



### Leading at the local level:

Lessons learned from municipalities with bold sustainability goals

Making Clean Local Energy Accessible Now

March 22, 2016

#### **Webinar FAQ**



- Webinar recording and slides will be sent to registered attendees within two business days
- All webinars are archived on www.clean-coalition.org and the Clean Coalition's YouTube channel
- Submit questions in the 'Questions' window at any time (window view varies by operating system and browser)
- Questions will be answered during the panel portion of the webinar
- Contact us at info@cleancoalition.org







Hunter Lovins President & Founder Natural Capitalism Solutions



Pat Burt Mayor City of Palo Alto



John Bernhardt Outreach & Communications Director Clean Coalition

## NATURAL CAPITALISM SOLUTIONS



Leading at the local level: Lessons learned from municipalities with bold sustainability goals

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#### Who We Are





#### Natural Capitalism, a non-profit organization, is an internationally recognized leader in sustainability education, strategy, and implementation.

#### Longmont, CO

#### **Empowering Communities**





# WORLD CLIMATE SUMMIT PARIS, FRANCE, 2015



PARIS CLIMAT 2015

United Nations Framework Convention on Climate Change



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## PARIS2015





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United Nations Climate Oxange Conference 20

Parls, Prania

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United Nations

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Paris, France



"When in 2014 the UN Secretary General convened his UN Climate Change Summit and hundreds of thousands of people marched in the streets of New York, it was then that we knew that we had the power of the people on our side."

Christiana Figueres, head of UN climate talks, in her closing speech to the summit.

## Protect Old Growth Forests

Forest

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#### Strong civil society presence



"If we get this right, it will be more powerful than the industrial revolution.

A green race is going on." Lord Nic Stern

116 companies pledged to set science-based carbon goals

500 companies signed on to Divest for Paris

We Mean Business: 6 million companies commit to one of: Sciencebased emissions goals; a price on carbon; 100% renewable energy; "responsible corporate engagement in climate policy"; reporting climate change details "in mainstream reports as part of fiduciary duty"; removing deforestation from supply chains by 2020; and reducing "short-lived climate pollution emissions."

53 companies commit to 100% renewable energy: Unilever, IKEA and Swiss Re: BT; Commerzbank; FIA Formula E; H&M; KPN; Mars; Nestle; Philips; Reed Elsevier; and J. Safra Sarasin, Coca Cola, BMW.

General Mills cut carbon 28% over 20 years, spend \$100 million

## **CLIMATE CHANGE** URBAN SOLUTIONS

UN Climate Change Conference PARIS NOV 30 - DEC 11 2015

CLIMATE

DIALOGUES

#### UN-HABITAT AT COP 21

Comercince sur les changements climatiques 2013

Paris, France



More than 1,000 cities committed to 100% renewable energy

#### THE HUFFINGTON POST

#### **BREAKING NEWS**

Saturday December 12, 2015

#### Historic Climate Change Agreement Adopted In Paris



Francois Mori/AP

#### Article 2

This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: (a) Holding the increase in the global average temperature to well below 2° C above pre-industrial levels and to pursue efforts to limit the temperature

increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;

#### **CLIMATE CHANGE NUMBERS FOR COP21 IN PARIS**

**Temperature Increases Above Pre-Industrial Levels** 



\*NOTE: Pledges, BAU Scenario, and temperature colors from ©Ecofys and Climate Analytics, http://climateactiontracker.org/, other credits at markatcop21.wordpress.com



2 days Red Alert – Beijing shut from air pollution

Hundreds dead, almost 3 million cut off, displaced





If climate change continues unabated, half the homes in at least 21 US cities will be under water by 2100

St 22 / Car

#### Climate deniers lost.



# I DON'T BELIEVE IN

The \$500 million-plus spent promoting climate denial over the last 2 decades was wasted. Leaders of 196 countries agreed that climate change is threatening human life on Earth

#### \$1.3 Trillion Wipeout

Energy companies lost \$1.3 trillion in value since oil peaked last year at \$107 a barrel. \$4.0 Trillion



In the hours after the Paris Deal the conservative trade ournal MarketWatch reported:

"As if it couldn't get any worse for oil companies, the historic climate-change deal agreed in Paris is seen as another nail in the coffin of future demand for fossil fuels." Morgan Stanley analysts

Bloomberg I

# THE AGE OF FOSSIL FUELS IS OVER

IF THE WORLD IS SERIOUS ABOUT ADDRESSING THE CLIMATE CRISIS, We must get completely off fossil fuels – and soon

# THE AGE OF FOSSIL FUELS IS OVER

IF THE WORLD IS SERIOUS ABOUT ADDRESSING THE CLIMATE CRISIS, We must get completely off fossil fuels – and soon

> We have achieved a universal legal agreem to limit future man-made climate change, t greatest existential threat to life on earth



## Town of Lyons

Worked with the town to create their first environmental sustainability plan, that subsequently became a main anchor of their flood recovery plan. Key Stats:

- Coordinated with over 25 stakeholders, including FEMA
- Engaged over 500 community organizations and members
  - Detailed over 90+ recommendations to advance sustainability

#### **Proven Success**

## Testimonial

"NCS not only capably lead Lyons Environmental Sustainability Action Plan, but also played an integral part in supporting the towns recovery efforts after the devastating floods of 2014.

NCS went above and beyond their contract to ensure that sustainability was integrated into our long-term recovery plan... and we look forward to continued engagement with them for years to come. "

- John Obrien, Mayor of Lyons



# SUSTAINABLE



December 3, 2015 University of Denver



# **Boulder County Analysis Tool**

Yellow = User Entry Cell															
					LIFETIME BENEFITS FROM BASELINE YEAR										
BASELINE	CURRENT BUDGET	N OF OVERALL BUDGET	G	st / GHG (mt)	CO2e (Mt)	Electricity (kWh)	Gas (Dth)	Water (gal)	Waste (tons)	Direct Savings / Benefit	Indirect Savings / Benefits	Social Cost of Carbon	Total Economic Benefit	\$1 invested Returns	Baseline Year
Residential	\$ 1,612,707.65	19.80%	\$	77.94	20,690.48	15,902,349.72	582,279.52	8,724,048.00		\$ 6,329,975.60	\$ 9,489,944.77	\$ 1,016,267.09	\$ 16,836,187.46	\$ 10.44	2013
Commercial	\$ 1,420,023.85	17.43%	\$	37.46	37,908.03	43,784,484.93	4,691.20			\$ 4,324,061.18	\$ 8,648,122.36	\$ 1,352,501.88	\$ 14,324,685.43	\$ 10.09	2013
Weatherization	\$ 2,188,695.35	26.87%	\$	483.74	4,524.55	3,142,899.78	48,898.82			\$ 746,124.41	\$ 1,492,248.81	\$ 108,589.27	\$ 2,346,962.49	\$ 1.07	2013
Build Smart (New Residential)					4,521.60	3,915,547.01	21,370.60			\$ 627,817.46	\$ 1,255,634.92	\$ 213,645.43	\$ 2,097,097.82	\$ 19.06	2013
Build Smart (C&D)	\$ 110,000.00	2.35%	•	21.40	618.12				801.31			\$ 19,779.80	\$ 19,779.80	\$ 0.18	2013
Waste (Diversion)	\$ 2,365,317.67	29.04%	\$	11.57	204,440.00				74,950.00			\$ 6,542,080.00	\$ 6,542,080.00	\$ 2.77	2013
Ecopass	\$ 114,360.00	1.40%	\$	377.43	303.00					\$ 328,100.00	\$ 31,804.00	\$ 9,696.00	\$ 369,600.00	\$ 3.23	2012
Transit Service Buy-ups	\$ 334,778.00	4.11%	\$	716.87	467.00					\$ 257,000.00	\$ 43,156.00	\$ 14,944.00	\$ 315,100.00	\$ 0.94	2012
Total	\$ 8,145,882.52	100.00%	15	29.79	273,472.78	66,745,281.43	657,240.14	8,724,048.00	75,751.31	\$12,613,078.65	\$20,960,910.87	\$ 9,277,503.48	\$ 42,851,493.00	\$ 5.26	
													\$ 630.58		
				LIFETIME BENEFITS FROM BASELINE YEAR											
OPTION ONE	CURRENT BUDGET	% OF OVERALL BUDGET	9	ost/Ton	CO2e (Mt)	Electricity (kWh)	Gas (Dth)	Water (gal)	Waste (tons)	Direct Savings	Indirect Savings	Social Cost of Carbon	Economic Benefit		Baseline Year
Residential	1	14.29%	\$	77.94	0.0128	9.8607	0.3611	5.4096		\$ 3.93	\$ 5.88	\$ 0.63	\$ 10.44		2013
Commercial	1	14.29%	\$	37.46	0.0267	30.8336	0.0033			\$ 3.05	\$ 6.09	\$ 0.95	\$ 10.09		2013
Weatherization	1	14.29%	\$	483.74	0.0021	1.4360	0.0223			\$ 0.34	\$ 0.68	\$ 0.05	\$ 1.07		2013
Build Smart (New Residential)					0.0411	35.5959	0.1943			\$ 5.71	\$ 11.41	\$ 1.94	\$ 19.06		2013
Build Smart (C&D)	1	14.29%	÷	21.40	0.0056				0.0073			\$ 0.18	\$ 0.18		2013
Waste	1	14.29%	1	1.5697401	0.0864				0.0317			\$ 2.77	\$ 2.77		2013
Ecopera	1	14.29%	\$	377.43	0.0026					\$ 2.87	\$ 0.28	\$ 0.08	\$ 3.23		2012
Transit Service Buy-ups	1	14.29%	\$	716.87	0.0014					\$ 0.77	\$ 0.13	\$ 0.04	\$ 0.94		2012
Total	7	100.00%	\$	39.15	0.179	77.726	0.581	5.410	0.039	\$ 16.66	\$ 24.48	\$ 6.65	\$ 47.78		
					LIFETIME BENEFITS FROM BASELINE YEAR										
OPTION TWO	CURRENT BUDGET	% OF OVERALL BUDGET	6	ost/Ton	CO2e (Mt)	Electricity (kWh)	Gas (Dth)	Water (gal)	Waste (tons)	Direct Savings	Indirect Savings	Social Cost of Carbon	Economic Benefit		Baseline Year
Residential	\$ 1,773,978.42	19.80%	\$	77.94	22,759.533	17,492,584.687	640,507.473	9,596,452.800		\$ 6,962,973.16	\$10,438,939.25	\$ 1,117,893.80	\$ 18,519,806.20		2013
Commercial	\$ 1,562,026.24	17.43%	\$	37.46	41,698.832	48,162,933.418	5,160.320			\$ 4,756,467.30	\$ 9,512,934.60	\$ 1,487,752.07	\$ 15,757,153.97		2013
Weatherization	\$ 2,407,564.89	26.87%	\$	483.74	4,977.008	3,457,189.754	53,788.700			\$ 820,736.85	\$ 1,641,473.70	\$ 119,448.20	\$ 2,581,658.74		2013
Build Smart (New Residential)	A	4.30%		24.42	4,973.756	4,307,101.712	23,507.659			\$ 690,599.21	\$ 1,381,198.42	\$ 235,009.98	\$ 2,306,807.60		2013
Build Smart (C&D)	\$ 121,000.00	1.35%	>	21.40	679.931				881.4			\$ 21,757.78	\$ 21,757.78		2013
Waste	\$ 2,601,849.43	29.04%	\$	11.57	224,884.000							\$ 7,196,288.00	\$ 7,196,288.00		2013
Ecopera	\$ 125,796.00	1.40%	\$	377.43	333.300					\$ 360,910.00	\$ 34,984.40	\$ 10,665.60	\$ 406,560.00		2012
Transit Service Buy-ups	\$ 368,255.80	4.11%	\$	716.87	513.700					\$ 282,700.00	\$ 47,471.60	\$ 16,438.40	\$ 346,610.00		2012
Total	\$ 8,960,470.77	64.10%	\$	129.05	69,435.373	69,112,707.860	699,456.493	9,596,452.800	881.44	\$13,874,386.51	\$23,057,001.96	assesses as	\$ 47,136,642.30		



#### **Boulder County**

#### \$1 Invested in These Services Returns


### Sustainability Impact Overview

#### **BOULDER COUNTY | COLORADO**

#### ECONOMIC IMPACT



Over \$37 million in direct savings to residents and businesses, and another \$62 million reinvested into the community.

#### CLIMATE IMPACT



Reduced greenhouse gas emissions equal to powering 41,000 homes.

#### SOCIAL IMPACT



Created close to 187 full time jobs in the community and reduced utility bills for over 1,000 low-income residents.

All program results reflect the time frame between 2011 and 2013

#### For every **\$1** invested in Boulder County sustainability programs, our community receives **\$5** worth of benefits.

### **ENERGY & BUILDINGS** Saved enough energy Over 90% of all crops in the last three years

to power over 22,000 homes.

#### FOOD & AGRICULTURE

grown on Boulder County agricultural land ends up in the food system.

#### WASTE



Diverted over 76,000 tons of waste annually, enough to fill over 7,000 garbage trucks.

#### WATER



Saved enough water to provide drinking water for over 120,687 residents for one year.

#### TRANSPORTATION



Individuals drive their cars 22% less than other residents in the Central Front Range.

### **Boulder County**





Collective Benefits: Baseline Year 2013

~\$13 M



~ \$21 M Indirect savings

Reduced Boulder County's exposure to climate change, from things like flood risk, loss of agricultural productivity, and air quality by



# Testimonial

**Boulder County** 

"It was a complex scope of work and the NCS team's expertise allowed us to gain valuable insight and actionable information into our sustainability programs that was previously not available.

The NCS team really took the time to understand our local realities, and then produced a final product of the highest quality."

Lea Yancey, Sustainability Specialist

# There's A Lot That Can Be Done



We Don't Need To Do It All At Once

# **Climate Action Plan Roadmap (CAPR)**











# Climate Action Plan Roadmap (CAPR)



### Natural Capitalism Solutions LONGMONT, COLORADO

Email: solutions@natcapsolutions.org

Visit: www.natcapsolutions.org



#### SERVICES ANALYZED

EnergySmart Residentia Partners for a Clean Environment (includes EnergySmart Commercial)

BuildSmart

Low-Income Weatherization

#### SUMMARY

Boulder County strives to reduce energy use in buildings and support renewable energy. Through services such as EnergySmart, business owners and residents are able to make their buildings more efficient, save money on their utility bills, and increase the comfort in their home or business. The impact of Boulder County's investment in energy efficiency and renewable energy has resulted in substantial environmental, economic, and social benefits.

#### IMPACT

In the last three years over 12,000 residents have participated in these services. Participants who installed measures have saved an average of \$200 annually, and will save close to \$2,200 over the next decade.

Over 3,000 businesses have participated in Partners for a Clean Environment. Businesses that installed measures have saved an average of \$1,300 annually and will save close to \$13,000 over the next decade.

Collectively, these services have supported renewable energy and energy efficiency upgrades that have saved over \$3 million to date in direct energy costs, and will save another \$33 million in direct energy costs over the next decade, These savings will continue to generate economic activity as they are reinvested back into the community through local purchases and jobs.

#### LEARN MORE

www.EnergySmartYES.com

www.PACEpartners.com

www.bouldercounty.org/doc/sustainability/ sustainplanwebv.pdf

#### SERVICES ANALYZED

Agricultural Resources

#### SUMMARY

Of the 62,902 acres of publicly owned and leased open space land; about 39% is leased to local farmers and ranchers, helping to encourage sustainable agriculture. Boulder County has been working to improve the viability of county agricultural lands through sustainable management practices. This includes working with farmers to implement efficient irrigation of cropland, supporting local biodiesel, expanding acreage for organic agriculture, improving infrastructure as well as helping train and support the next generation of farmers. Additionally the county is helping support improved farm-to-market opportunities, educational tours, and local food for community residents. These services help to support the wide variety of agricultural operations taking place on open space land that in turn produce an even wider range of products and benefits for the community.

#### **IMPACT**

The county owns over 25,000 acres of agricultural lands, which it leases to over 70 qualified farmers and operators. Over 2,500 residents have toured these farms, learning about different agricultural production systems, challenges, and opportunities.

Over the last eight years Boulder County has increased organic acreage by over 880%, with almost 2,000 acres in production to date. This puts the county on track to transition 20% of county open space farmlands to organic crops.

Boulder County is making 100% local biodiesel by recycling used-cooking oil from participating local restaurants. This biodiesel is then used to run county vehicles, reducing GHG emissions by 85% compared to conventional diesel.

#### LEARN MORE

www.BoulderCounty.org/os/openspace/ pages/agriculture.aspx

#### SERVICES ANALYZED

Recycling

Composting

Trash and Hauling

Hazardous Materials Management Facility (HMMF)

Center for Hard to Recycle Materials (CHaRM)

BuildSmart

#### SUMMARY

Boulder County has the goal of becoming zero waste or darn near by 2025 and is committed to developing policies, programs, and infrastructure that help residents and businesses recycle, compost, and safely dispose of hazardous materials. The county has made significant inroads towards this goal by conserving natural resources, improving waste diversion infrastructure. and reducing the materials sent to landfill. Increased efforts in zero waste will further reduce the materials sent to the landfill, lower greenhouse gas emissions, and improve the local economy.

#### MPACT

Boulder County diverts an estimated 30% of its waste stream away from landfill annually, approximately 76,000 tons of material or about 500 pounds per person. This has an equivalent greenhouse gas impact of taking over 43,000 cars off the road.

Of the materials diverted:

- \* 80% are recyclable materials
- \* 15% are compostable materials
- \* 2% are hard to recycle materials
- \* 2% are construction and demolition materials
- \* 1% are hazardous materials

#### LEARN MORE

www.bouldercounty.org/env/sustainability/ pages/wasteservices.aspx

#### SERVICES ANALYZED

Keep It Clean Partnership

EnergySmart Residentia

Partners for a Clean Environment (indudes EnergySmart Commercial) Agricultural Resources

#### SUMMARY

Boulder County is working to ensure clean, healthy water for all residents by improving water quality, and increasing water conservation. Along with other communities, the county is supporting and playing an active role in protecting our water quality through the Keep it Clean Partnership. Boulder County also focuses efforts on water conservation services for residents and businesses through EnergySmart, Partners for a Clean Environment, and water efficient agricultural practices. Through all these efforts, the County is working to ensure clean water for current and future generations.

#### IMPACT

An estimated 35 million gallons of water are saved annually through water-saving devices installed by EnergySmart participants.

In 2013 alone Boulder County reached 3.650 residents to raise awareness and help drive action to reduce stormwater pollution through outreach events. In addition, 62% of restaurants and 84% of auto body shops met or exceeded all stormwater best practices.

Boulder County Open Space has helped local farmers install water-efficient irrigation systems over nearly 2,600 acres. These upgrades improved water efficiency by at least 50%, increased crop production, and improved soil conservation.

#### LEARN MORE

www.KeepitCleanPartnership.org www.EnergySmartYes.com

#### SERVICES ANALYZED

Transit Service Buy-Ups Community EcoPass Programs

#### SUMMARY

Boulder County promotes the use of alternative transportation in order to decrease emissions while maintaining or expanding mobility for all county residents, employees, and visitors. The county has supported innovative land use management and bike infrastructure to encourage residents to use alternative transportation. The information below highlights two services that show great promise, the community EcoPass programs in Lyons and Nederland and the county's investment in select bus routes.

#### IMPACT

On bus routes that Boulder County currently invests in, 10% of commuters would not be able to maintain their employment without access to these transit services.

Research shows that residents and employees who are provided EcoPasses dramatically increase their bus ridership. This leads to a decrease in the number of cars on the road. reducing congestion and the need for costly parking, and opening up space for other land use needs.



www.bouidercounty.org/env/sustainability/ pages/transportation.aspx

www.PACEpartners.com

# **Program Areas**



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#### ENERGY & BUILDING RECOMMENDATIONS

**EB-1 | Solar Gardens for Low Income Housing:** Install solar gardens for the existing 611 units of Boulder County Housing Authority residences and in all new developments. As the Boulder County Housing Authority pays the utilities on these properties the direct savings earned would pay back the investment. | New Program

**EB-2** | Home Sales EnergySmart Requirement: Create regulations that require households sold within the Unincorporated County to participate in the EnergySmart program. In order to reduce impact on sellers/buyers this could be partially subsidized. Additionally there would need to be some set of requirements that if met would enable the home to bypass this process. | Scale Up Existing Program

EB-3 | Amplify PACE Program: The Commercial EnergySmart Program (now rolled into PACE) should be scaled up. This can be done by adding some of the recommended program enhancements, increasing advisory staff and/or by Increasing marketing and outreach. | Scale Up Existing Program

**EB-4** | Multifamily Prioritization: Amplify the focus of the residential EnergySmart Program to prioritize multifamily homes to increase the overall effectiveness of the program. Furnace replacement (when the furnace serves multiple units) has the highest impact of multifamily measures installed. | Tweak Existing Program

EB-5 | LED Purchasing Program: Work with retailers to subsidize the higher cost of select, high-performance, LED lighting products. This will normalize the consumers (mainly residential) to purchase the most efficient replacement products, without having to pay more. Rebates need to be available for purchases made from non-participating distributors. New Program



PHASE 3: Implementation

Sustainability Plan

# How do you build a roadmap?





# **Clean** Coalition

### Helping municipalities secure the benefits of local renewable energy

John Bernhardt Outreach & Communications Director (703) 963-8750 mobile john@clean-coalition.org

Making Clean Local Energy Accessible Now

### Today's agenda

**Clean** Coalition

- Overview of the Clean Coalition
- Our work with municipalities
  - Assessing renewable energy potential
  - Designing renewable energy programs
  - Establishing Community Microgrids



## To accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise

### Our vision: a distributed, integrated grid

### **Clean** Coalition



Making Clean Local Energy Accessible Now



<ul> <li>2,000 public utilities, serving more than 20 million customers (~15% of the nation's electric customers)</li> <li>Municipalities served by public utilities have greatest control over electricity decision</li> </ul>
<ul> <li>Roughly 200 investor-owned utilities serving more than 100 million customers (~70% of the nation's electric customers)</li> <li>For-profit companies making investments to benefit shareholders; oversight by regulatory agencies (PUC, PSC, etc.)</li> </ul>
<ul> <li>More than 900 RECs serving more than 18 million customers (~12% of the nation's electric customers)</li> <li>Private, independent, non-profit; owned by the customers they serve</li> </ul>
<ul> <li>Increasingly popular in California, Illinois and a few other states</li> <li>Exert control of generation purchases but do not own the poles and wires</li> </ul>

### **Our expertise areas**

# **Clean** Coalition



- Full cost and value assessment
- modeling
- **Optimize local** energy resources
- design
- implement innovative community-wide projects

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### **Analysis and planning**

 Renewable energy siting surveys to identify and understand opportunities for local energy production



**Clean** 

Coalition

### **Analysis and planning**

 Renewable energy siting surveys to identify and understand opportunities for local energy production



**Clean** 

Coalition

### **Analysis and planning**



Assess the value of local renewable generation



### **Grid modeling and optimization**

- **Clean** Coalition
- Conduct powerflow modeling, using Cyme, of the entire Hunters Point substation in San Francisco, CA



### **Grid modeling and optimization**



 Driving state-level policy to enhance distribution grid planning and visibility in California

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#### Making Clean Local Energy Accessible Now

### **Program design**

 Support municipalities and utilities in the design of programs to bring local renewable energy online





### Feed-in tariffs keep it simple

- Standardized and guaranteed contract with a long-term, predefined rate paid for energy produced
- Enables broad participation in energy generation, including City-owned properties

100% of the renewables

generation is purchased by

City of Palo Alto Utilities

at FIT rate

### FIT project



Utility customer

100% of customer energy usage is purchased based on a normal <u>retail rate</u>





### **Community Microgrids – a path forward**



- Proving the feasibility of high levels of local renewable energy
- Creating a model for communities across the country



Ecoplexus project at the Valencia Gardens Apartments in SF. ~800 kW meeting ~80% of the total annual load.

### Traditional microgrids benefit a single customer





Source: Oncor Electric Delivery Company

Making Clean Local Energy Accessible Now

### **Community Microgrids benefit thousands of customers**





Source: Oncor Electric Delivery Company

Making Clean Local Energy Accessible Now

### **Energy equity brings community-wide benefits**

### **Clean** Coalition



### **The Long Island Community Microgrid Project**

- Provides up to 50% of local electricity demand from local solar power
- Enhances community resilience through renewables-based power backup (from solar and energy storage) at critical facilities
- Reduces use of diesel generators
- Keeps customer bills down



**Clean** 

Coalition

### Hunters Point Community Microgrid Project

- Innovative project in the Bayview-Hunters Point area of San Francisco, in collaboration with Pacific Gas & Electric (PG&E)
- Model for achieving 25% of the total energy consumed in the area from local renewables, while maintaining or improving grid reliability and power quality using dynamic grid solutions
- The Hunters Point substation serves ~20,000 customers (about 90% residential, 10% commercial/industrial)





# **Palo Alto's Path to Carbon Neutrality**







March 2016





100% Carbon Neutral Electricity



# Palo Alto at a Glance

- 26 square miles
- Between Stanford and San Francisco Bay
- 67,000 residents, 30,000 homes
- 100,000 work here
- 4,000 businesses, including HP, SAP, Tesla, PARC, Palantir







### **Palo Alto Owns and Operates its Utilities Services**



Water - 1896



Fiber - 1996



### Wastewater - 1898





**Storm Drain** 



**Electric - 1900** 



Gas - 1917

# 37% GHG reduction from 1990 baseline...

- Strong and early renewables
   opportunistic contracts
- Early 2007 Climate Protection Plan
- 2002 Sustainability Plan -150+ initiatives
- 2013 Carbon neutral electricity
- Green Building Code
- Zero Waste Program

- Local Solar Plan
- Urban Forest Master Plan
- Energy/compost facility
- PV permit streamlining
- Bicycle system
- EV readiness



# ... with challenges ahead


## **Carbon Neutral Electricity**

- Palo Alto Green (2005)
  - 22% of residential voluntary participation
- 20% lower rates that CA IOU's
- Fossil-free portfolio by 2017
- Strong efficiency programs
- Program for Emerging Technologies
- Local Solar Programs: 4.0% by 2023
  - Rooftops, Group Buy, Community Solar









### FITs address the Wholesale DG market segment

### **Clean** Coalition



Making Clean Local Energy Accessible Now



- Maintains relationship with customers: A buy-all, sell-all structure; utility customers continue to pay for all energy they consume, so load is not reduced by DG.
- Creates visible, manageable assets: A FIT uses wholesale interconnection, so the local utility has visibility and control of power produced by DG systems.
- Maximizes applicable properties: A FIT simplifies the process for all commercial properties to participate in energy generation, including nonowner occupied and split-metered properties. Also, a FIT removes on-site load limitations allowing optimal project sizing.
- Finables guiding deployment to optimal grid locations: FIT design can direct the market to build DG capacity where it is most valuable (maximum benefits to the grid at minimum cost).

### Palo Alto rolls out its FIT

- The Clean Coalition helped City of Palo Alto Utilities design its FIT program
- Capacity:
  - 3 MW for local solar
  - 3 MW for non-solar eligible , renewable energy resources
- Pricing:
  - Solar PV: 16.5¢/kWh
  - Non-solar: 9.3¢/kWh
- Contract length:
  - 20 and 25 year options







### **Pricing for Palo Alto's FIT**





#### Making Clean Local Energy Accessible Now

### Solar installations approved by City Council

**Clean** Coalition



# CITY OF PALO ALTO

#### MOST POPULAR

- Water & Drought Update
- Efficiency Programs and Rebates
- My Utilities Account (MUA Login)
- New Customer Information
- Outages-Planned and Unplanned



#### CITY OF PALO ALTO TO SOLARIZE CITY-OWNED PARKING STRUCTURES AND ENABLE ITS ELECTRIC VEHICLE FUTURE

January 26, 2016

With support from the Clean Coalition, the C of Palo Alto creates a new model for deployi local renewables on municipal properties. Read More... 1 2 3 4 5

#### MY UTILITIES ACCOUN



**VIEW ALL STORIES** 

LOGIN TO YOUR ACCOUNT

## **Electrification Fuel Switching**

- Over <u>30% of remaining carbon footprint from natural gas</u>
- Shift from natural gas toward clean electricity
  - Examining technologies, economics, logistics
  - Renewable gas portfolio?
  - Who pays for stranded infrastructure under lower gas revenue and customer base?









## Mobility

- More than <u>60% of remaining carbon footprint from</u> <u>transportation</u>: commute + non-commute
- Bike plan: now 45% high school mode share
- PTOD Pedestrian and Transit Oriented Development
- EV readiness and intrinsic adoption
- Expanded shuttle program
- Expanded rail and bus system
- Mobility as a Service (MaaS)





#### PAUSD HIGH SCHOOL BIKE COUNTS (%), 1985-2015



### **ZEV Tech & Costs Changing Quickly**

### Projected Cost of EV with 200-mile range



batteries,16% yearly improvement in battery costs.

Convoint Instead





## **Headwind Challenges**

- Electric demand and the role of efficiency
  - Necessity of efficiency transformation
  - Grid capacity
  - Smart distribution
  - Time of use vs time of generation
  - Storage







## How far and How fast?

- California: 80% by 2050
- Palo Alto shot: 80% by 2030, 100% by 2050?
- What's feasible? What's desirable?
  - Technically
  - Economically
  - Legally/politically
  - Culturally/behaviorally





## ...with lots more in the pipeline

- Climate neutral utility?
- Electrification "Fuel switching"
- Power of the purse—public & private: "Default to green."
- Transform transportation
- Open, transparent, streamlined

- Sustainability dashboard & Open Data
- Green Teams
- Process improvement
- Finance: "total cost of operations" + "cost of externalities"
- "Future generations" policies.
- Sustainable water supply



## The Big Questions

- **Carbon-neutral** city, how fast?
- How to reduce or eliminate the 60% of carbon footprint from **transportation**?
- How will we reduce or eliminate the 30% of carbon footprint from natural gas?
- How to adapt to climate change?
- Other sustainability goals?







 Submit questions in the 'Questions' window at any time

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