

Austin Solar City Partnership

Market Transformation

## Presenter

Austin Energy

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## Timeline

- Start date: September 15, 2007
- Completion Date: March 15, 2011
- Current Status: 80% completed

## Budget

- Total project funding: \$373,930.00
  - DOE: \$186,930.00
  - AE: \$187,000.00
- Funding received in FY09
- Funding for FY10

## Barriers

- Lack of understanding of distributed and large scale solar.
- Lack of solar education:
  - Students
  - Teachers and
  - Community

## Partners

- Austin Energy (AE)
- Austin Independent School District (AISD)
- Eanes Independent School District (EISD)
- Clean Energy Associates (CEA)
- Texas Solar Energy Society TXSES)

- Lack of education around rooftop solar potential made it difficult for Austin Energy to incorporate distributed solar into its generation plan.
- The solar/wind study addressed the lack of understanding around the effect of adding solar power on already constrained transmission lines in west and south Texas.
- The lack of inquiry based solar curriculum prevented the Austin Independent School District from fully utilizing existing and newly installed solar demonstration projects.
- The lack of proactive community outreach on the benefits of solar energy, energy efficiency and climate protection limited community involvement in Austin Energy incentive programs.

- The Solar Rooftop assessment helped to identify the solar rooftop potential for Austin.
- The results of this assessment helped City staff, Utility staff and stakeholders better understand the MW potential for rooftop solar.
- This information was used to increase the solar goals in Austin Energy's newly adopted Generation Plan; 100MW of solar by 2020 to 200 MW of solar by 2020.

- The Solar/ Wind assessment sought to identify the impacts of co-location of wind and solar on already constrained by existing wind generation in west and south Texas.
- This assessment demonstrated that solar generation can be reasonably accommodated within the transmission systems.
- This information was used to increase the solar goals in Austin Energy's newly adopted Generation Plan; 100MW of solar by 2020 to 200 MW of solar by 2020.

- To increase the understanding of solar energy by providing solar demonstration projects and solar curriculum to area schools.
- Work with one school district to develop curriculum that could be delivered to all districts in AE service territory and could even be used statewide
- This curriculum would be inquiry based and would incorporate the solar demonstration projects.
- A hardbound version of the curriculum with colorful graphics would be created and distributed nationwide.

- Proactive education outreach will result in increased participation in solar energy, energy efficiency and climate protection programs.
- Presentations would be given to local organizations through a contract with TXSES.
- TXSES would proactively contact neighborhood associations, environmental organizations and other organizations to look for interest in receiving a presentation.
- Trained TXSES members would provide presentations and receive compensation for their efforts.

- Contracted with Clean Energy Associates, CEA to develop a model to estimate the gross square footage of available rooftop space in Austin Energy's service territory by property class and subsequently estimated the MW and MWh potential for rooftop PV.
- The net square footage of available rooftop space was estimated by excluding from the gross rooftop area;
  - structurally unsound roofs,
  - improperly oriented roofs,
  - shaded rooftop area and
  - rooftop areas unacceptable for PV module installation.
- Using the net square footage an estimate of PV production was made assuming three scenarios:
  1. Current technology (all crystalline silicon modules deployed):
  2. Combination of CSi and thin film.
  3. All thin film
- Will validate model with Input from CH2MHill



- Identified two sites to be assessed; one in west Texas and the other in south Texas.
- Contracted with Clean Energy Associates, CEA to develop a model to evaluate varying levels of solar thermal, PV and wind capacity against an assumed transmission capacity limits.
- This model quantifies the total combined wind and solar generation as well as the amount of generation in excess of the assumed transmission limit, measured in both MWh and economic value.
- Correlations were observed for different scenarios at each location.
- Base cases were generated and sensitivity analysis were performed at each of the two sites.

- ACC, AISD and EISD identified sites for solar installations.
- AE purchased solar panels, developed bid packages and secured a PV installation contractor
- Installed 6 demonstration projects at schools
- Worked with TXSES and AISD to identify areas where solar could be incorporated into the curriculum.
- AISD paid teachers and a consultant to write the curriculum
- Curriculum would be included in the AISD system as part of the standard curriculum.
- A hardbound version of the curriculum including colorful images would be distributed locally and maybe even statewide.

- Contract with TXSES to develop a presentation.
- TXSES will work with our Corporate communications director to develop a presentation on AE programs.
- A presentation to a community group was delivered and feedback given.
- Program materials would be made available at the presentation.
- TXSES contacts organizations and schedules presentations.

- Austin Independent School District (AISD)
  - Develop k-12 curriculum using solar as the vehicle to teach science fundamentals
- Installation of solar demonstration projects at:
  - Austin Independent School District (AISD)
  - Austin Community College (ACC)
  - Eanes Independent School District (EISD)
- Texas Solar Energy Society (TXSES)
  - Technical Expertise to AISD for curriculum development
  - Community Outreach
- Clean Energy Associates (CEA)
  - Perform solar rooftop study
  - Perform study to determine coincidence of solar and wind resources in West Texas.

- Solar generation can be reasonably accommodated within transmission systems already constrained by existing wind generation while experiencing only minimal energy and economic losses.
- 12 to 18 GW of new transmission is being built in Texas (CREZ). If 30 to 40% of this capacity can include solar there is a 5-6 GW solar potential.
- Rooftops within Austin Energy's service area could accommodate approximately 2,446 MW (DC stc) of PV capacity, capable of producing approximately 3.3 million MWh annually.
- Austin Energy's generation plan was adopted by City Council which included increased goals for solar; from 100 MW to 200 MW by 2020.
- The collaboration developed for solar for schools continues to broaden and now includes AISD, ACC and UT at Austin (Market Transformation Grant).
- Community outreach efforts continue in collaboration with TXSES as new creative methods are explored

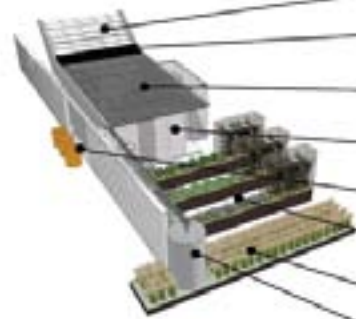
- Continue proactive outreach to increase participation in solar and energy efficiency programs.
  - Booths at farmers markets
- Publish and distribute the k-12 solar curriculum statewide and make it available nationwide
- Market Transformation Grant
  - Install up to 21 solar “outdoor learning centers” at schools at AISD.
  - Develop solar curriculum for high school seniors
    - Solar design course
    - Solar installer course
  - Key Milestones
    - Austin City Council approved acceptance of the grant on May 13, 2010
    - Ribbon cutting ceremony and grant kick-off May 14, 2010

# AISD Outdoor Learning Center Concept

Webber + Studio Architects



- Biodiversity domes / Insect Garden / Butterfly Garden: **BIOLOGY**
- Prefabricated Concrete frames / installation: **PHYSICS, ASTRONOMY, RESOURCE MANAGEMENT**
- UV purified irrigation water tanks: **WATER & RESOURCE MANAGEMENT**
- Interactive Smart Board: **TECHNOLOGY, ENGINEERING**
- Commonal Lab Tables with data ports for use with data monitors.



- Wind turbines for wind power: **ENGINEERING, PHYSICS**
- Solar powered thermal water heating: **ENGINEERING, PHYSICS**
- Solar powered photovoltaic electricity generation: **ENGINEERING, PHYSICS**
- Telescoping translucent doors for natural daylighting and wintertime heat capture.
- Recycle / Compost / Garbage bins: **RESOURCE MANAGEMENT**
- Sustainable food and Experimental Gardens: **BIOLOGY**
- Wetlands Ecosystem / Habitat: **RESOURCE MANAGEMENT, BIOLOGY**
- Rainwater collection tank with hydropower turbine: **RESOURCE MANAGEMENT, ENGINEERING**



- Solar panel and wind turbine observation and data collection platform.
- Vertical sun shade louvers: **ASTRONOMICAL, GEOGRAPHICAL ENGINEERING**
- Concrete structural frame to be painted with educational "Lesson Mural"
- Biodiversity domes / Insect Garden / Butterfly Garden: **BIOLOGY**

- The solar rooftop and co-location of solar/wind assessments provided valuable input to the newly adopted Generation Plan.
- The collaboration of AE, AISD, EISD and ACC has provided the necessary framework for educating students, teachers and the community about solar energy.
  - At first AISD was hesitant to participate and now they are leading the way.
- Third party (TXSES) proactive marketing is an effective way to increase participation in AE's solar and energy efficiency programs.