HOMES Rebates, The Measured Approach

Why it's here and how it can provide states with policy options.

Kara Saul Rinaldi
AnnDyl Policy Group
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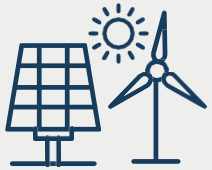
The AnnDyl Policy Group

Washington, DC-based policy strategy firm that focuses on Federal and State legislative, regulatory, and administrative energy and environmental policy.

Our team brings together extensive knowledge, experience, and expertise to take a substantive approach on policy and advocacy.



We specialize in advanced grid infrastructure, energy efficiency, smart technology, demand response, clean energy financing, renewable energy, carbon and climate policy, and much more.

History: HOMES and HEAR

- 2008 - 2010 Home Star (Silver and Gold)
- 2012 - 2020 HOMES Act
- 2020 HOPE for HOMES
- 2022 Inflation Reduction Act

Inflation Reduction Act (IRA) passed by Budget Reconciliation

- Signed into law August 16, 2022
- 50 Votes in the Senate, Party-line
- Simplified Guidance
- Split HOPE for HOMES
  - HOPE – Contractor Training Grants (TREC)
  - HOMES (HER) – Performance-based Energy Efficiency
  - HEEHR (HEAR) – Prescriptive Electrification Enabling

Home Owners Manage Energy Savings (HOMES) A.K.A Home Efficiency Rebates

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- $4.3 billion for HOMES, **a performance-based, energy savings rebate program.**
  - **More savings = more rebate.**
- **Can use either a ”measured” and/or a ”modeled” approach.**
  - Measured: Payments are based on actual measured savings
  - Modeled: Payments are based on estimated savings from modeled predictions
- Both **single- and multi-family existing homes** are eligible
- **Cap:** Incentive cannot exceed 50% of the project cost (80% for Low-Moderate Income, though could be higher with DOE approval)

HOMES: Modeled Energy Savings Pathway

Contractors use approved (BPI2400) software to model homes using past utility data, assess potential improvements, and predict energy savings

Energy Savings	Single-Family	Multifamily
20 – 34 percent	**$2,000** or **50 percent** of the project cost (whichever is less).	**$2,000** per dwelling unit, with a maximum of **$200,000** per multifamily building.
	DOUBLE for low-income households: **$4,000** or **80 percent** of the project cost (whichever is less).	
35 percent and over	**$4,000** or **50 percent** of the project cost (whichever is less).	**$4,000** per dwelling unit, with a maximum of **$400,000** per multifamily building.
	DOUBLE for low-income households: **$8,000** or **80 percent** of the project cost (whichever is less).	

HOMES: Measured Energy Savings Pathway

Contractors and aggregators use approved software to measure home energy usage post-installation, providing rebates based on actual achieved energy savings across a portfolio

Energy Savings	Single-Family & Multifamily
15 percent and over (portfolio)	**$2,000** payment rate per kilowatt hour saved equal to a 20 percent reduction for the average home in the state, or up to **50 percent** of project cost.
	DOUBLE for LMI individuals, **$4,000** payment rate per kilowatt hour saved equal to a 20 percent reduction per home or dwelling unit, or up to **80 percent** of project cost. For multifamily buildings to qualify, at least 50 percent of residents must be LMI.

Potentially **higher rebates** for leaky & poorly insulated homes.

Aggregators can provide up-front payments to contractors and building owners, avoids waiting for rebate payments.

IRA HOMES Measured program incentivizes on a per-kWh-equiv basis – Mark-

- Payment rate is **calculated per kWh-equivalent saved**, equal to $2,000 for a 20% reduction of energy use for the average home in the state ($4,000 for LMI, higher with DOE approval)
- Payments are made based on the **measured savings and the payable rate per kWh at the portfolio level.**
- **Minimum:** The portfolio of homes must achieve at least 15% energy savings.
- **Open-Source Advanced M&V software required.**

Examples from DOE Calculator:

Market-rate project (TX SFH)

$$\text{Incentive rate} = \frac{\$2{,}000}{(20\%) * (21{,}701\ \text{kWhe})} = \$0.46 / \text{kWhe}$$

State-Specific Data for Texas

Average site energy use*		
Energy Type	**Single Family**	**Multi family**
Electric	14664 kWh	8289 kWh
Natural Gas	224 Therm	48 Therm
Propane	18 gallons	2 gallons
Fuel Oil	124 gallons	10 gallons

Measured Incentive Payment Rate (by energy type, dwelling type, and income level)				
	Single Family		**Multi Family**	
Energy Type	Market	LMI	Market	LMI
Electric ($/kWh)	**0.46**	**0.92**	**1.02**	**2.04**
Natural Gas ($/Therm)	**13.51**	**27.01**	**29.90**	**59.80**
Propane ($/gallon)	**12.36**	**24.72**	**27.36**	**54.72**
Fuel Oil ($/gallon)	**20.23**	**40.45**	**44.78**	**89.56**

(1 Therm=29.3 kWhe)

HOMES: Key Requirements Comparison

Requirement	Modeled Approach	Measured Approach
Home Assessment	40+ data elements required; **additional 20+ data points recommended by DOE guidance**	40+ data elements required
Rebate calculation	**Based on BPI-2400** whole-home energy model via approved modeling software	**Based on actual whole-home energy savings** via approved open-source measurement software
Customer utility data	Required; 12 months (per BPI-2400)	Required; 9-12 month (for measured savings comparison)
ENERGY STAR for HVAC & water heating	Required	Required
Home certificate	Required	Required
Risk of underperformance	**State** bears risk if energy savings aren't achieved	**Aggregator** bears risk if energy savings aren't achieved
Technology Braiding	Can braid with **all HEAR technologies** (for separate measures)	Only braiding with non-energy, **enabling HEAR technologies (panels, wiring)**
Homeowner receives up-front rebate?	Required on invoice; may be provided upfront to homeowner and carried **by contractor** until rebate processed @ 4 weeks	Required on invoice; typically **provided upfront to homeowner** and **carried by aggregator** until rebate processed @ 12 months

Flexible Options for Using Measured Path to Value TLGHG

States must provide a plan to "value savings based on time, location, or greenhouse gas emissions" (TLGHG). **Measured approach provides tools to:**

- Customize programs to **align with state energy policy** and climate goals
- **Achieve improved grid reliability and flexibility** benefits based on time and location factors
- Align rebates with **emissions reduction goals** by incentivizing savings from higher emission sources

Baseline: Rebate at standard rate of $2,000 per 20% savings, without TLGHG added

Can use same process for low-income and market-rate

Option 1: Use GHG emissions intensity to adjust rates;
Higher rebate for higher GHG savings

Option 2: Use TLGHG weighted average to incentivize certain hours;
20% *average* savings still equals $2,000.

May only be allowed for low-income projects

Option 3: Use TLGHG to include an "adder" for certain hours;
20% average savings is > $2,000.

Example: Weighted Average to Value Certain Hours (using TLGHG)

- Prioritize savings during peak grid demand (e.g. using TOU periods) to distribute value
- TLGHG multipliers may be different for low-income and market rate; market rate may be capped by statutory $2,000/20% savings values, while low-income ($4,000/20%) can be increased with DOE approval.
- By increasing some values and decreasing other, the average rates remains 20% savings = $2,000

	Hours	Relative Value	Convert to Weighted Rate	Weighted Rate ($ / kWhe)
Summer Morning Peak	488	20x		$0.90
Summer Evening Peak	726	100x		$4.49
Remaining Hours	7,546	1x		$0.04
Total	**8,760**			**Average rate = $0.46**

Market Rate Example:
20% Average Savings = $2,000

By increasing some values and decreasing other, the average rates remains 20% savings = $2,000

When energy savings are distributed evenly (on average)…

Example TX SFH – 20% Savings (Weatherization + AC/ER)					
Fuel	**Time Period**	**Hours**	**Energy Savings**	**Payment Rate $ / kWhe**	**Incentive**
Electric	Peak Morning:	488 (5.5%)	242 kWh (5.5%)	$0.90	$217
	Peak Evening:	726 (8.3%)	360 kWh (8.3%)	$4.49	$1,615
	Off-Peak:	7,540 (86.1%)	3,739 kWh (86.1%)	$0.04	$168
Total:		**8,760 (100%)**	**4,340 kWh**		**$2,000**

…most of the incentive is for avoided peak kWh…

… and the payment still equals $2,000 / 20%

Measured Flexibility: TLGHG Adders, Without Decreasing Base Rate, Supporting LMI

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State: We are valuing savings based on time location and GHG by providing an additional incentive of $5/kWhe for summer peak evening and $2/kWhe for summer peak morning. We are keeping our remaining hours at the average home rate of $0.92/kWhe.

***LMI project base rate* = $0.92 / kWhe**

Adders increase value for peak hours

20% Savings ≠ $4,000

	Hours	Energy Savings – Peak Focused (kWhe)	TLGHG Incentive ($/kWhe)	Wx+HP+HPWH Rebate With TLGHG Adders
Summer Peak Morning	488	1,000	$2/kWhe	$2,000
Summer Peak Evening	726	2,000	$5/kWhe	$10,000
Remaining Hours	7,540	8,068	$0.92/kWhe	$8,771
Total	**8,760 hours**	**11,068 (51% energy savings**		**$20,771**

Shift in energy savings to peak periods, but keeps base rate higher

Measured Approach – Desired Outcomes

- The measured savings approach ensures that states only provide rebates for actual, verified energy savings
  - **Homeowners and contractors receive an up-front rebate**; risk is borne by the aggregator
  - There is a strong incentives for **high-quality installations**, as projects that underperform will cost aggregators
- Allows smaller projects (<20% energy savings) to be part of a portfolio – important flexibility for income-constrained households
- Combining measured savings with grid flexibility (DR) programs can unlock additional grid benefits and lower grid costs
- Multiple tools to protect consumer and ensure savings and maximum rebates to homeowners:
  - Functioning market **competition between aggregators drives higher customer rebates**
  - DOE Sample proposes 120% cap on final aggregator payment to mitigate underpredictions
  - Program reviews can address overpredictions, underpredictions, and support best practices.

Mythbusting

- Myth: Homeowners and contractors wait 12 months to get their measured approach rebate.
  - Fact: Aggregators will offer up-front payments to contractors and homeowners; aggregators wait to collect the final rebate 12 months later, not customers.
- Myth: Measured programs are harder because they require utility data.
  - Fact: Modeled programs require BPI-2400 or equivalent modeling (per statute), which also requires 12 months of previous utility data.
- Myth: Measured rebates are lower because of aggregators.
  - Fact: In many cases, measured rebates are higher than modeled rebates. Modeled rebates cap at specific values, while measured programs value every saved kWh_eq.
- Myth: Measured programs are too complicated.
  - Fact: Measured programs leverage aggregators and straightforward calculations to make programs simpler for contractors and customers.

Thank You

Kara Saul Rinaldi
President & CEO
AnnDyl Policy Group

202.276.1773
kara@anndyl.com

APPENDIX

Market Rate Example:
20% Average Savings = $2,000

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When energy savings are distributed evenly (on average)…

Example TX SFH – 20% Savings (Heat Pump Electrification)					
Fuel	**Time Period**	**Hours**	**Energy Savings**	**Payment Rate $ / kWhe**	**Incentive**
Electric	Peak Morning:	488 (5.5%)	-132 (5.5%)	$0.90	($119)
	Peak Evening:	726 (8.3%)	-196 (8.3%)	$4.49	($882)
	Off-Peak:	7,546 (86.1%)	-2042 (86.1%)	$0.04	($92)
Gas	Winter Nights	2,190 (25%)	1,678 (25%)	$2.13	**$1,784**
	Winter Days	2,190 (25%)	1,678 (25%)	$1.42	**$1,189**
	All Other	4,380 (50%)	3,355 (50%)	$0.07	**$119**
Total:		**8,760 (100%)**	**4,340 kWh**		**$2,000**

Repeat the weighting process using gas peak hours ->

Assumptions: Gas savings of 229 therms; HSPF of 8.5; No A/C savings for illustration purposes

… the payment still equals $2,000 / 20%

Calculation of time-based weighted values

Step 1: Lookup payment rate in DOE calculator
Step 2: Establish relative values for each time period (from TOU or GHG calculators)
Step 3: Establish weighted hours for each time period (hours * relative value)
Step 4: Calculate weighted payment rate:

$$\text{Standard Rate} \times \left[\text{Relative Value}\right] \times \left[\frac{\text{Total Time}}{\text{Total Weighted Values}}\right] = \text{Weighted Payment Rate}$$

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Measured Incentive Payment Rate
(by energy type, dwelling type, and income level)

	Single Family		Multi Family	
Energy Type	Market	LMI	Market	LMI
Electric ($/kWh)	0.46	0.92	1.02	2.04
Natural Gas ($/Therm)	13.51	27.01	29.90	59.80
Propane ($/gallon)	12.36	24.72	27.36	54.72
Fuel Oil ($/gallon)	20.23	40.45	44.78	89.56

	Hours (2)	Relative Value (3)	Weighted Value	Weighted Payment Rate (4)
Summer Peak Morning	488	20x	9,760x	$0.90
Summer Peak Evening	732	100x	73,200x	$4.49
Remaining Hours	7,540	1x	7,540x	$0.04
Total	**8,760**		**90,500x**	

e.g. Summer Peak Morning: $\frac{\$0.46}{\text{kWh}} \times \left[20x\right] \times \left[\frac{8{,}760 \text{ hours}}{90{,}500x \text{ hours}}\right] = \frac{\$0.90}{\text{kWh}}$

Calculation of weighted GHG values

Step 1: Calculate emission intensity per kWhe (slide #18)
Step 2: Get average energy use per fuel from DOE calculator
Step 3: Calculate weighted payment rate:

$$\text{Standard Rate} \times \left(\text{Emissions Intensity}_{\text{selected fuel}}\right) \times \left(\frac{\text{Total kWhe}_{\text{all fuels}}}{\left(\begin{array}{c}\text{kWhe}_{\text{avgelectric}}*\text{Intensity}_{\text{electric}} + \\ \text{kWhe}_{\text{avggas}}*\text{Intensity}_{\text{gas}} + \\ \text{kWhe}_{\text{avgpropane}}*\text{Intensity}_{\text{propane}}\end{array}\right)}\right) = \text{Weighted Payment Rate}$$

*Fuel oil not shown for simplicity

	Emissions Intensity[1]	Conversions to kWh_e	Emission per kWh_e
1 Electric (kWh, Texas Grid)	0.813 lbs / kWh	-	0.813 lbs/kWh
Natural gas (therms)	11.66 lbs /therm	1 therm = 29.3 kWh_e	0.398 lbs / kWh_e
Propane (gallons)	12.362 lbs/gal	1 gallon = 26.8 kWhe	0.461 lbs / kWh_e

	1 Emission Intensity (lbs/kWhe)	2 Average Energy Usage (kWhe)	3 Weighted Payment Rate
Electric	0.813	14,664	$1.10
Natural gas	0.398	6,563	$0.54
Propane	0.461	482	$0.63
Total		**21,701**	

e.g. Electric:

$$\frac{\$0.92}{\text{kWh}} \times \left(\frac{0.813 \text{ lbs}}{\text{kWhe}}\right) \times \left(\frac{21{,}701 \text{ kWhe}}{\underbrace{14{,}664*0.813}_{\text{[electric]}} + \underbrace{6{,}563*0.398}_{\text{[gas]}} + \underbrace{482*0.461}_{\text{[propane]}}}\right) = \frac{\$1.10}{\text{kWh}}$$