

# Partnering for Success

## Manhattan Beach Unified School District



Ashu Jain, P.E.  
Sarah Pearce, P.E., LEED AP  
Arash "Art" Sarhangian

Senior Business Development Manager  
Senior Project Manager  
Project Manager

May 5, 2014

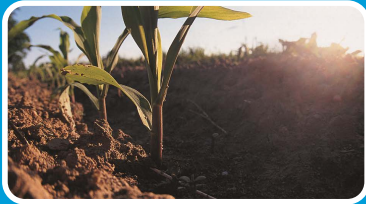


# Sowing Seeds of Success for MBUSD



- Create over \$8.7 million in savings
- Reduce District energy spend by 50%
- Air condition Manhattan Beach Middle School & Building “Y” at Mira Costa High School
- Install state-of-the-art LED lighting at the Auditorium and throughout the District
- Demonstrate responsible stewardship of resources

# Agenda



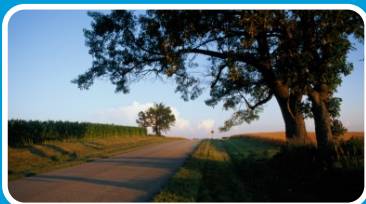
## Program Scope



## Financial Overview

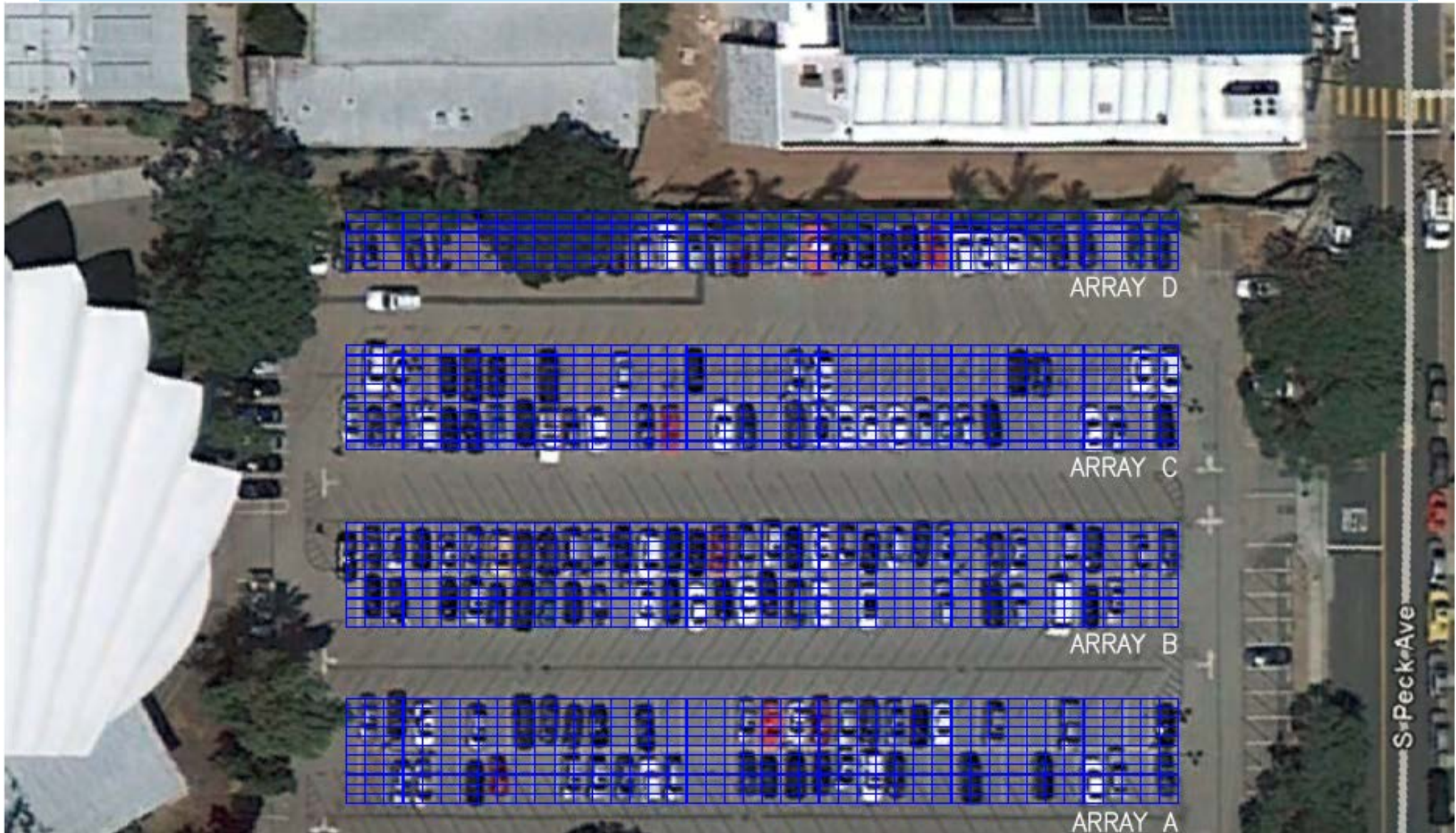


## Program Benefits



## Roadmap

# Mira Costa High School – 515 kW Solar Parking Shade Structures



# Mira Costa High School – 116 kW Solar System on the Roof of the New Math/Science Building



# Mira Costa High School – Modernization of Auditorium Lighting



- Replace conventional lighting instruments with equivalent energy-efficient LED lamps
- Install cables, lighting barrels, and other miscellaneous parts
- Install dimming and control system
- Benefits include:
  - Replaces old lamps and ballasts
  - Savings in energy cost
  - Longer life of lamps and ballasts
  - Reduces maintenance cost
  - No need of gel purchase
  - Enhances Auditorium environment
  - Increases rental revenue



# Mira Costa High School – HVAC of Building “Y”



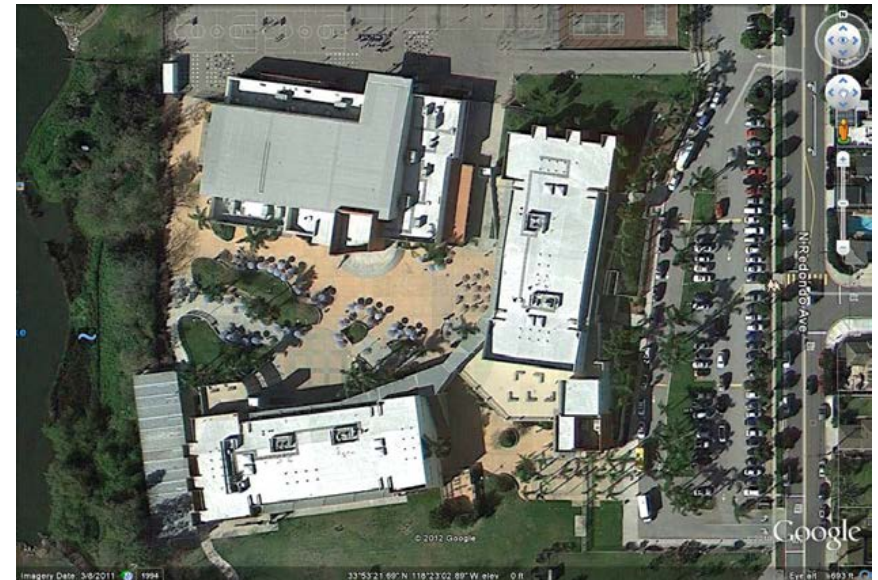
- Remove four (4) existing heating units from the rooftop and install fourteen (14) new split system heat pump units and connect to existing supply ducts
- Each room will be provided with individual control of space temperature
- The capacities of the new units are: one (1) of 5 tons, five (5) of 4 tons, one (1) of 3.5 tons, five (5) of 3 tons, and two (2) of 2.5 tons
- Benefits include:
  - Increases student and teacher comfort
  - Improves learning environment



# Manhattan Beach Middle School – Provide Air Conditioning



- Install thirty (30) new 4-ton and nine (9) new 5-ton cooling only split unit condensers on the roofs of classroom buildings “A” and “B”. Install associated cooling coils into existing furnaces and connect with refrigerant piping
- Replace eleven (11) Carrier VVT dampers with new VAV (variable air volume) dampers in the Administration Building
- Install energy management system for controlling HVAC equipment
- Benefits include:
  - Increases student and teacher comfort
  - Improves learning environment





# District-wide – Install LED Lighting



- Replace exterior and interior lighting throughout the District – all the schools and the District Office
- Replace T-8 and T-12 lamps and ballasts with LED lamps
- Install wireless occupancy sensors with option to shut off interior lighting when rooms are unoccupied
- Replace Metal Halide fixtures in walkways and parking lots with LED fixtures
- The number of fixtures will be reduced throughout the District leading to increased energy savings without compromising lighting levels
- LED lamps have a life of 75,000 hours leading to substantial savings in maintenance cost



# Other Program Elements



- Mira Costa High School:
  - Install solar hot water heating for the pool
  - Install pool pump speed control
  - Install energy management system for controlling HVAC equipment and stadium lighting
  - Convert Building “GG” from pneumatics to DDC (direct digital control) and tie into EMS
  - Install a dual electric vehicle car charging station
  - Install two (2) bottle filling stations
  - Install two (2) solar trash compactors
- District Office:
  - Install a dual electric vehicle car charging station



# Envision™ Education Program

## Linking STEM to Real World Learning Opportunities



- Provide a Living Lab for solar PV technology at the new Math/Science Building, including 3 years of curriculum support
- Provide seven (7) professional development workshops for teachers over 3 years for the Envision program
- Provide ten (10) solar suitcases with working models of solar PV technology
- Provide three (3) kits of each of these technologies:
  - Solar Power
  - Wind Power
  - Hydro Power
  - Energy Efficiency
  - Hydrogen Fuel Cells
- Install a monitor at the DO to display live solar project information
- Benefits include:
  - Inspires students to explore STEM subjects and careers
  - Project-based learning hones problem solving skills
  - Enables students to understand core concepts through real-world examples
  - Equips teachers with skills to create meaningful lesson plans

# Program Financial Analysis – 18-Year Finance Term



Chevron Program Fee													\$8,391,154
Direct Purchase of Material with Prop 39 Funds													\$1,314,205
District Soft Costs													\$400,000
Amount to be Financed													\$10,105,359
Finance Term													18
Annual Interest Rate													3.63%
Annual Escalation of Electricity Cost													5.00%
Annual Escalation of Natural Gas Cost													3.00%
Annual Escalation of O&M Cost													3.00%
Year	Projected Electricity Savings	Projected Natural Gas Savings	Increased Revenue for Auditorium Rental	Incentives	Projected O&M Savings	Prop 39 Funding	District Contribution	Total Program Savings	Lease Payment	M&V Cost	Solar Maintenance Cost	Total Program Costs	Net Savings
Year 1	\$371,773	\$18,106	\$15,000	\$268,506	\$24,975	\$262,841	\$60,000	\$1,021,202	\$970,815	\$18,348	\$16,105	\$1,005,268	\$15,934
Year 2	\$389,659	\$18,650	\$15,450	\$102,818	\$25,724	\$262,841	\$60,000	\$875,142	\$823,537	\$19,082	\$16,589	\$859,208	\$15,934
Year 3	\$408,409	\$19,209	\$15,914	\$102,303	\$26,496	\$262,841	\$60,000	\$895,172	\$842,307	\$19,845	\$17,086	\$879,238	\$15,934
Year 4	\$428,062	\$19,785	\$16,391	\$101,792	\$27,291	\$262,841	\$60,000	\$916,162	\$861,991	\$20,639	\$17,599	\$900,229	\$15,934
Year 5	\$448,664	\$20,379	\$16,883	\$101,283	\$28,110	\$262,841	\$60,000	\$938,159	\$882,634	\$21,465	\$18,127	\$922,226	\$15,934
Year 6	\$470,261	\$20,990	\$17,389	\$0	\$28,953	\$0	\$60,000	\$597,593	\$562,989	\$0	\$18,671	\$581,660	\$15,934
Year 7	\$492,899	\$21,620	\$17,911	\$0	\$29,821	\$0	\$60,000	\$622,251	\$587,087	\$0	\$19,231	\$606,318	\$15,934
Year 8	\$516,631	\$22,269	\$18,448	\$0	\$30,716	\$0	\$60,000	\$648,064	\$612,323	\$0	\$19,808	\$632,131	\$15,934
Year 9	\$541,508	\$22,937	\$19,002	\$0	\$31,638	\$0	\$60,000	\$675,084	\$638,749	\$0	\$20,402	\$659,150	\$15,934
Year 10	\$567,587	\$23,625	\$19,572	\$0	\$32,587	\$0	\$60,000	\$703,370	\$666,423	\$0	\$21,014	\$687,437	\$15,934
Year 11	\$594,925	\$24,334	\$20,159	\$0	\$33,564	\$0	\$60,000	\$732,981	\$695,403	\$0	\$21,644	\$717,048	\$15,934
Year 12	\$623,583	\$25,064	\$20,764	\$0	\$34,571	\$0	\$60,000	\$763,982	\$725,754	\$0	\$22,294	\$748,048	\$15,934
Year 13	\$653,625	\$25,815	\$21,386	\$0	\$35,608	\$0	\$60,000	\$796,435	\$757,539	\$0	\$22,963	\$780,502	\$15,934
Year 14	\$685,119	\$26,590	\$22,028	\$0	\$36,677	\$0	\$60,000	\$830,414	\$790,829	\$0	\$23,651	\$814,480	\$15,934
Year 15	\$718,134	\$27,388	\$22,689	\$0	\$37,777	\$0	\$60,000	\$865,987	\$825,693	\$0	\$24,361	\$850,054	\$15,934
Year 16	\$752,744	\$28,209	\$23,370	\$0	\$38,910	\$0	\$60,000	\$903,233	\$862,207	\$0	\$25,092	\$887,299	\$15,934
Year 17	\$789,027	\$29,056	\$24,071	\$0	\$40,078	\$0	\$60,000	\$942,230	\$900,452	\$0	\$25,845	\$926,297	\$15,934
Year 18	\$827,063	\$29,927	\$24,793	\$0	\$41,280	\$0	\$60,000	\$983,063	\$940,509	\$0	\$26,620	\$967,129	\$15,934
Year 19	\$866,937	\$30,825	\$25,536	\$0	\$42,518	\$0	\$0	\$965,817	\$0	\$0	\$27,418	\$27,418	\$938,398
Year 20	\$908,740	\$31,750	\$26,303	\$0	\$43,794	\$0	\$0	\$1,010,586	\$0	\$0	\$28,241	\$28,241	\$982,345
Year 21	\$972,236	\$0	\$27,092	\$0	\$45,108	\$0	\$0	\$1,044,436	\$0	\$0	\$29,088	\$29,088	\$1,015,347
Year 22	\$1,019,162	\$0	\$27,904	\$0	\$46,461	\$0	\$0	\$1,093,527	\$0	\$0	\$29,961	\$29,961	\$1,063,566
Year 23	\$1,068,359	\$0	\$28,742	\$0	\$47,855	\$0	\$0	\$1,144,955	\$0	\$0	\$30,860	\$30,860	\$1,114,096
Year 24	\$1,119,936	\$0	\$29,604	\$0	\$49,290	\$0	\$0	\$1,198,830	\$0	\$0	\$31,785	\$31,785	\$1,167,045
Year 25	\$1,174,010	\$0	\$30,492	\$0	\$50,769	\$0	\$0	\$1,255,271	\$0	\$0	\$32,739	\$32,739	\$1,222,532
Year 26	\$399,701	\$0	\$0	\$0	\$0	\$0	\$0	\$399,701	\$0	\$0	\$33,721	\$33,721	\$365,980
Year 27	\$417,588	\$0	\$0	\$0	\$0	\$0	\$0	\$417,588	\$0	\$0	\$34,733	\$34,733	\$382,855
Year 28	\$436,275	\$0	\$0	\$0	\$0	\$0	\$0	\$436,275	\$0	\$0	\$35,775	\$35,775	\$400,500
Year 29	\$455,798	\$0	\$0	\$0	\$0	\$0	\$0	\$455,798	\$0	\$0	\$36,848	\$36,848	\$418,950
Year 30	\$476,195	\$0	\$0	\$0	\$0	\$0	\$0	\$476,195	\$0	\$0	\$37,954	\$37,954	\$438,241
<b>Totals</b>	<b>\$19,594,609</b>	<b>\$486,528</b>	<b>\$546,889</b>	<b>\$676,702</b>	<b>\$910,570</b>	<b>\$1,314,205</b>	<b>\$1,080,000</b>	<b>\$24,609,503</b>	<b>\$13,947,242</b>	<b>\$99,379</b>	<b>\$766,223</b>	<b>\$14,812,844</b>	<b>\$9,796,659</b>

# Program Financial Analysis – 15-Year Finance Term



Chevron Program Fee													\$8,391,154
Direct Purchase of Material with Prop 39 Funds													\$1,314,205
District Soft Costs													\$400,000
Amount to be Financed													\$10,105,359
Finance Term													15
Annual Interest Rate													3.23%
Annual Escalation of Electricity Cost													5.00%
Annual Escalation of Natural Gas Cost													3.00%
Annual Escalation of O&M Cost													3.00%
Year	Projected Electricity Savings	Projected Natural Gas Savings	Increased Revenue for Auditorium Rental	Incentives	Projected O&M Savings	Prop 39 Funding	District Contribution	Total Program Savings	Lease Payment	M&V Cost	Solar Maintenance Cost	Total Program Costs	Net Savings
Year 1	\$371,773	\$18,106	\$15,000	\$268,506	\$24,975	\$262,841	\$165,000	\$1,126,202	\$1,075,865	\$18,348	\$16,105	\$1,110,319	\$15,883
Year 2	\$389,659	\$18,650	\$15,450	\$102,818	\$25,724	\$262,841	\$165,000	\$980,142	\$928,588	\$19,082	\$16,589	\$964,259	\$15,883
Year 3	\$408,409	\$19,209	\$15,914	\$102,303	\$26,496	\$262,841	\$165,000	\$1,000,172	\$947,358	\$19,845	\$17,086	\$984,289	\$15,883
Year 4	\$428,062	\$19,785	\$16,391	\$101,792	\$27,291	\$262,841	\$165,000	\$1,021,162	\$967,042	\$20,639	\$17,599	\$1,005,280	\$15,883
Year 5	\$448,664	\$20,379	\$16,883	\$101,283	\$28,110	\$262,841	\$165,000	\$1,043,159	\$987,685	\$21,465	\$18,127	\$1,027,276	\$15,883
Year 6	\$470,261	\$20,990	\$17,389	\$0	\$28,953	\$0	\$165,000	\$702,593	\$668,040	\$0	\$18,671	\$686,710	\$15,883
Year 7	\$492,899	\$21,620	\$17,911	\$0	\$29,821	\$0	\$165,000	\$727,251	\$692,138	\$0	\$19,231	\$711,369	\$15,883
Year 8	\$516,631	\$22,269	\$18,448	\$0	\$30,716	\$0	\$165,000	\$753,064	\$717,373	\$0	\$19,808	\$737,181	\$15,883
Year 9	\$541,508	\$22,937	\$19,002	\$0	\$31,638	\$0	\$165,000	\$780,084	\$743,799	\$0	\$20,402	\$764,201	\$15,883
Year 10	\$567,587	\$23,625	\$19,572	\$0	\$32,587	\$0	\$165,000	\$808,370	\$771,473	\$0	\$21,014	\$792,487	\$15,883
Year 11	\$594,925	\$24,334	\$20,159	\$0	\$33,564	\$0	\$165,000	\$837,981	\$800,454	\$0	\$21,644	\$822,098	\$15,883
Year 12	\$623,583	\$25,064	\$20,764	\$0	\$34,571	\$0	\$165,000	\$868,982	\$830,805	\$0	\$22,294	\$853,099	\$15,883
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Year 14	\$685,119	\$26,590	\$22,028	\$0	\$36,677	\$0	\$165,000	\$935,414	\$895,879	\$0	\$23,651	\$919,531	\$15,883
Year 15	\$718,134	\$27,388	\$22,689	\$0	\$37,777	\$0	\$165,000	\$970,987	\$930,743	\$0	\$24,361	\$955,104	\$15,883
Year 16	\$752,744	\$28,209	\$23,370	\$0	\$38,910	\$0	\$0	\$843,233	\$0	\$0	\$25,092	\$25,092	\$818,141
Year 17	\$789,027	\$29,056	\$24,071	\$0	\$40,078	\$0	\$0	\$882,230	\$0	\$0	\$25,845	\$25,845	\$856,386
Year 18	\$827,063	\$29,927	\$24,793	\$0	\$41,280	\$0	\$0	\$923,063	\$0	\$0	\$26,620	\$26,620	\$896,443
Year 19	\$866,937	\$30,825	\$25,536	\$0	\$42,518	\$0	\$0	\$965,817	\$0	\$0	\$27,418	\$27,418	\$938,398
Year 20	\$908,740	\$31,750	\$26,303	\$0	\$43,794	\$0	\$0	\$1,010,586	\$0	\$0	\$28,241	\$28,241	\$982,345
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Year 24	\$1,119,936	\$0	\$29,604	\$0	\$49,290	\$0	\$0	\$1,198,830	\$0	\$0	\$31,785	\$31,785	\$1,167,045
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Year 30	\$476,195	\$0	\$0	\$0	\$0	\$0	\$0	\$476,195	\$0	\$0	\$37,954	\$37,954	\$438,241
<b>Totals</b>	<b>\$19,594,609</b>	<b>\$486,528</b>	<b>\$546,889</b>	<b>\$676,702</b>	<b>\$910,570</b>	<b>\$1,314,205</b>	<b>\$2,475,000</b>	<b>\$26,004,503</b>	<b>\$12,819,831</b>	<b>\$99,379</b>	<b>\$766,223</b>	<b>\$13,685,434</b>	<b>\$12,319,069</b>

# Benefits of the Program



## Modernize Facilities

- Upgrades existing infrastructure without using General Fund dollars
- Addresses deferred maintenance needs
- New LED lighting for Auditorium
- Provides air conditioning of Middle School and Building “Y” of High School

## Generate Savings

- Significant savings in facilities maintenance cost
- Reduces the impact of future utility rate increases
- Guarantees energy savings

## Create a Lasting Impact

- Showcases the District as a leader in project-based learning
- Showcases the District as a leader in energy efficiency and renewable energy technology
- Substantial environmental benefits – equivalent to removing 366 cars off the road annually

**Program projected to contribute over \$8.7 million to the General Fund**

# Roadmap



Opportunity Assessment  
Program Development  
Implementation

Aug 2012 – Aug 2013  
Sep 2013 – Apr 2014  
Jun 2014 – May 2015