GREEN ENERGY AND ELECTRIC VEHICLES.

BMW GROUP TECHNOLOGY OFFICE USA.
BACKGROUND.

– Markets for green energy and electric vehicles can accelerate each other.
  ➢ Nearly 40% of MINI E customers invested in residential solar.
  ➢ Adding Green-E options increased overall demand for EV designs among conventional buyers by 23% in a UCD survey.

– A portfolio approach to green energy allows us to meet EV customer needs.
  ➢ Solar, wind and other sources of energy are valued differently by customers.
  ➢ Intelligent charging of EVs can enable more green energy.
MINI E AND BMW ACTIVE E E SERVE AS KEY LEARNING PROJECTS FOR THE BMW I3.

Renewable energy

Market potential

Multi-modality

User behaviour

Acceptance

Demands on infrastructure

Strengths and weaknesses

MINI E 2009

BMW ActiveE 2011

BMW i3

Workshop, ZT-Z, 04-02-2012
GLOBAL MINI E LEARNINGS ABOUT ENERGY SOURCE.

Germany:
• 96% of private users regard renewable energy for charging electric vehicles as important.
• 72% of users agree that EVs should be charged exclusively with renewables.

Great Britain:
• 89% of private users regard renewable energy for charging electric vehicles as important.
• 22% of users agree that EVs should be charged exclusively with renewables.
US MINI E USERS PREFER SOLAR AND WIND ENERGY.

The electricity for charging the MINI E should come from... (n=41)

- Solar: 100% Agree
- Wind: 98% Agree
- Hydro: 90% Agree
- Nuclear: 63% Agree, 37% Disagree
- Natural Gas: 61% Agree, 39% Disagree
- Coal: 71% Agree, 29% Disagree
MANAGED CHARGING LINKS GREEN E AND MINI E.

Wind-to-Vehicle (W2V)
Charge the Battery preferably with Excess Wind Energy

Grid and Load Management
Wind integration and load balance

Off-Peak Wind

Peak Load

Vehicle-to-Grid (V2G)
Recharging of Wind Energy during Peak Periods in order to substitute Gas Power Plants

Local Load Management (LLM)
Priority Rules at Hot Spots with Excess Demand

Reduction in CO2/km of 3-6% compared to uncontrolled charging.

Source: VATTENFALL
BMW TECHNOLOGY OFFICE SOLAR TREE.

- A way to visualize electricity generation of the Solar Tree.
- Data collected on a second basis.
- 30-day history compares the Solar Tree generation to Active E electricity use.

http://bmwtechnology.com/solartree2/
A NOVEL STUDY DESIGN, IN THREE PARTS.

- This is a project exploring the consumer demand for plug-in electric vehicles (PEVs) and “Green” electricity.

- **Part 1: Literature review** (completed in October 2011).

- **Part 2: Focus groups** with MINI E drivers, MINI drivers, and green electricity program participants in LA, New York and New Jersey (completed in October 2011).

- **Part 3: U.S. nationwide survey** of new car buyers, including subsets of hybrid buyers and recent BMW electric vehicle leasers (completed in July 2012).
PUTTING IDEAS INTO PRACTICE, REC SOLUTION.

- BMW provides a renewable energy option for the Active E, allows customers to “top up” at end of year based on actual usage.
- Cost (Customer): $48/2- yrs.
- BMW customer has a choice about the source of energy for charging.
PUTTING IDEAS INTO PRACTICE, RESIDENTIAL SOLAR

The Power of Zero

Tweet

With the exceptional technology of the BMW ActiveE, you are leading the way to a zero-emissions commute. Now you're ready to unlock the power of the sun to make that drive a perfect zero.

At Real Goods Solar, we are honored to have been selected by BMW to help you take the final step to making your Ultimate Driving Machine into the Ultimate Green Machine.

Learn about Real Goods Solar's EXCLUSIVE BMW ActiveE offer.

Save immediately on power bills, enjoy a fuel free future, and bring the beauty of zero home.

LET'S GET STARTED.

Step One: Choose your state
THANKS.

“I had thought that it would be really cool if an auto manufacturer could talk to the prospective EV owner about their energy supply and maybe partner with a solar installer in the area.”

“I don’t have the opportunity (for solar) so this is maybe a model where I can still guarantee where my power’s coming from.”

“The perfect model is buy an electric car, put a solar array on your house, charge after midnight, and let your solar array feed the grid during the day.”