

Hot Science Cool Talks

UT Environmental Science Institute

65

Pecan Street Project: Smart Grids and Austin's Energy Future

Brewster McCracken, Karl Rabago & Dr. Michael Webber
April 30, 2010

Produced by and for *Hot Science - Cool Talks* by the Environmental Science Institute. We request that the use of these materials include an acknowledgement of the presenter and *Hot Science - Cool Talks* by the Environmental Science Institute at UT Austin. We hope you find these materials educational and enjoyable.

Pecan Street Project – Smart grids and Austin's energy future

Brief presentations from our panelists:

- Karl Rabago: Austin's energy & Smart grid technology
- Brewster McCracken: The Pecan Street Project & the Mueller Experiment
- Michael Webber: Austin, TX as an Energy Laboratory

Questions & Discussion

Closing Remarks

Hot Science – Cool Talks

March 26, 2010

Smart Grid Intro & Austin Energy by the Numbers

Karl R. Rábago

Vice President, Distributed Energy Services



What Drives the Smart Grid in Austin, TX?

- Best Managed Utility in the US
- 2010 Goals
 - Get AA bond rating
 - Get to 83% in customer satisfaction index
 - Get SAIDI to 40, SAIFI to 0.5 and SALTPI to 3
- 2020 Goals
 - Get to 700 (800) MW of energy efficiency
 - Get to 30% (35%) mix of renewable energy in our generation
 - Get to 100 (200) MW of Solar generation

What is the Smart Grid?

- Our Smart Grid definition unites the Utility Grid, Buildings and Vehicles into one grid
- Smart Grid = Electric Grid + Communications Network + Hardware + Software
- The Smart Grid monitors, controls, and manages the creation, distribution and consumption of energy
- The Smart Grid of the future is distributed, interactive, self-healing and reaches every device

Why Do the Smart Grid?

Computer Industry Evolution



Mainframe



Minicomputer



PC



Laptop

Telecom Industry Evolution



SS7 Switch



PBX



Fax / phone



Wireless phone

Electric Industry Evolution



Power plant



Co-gen plant



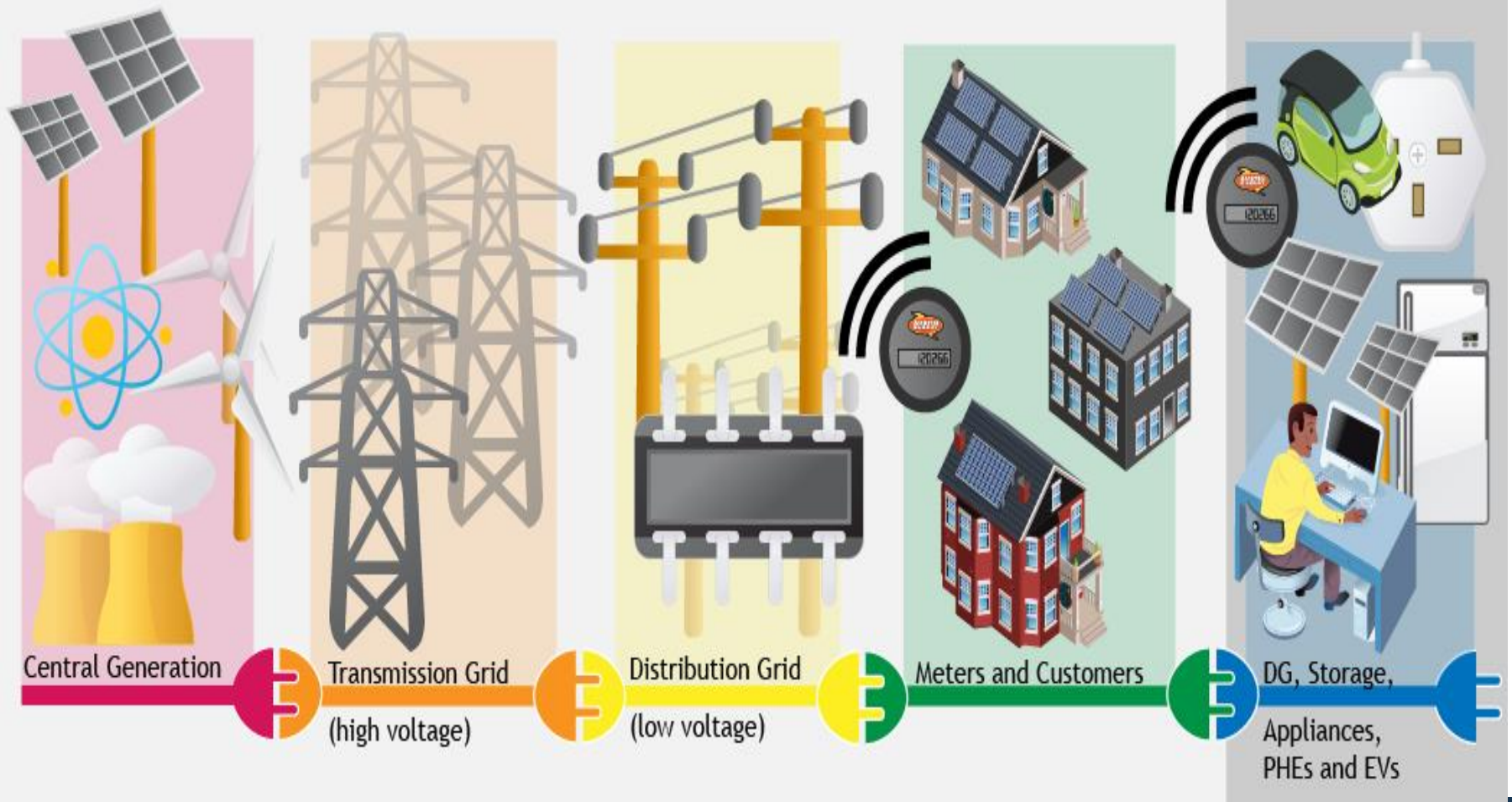
Solar Roof Top



Electric Car

Austin Energy Smart Grid

Phase 1: Smart Grid 1.0



FY 2009 Numbers

Customer Class	Revenue	kWh Sales	Customer Bills
Residential	\$406 million	4,218 million	363,217
Commercial	\$402 million	4,480 million	43,050
Industrial	\$133 million	2,218 million	80
Street & Highway	\$8 million	48 million	4
Other Gov't Sales	\$83 million	1,137 million	1,575
TOTAL	\$ 1,032 million	12,103 million	407,926

2009 Population: 774,000

Questions

Contact Information:

Karl R. Rábago

Distributed Energy Services

512.322.6098

karl.rabago@austinenergy.com





The Pecan Street Project

The Pecan Street Project is a collaboration of –

- Austin Energy
- University of Texas
- Environmental Defense Fund
- Greater Austin Chamber
- City of Austin
- technology advisory committee

ERCOT • Bluebonnet Electric Coop

CPS Energy San Antonio • Pedernales Electric Coop



The Pecan Street Project

an open platform **Energy Internet**

integrating

distributed solar

smart grid water

demand response

electric vehicles

energy storage

dynamic pricing

smart appliances

green building

built on Austin's advanced smart grid platform

The Pecan Street Project

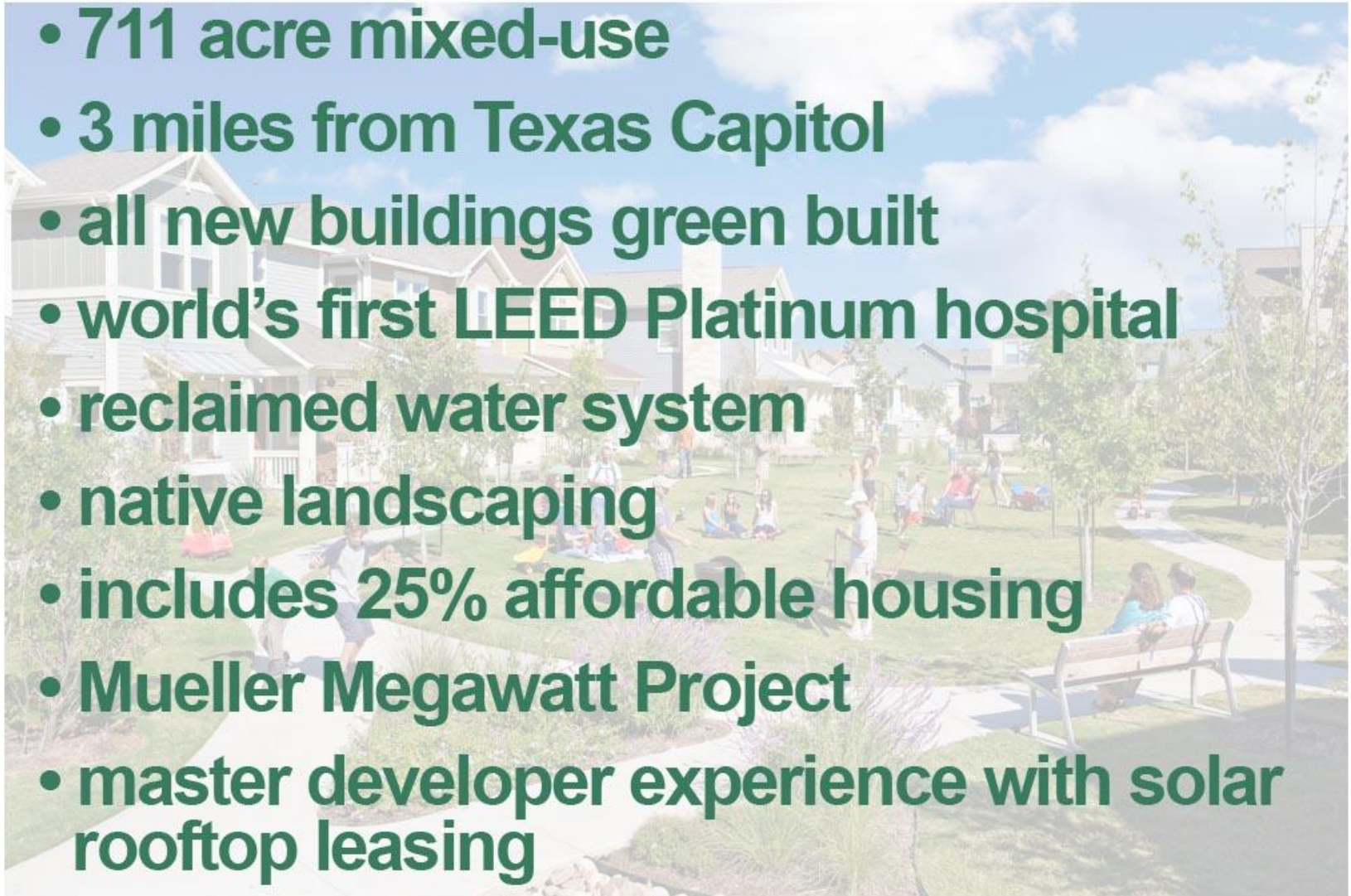
Why Mueller...



The Pecan Street Project

Mueller

- 711 acre mixed-use
- 3 miles from Texas Capitol
- all new buildings green built
- world's first LEED Platinum hospital
- reclaimed water system
- native landscaping
- includes 25% affordable housing
- Mueller Megawatt Project
- master developer experience with solar rooftop leasing





The Pecan Street Project

A Day in the Life



Opening an app on her mobile phone one summer afternoon in 2014, Mueller resident Mattie Camacho receives a **real-time report** on energy usage inside her home. She learns that her electricity usage will cause her to exceed the **energy and carbon budget** she had set at the beginning of the month.

But, her **home energy gateway** informs her, the software linked to her **smart appliances** can adjust settings on her air conditioner and washer/dryer while she is at work during the day to take advantage of peak pricing.



The Pecan Street Project

It won't just be to take advantage of peak pricing for the energy she uses.

It will also be to take advantage of **peak pricing**...

...for the power coming from the **solar panels** on her roof.

She touches a button on her phone screen. Instantly, she sees that electricity from the solar panels on her roof is now feeding into the

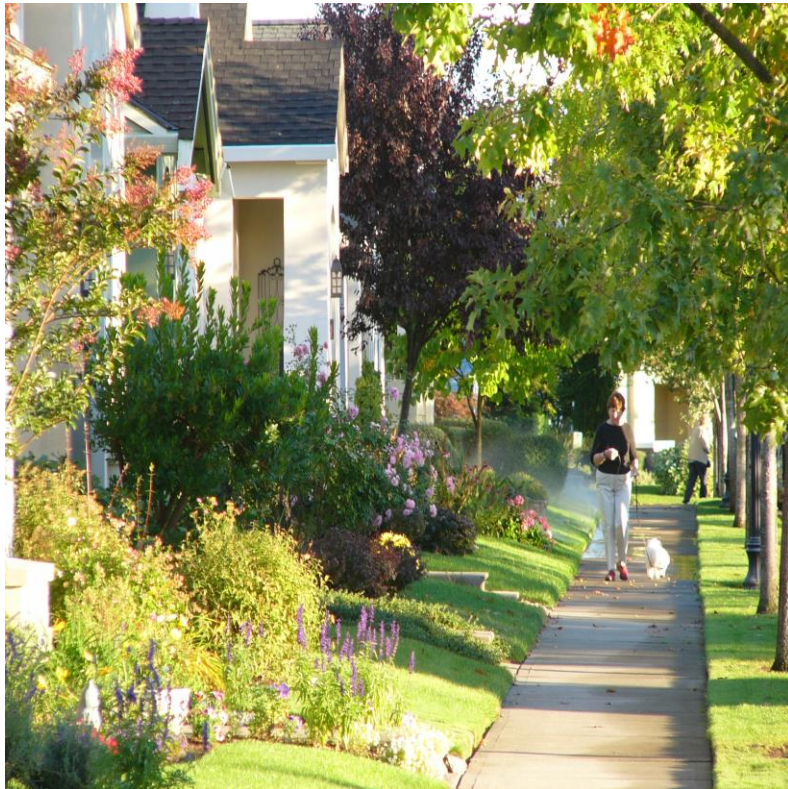
Energy Internet and reducing her electric bill.





The Pecan Street Project

Her monthly water bill is also on track — thanks to her **smart sprinkler system**, which detected a leak at a sprinkler head earlier this month.

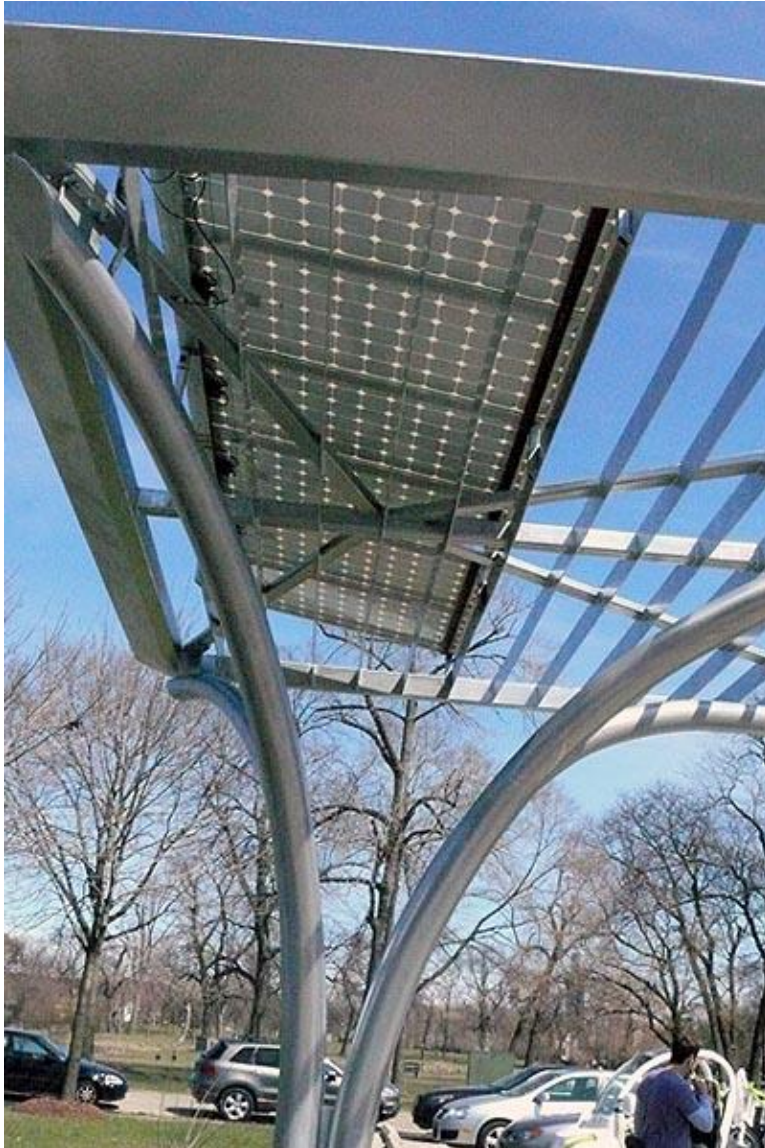


Earlier in the summer, her **smart grid water** system had detected a leak in her toilet while she was at work.

It had automatically shut off the leak and alerted her.



The Pecan Street Project



She had stopped by the
green built Home Depot at Mueller
on the way home.

She had even charged her
electric car at a Mueller
solar-powered car charging
station while she shopped.



The Pecan Street Project

The **Energy Internet**... has the potential to give us more growth with fewer power plants, better energy efficiency, and more renewable energy.

Thomas Friedman, *Hot, Flat and Crowded*

The Pecan Street Project

How Pecan Street is different

- **Open platform for private sector**
- **Integration of water**
- **Environmental focus**





QUESTIONS & DISCUSSION



Brewster McCracken

Executive Director of the Pecan Street Project

This project supports clean-energy technology for Austin.

Experience:

Mayor pro tem,

Austin City Council

UT-Austin Law and MPA degrees

Prosecutor, Harris County D.A.



Karl Rábago

Vice President of Distributed Energy Services at Austin Energy

Experience:

Deputy Assistant Secretary,
US Department of Energy

Commissioner,
Texas Public Utility Commission

Sustainability Leader, NatureWorks

Judge Advocate General's Corps



Michael Webber

**Associate Director,
Center for International Energy and
Environmental Policy
Mechanical Engineering Professor**



Experience:

Energy and environmental policy
Alternative and renewable energy
Combustion; gas sensors; oil and gas