"
- Standardized "rural" engineering

The Energy Efficiency and Conservation Loan Program

- Rural Utilities Service published the Final Rule for the Energy Efficiency and Conservation Loan Program on December 5, 2013 which implements Section 6101 of the 2008 Farm Bill.
- Section 6101 expands the ability of the electric program to make loans for energy efficiency activities .
- This regulation is an added subpart to an existing regulation (new "subpart H" to 7 CFR 1710).
- The regulation allows new financing opportunities for RUS borrowers to provide energy efficiency activities to businesses and homeowners in rural America.
- Eligible EE programs can be developed and implemented by an eligible borrower for its service territory.
- Eligible investments and activities include; building weatherization, HVAC upgrades, ground source heat pumps, lighting, small scale renewable generation, energy audits, soft costs, etc.

The Energy Efficiency and Conservation Loan Program – cont…

- A typical borrower's energy efficiency program might have the utility relending the funds to the consumer for EE upgrades to homes, businesses or industry.
- Utilities may charge an interest rate to the consumer for the EE loan.
- Many EE programs feature on-bill repayment directly to the utility.
- Loans to RUS borrowers may have terms for up to 30 years in some cases.
- RUS will ask potential borrowers for a business plan and quality assurance plan to support the loan application.
- Potential borrowers should reach out to GFRs and/or headquarters personnel for guidance on submitting an application.

Options to Enable Energy Efficiency

- Payment through Electric On-Bill Financing
- This could be a tariff based program or a loan based program
- Loans may be serviced directly by an RUS Borrower or a financial institution

EECLP provisions

- Loan advances shall be on a reimbursement basis
- Start-up costs are possible 5%
- Consumer education and outreach programs may not exceed 5% of the RUS loan amount

EECLP Loan Requirements

- The EECLP loan process closely mirrors our existing loan process
- There are some differences though....
- Business Plans
- Quality assurance plans
- Prudent practice for any EE program

Who can borrow under EECLP?

1-An entity in the **business of providing** direct or indirect **retail electric service to consumers** in rural areas.

2-An entity in the **business of providing wholesale electric supply to distribution entities** providing service to consumers in rural areas.

3-An entity in the business of **providing transmission service to distribution or generation entities** providing services to consumers in rural areas.

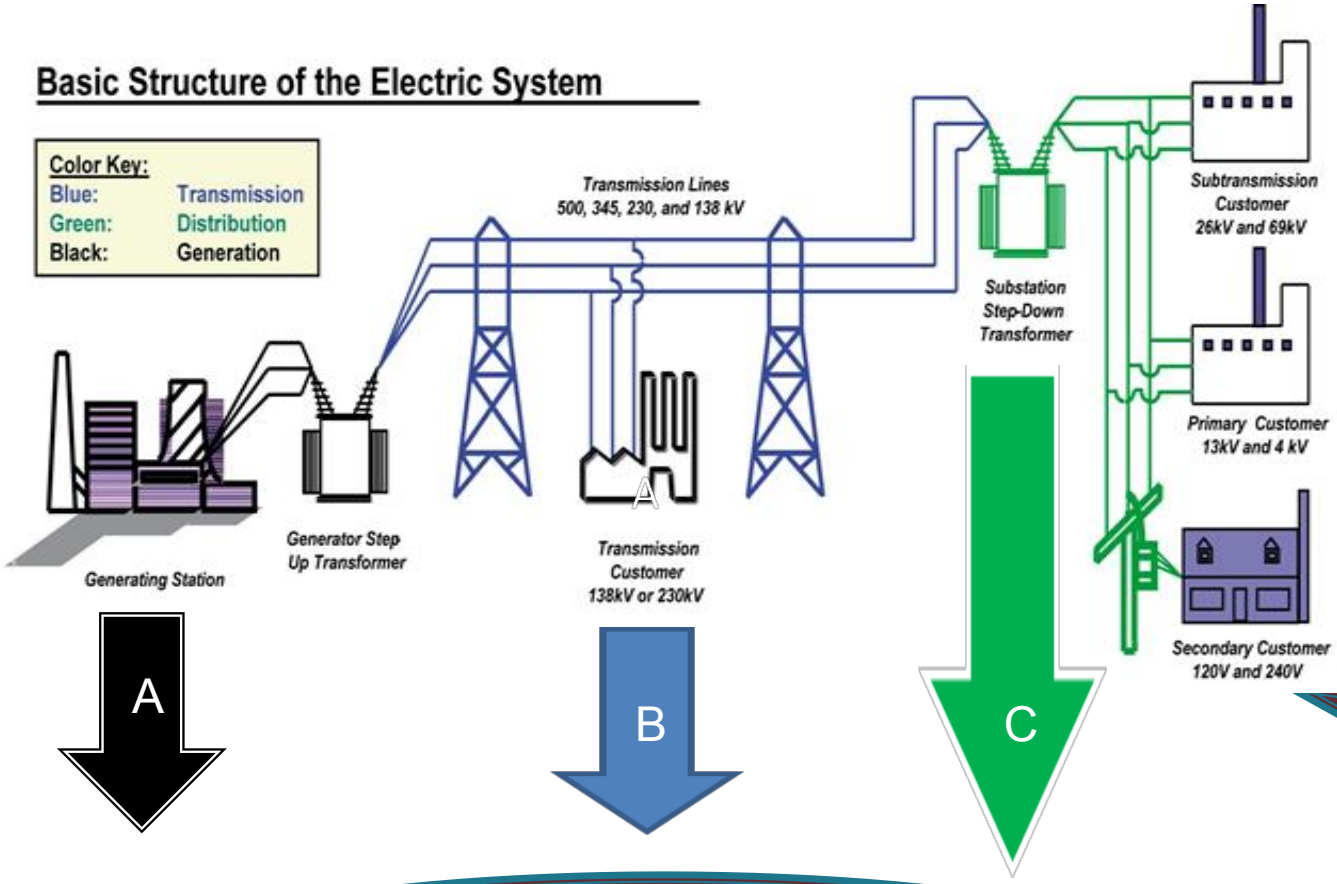
*The entity shall provide the applicable service using **self-owned or controlled assets** under a **published tariff** that the entity and any associated regulatory agency may adjust.*

Definition of "rural"

- The "rural area" definition currently in use by the Electric Program was established by Congress in the 2008 Farm Bill, enacted on June 18, 2008. For the Electric Program, a "rural area" is "any area other than a city, town, or unincorporated area that has a population of greater than 20,000 inhabitants."
- Existing borrower service territories were grandfathered at the time of enactment.
- RUS uses 2010 Census Places as the basis for making it's determinations as to what is rural and urban.
- Census data indicates **93% of places** (cities, towns and census designated places) were under the 20,000 threshold in 2010.

2000 Places	2010 Places	Census Population
1,944	2,098	>20,000
23,431	27,416	<=20,000
25,375	29,514	

A, B and C are eligible under EECLP



Rural Area in USA=
equal or less than
20K inhabitants

Leveraging other RD programs

- The Rural Business Service (RBS) and Rural Housing Service (RHS) have programs that can be leveraged using EE funds
- REAP
- REDLG
- Housing loans for EE
- Let us know your plans and we can get you to the right people…

For Additional Information

Please visit our website at: http://www.rurdev.usda.gov/UEP_HomePage.html

Energy+Environmental Economics

Energy Efficiency Cost Effectiveness Testing

November 20, 2014

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Why cost-effectiveness analysis?

+ Shortcomings of "full IRP" approach

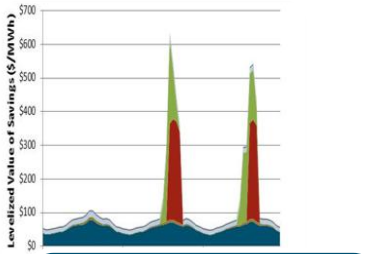
- Complex analysis on broad set of issues from fuel supply, operability, supply technology
- Significant time required (2+ years typically)
- Lack of stakeholder transparency
- Focus on ratepayer cost and risk, subject to minimum standards on reliability, environment

+ Once you have your 'preferred plan'

How do you test for a lower cost solution?

Reporting

- **Calculate avoided costs**
- **Input EE program and measure data**
- **Transparent analysis of costs and benefits using publicly available data**
- **Perform Standard Practice Manual cost tests**



Avoided Cost

Nominal Dollars

Adjusted Avoided Cost Values	2012
Monthly Generation Capacity Allocation	
Monthly T&D Capacity Allocation	
Adjusted Generation Capacity Value ($/kW-Yr)	$167.56
Adjusted T&D Capacity Value ($/kW-Yr.)	$77.59
Adjusted On-Peak Avoided Energy Cost ($/MWh)	$82.99
Adjusted GHG Value ($/MWh)	$9.21
Impacts	

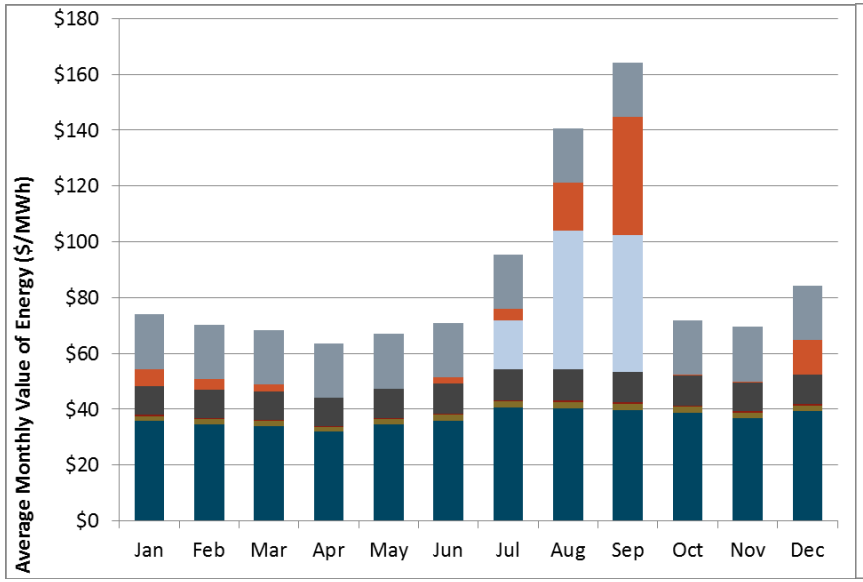
Program Impacts

	BIP
Benefit/Cost Ratio	
TRC	3.15
PAC	2.40
RIM	2.39
PCT	1.33
Load Impacts (MW)	233

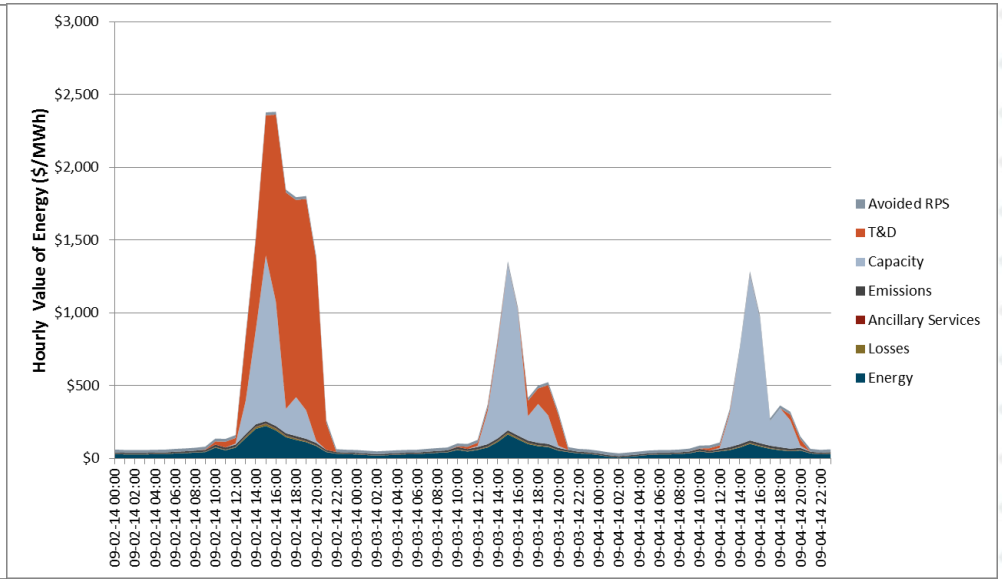
Cost-effectiveness Results

Avoided Costs (California)

Monthly Average



Peak Days



Definition of Cost Tests

Cost Test		Key Question Answered	Summary Approach
Total Resource Cost	TRC	Will the total costs of energy in the utility service territory decrease?	Comparison of program administrator and customer costs to utility resource savings
Participant Cost Test	PCT	Will the participants benefit over the measure life?	Comparison of costs and benefits of the customer installing the measure
Utility/Program Administrator Cost Test	UCT/ PAC	Will utility bills increase?	Comparison of program administrator costs to supply side resource costs
Ratepayer Impact Measure	RIM	Will utility rates increase?	Comparison of administrator costs and utility bill reductions to supply side resource costs
Societal Cost Test	SCT	Is the utility, state, or nation better off as a whole?	**Comparison of society's costs of** energy efficiency to resource savings and non-cash costs and benefits

Summary of Costs and Benefits

Component	TRC	PCT	PAC	RIM
Energy and capacity	Benefit		Benefit	Benefit
Additional resource savings	Benefit			
Non-monetized benefits				
Equipment and install costs	Cost	Cost		
Program overhead costs	Cost		Cost	Cost
Incentive payments		Benefit	Cost	Cost
Bill Savings		Benefit		Cost

Defining "Ratepayer Neutral"

- Most restrictive cost-test

Benefits

- Energy
- Capacity
- T&D
- GHG
- Losses
- RPS Purchases
- Ramp
- Overgeneration

>

Costs

- Bill Savings
- Incentives
- Admin & Overhead
- EM&V

PAC

RIM

Defining Incremental Costs

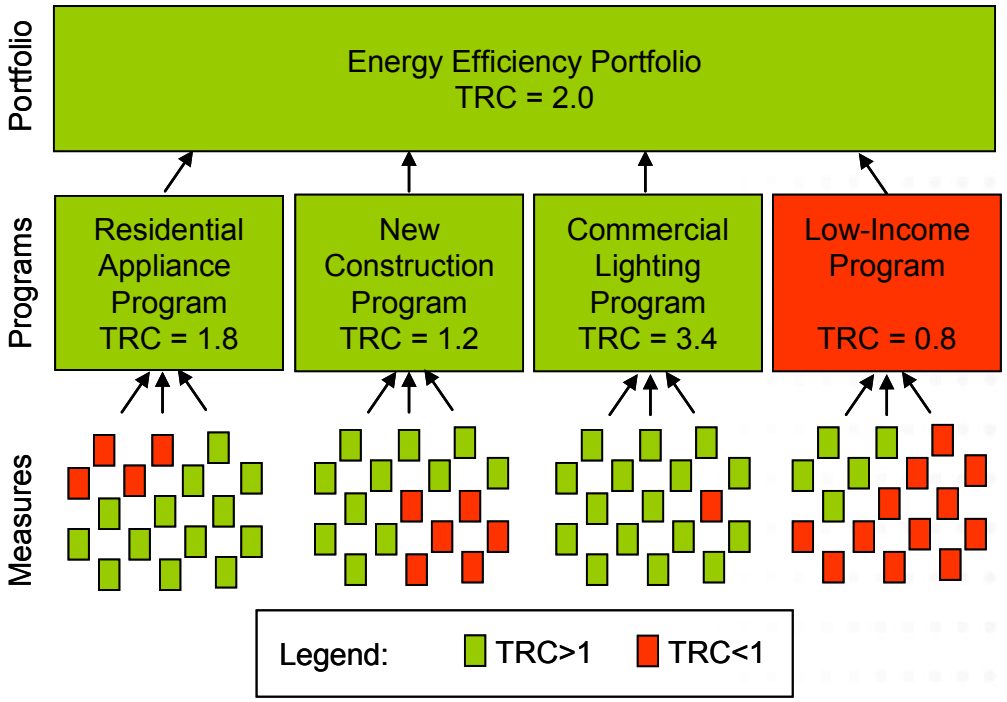
Decision Type	Definition	Example
New New construction Lost opportunity	Encourages builders and developers to install energy efficiency measures that go above and beyond building standards at the time of construction	Utility offers certification or award to builder of new homes that meet or exceed targets for the efficient use of energy.
Replacement Failure replacement Natural replacement Replace on burnout	Customer is in the market for a new appliance because their existing appliance has worn out or otherwise needs replacing. Measure encourages customer to purchase and install efficient instead of standard appliance.	The utility provides a rebate that encourages the customer to purchase a more expensive, but more efficient and longer-lasting CFL bulb instead of an incandescent bulb.
Retrofit Early replacement	Customer's existing appliance is working with several years of useful life remaining. Measure encourages customer to replace and dispose of old appliance with a new, more efficient one.	The utility provides a rebate toward the purchase of a new, more efficient refrigerator upon the removal of an older, but still working refrigerator.
Retire	Customer is encouraged to remove, but not replace existing fixture.	The utility pays for the removal and disposal of older but still working "second" refrigerators (e.g., in the garage) that customer can conveniently do without.

Incremental Costs

Type of Measure	Measure Cost ($/Unit)	Impact Measurement (kWh/Unit and kW/Unit)
New New construction Lost opportunity	Cost of efficient device **minus** cost of standard device *(Incremental)*	Consumption of standard device **minus** consumption of efficient device
Replacement Failure replacement Natural replacement Replace on burnout	Cost of efficient device **minus** cost of standard device *(Incremental)*	Consumption of standard device **minus** consumption of efficient device
Retrofit Early replacement *(Simple)*	Cost of efficient device **plus** installation costs *(Full)*	Consumption of old device **minus** consumption of efficient device
Retrofit Early replacement *(Advanced)**	Cost of efficient device **minus** cost of standard device **plus** remaining present value	*During remaining life of old device:* Consumption of old device **minus** consumption of efficient device *After remaining life of old device:* Consumption of standard device **minus** consumption of efficient device
Retire	Cost of removing old device	Consumption of old device

Point of cost-effectiveness measurement

Typical



- **Application at portfolio level allows for inclusion of individual programs or measures that do not past cost test**
  - Low Income, emerging technologies, market transformation

Discount Rates are a key input

Tests and Perspective	Discount Rate Used	Illustrative Value	Present Value of $1/yr for 20 years	Today's value of the $1 received in Year 20
Participant Cost Test (PCT))	**Participant's** discount rate	10%	$8.51	$0.15
Ratepayer Impact Measure (RIM)	Utility WACC	8.5%	$9.46	$0.20
Utility Cost Test (UCT/PAC)	Utility WACC	8.5%	$9.46	$0.20
Total Resources Cost Test (TRC)	Utility WACC	8.5%	$9.46	$0.20
Societal Cost Test	Social discount rate	5%	$12.46	$0.38

Summary

- **Total Resource Cost test is the primary cost-effectiveness test used by most states**
  - Though, there are differing views on if this is right test, how it should be used and calculated
- **Long list of key drivers that can have a meaningful impact on the cost-effectiveness result**
  - Not just energy and capacity savings
- **For States, local governments, other jurisdictions, CE questions may include:**
  - What is the right cost-effectiveness framework?
  - Are we applying the framework correctly?
  - Do we have the right tests?
  - We are going to discuss these questions and others next

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EE Reporting Tool (CA)

Instructions | Program | Measures | Avoided Costs

	Resource Savings Summary					Cost of Efficiency		Cost Test Ratios			
	Print Results (Ctrl+Shft+P)	Units Installed	Net Demand Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Utility ($/kWh)	Total Resource ($/kWh)	PAC	TRC	PCT	RIM
	TOTAL EE PORTFOLIO	**4,500**	**116**	**249,925**	**2,903,653**	**1,572**	**0.03**	**0.09**	**3.8**	**1.1**	**0.3**	**3.8**
	Res Smart Appliance	1,000	30	181,500	2,541,000	1,378	0.03	0.10	4.0	1.1	0.2	4.0
	Lighting	3,500	86	68,425	362,653	194	0.03	0.06	2.6	1.2	1.0	2.6

Instructions | Program | Results | Avoided | Custom

Must enter Program, Units Installed and at least one incentive, cost or overhead cost (on Program Data Sheet)

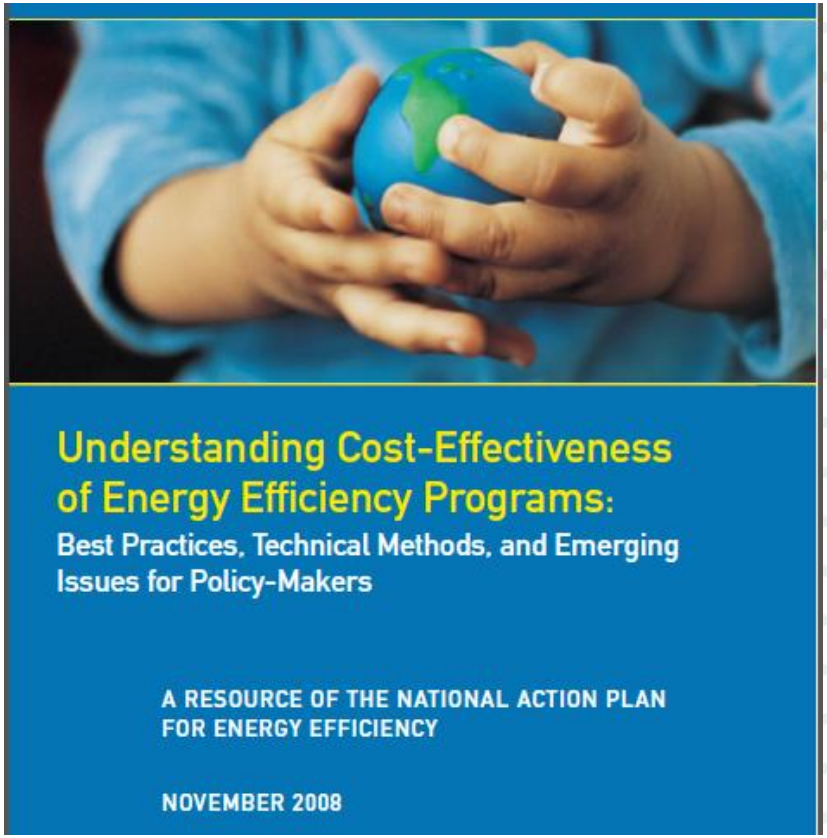
Select Measure | Show All Measures | Measures In Use | Clear Data | Transfer Data

	Item	Customer Sector	Measure	Cost per savings unit	Net Cost To Customer	Program	(Cost) Units Installed	Incentives Received by Customer ($/Unit)	Incentives Paid by Utility ($/Unit)	Variable Overhead Cost ($/Unit)	Incl. Gas Savings	Measure Type
3	1	Residential	CFL: Torchiere, Average Wattage	$58.00	$58.00							EE
4	2	Residential	CFL: Screw-In (<=15W), direct install	$7.88	$7.88							EE
5	3	Residential	CFL: Screw-In (<=15W), downstream	$5.68	$2.68		100	$3.00				EE
6	4	Residential	CFL: Screw-In (<=15W), upstream	$2.52	[illegible]							EE
7	5	Residential	CFL: Screw-In (16-24W), direct install	$10.69	$10.69							EE
8	6	Residential	CFL: Screw-In (16-24W), downstream	$5.74	$5.74							EE
9	7	Residential	CFL: Screw-In (16-24W), upstream	$2.74	$2.74							EE
10	8	Residential	CFL: Screw-In (>=25W), direct install	$11.52	$11.52							EE
11	9	Residential	CFL: Screw-In (>=25W), downstream	$6.43	$6.43							EE
12	10	Residential	CFL: Screw-In (>=25W), upstream	$2.88	$2.88							EE

https://e3.sharefile.com/d/s59ff3b8c54e4be38

Action Network Cost-effectiveness

- **The State and Local Energy Efficiency Action Network (SEE Action) is a state- and local-led effort facilitated by the DOE and the EPA to scale up and achieve all cost-effective energy efficiency by 2020**
- **Several resource guides are available to support policy makers, regulators, utilities in implementing energy efficiency**



http://www.epa.gov/cleanenergy/energy-programs/suca/resources.html

New DOE Cost-effectiveness Tool

About the DOE CE Tool

- Excel based tool follows standard CE protocols
- 5 main cost tests calculated
- User can build up a program
- Tool supports measure level and whole-building approaches
- Tool supports sensitivity analysis on key inputs

Using the DOE CE Tool

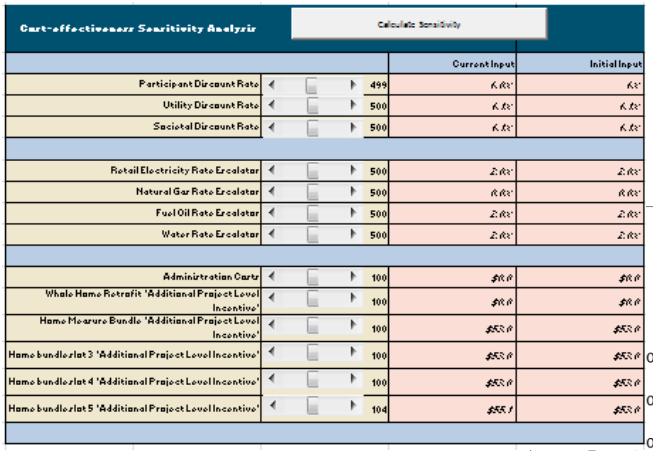
- User enters general inputs (rates, discount rates)
- Utility specific avoided costs are entered
- Measure level & program data are defined
- Report generates results in graphical and tabular form

Energy+Environmental Economics

Better Buildings
U.S. DEPARTMENT OF ENERGY

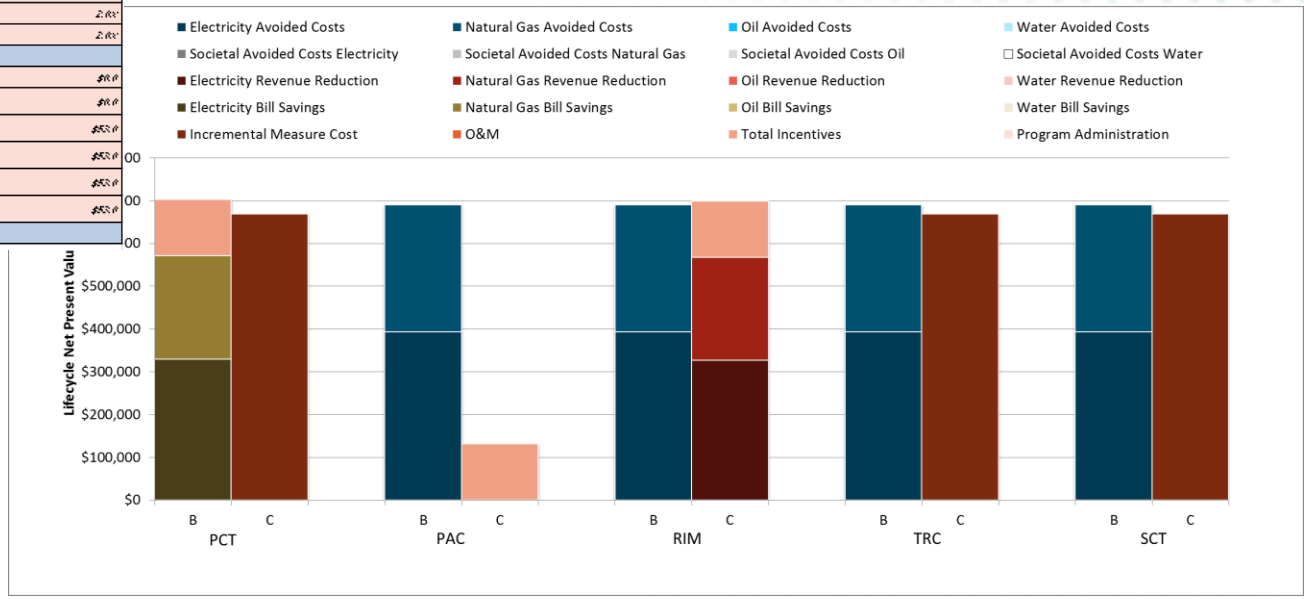
CE Tool Screenshot: reporting

- **Results are shown in graphical form and in tables**
- **Tool facilitates sensitivity analysis, so impacts of different program designs, cost inputs, discount rates, etc. can be explored**



Sensitivity slider

Graphical display of results



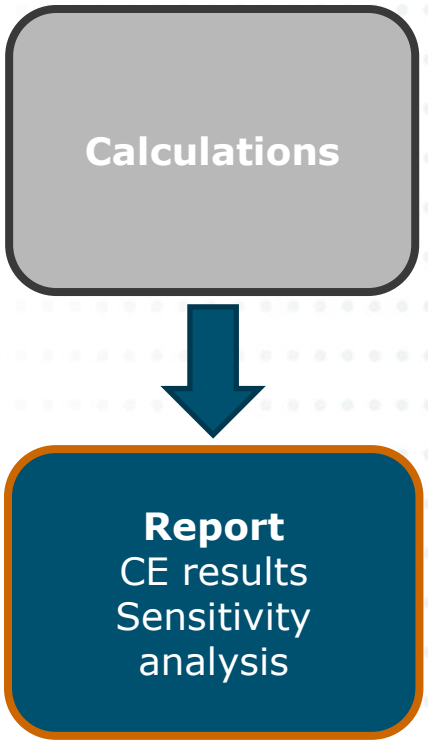
Model structure

General inputs
Utility rates, discount rate cost tests of interest etc.

Avoided cost inputs
Electricity, gas, water, …

Measure level data
kWh and KW savings, costs Incentives …

Program data
Number of homes that will be retrofitted Admin costs …



- **User enters general inputs (rates, discount rates)**
- **Utility specific avoided costs are entered**
- **Measure level & program data are defined**
- **Report generates results in graphical and tabular form**

Screenshot: program builder

Installation Schedule and Incentive Budget by Project Type			
	Year 1	Year 2	Year 3
Whole Home Retrofit	50	100	150
Home Measure Bundle	1	0	0
Type 3	0	0	0
Type 4	0	0	0
Type 5	0	0	0
Incentive Budget	$ 50,050	$ 100,000	$ 150,000

Non-Incentive Program Budget ($)			
	Year 1	Year 2	Year 3
a. Administrative Costs	$ 10,000	$ 10,000	$ 10,000
a.i. Overhead and G&A	$ -	$ -	$ -
a.ii. Other Admin costs	$ -	$ -	$ -
b. Marketing/Outreach	$ 15,000	$ 15,000	$ 15,000
c. Direct Implementation (non incentive)			
c.i. Activity	$ -	$ -	$ -
c.ii. Installation	$ -	$ -	$ -
c.iii. Hardware & Materials	$ -	$ -	$ -
c.iv. Rebate Processing and Inspection	$ -	$ -	$ -
d. EM&V	$ -	$ -	$ -
Total Administration Budget	$ 25,000	$ 25,000	$ 25,000
Total Budget	$ 75,050	$ 125,000	$ 175,000

Program builder

- User defines schedule of retrofits over 3 year period
- Program budget is defined by the incentives and administrative costs

Example is purely illustrative!

Questions

Thank you!

Join us for the rest of the webinar series:

- **Evaluation, Monitoring & Verification –** Thursday, Dec 4th 3:00pmET

A part of a robust energy efficiency program is evaluation, monitoring and verification. EECLP gives guidance as to what is expected from a borrower.

Register here: https://www1.gotomeeting.com/register/518263265

- **Residential Energy Efficiency Deep Dive, Part One** – Thursday, Dec 11th 3:00pmET

EECLP can offer eligible borrowers the financial resources to help establish a sustainable energy efficiency program. Register here: https://www1.gotomeeting.com/register/900957873

- **Residential Energy Efficiency Deep Dive, Part Two –** Thursday, Dec 18th 3:00pmET

EECLP can offer eligible borrowers the financial resources to help establish a sustainable energy efficiency program. Register here: https://www1.gotomeeting.com/register/244353121

- **On-Bill Financing** – Thursday, Jan 8th 3:00pmET

EECLP recognizes the benefits of on-bill financing and enables this option for eligible borrowers.

Register here: https://www1.gotomeeting.com/register/230715008

- **Solar Program Overview** – Thursday, Jan 22nd 3:00pmET

EECLP can help enable roof-top solar systems in the service territory of eligible borrowers.

Register here: https://www1.gotomeeting.com/register/493276257

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