



Renewable Energy on a Budget at the Dallas/Fort Worth International Airport

American Association of Airport Executives
Airports Going Green Conference

November 16, 2010





Outline

- Renewable Energy Purchases
- Biofuels
- Solar Water Heating
- Solar Powered Devices
- Marketing Agreement
- Grant Funded Onsite Solar PV

Renewable Energy Purchases

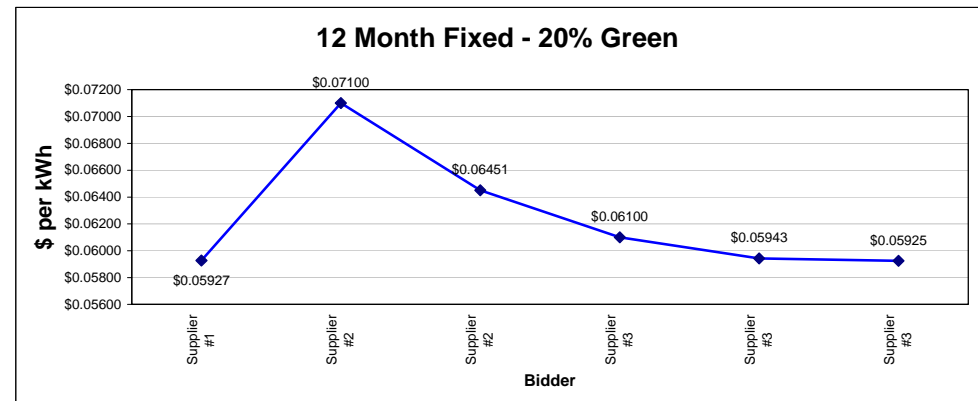
- 20% of DFW's annual electric energy (~60 million kWh per year) is wind-generated with zero emissions
- The U.S. EPA Green Power Partnership recognized DFW on its "Top 20 Local Government List" of the largest green power purchasers and as a member of the Green Power Leadership Club
- DFW ranks 11th on the most recent list



Renewable Energy Purchases

- Reverse Online Auction for supply of electricity
- 8 auctions held almost simultaneously varying pricing form, term and green content

TDSP	Contract Term	Form of Pricing	Green Power	Bandwidth (+/-)	RFP End Time (CT)
Oncor	12 month	Heat Rate + Adder	10%	10%	10:30 AM
Oncor	24 month	Heat Rate + Adder	10%	10%	10:35 AM
Oncor	12 month	Fixed Rate	10%	10%	10:40 AM
Oncor	24 month	Fixed Rate	10%	10%	10:45 AM
Oncor	12 month	Heat Rate + Adder	20%	10%	10:50 AM
Oncor	24 month	Heat Rate + Adder	20%	10%	10:55 AM
Oncor	12 month	Fixed Rate	20%	10%	11:00 AM
Oncor	24 month	Fixed Rate	20%	10%	11:05 AM



Description	Accounts	Annual kWh	Delivery Date	Auction End Date	Total Bids	Total Bidders	Best Bid	Best Bid Company
12 Month Heat Rate 10% Green	204	297,492,502	2/28/2010	5/26/2009 11:30:00 AM	6	3	0.05901	Reliant Energy Solutions East
24 Month Heat Rate 10% Green	204	297,492,502	2/28/2010	5/26/2009 11:35:00 AM	5	3	0.06169	Reliant Energy Solutions East
12 Month Fixed Rate 10% Green	204	297,492,502	2/28/2010	5/26/2009 11:40:00 AM	5	3	0.0589	Champion Energy Services
24 Month Fixed Rate 10% Green	204	297,492,502	2/28/2010	5/26/2009 11:45:00 AM	4	3	0.06345	Reliant Energy Solutions East
12 Month Heat Rate 20% Green	204	297,492,502	2/28/2010	5/26/2009 11:50:00 AM	4	3	0.059278	Champion Energy Services
24 Month Heat Rate 20% Green	204	297,492,502	2/28/2010	5/26/2009 11:55:00 AM	5	3	0.06207	Reliant Energy Solutions East
12 Month Fixed Rate 20% Green	204	297,492,502	2/28/2010	5/26/2009 12:00:00 PM	6	3	0.05925	Champion Energy Services
24 Month Fixed Rate 20% Green	204	297,492,502	2/28/2010	5/26/2009 12:05:00 PM	3	3	0.06383	Reliant Energy Solutions East

Biofuels

- B20 bio-diesel fuel used in DFW's heavy duty and off-road fleet
- 7% - 14% of diesel fuel use (0.4% - 0.7% of total fuel use)
- -\$0.06/gal to \$0.19/gal price differential



Solar Water Heating

- Solar thermal hot water system installed during Wellness Center renovation project
- 80,000 Btu per day rated capacity
- \$9,945 incremental cost
- Providing 45% of average daily HW consumption
- 14.5 year SPP at current energy rates



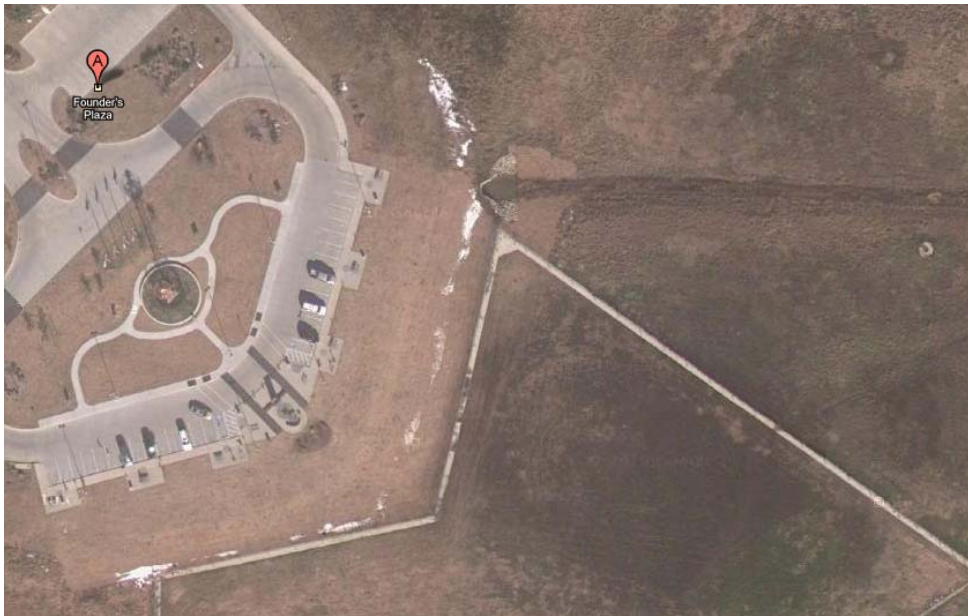
Solar Powered Devices



- Dynamic parking availability signs
- Light emitting diode displays
- Solar powered with reserve battery
- Cell phone activated
- Storm water samplers, flow metering devices, irrigation controllers, traffic signage

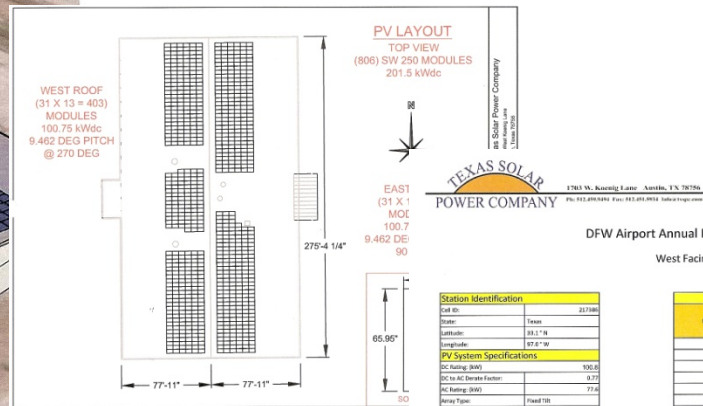
Marketing Agreement

- Sponsored purchase and installation of ground mounted 10 kW solar array at Airport observation area
- Joint marketing, promotional and educational value



Grant Funded Onsite Solar PV

- ARRA funded grant program for onsite Renewable Energy projects
- 80% grant funding up to \$1M



DFW Airport Annual Energy & Cost Savings
West Facing Modules

Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	2.82	635	641.51
2	3.48	754	759.23
3	4.7	1027	1040.41
4	5.76	1243	1259.44
5	6.15	1332	1358.43
6	6.48	1371	1398.13
7	6.48	1362	1383.47
8	6.02	1298	1317.25
9	5.02	1076	1096.71
10	4.27	926	933.3
11	2.97	639	648.23
12	2.54	545	555.32
Total	61.28	11770	1193.32

Results				
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2	3.48	754	759.23	759.23
3	4.7	1027	1040.41	1040.41
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5	6.15	1332	1358.43	1358.43
6	6.48	1371	1398.13	1398.13
7	6.48	1362	1383.47	1383.47
8	6.02	1298	1317.25	1317.25
9	5.02	1076	1096.71	1096.71
10	4.27	926	933.3	933.3
11	2.97	639	648.23	648.23
12	2.54	545	555.32	555.32
Total	61.28	11770	1193.32	1193.32



201.5 kW grid-tied, roof-mounted array
 242,783 kWh annual production
 \$1.193M total cost
 10% ROI on Airport investment (\$240k)

All predicted energy and cost savings are based upon the first year system performance models. Due to system degradation, performance could decrease as much as 2% each year.

Thank you for your kind attention

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