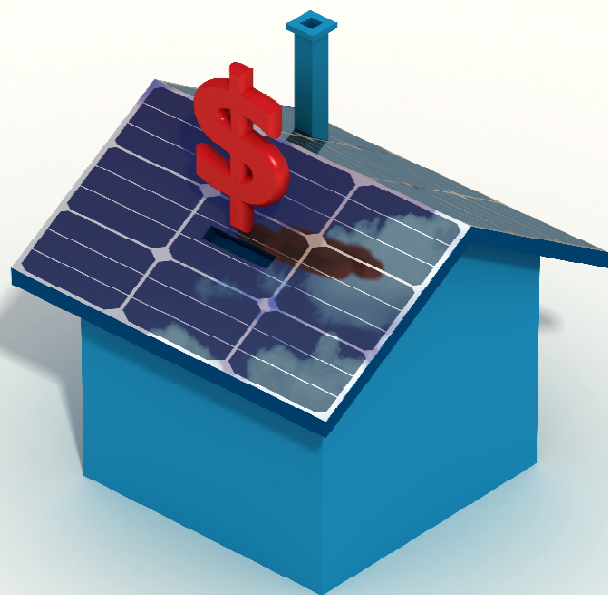


# Solar Economics



Cathy Redson  
SolPowerPeople, Inc.  
NATiVE, Inc.

October 18, 2014

NATiVE



# Glad to Be Here!

- ★ Began in Solar industry in 2007
- ★ “Free Fuel” Wins
- ★ Solar Educator – 2007 to Present
- ★ Solar Practitioner – 2012 to Present
- ★ Permaculture Designer, HERS Rater, NABCEP Certified PV Installer, IREC Instructor...
- ★ Passionate Solar Advocate!

# What if?

- ★ 25 year warranty!
- ★ FREE fuel!
- ★ No Maintenance (o.k., keep it clean!!!)
- ★ Millions of Jobs!
- ★ Invented/Made in the USA!
- ★ 3 year “energy payback”
- ★ Freedom to go wherever you want, whenever you want!

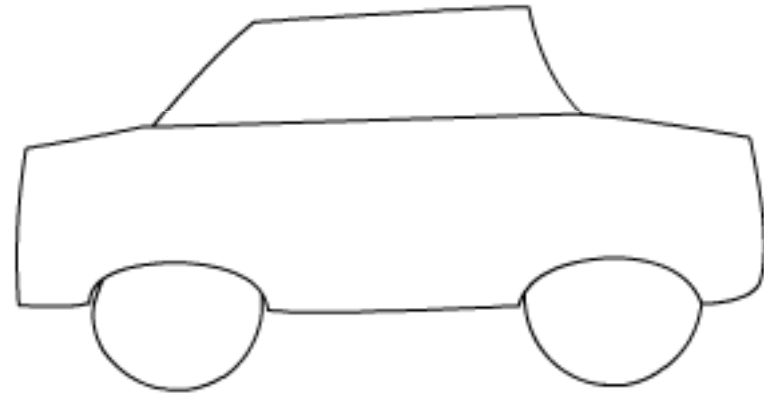


Image: toondraw.com

**What would you be  
WILLING to pay?**

**NATIVE**

 **SolPower**  
PEOPLE

# What if it was not a car, but a HOME energy system?

- ★ 25 year warranty!
- ★ FREE fuel!
- ★ No Maintenance (o.k., keep it clean!!!)
- ★ Millions of Jobs!
- ★ Invented/Made in the USA!
- ★ 3 year “energy payback”
- ★ Energy Independence!

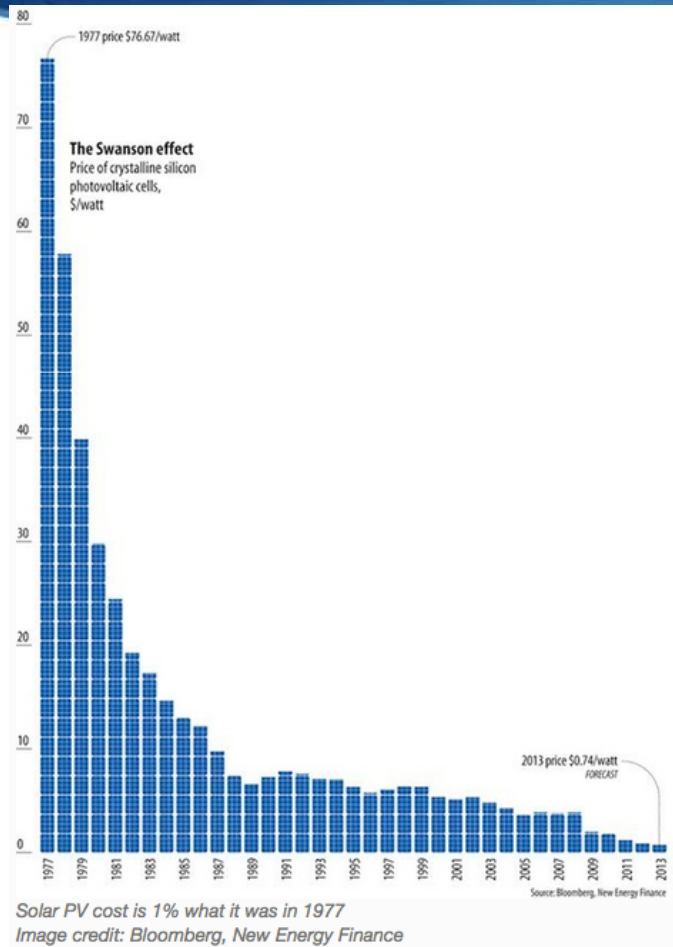


What would you be **WILLING** to pay?

**NATIVE**

 **SolPower**  
PEOPLE

# Solar ... “The New Granite Countertops”



- ★ **Cost has dropped 80% since 2009**
- ★ **New Financing**
- ★ **Adds \$5,911 for every kW of solar installed**
- ★ **Solar Homes Sell Faster**

**NATIVE**





# Not Why, But WHY NOT?

- ★ Economics Make Cents!
- ★ Solar is an Investment
  - ★ Like an Annuity
    - ★ Upfront investment, monthly returns
    - ★ kWh can only go up in value
  - ★ ROI = 8-10%
  - ★ Adds value to your home
- ★ You will be paying for electricity whether you have solar or not!

# PV Economics

- ★ Payment Options
  - ★ Upfront payment
  - ★ Loan – short term, home equity loan, refinance
- ★ Typical system price ~ \$3.60/watt
- ★ Varies depending on complexity of installation



**Investment Opportunity**

**Bank of Solar 8 - 10%**  
**High Street Bank 0 - 2.5%**

**You choose.**

- Cut your energy bills
- Receive around £1000 tax free per year, index linked for 25 years
- Earn additional payments from the National Grid
- Add value to your property
- Protect yourself from ever rising energy costs

save energy RENEWABLES

The advertisement features a hand dropping a coin into a white piggy bank, with solar panels visible in the background.

# Usage Determines PV System Size

- ★ Gather 12 months Energy Bills
- ★ **Look for highest, lowest, and average monthly usage in kWh**
- ★ Average home: 1,200 kWh/mo = 14,400 kWh/yr.
- ★ PV System Sizing Formula:

**Monthly kWh ÷ 30 days ÷ 5.3 PSH ÷ .77 = PV System Size in kW**

**Space Required = approx. 100 ft<sup>2</sup> for every 1,000 AC Watts of PV**



# PV Incentives & Financial Considerations

- ★ Rebates & Incentives

- ★ **Austin Energy**: \$1.10/watt x Inverter Efficiency (96% typically)

- ★ Value of Solar Tariff: 2014 - \$.107/kWh; **2015 - \$.113/kWh**

- ★ **Oncor**: \$1.09/watt – adjusted lower for “non-optimal” orientation

- ★ 2014 rebate pool – gone

- ★ 2015 – “heard on the street”

- ★ 20% reduction in fund pool

- ★ Reducing rebate by about 10% - depends entirely on ERCOT rate

- ★ 30% Federal Investment Tax Credit until 2016

- ★ Compare to other investments on *after-tax* basis

# Austin Energy – Example Assumptions

- ★ **Typical PV System**

- ★ (26) LG280 Modules – approx. 500 sq. ft. on South/West/East roof
- ★ SolarEdge 7000 Inverter with DC Optimizers
- ★ AE Rebate: \$1.10/watt x Inverter Efficiency
- ★ Value of Solar Tariff:
  - ★ Thru 12/31/2014: \$.107/kWh
  - ★ Beginning 1/1/2015: \$.113/kWh, no sweep!
- ★ 30% Investment Tax Credit – calculated on “after-rebate” amount

# Austin Energy – Cost/Value

- ★ Expected Energy Yield & AE Bill Credit:

- ★ 972 kWh/month x \$.113/kWh ( 2015 Value of Solar Tariff)

- ★ Monthly Bill Credit: **\$109**; Annual Credit: **\$1,318**

- ★ Cost::

7,280 DC Watts @ \$3.60/watt:	\$26,208.00
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Less: AE Rebate (7280 x \$1.10 x .97)	( 7,767.76)
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Less: 30% Investment Tax Credit:	<u>( 5,532.07)</u>
----------------------------------	--------------------

Net Cost:	<b>\$12,908.17</b>
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<b>Lifetime Cost/kWh:</b> (972 kWh x 300 mos.):	<b>\$0.044 / kWh</b>
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# Oncor – Example Assumptions

- ★ **Typical PV System**

- ★ (26) LG280 Modules – approx. 500 sq. ft. on South/West/East roof
- ★ SolarEdge 7000 Inverter with DC Optimizers
- ★ Oncor Rebate: **\$1.00/watt** (“guess-timate” for 2015)
  - ★ Assumes Exposure is: South (180° ), SE (160° ), or SW (200° )
  - ★ Assumes less than 10% shading
- ★ 30% Investment Tax Credit – calculated on “after-rebate” amount

# Oncor – Example

## Assumptions

- ★ Expected Energy Yield & AE Bill Credit:

- ★ 972 kWh/month x **\$0.076/kWh** (TXU & Reliant Energy credit)

- ★ Monthly Bill Credit: **\$73.87**

- ★ Cost::

7,280 DC Watts @ \$3.60/watt:	\$26,208.00
-------------------------------	-------------

Less: AE Rebate (7280 x \$1.00)	( 7,280.00)
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Less: 30% Investment Tax Credit:	( <u>5,678.40</u> )
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Net Cost:	<b>\$13,249.60</b>
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<b>Lifetime Cost/kWh:</b> (972 kWh x 300 mos.):	<b>\$0.045 / kWh</b>
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# Solar Finance Revolution!

- ★ Solar market is maturing
- ★ Costs & Returns are predictable, stable, reliable = ***BANKABLE!***
- ★ Financial Institutions are waking up!
  - ★ Investors buying solar assets; steady return
  - ★ YieldCos – solar version of MLP
  - ★ Crowdfunding
  - ★ Securitizing solar loans

# Solar Financing Options

- ★ Cash Purchase
- ★ Bank/Credit Union Financing
- ★ Solar Lease
- ★ Solar PPA
- ★ Solar Loan Options
- ★ Community Solar
- ★ Solarize Programs

# Cash Purchase

- ★ “The cheapest money is the money you don’t borrow” **Or is it?**
  - ★ Opportunity Cost – what are you not using it for?
  - ★ Energy Efficiency – cheapest energy is energy you don’t use!
- ★ All incentives flow to you ... eventually.
- ★ **Not liquid – no used market for solar**
- ★ You assume all responsibilities of ownership
  - ★ Maintenance
  - ★ System Management

# Bank Financing

- ★ First Mortgage / Refi
  - ★ FACT: Increase in mortgage payment is LESS than the offset on your electric bill.
  - ★ No new home should be closed without solar.
- ★ 2<sup>nd</sup> Mortgage – low interest rate, lien
- ★ Home Equity Line of Credit
  - ★ Low interest rate, easy to draw from & use

# Bank Financing - continued

- ★ Secured Loan – Low Rates; Max 7 yr. Term
  - ★ Cash balance, CD, Investment Portfolio
  - ★ Assets – car, motorcycle, boat, RV, etc.
- ★ Unsecured Loan – higher interest; 7 yr.
- ★ Credit Card
  - ★ 12 to 18 month no interest offers!
  - ★ At end of intro period interest accrues only on balance at that time



# Solar Lease

- ★ Most popular
- ★ Most expensive
- ★ Least flexible
- ★ Read the fine print!

# Solar Lease - Terms

- ★ \$0 Money Down – *usually*
- ★ Payment set at 10-20% below electricity rates
- ★ **2.9% annual escalator**
- ★ All financial incentives flow to Lessor – 10% remain for Lessee
  - ★ Rebates, Tax Credits, Renewable Energy Credits
- ★ Maintenance – Lessor files claim with manufacturer
- ★ Repair “promise” – only mftr defects or workmanship damage
- ★ Production Guarantee – *sort of...*

# Solar Lease – Fine Print

- ★ System Operation & Maintenance Manual
  - ★ Lessee cleans, notifies Lessor of issues
  - ★ Lessee trims trees, etc.
- ★ “No Easy Way Out!”
- ★ No Buyout Option
  - ★ Rolls over at rate 10% below prevailing electric rates for (1) year
  - ★ Renew for up to (10) years
  - ★ **Still don’t own the system!**

# Sale of Your Home

- ★ New Buyer can assume lease if they qualify
- ★ Must sign Transfer Agreement
  - ★ If they don't, YOU are liable for remainder of lease
  - ★ If they default prior to signing transfer agreement, you are liable
- ★ Prepay lease same as Default
  - ★ New owner assumes all responsibilities
    - ★ “Solar Operations & Maintenance Manual”
    - ★ Cleaning, tree-trimming
  - ★ At the end, they don't own it either.

# Lease Terms for Default

- (i) recover from you (i) all accrued but unpaid Monthly Payments, taxes, late charges, penalties, interest and all or any other sums then accrued or due and owing, plus (ii) the unpaid balance of the aggregate rent, each payment discounted to present value at 5% per annum, plus (iii) reasonable compensation, on a net after tax basis assuming a tax rate of 35%, for the loss or recapture of (A) the investment tax credit equal to thirty percent (30%) of the System cost, including installation; and (B) accelerated depreciation over five (5) years equal to eighty five percent (85%) of the System cost, including installation, and for the loss of any anticipated benefits pursuant to Section 9 of this Lease [Lessor] shall furnish you with a detailed calculation of such compensation if such a claim is made); or
- (j) use any other remedy available to us in this Lease or by law.

***And They Still Don't Own it!***



# Latest: The “Solar Loan!”

- ★ Solar is “*BANKABLE*”
- ★ Need for Longer Term Financing
  - ★ PV Modules – 25 year warranty
  - ★ Oldest solar module (1954) still working!
  - ★ Expected 40 year life
- ★ Payment needs to align with value of kWh offset
- ★ “Cash Positive” (at least neutral)

# Solar Loan - Terms

- ★ Up to \$50,000 at Low Interest Rates
  - ★ Hidden Fees “Cash Discount”
- ★ Longer Term Options aligned with system life
  - ★ 2011 to 2013: 12 yr. 2.99 %
  - ★ 2014: 20 year, 5.99 % – 6.49% Interest
- ★ Incentives flow to – YOU, the *SYSTEM OWNER!*
- ★ No Prepayment Penalty
- ★ Fixed Monthly Payment – NO ESCALATOR!



# Solar Tax Credit Loan

- ★ *Remember Purchase “Out of Pocket”:*
  - ★ Gross System Cost – Rebate
  - ★ Wait until tax time to realize Tax Credit
- ★ *Why Not “Finance” Tax Credit?*
  - ★ Same-as-Cash Plans - No Interest, No Payments
  - ★ OPM for 6 to 18 months!
  - ★ Pay taxes, take tax credit → PAY OFF LOAN!
- ★ Long Term Loan on Bottom Line Only!



# Community Solar

- ★ Many models being tested
  - ★ Utility-owned, “Solar Choice”
  - ★ Several users form LLC and enter into agreement to sell power to utility
  - ★ Virtual Net Metering
  - ★ Micro Grids
- ★ Utilities challenged to see what work for their “Business Model”

# Thank You!

**Cathy Redson**

**Director of Sales, NATiVE, Inc.**

**President, SolPowerPeople, Inc.**

**(512) 547-8084**

**[credson@solpowerpeople.com](mailto:credson@solpowerpeople.com)**

**[cathy@buildnative.com](mailto:cathy@buildnative.com)**

**NATiVE**

