

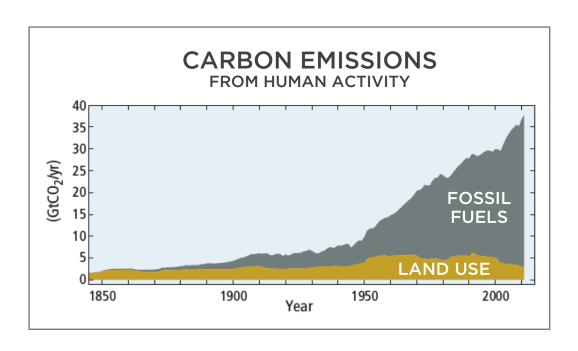
## OUR GENERATION IS CHANGING ENERGY

#### We Have a Problem...





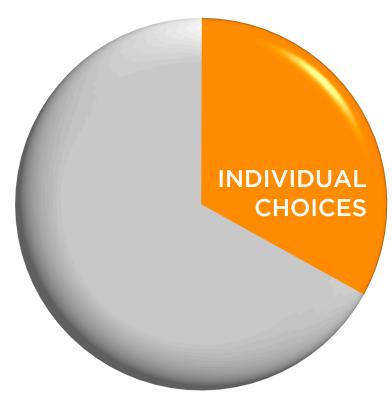
Our use of fossil fuels is affecting the health & quality of our lives.



Climate change threatens a secure, healthy future for everyone.

### Why Energy Awareness Matters...





CARBON DIOXIDE EMISSIONS in the United States

## **OUR CHOICES**

CONTROL OVER ONE-THIRD
OF CARBON DIOXIDE EMISSIONS

(mostly electricity, transportation and food).

## **Energy Awareness has Become a Movement**



## WE HAVE A NEW PERSPECTIVE AND BETTER CHOICES.

We're changing the food we consume, the things we buy, and the energy we use.

We're securing a healthier future.



Thermal image: an open door spills cool air and wastes energy

## **Energy Awareness is a Cultural Shift**







A change in *perspective* among many individuals—a cultural shift— is a powerful leverage point to transform an entire system: economies, politics, businesses, and societies.

So what exactly is the goal of the Energy Awareness Movement?



THE

# FIVE TRENDS

ADVANCING THE ENERGY AWARE MOVEMENT



#### FROM THIS...



#### **OVER 70%**

of air pollutants come from power and transportation.<sup>1</sup>



#### **ABOUT 50%**

of our water is drawn by thermal energy generation.<sup>2</sup>



#### ...TO THIS



ZERO
air pollution or
water consumed by
solar and wind power

we'll breathe easier and save water

#### FROM THIS...















#### ...TO THIS





we're replacing fuel with technology



POPULAR SUPPORT







SOCIAL MOMENTUM







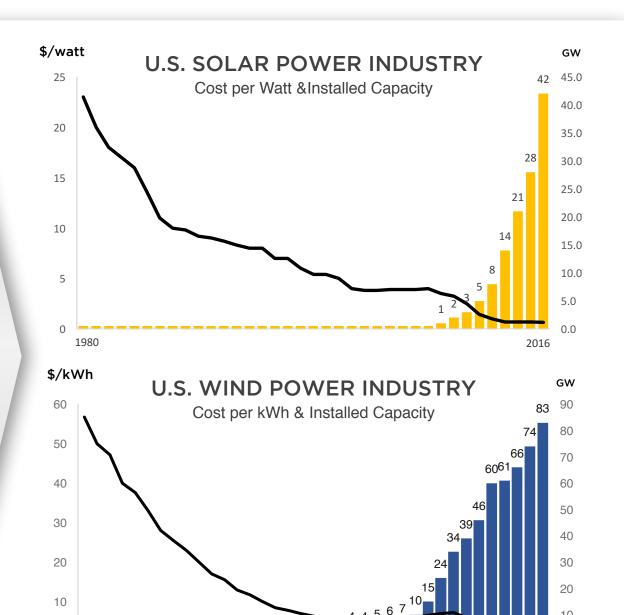
MORAL BASIS



cultural momentum is building

POPULAR SUPPORT

FAVORABLE TRENDS IN THE POWER INDUSTRY



2016





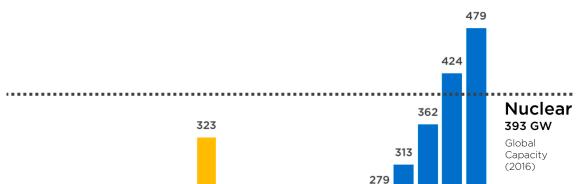
we can do this

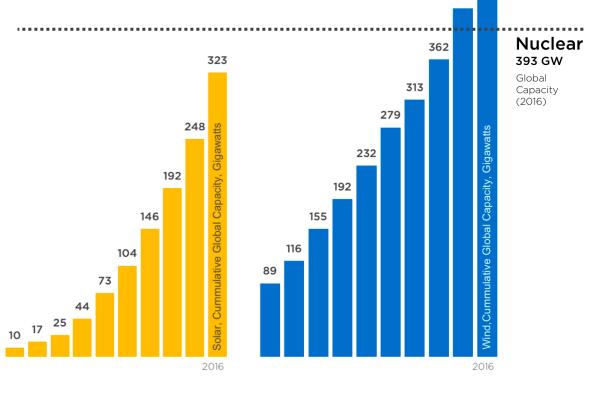
0

1980

**POPULAR SUPPORT** 

**FAVORABLE TRENDS IN** THE POWER **INDUSTRY** 





#### **SOLAR AND WIND POWER**

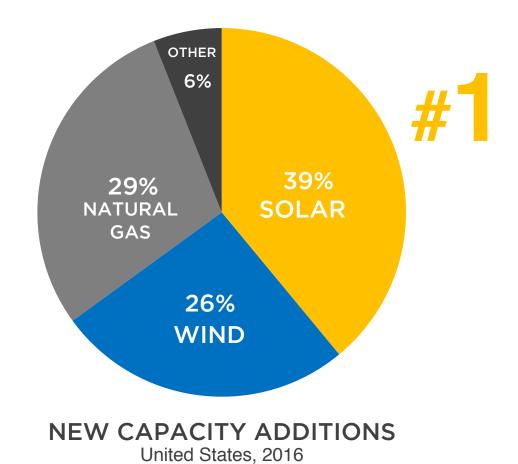
**Global Generation Capacity** 

The world's fastest-growing sources of energy, the lowest cost energy in most markets



POPULAR SUPPORT

FAVORABLE TRENDS IN THE POWER INDUSTRY



Solar added 14 GW of new capacity last year, around \$30 billion of investment in energy infrastructure





POPULAR SUPPORT

FAVORABLE TRENDS IN THE POWER INDUSTRY



WIND POWER



**HYDROPOWER** 

# WIND POWER IS THE LEADING SOURCE OF RENEWABLE ENERGY

**United States** 

another milestone



POPULAR SUPPORT

FAVORABLE TRENDS IN THE POWER INDUSTRY



**EMPLOYMENT** 

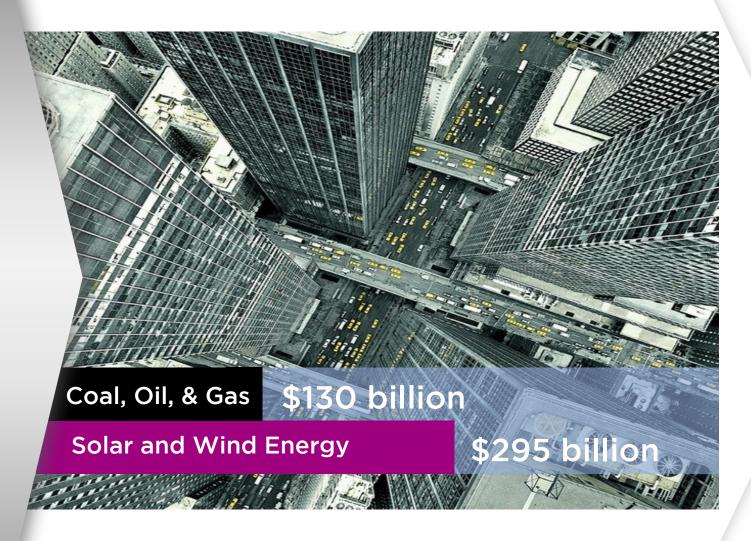
Electricity Sector, 2016

more jobs in clean energy



POPULAR SUPPORT

FAVORABLE TRENDS IN THE POWER INDUSTRY



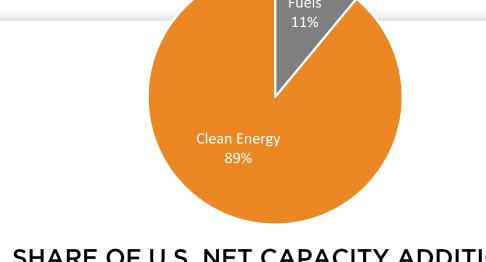
**GLOBAL INVESTMENT** 

Electricity Sector, 2016

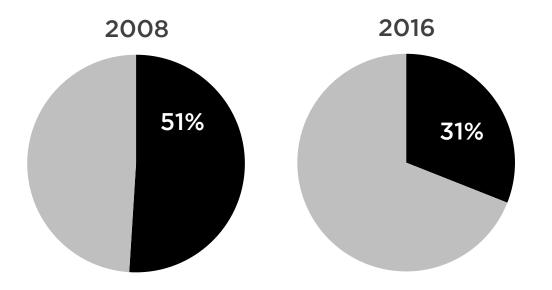
more investment in clean energy

POPULAR SUPPORT

FAVORABLE TRENDS IN THE POWER INDUSTRY



## SHARE OF U.S. NET CAPACITY ADDITIONS 2008–2015





we're moving beyond coal



POPULAR SUPPORT

FAVORABLE TRENDS IN THE POWER INDUSTRY

BUSINESSES BUYING CLEAN ENERGY



























POPULAR SUPPORT

FAVORABLE TRENDS IN THE POWER INDUSTRY

BUSINESSES BUYING CLEAN ENERGY

NEW AND BETTER CHOICES







## 180 GENERATION 180

#### PRODUCT INNOVATION

- ✓ Better performance
- ✓ More convenience
- ✓ More value





#### MARKET OPPORTUNITY

Businesses are pursuing new opportunities to capture market share



consumer preference, market opportunity





THE

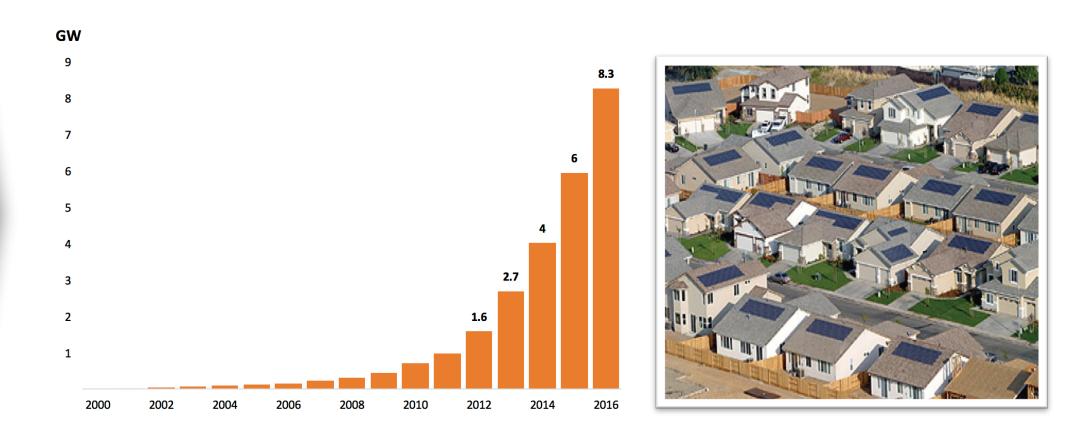
# EVIDENCE

PEOPLE ARE EMBRACING CLEAN ENERGY



## **U.S. Residential Solar Capacity**



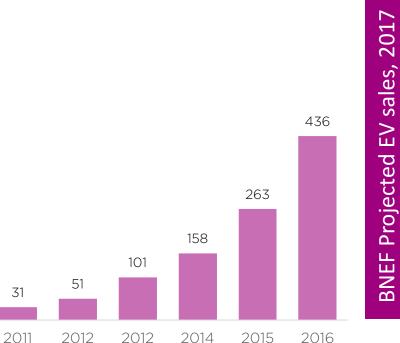


Every two minutes another home or business goes solar in the U.S.



### **Global EV Sales**





## 2 Million

EV's Worldwide Expected by year-end...



exponential growth

Units Sold (000's)

## The Top Selling Luxury Sedan is Electric



The threat to incumbents is real

U.S. Large Luxury Sedans Sales, 2016



Tesla sold more than Mercedes, BMW, Porsche, Jaguar and Lexus, Combined.



## Chevy Bolt - 2017 Car of the Year



Chevy, Ford, Volkswagen, Volvo, Mercedes, Honda, Toyota All the major brands are bringing electric cars to market

AWARD WINNING





MSRP from \$35,6000

## **Electrifying Everything**







## **Electrify Municipal Fleets**



**Zero**Tailpipe Emissions

26%
Quieter than Diesel Buses



\$50,000 Annual savings in diesel costs per bus

NYC has approx. 4,000 bus...accounts for \$200,000,000 in annual savings in NYC alone

\$237,000 Savings in maintenance costs over the life of the vehicle

No oil changes, 75% fewer brake repairs



## **LED Streetlights**



\$8,000,000 Annual savings

When Los Angels replaced 150,000 bulbs,

63% Energy savings

When Los Angels replaced high pressure sodium lights









#### The

# **THESIS**

HOW AND WHY
ENERGY AWARENESS
HAS BECOME A MOVEMENT





POPULAR SUPPORT \*

FAVORABLE TRENDS IN THE POWER INDUSTRY \*

BUSINESSES BUYING CLEAN ENERGY \*

NEW AND BETTER CHOICES \*

\*relatively new factors; within the last few years

# THE TIPPING POINT

TRENDS ARE CONVERGING

PEOPLE ARE EMBRACING CLEAN ENERGY

ENERGY AWARENESS
IS AN IDEA WHOSE
TIME HAS COME



### The New Energy Narrative



FROM THE OLD SCRIPT...

TO A NEW ONE - THAT LAUNCHED THE ENERGY AWARE MOVEMENT

WE ARE DEPENDENT

PROBLEM IS TOO BIG

**FUTURE IS GRIM** 

CLEAN ENERGY MYTHS

> CLIMATE DENIAL

CLIMATE DOOM AND GLOOM WE'RE MAKING PROGRESS

THERE ARE SOLUTIONS

BROAD PUBLIC SUPPORT

TRENDS ARE FAVORABLE

THE ENERGY
TRANSITION IS
HAPPENING

#### My choices matter

I can be part of the solution Better, more affordable Sign me up

#### I'm a believer

Hopeful
More confident future
Let's all do our part





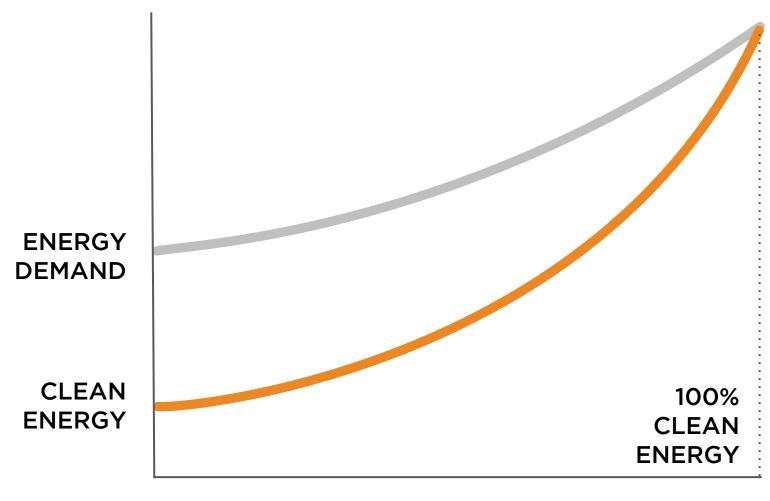
THE

# **OBJECTIVE**

OF THE ENERGY AWARE MOVEMENT

## Getting to 100% Clean Energy

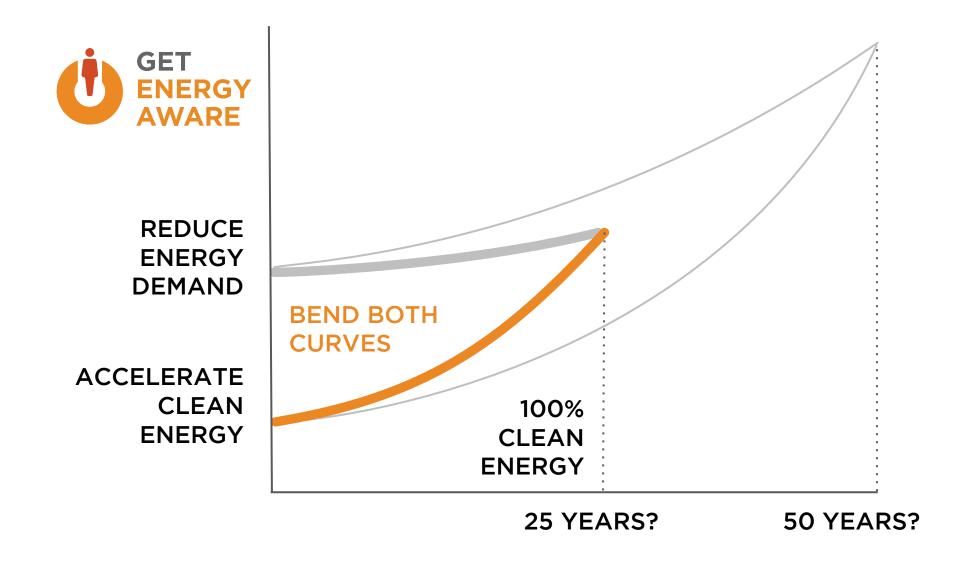




50 YEARS?

## Getting to 100% Clean Energy... Faster







#### THE

# MOVEMENT

AND HOW TO ENGAGE

### Our Call to Action











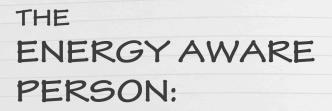


"How each person thinks and perceives his or her role and responsibility in the world is the first step in any transformation – the base upon which all change depends".

Paul Hawken, Drawdown

## **Energy Aware Basics...**

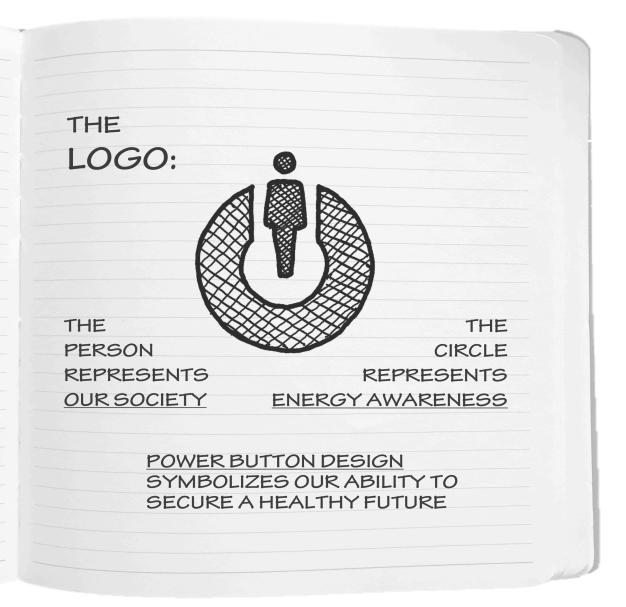




UNDERSTANDS
THE TRANSITION TO CLEAN
ENERGY IS HAPPENING

IS EMPOWERED
BY NEW CHOICES

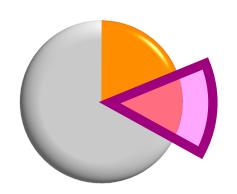
IS DETERMINED
TO TAKE ACTION





# THE TOP 3

ways to lower your emissions









#### CLEAN ENERGY

TRANS-PORTATION

PLANT RICH DIET

# Go local with solar on your roof. If you rent or are in a shaded area, look for a

THESE ARE THE THREE BIGGEST STEPS YOU CAN TAKE

Reduce your carbon emissions by 50% or more for most people

community solar or utility clean energy program

Electric cars, bikes,

mopeds, and motorcycles will save you money, or just walk more.

A plant rich diet is healthier and less expensive. Eat less meat, especially beef.

Estimated Savings

\$1,180
Average annual savings with an average solar installation

\$1,017
Average annual gas savings with

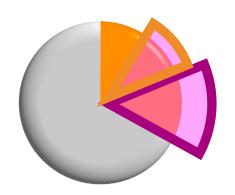
an EV \$420

Average annual savings for low carbon diet



# Next 2

ways to lower your emissions









FLY LESS

SEALING LEAKS AND INSULATION Air travel is very carbonintensive. One flight across the U.S. can equal a year's worth of driving.

FLYING IS UNAVOIDABLE SOMETIMES
especially for work, but you can explore
alternatives like taking a train or video conferencing

Stop energy waste in your home by insulating and sealing the leaks. A thermal camera can help locate the spots that need

attention.

Estimated Savings

\$350 Average savings for an avoided domestic flight

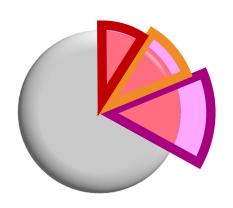
\$155
Average annual savings from air sealing/insulation



# EVEN D

# MORE

ways to lower your emissions that add up quickly.











		Estimated Savings
BE SMART	12-20% Energy savings More comfort, less waste, more savings	\$50 Average annual savings per household
SAVE POWER	12% Energy savings "Vampire loads" are devices that draw power even when they are turned off.	\$70 Average annual savings per household
GET MORE	75% Energy savings Compared to a conventional light bulb, a great investment.	\$88 Average annual savings from replacing 15 incandescents
USE YOUR SWITCH	Lights out when you leave a room. It's a daily reminder to be energy aware - it's how we win.	Data too variable to be determined

## Make a Personal Energy Action Plan



# MORE

ways to lower your emissions that add up quickly.





	Over half of the average home's electricity usage goes to technology and appliances that can be made or used more efficiently	Estimated home electricity usage
APPLIANCES AND DEVICES	<ul> <li>Replace appliances and electronics with energy-efficient ones, like ENERGY STAR products</li> <li>Prevent "vampire devices" from wasting energy in your home by unplugging devices, turning off power strips, and using devices with efficient standby mode</li> </ul>	26%
HEATING AND COOLING	<ul> <li>Ensure your home is properly insulated and air sealed to prevent energy waste</li> <li>Use your home heating/cooling system efficiently with a smart thermostat or by turning the thermostat up a few degrees on cooling days and down a few degrees on heating days</li> </ul>	25%
LIGHTING	Change the light bulbs in your home to LEDs, especially the ones you use the most	9%
HEATED WATER	<ul> <li>Conserve hot water use by washing laundry in cold water, using the dishwasher efficiently, or taking shorter showers</li> <li>Install a solar or tankless water heater and water-efficient toilets, faucets, showerheads and washers, like WaterSense products</li> </ul>	9%

START AT HOME





#### **Volunteers Lead Our Campaigns**



#### IT'S TIME TO RALLY.

Take local action to spread energy awareness and clean energy adoption.

Support local schools going solar, encourage businesses to stop energy waste, and deliver Energy Aware Workshops.



#### Keep It Cool Campaign



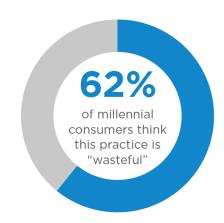




On hot days, people take notice of retailers' front doors and send us store locations via Facebook Messenger—either to flag a store that needs a friendly reminder to conserve energy, or to recognize a store for keeping its door closed.



We place a pin on our map, and reach out to remind retailers to close their doors to conserve energy.



25%

of all respondents are "less likely to shop" at retailers that leave their doors open with A/C running.

Retailers nationwide have the cumulative potential to prevent enormous amounts of pollution. How much? The same CO2 released by a car driving 830 million miles.



#### Keep It Cool Campaign





10,000 Facebook followers

7,000 campaign video views

23 States with pin drops











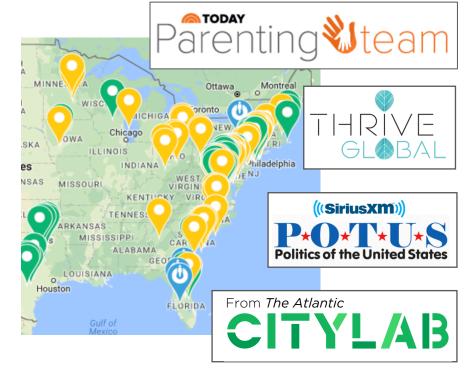
















#### **Media Coverage**







#### WTXF-Philadelphia, PA



KVVU - Las Vegas, NV



WFXB - Myrtle Beach, SC



#### Solar Schools Campaign



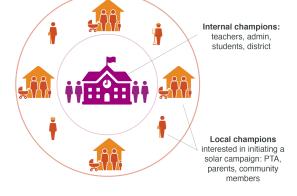


**OBJECTIVE** 

A national education system powered by solar energy

#### **OPPORTUNITY**

- Lower barriers for schools and increase adoption of solar through an online hub of solar resources.
- Encourage and facilitate solar school projects that engage students and community members, demonstrate solar benefits, and increase acceptability of solar to local communities.
- 3. Show and build momentum for solar schools. Identify solar school leaders and share best practices.



POTENTIAL ... 4,800,000 MT CO2 offset per year (all schools)



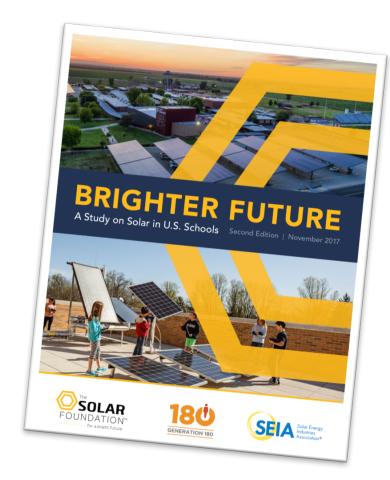
#### **Updated Study**





Generation 180 has collaborated with the Solar Foundation and SIEA to update the 2014 Solar Schools Report.

The new report is an asset for the solar school movement and our advocates nationwide.









#### Solar Schools Resource Map



- 2 Easily identify & explore case study schools from Brighter Futures report
- Easily find state- and regionallevel resources (Gov't and NGOs)
- 4 Search curated list of 3<sup>rd</sup> party resources (based on stakeholder type) from Gen180 resource database







See nationwide momentum of 5,500+ **solar schools** and

find those near you





#### **Energy Awareness Campaign**



#### BECOME A TEAM LEADER

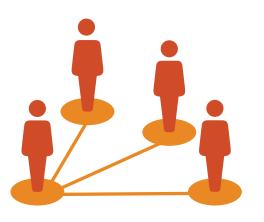
Volunteers lead workshops to empower individuals to become energy aware, change the energy conversation, and adopt personal lifestyle changes.

Workshop participants will be ready to engage in their local community and spread the word.







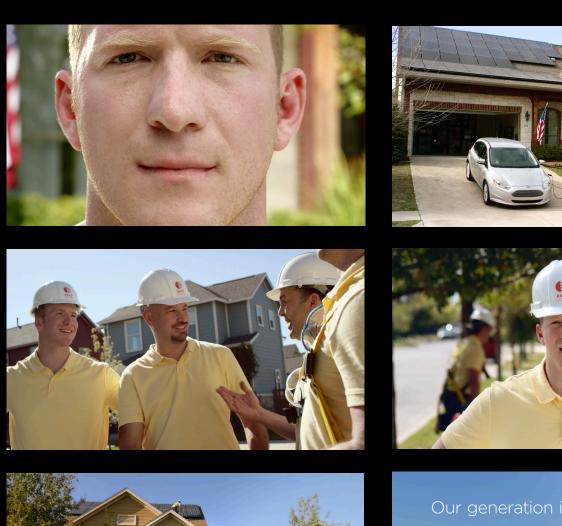


SPREAD THE WORD

### OUR IDEA OF A GREAT SUPERBOWL AD



Please go to generation 180.org to see the the one-minute ad



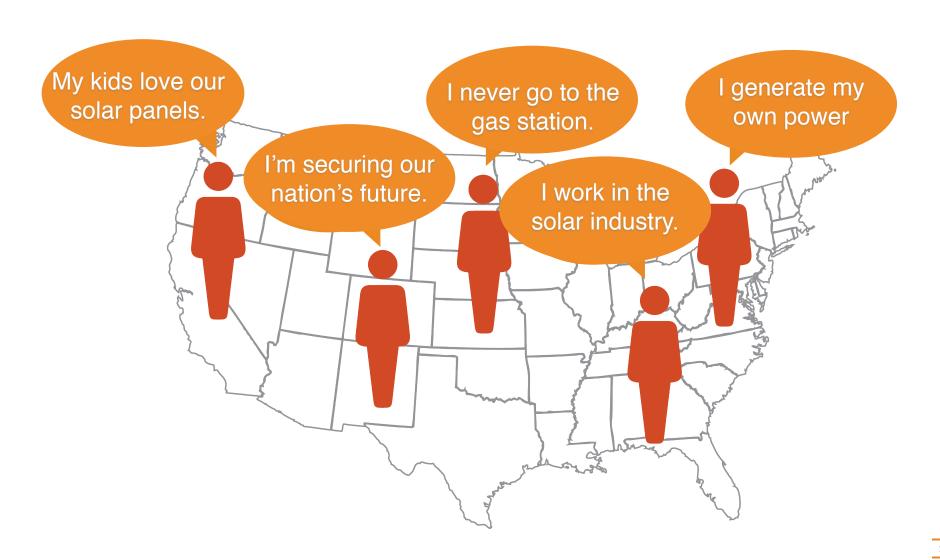




### The New Energy Conversation...



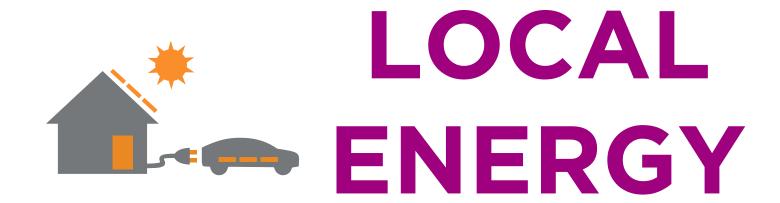
of the energy aware movement





#### The Language of a New World





#### SOLAR HAS MADE ENERGY A LOCAL PRODUCT

Save money, be healthier, more self-reliant, and cut pollution "Power your Home and Drive on sunshine"

#### Start a Conversation and Change the World



Spread an idea whose time has come - you are now Energy Aware.











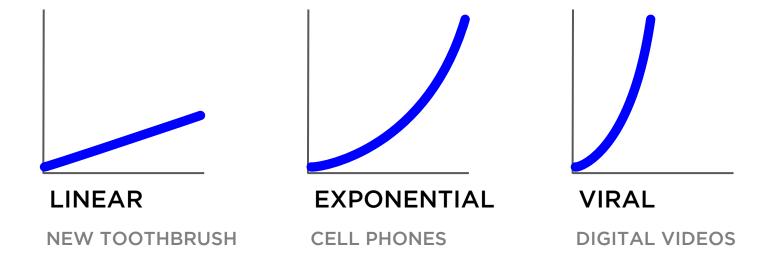
#### You know energy awareness is trending when...





#### How do we Define Success?

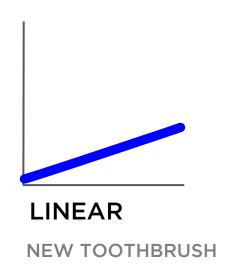


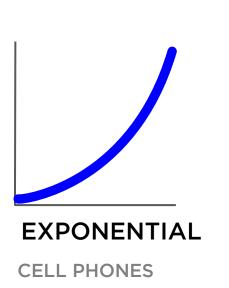


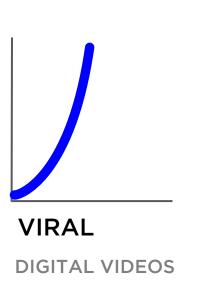


#### **A Cultural Shift**











**SOCIAL NORMS** 





#### **THANK YOU**

generation180.org

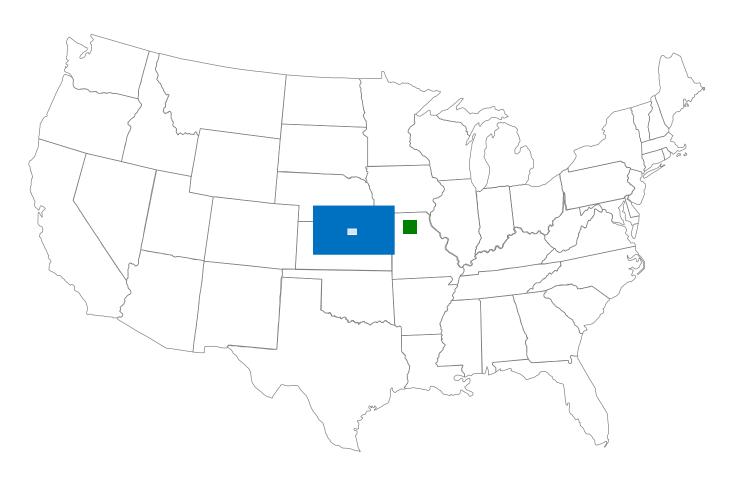


# REFERENCE SLIDES AND ENDNOTES

#### Wind Energy Land Use



#### Area required to power 100% of the US with wind energy



#### 68,267 sq. miles

**Blue Square -** Area of wind farms needed to meet 100% of the electricity generated in the U.S. in 2016. Farming, grazing and other land uses are compatible within this area.

#### 2,048 sq. miles

**Light Blue Square -** Area of the direct footprint of wind turbine infrastructure. (3% of the total area required)

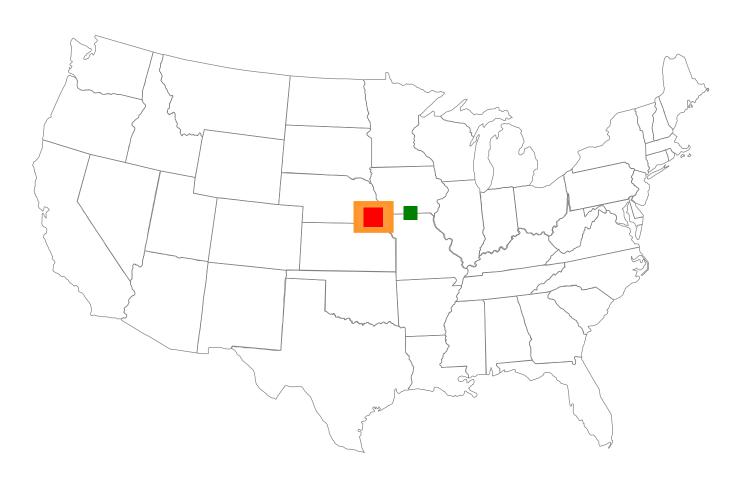
#### 3,507 sq. miles

**Green Square -** Area occupied by golf courses in the U.S.

#### Solar Energy Land Use



#### Area required to power 100% of the US with solar energy



#### 17,482 sq. miles

**Orange Square -** Area of solar panels needed to meet 100% of the electricity generated in the U.S. in 2016

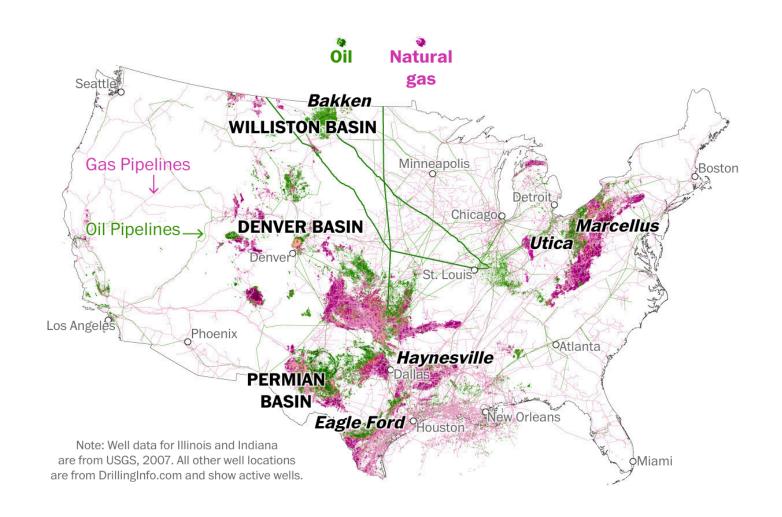
#### 6,268 sq. miles

**Red Square -** Area of solar panels that could be placed on rooftops alone (35.11% of the total area required)

#### 3,507 sq. miles

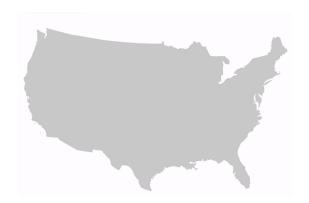
**Green Square -** Area occupied by golf courses in the U.S.

#### Oil and Gas Wells in the United States

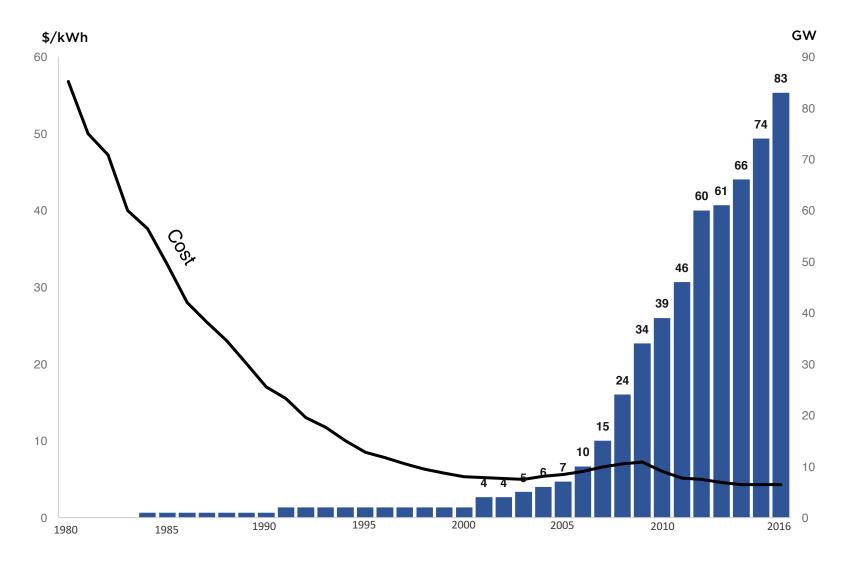


#### **U.S. Wind Power Industry**



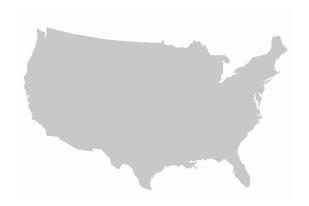


Falling costs have driven higher volumes and further cost improvements



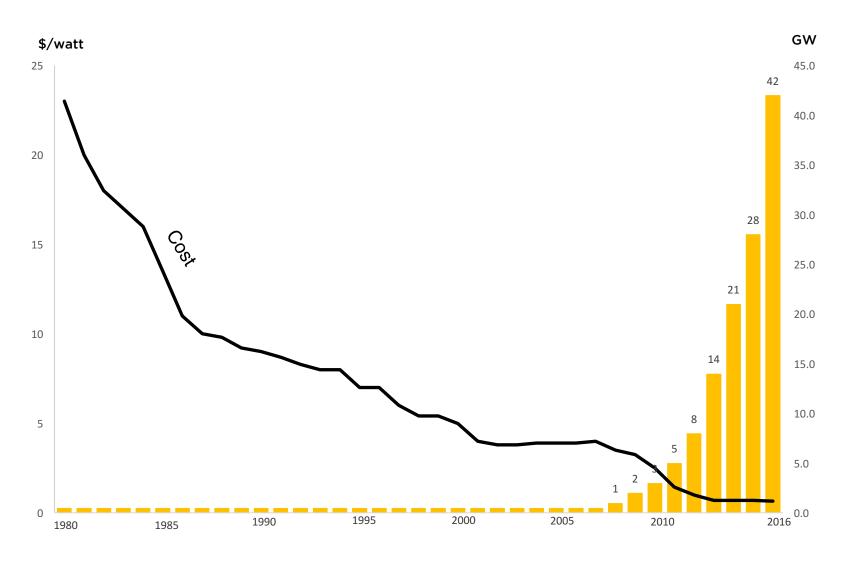
#### **U.S. Solar Power Industry**





Clean energy is ready today – the technologies are proven, the industry is scaling up fast.

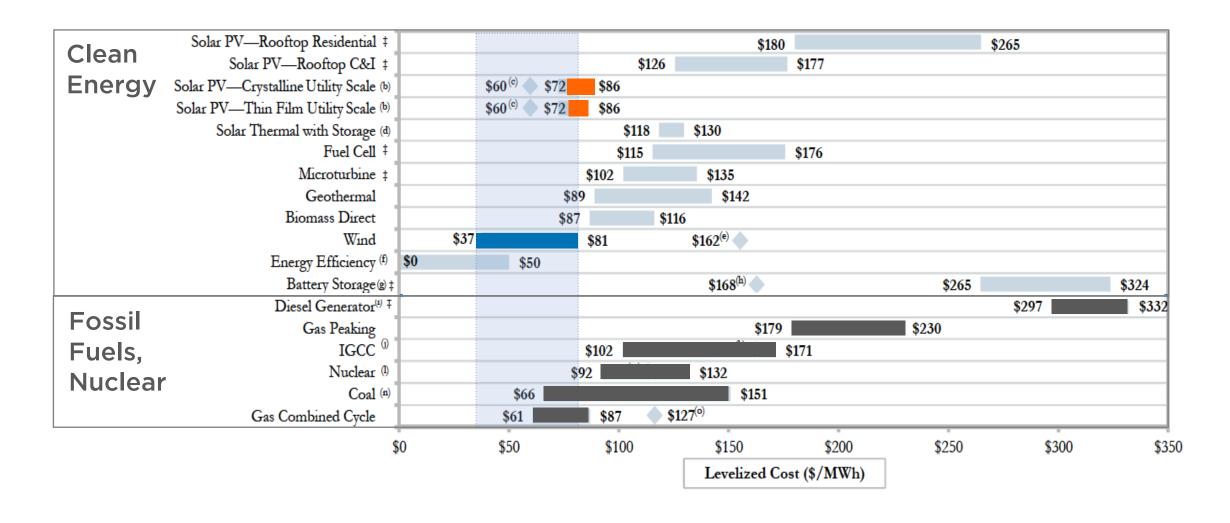
Solar has passed the tipping point, investment in 2016 exceeded \$30 billion.



#### **Unsubsidized Levelized Cost of Energy**



Solar and wind are competitive on an <u>unsubsidized</u> basis



### 100% Battery Powered







114 mile range



238 mile range



330 mile range



115 mile range



87 mile range

### Plug-In Hybrids













~450 mile total range ~40 miles battery only

range not an issue



#### **ENDNOTES**

## Endnotes (page 1 of 3)



	Estimated savings calculated using a combination of statistics and assumptions from US EIA and EnergySage.	
ENERGY	Source: -US EIA, Electric Power Monthly, June 2017 -US EIA, Average monthly residential electricity consumption, prices, and bills by state, 2016 -EnergySage, How Much Do Solar Panels Save?, 2017	
TRANSPORTATION	Estimated savings calculated using a combination of statistics and assumptions from US DOE, US EIA, US EPA, and Berkeley Institute of the Environment's CoolClimate Network.  Source: -US EIA, US Retail Gasoline and Diesel Prices, June 2017 -Berkeley Institute of the Environment, CoolClimate Network Household Calculator (accessed July 2017) -US DOE/EPA, fueleconomy.gov, August 2017	
PLANT RICH DIET	Estimated savings come directly from the CoolClimate Network Household Calculator, under the practice "Eat a low carbon diet". Coolclimate Network cites US BEA and USDA consumption statistics in their methodology.  Source: -Berkeley Institute of the Environment, CoolClimate Network Household Calculator (accessed July 2017)	
FLY LESS	Estimated savings calculated using the cost of an average domestic flight in the US.  Source: -US BTS, Average Domestic Air Fares, 2017	
AIR SEALING & INSULATION	Estimate based on US EIA statistics for average residential electricity consumption and costs and Energy Star program statistics on energy savings from air sealing & insulation.  Source: -US EIA, Average monthly residential electricity consumption, prices, and bills by state, 2016 -Energy Star, Methodology for Estimated Energy Savings from Cost-Effective Air Sealing and Insulating, accessed 2017	

## Endnotes (page 2 of 3)



BE SMART	Estimated savings calculated using Nest Thermostat estimates on heating and cooling savings and US EIA residential electricity use and price statistics  Source: -Nest, Energy Savings from the Nest Learning Thermostat, February 2015 -US EIA, Estimated US residential sector electricity consumption by end use, 2016 -US EIA, Average monthly residential electricity consumption, prices, and bills by state, 2016
SAVE POWER	Estimated savings calculated using Natural Resources Defense Council figures on idle load electricity consumption and US EIA residential electricity use statistics  Source: -Natural Resources Defense Council, <i>Home Idle Load Issue Paper</i> , May 2015 -US EIA, Average monthly residential electricity consumption, prices, and bills by state, 2016
GET MORE	Source: -US EPA, Greenhouse gas Equivalences Calculator—Calculations and References, July 2017 -Cree LED Lighting, LED Bulb Calculator, July 2017
USE YOUR SWITCH	N/A

## Endnotes (page 3 of 3)



KEEP IT COOL	Estimates based on the City of New York's Department of Consumer Affair's "Shut the Front Door Campaign" and a Natural Resources Defense Council survey on the practice of leaving storefront doors open with air-conditioning running.  Source:  -City of New York Department of Consumer Affairs, Shut The Front Door Campaign, July 2015 -Natural Resources Defense Council, NRDC Survey: NYC Businesses Still Blasting Their Air Conditioners with Doors Open, August 2015
SOLAR SCHOOLS	Figures taken from the original <i>Brighter Future: A Study on Solar in US Schools</i> report, created by The Solar Foundation (TSF) and Solar Energy Industries Association (SEIA). Generation 180, TSF and SEIA have partnered for the 2017 update to the <i>Brighter Future</i> report.  Source:  -The Solar Foundation, Solar Energy Industries Association, <i>Brighter Future: A Study on Solar in US Schools</i> , September 2014