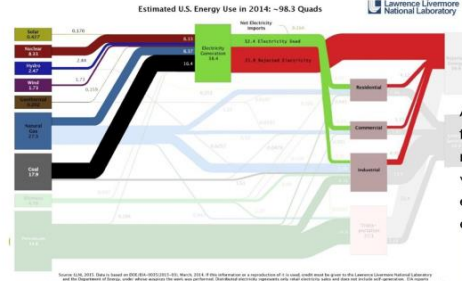




Personal Action: Electricity

Special thanks to: John Bringenberg john@bringenberg.com
720-289-3289

The Story of Solutions



Much Electricity is Lost Before it Reaches Your Home



Topics Today

- A hidden (seldom discussed) climate value of energy efficiency and Distributed Generation ... a.k.a rooftop solar.
- Why ROI [or “how long until break even?”] is not the right question when considering rooftop solar.
- What do the economics of rooftop solar look like?
- The Joy of opening your electric bill when you have rooftop solar.



Solar Technology and Storage

- Most improvements are to racking, smart inverters and storage
- Steady modest improvement in cell performance

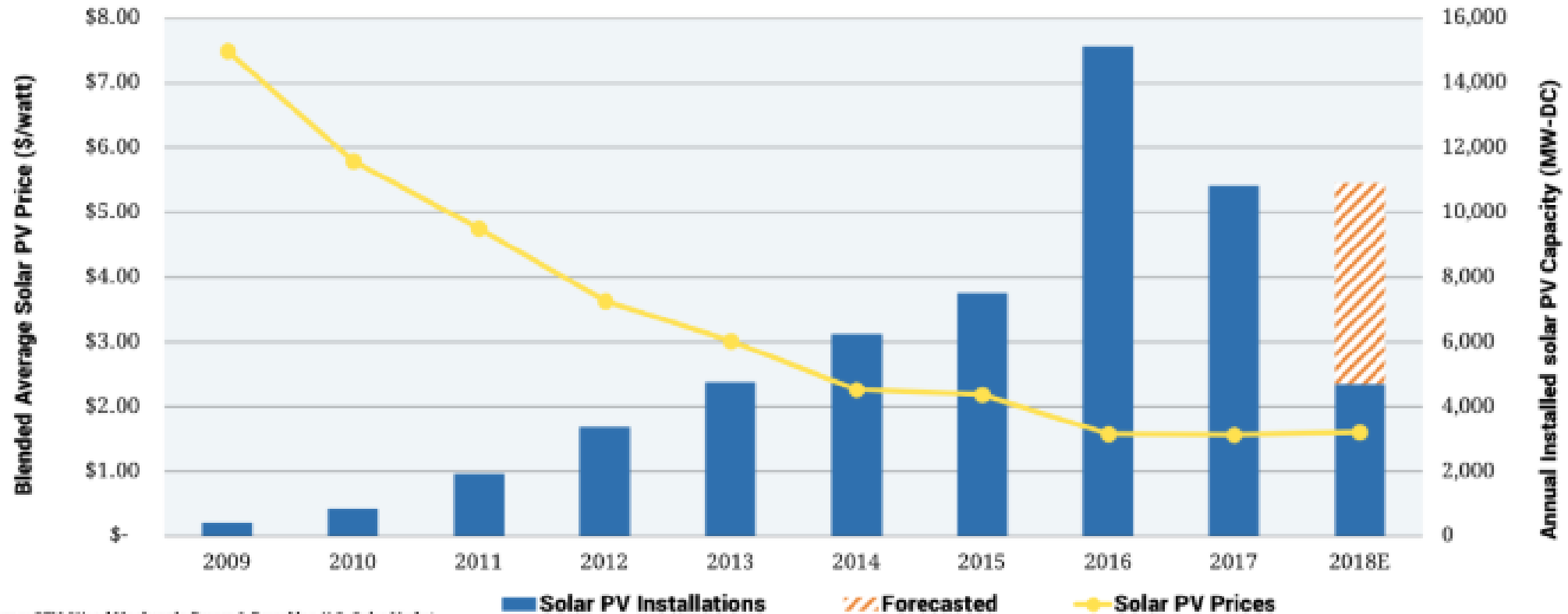



CanadianSolar



Solar Marketplace

Annual Solar PV Installations and Blended Average PV Prices



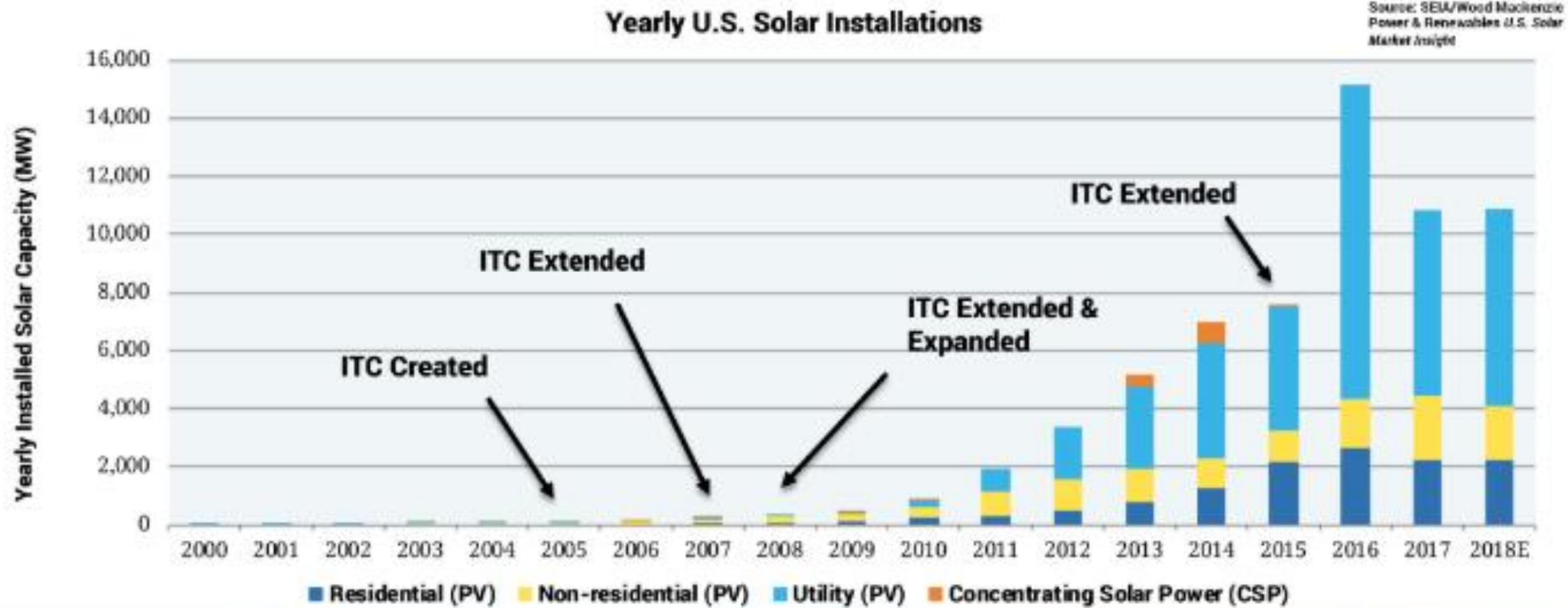
Source: SEIA/Wood Mackenzie Power & Renewables U.S. Solar Market Insight; Lawrence Berkeley National Laboratory, Tracking the Sun



Solar Means Local Jobs

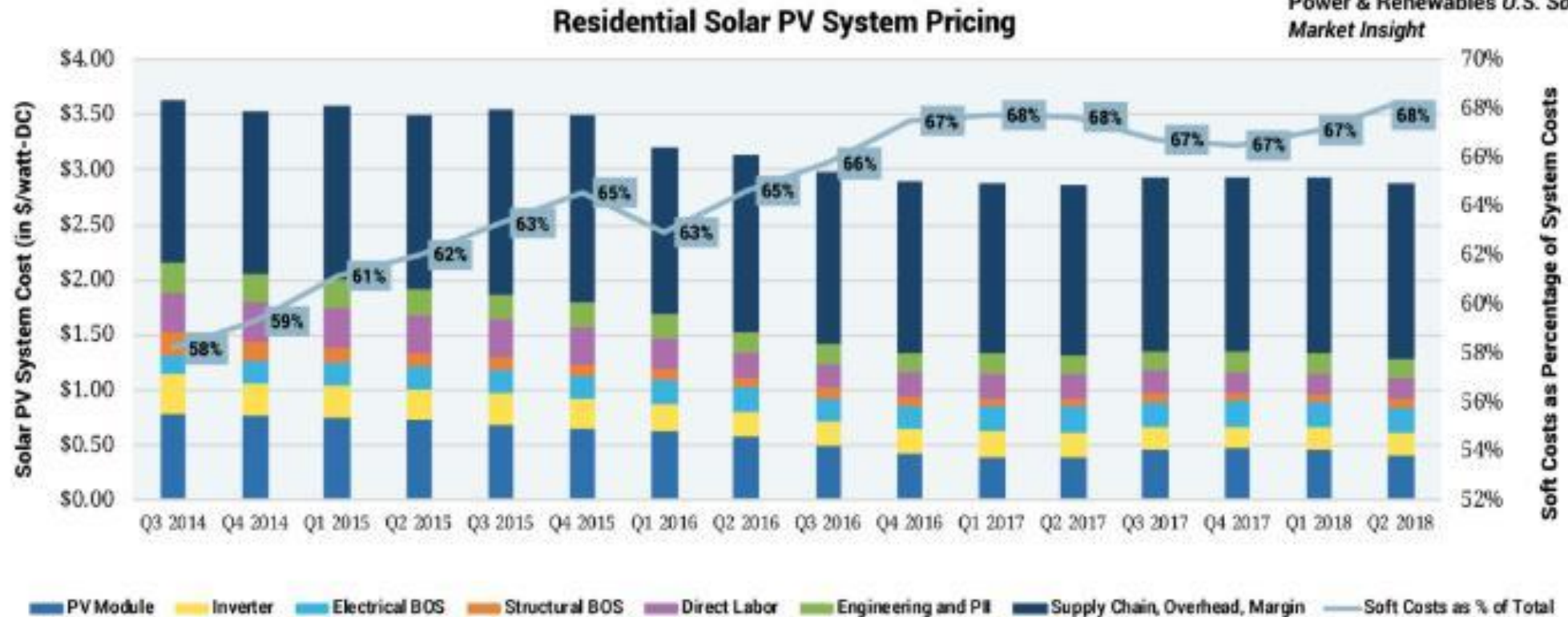
- ▶ Over 250,000 Americans work in solar -
- ▶ More than double the number in 2012
- ▶ More than 9,000 companies in every U.S. state.
- ▶ 2017 - generated \$17 billion investment in the US economy.

Tax Credits - Key Factor



Pricing Impacts are Changing

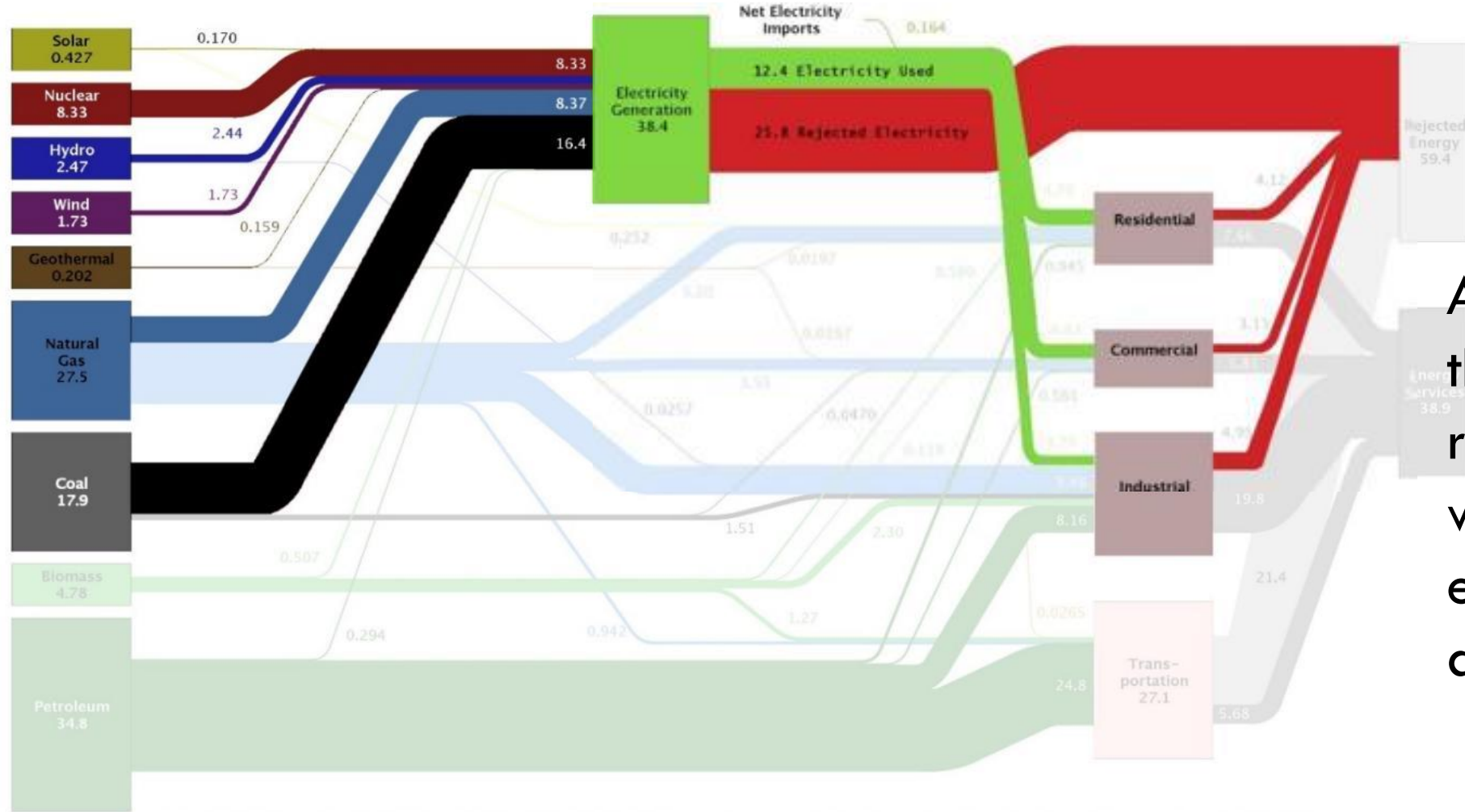
Source: SEIA/Wood Mackenzie Power & Renewables U.S. Solar Market Insight



Community Solar

- ▶ Started in CO
- ▶ CEC - Community Energy Collective
- ▶ SunShare
- ▶ Most have gravitated to commercial systems
- ▶ Bill Credit = about \$0.07 out of \$0.12
 - ▶ Most current deals = they keep bill credits and REC's
 - ▶ Charge no upfront costs
 - ▶ Customer retains 10% of the bill credits. (~\$0.007 discount)

Estimated U.S. Energy Use in 2014: ~98.3 Quads



Source: LLNL 2015. Data is based on DOE/EIA-0035(2015-03), March, 2014. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e. hydro, wind, geothermal and solar) for electricity in Btu-equivalent values by assuming a typical fossil fuel plant "heat rate". The efficiency of electricity production

All Red in this chart represents wasted energy not delivered

Much Electricity is Lost Before it Reaches Your Home

Estimated U.S. Energy Use in 2014: ~98.3 Quads



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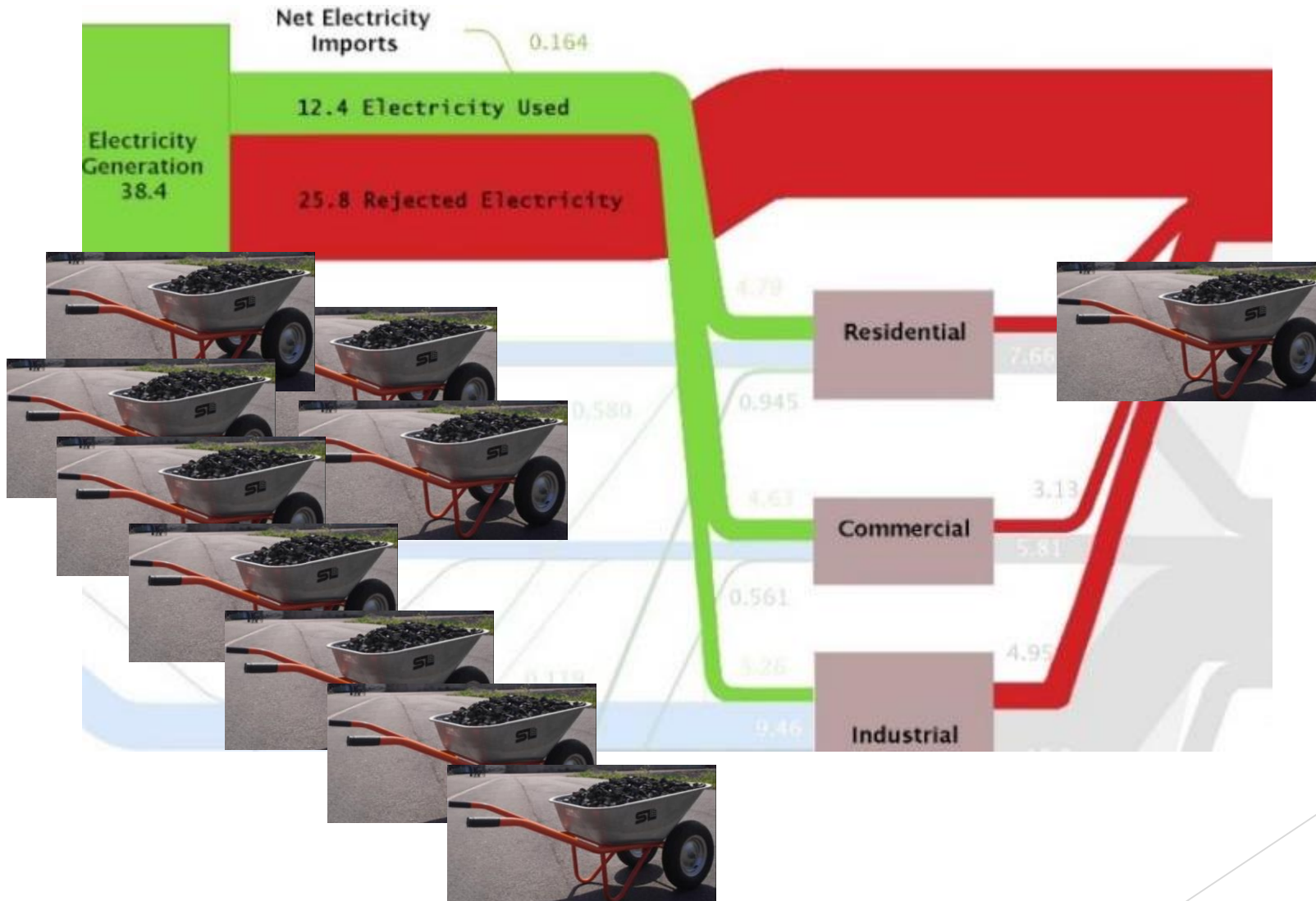
Source: LLNL 2015. Data is based on DOE/EIA-0035(2015-03), March, 2014. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e. hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant "heat rate." The efficiency of electricity production

Much Electricity is Lost Before it Reaches Your Home

The Real Costs of One Light Bulb



The Real Costs of One Light Bulb



All Red in this chart represents wasted energy not delivered

The Real Costs of One Light Bulb



Debunk: Too Long to Reach Breakeven

- ▶ One of the most common concerns about going Solar.
- ▶ Doesn't it take a long time to break even?



Debunk: Too Long to Reach Breakeven

True:

- ▶ *After approximately 8 – 12 years the monthly savings has paid for the 30+ year system and energy is essentially free thereafter.*
- ▶ *The \$12,000 - \$20,000 investment in rooftop solar will return ~4% - 7% annual ROI for each of 20+ years.*



Also True:

- ▶ *Your previous and next utility payment have negative financial gain ... Each month takes you further from any breakeven. **Perpetual cost. Never ROI.***

Can't solve this problem by continuing to pay your utility.

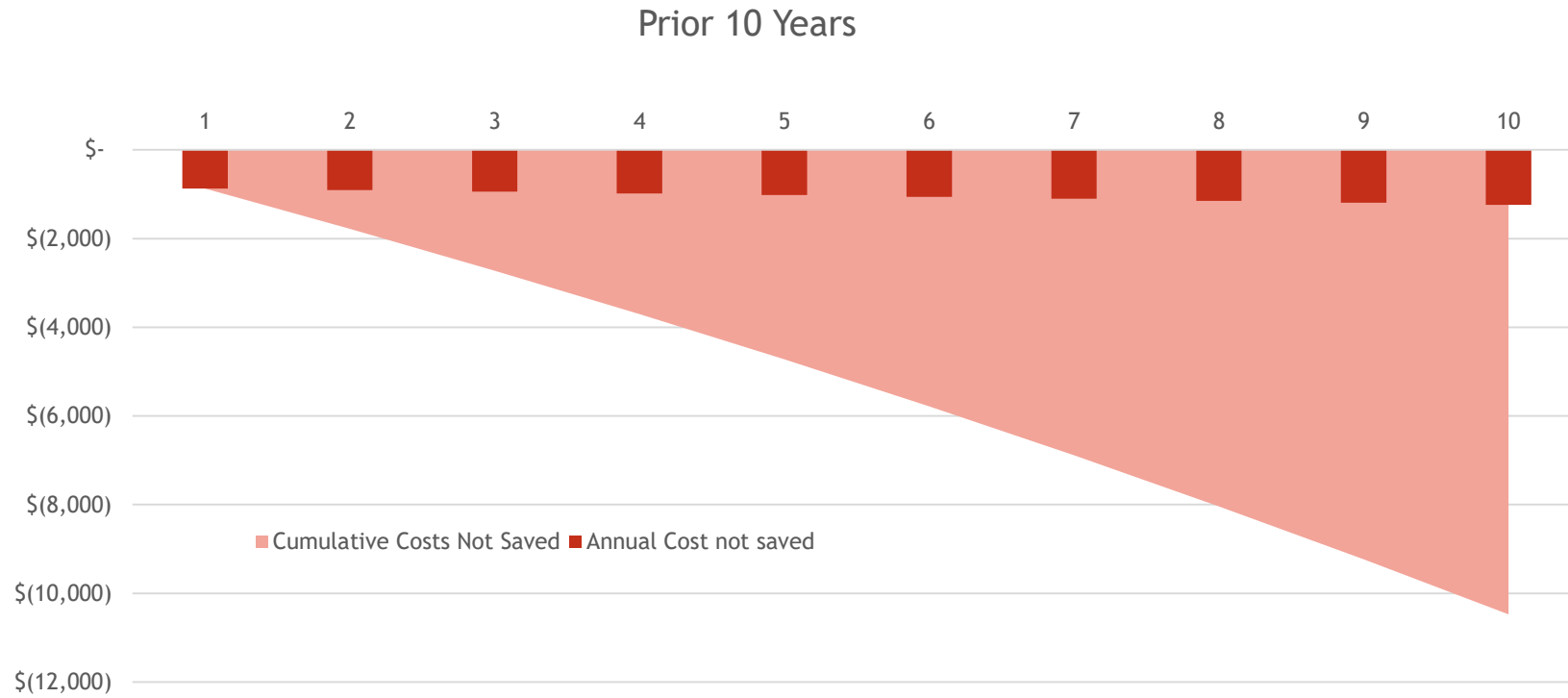
Debunk: Too Long to Reach Breakeven

System Example:

- ▶ *5.4kW system*
- ▶ *18 Solar Modules, 300kW each*
- ▶ *Cost at \$3.75 / W = ~ \$20,250*
- ▶ *First year Tax Credit = \$6,075 (can take over 19 years)*
- ▶ *\$0.125/kWh Energy increases at average 4% year*
- ▶ *Use internal cash liquidated from other sources*

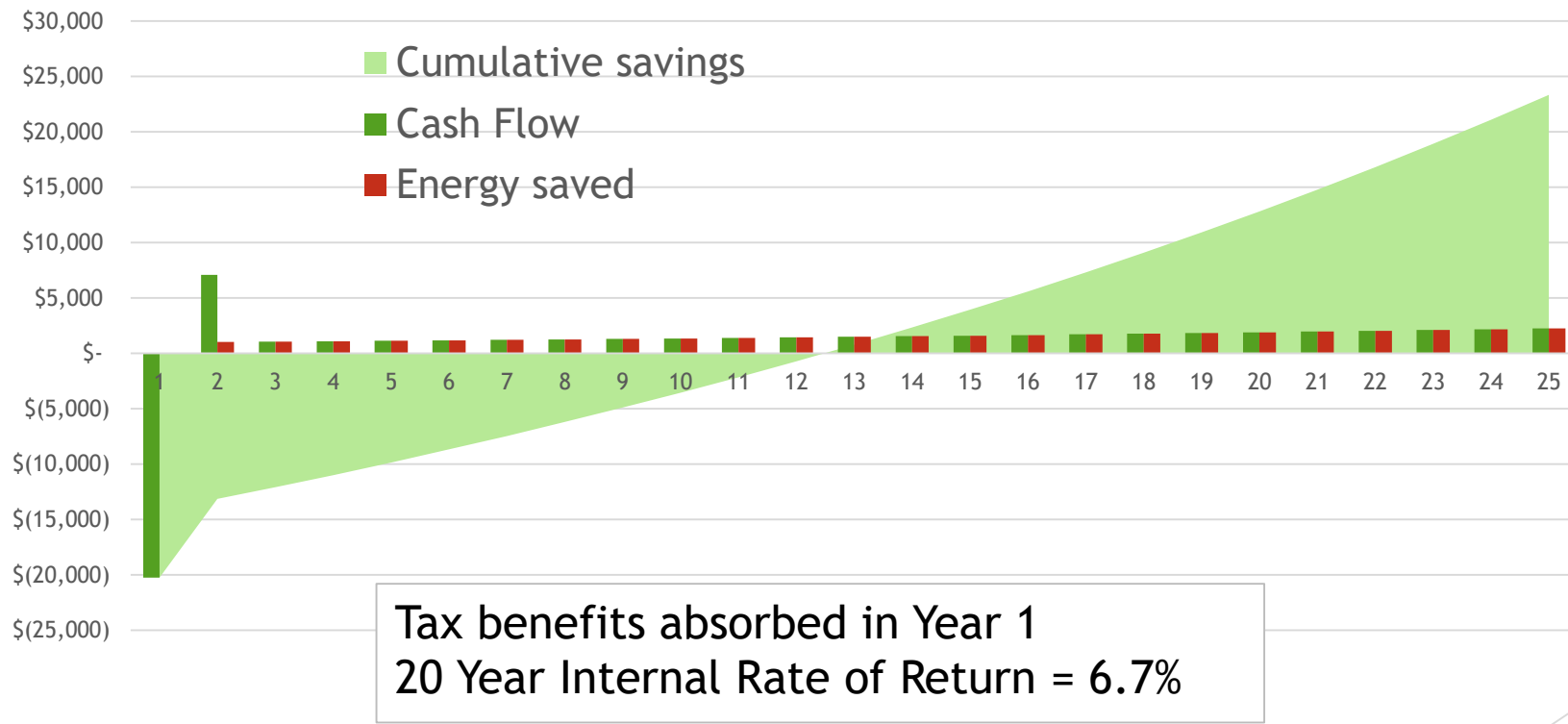


Debunk: Too Long to Reach Breakeven



Debunk: Too Long to Reach Breakeven

Solar Costs, Savings and Cumulative Savings



Can't solve this problem by continuing to pay your utility.

Residential PACE is Possible in 2019

- ▶ Residential PACE is among the most popular form of renewable and EE financing ... yet only offered in 3 states.
 - ▶ California, Florida, Missouri
- ▶ Colorado is possible to be the 4th State in first half of 2019.
- ▶ 100% financing is attached to the property tax. *(not attached to the homeowner)*
 - ▶ Stays with the home upon sale
 - ▶ Credit score does not disqualify
 - ▶ State administrated program with oversight
 - ▶ Qualified lenders and contractors



The Joy ...



© Inside Out

... of opening your electric bill when you have solar!

