

Report of the Albany Pool Sustainability Committee

Presented to the AUSD Board of
Education

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Committee Members

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Architecture
Business
Construction Management
Engineering
Environmental Assessment
Pool Management

Acknowledgments

- Superintendent Marla Stephenson
- Assistant Superintendent Laurie Harden
- Tom Murphy, Facilities Manager
- Dave Burke, Bollo Construction
- Steve Newsom, LPA

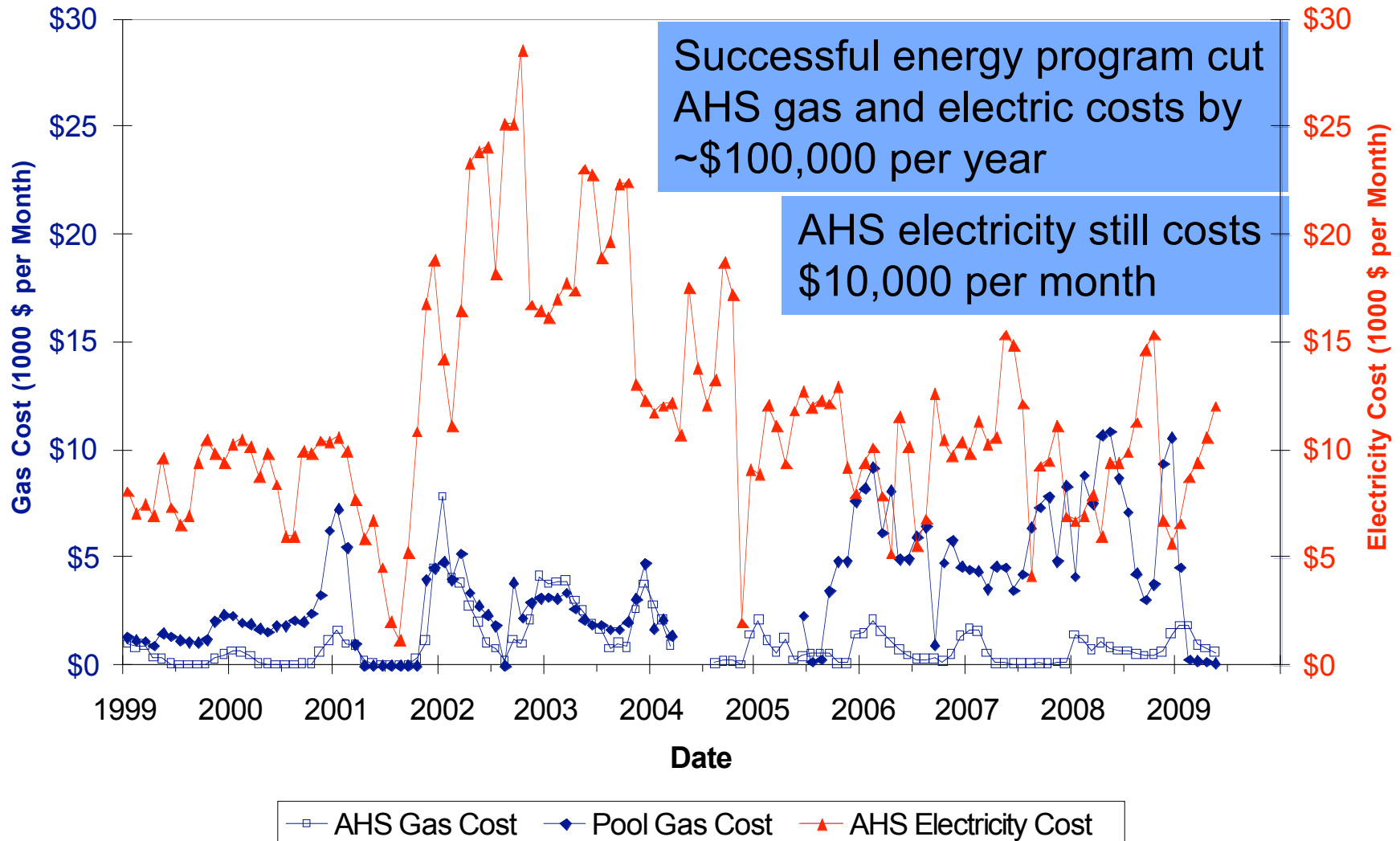
Committee Assignment - Provide Advice to the Superintendent Regarding:

- Sustainable technology options and costs for Albany Pool
- Possible grants for sustainable technology
- The business plan prepared by Sports Management Group considering utility costs and the state of the economy

Findings

- Albany Pool water heating is a major cost – can be greatly reduced with pool covers, solar water heating, co-generation, and small boilers
- Solar photovoltaic systems are a better match for AHS than for Albany Pool
- Chlorination is necessary but a complementary ultraviolet (UV) system will reduce chloramines and improve indoor swimming experience
- Pool facility can be run profitably (!)

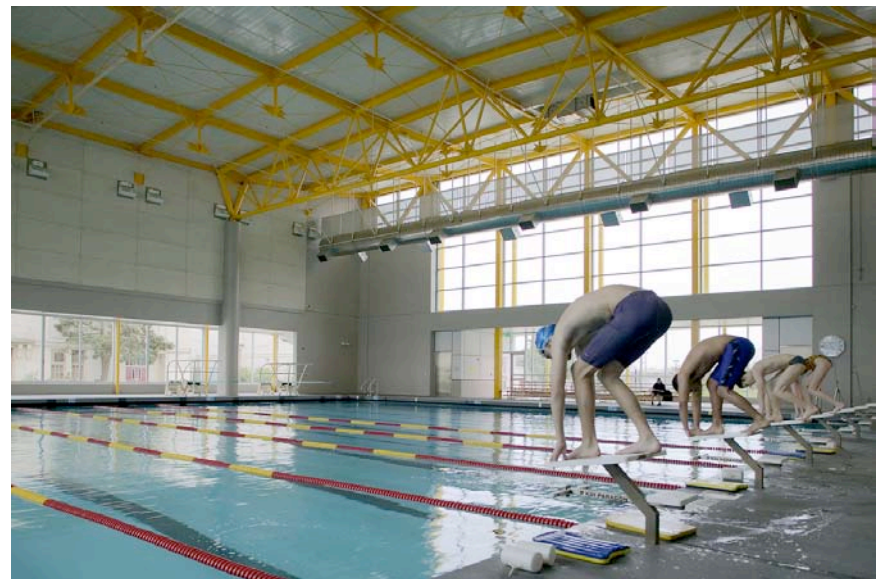
AHS and Albany Pool Gas and Electricity Costs



SMG pool utility costs ~ \$12,000 per month ~ \$150,000 per year

Challenge: Reduce AHS Electricity Costs and Pool Gas Costs

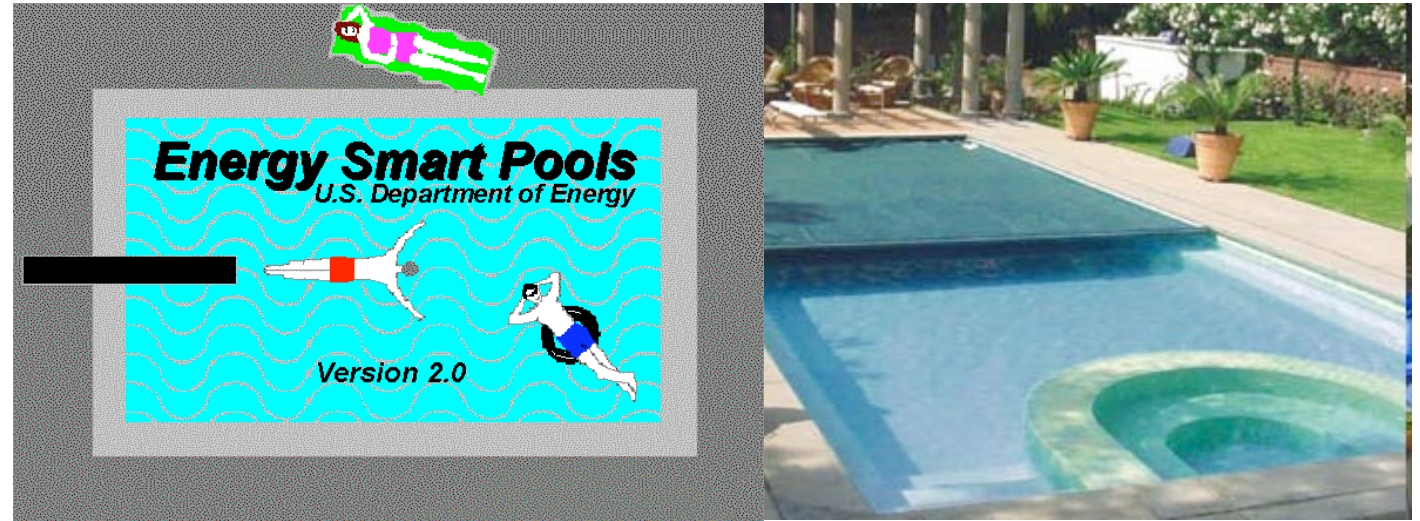
- Design team will need to put together an integrated package
- Options include:
 - Optimize bldg envelope
 - Pool covers
 - More co-generation
 - Solar water heating
 - Solar photovoltaic
 - Right-sizing equipment
- Spend Measure E bond and modernization monies to save money on annual operations



Building Efficiency Measures

- Introduce natural ventilation (aka easily-operable windows) to reduce dehumidification loads/costs during some times of year
- Is air conditioning necessary in Albany?
- Large ceiling fans create comfort w/moving air
- Radiant floor slabs instead of gas forced air
- Explore passive solar front and/or heat exchanger for pre-heating of 3250 cfm fresh air
- Utilize displacement instead of mixing supply air
- Design building envelope to minimize heating load
- Install separate water meter for the pool – eliminate sewage charge for pool water

Pool Covers



- 50 – 70% reduction of heating costs
- Invest in covers that have good thermal properties (insulated) and are easy to use (automatic)
- Annual savings: \$46 K (\$16K + \$30K) ++
- Payback: as short as 1 year
- Covers also reduce water and chemical use
- Safety covers recommended for public pools



*(All costs are approximate.
Actual returns may vary)*



Co-generation

- Add second co-gen unit – produce more electricity (new CARB-certified ULE unit)
- Installation cost: ~\$250K - \$300K
- Can we collect second PGE rebate?
- Annual savings: ~\$46K (@ 50% LF) +
- Payback period: 4 – 6 years
- Eliminate main boiler(s): offset costs



(All costs are approximate. Actual returns may vary)

Solar Water Heating

- Well-matched to pools (low-temperature hot water)
- Need ~50 to 75% of pool area – about 5000 sq ft (distributed over larger area to avoid shading, provide access, piping, etc.)
- Appropriate for Measure E bond and modernization monies – located at project site and integral to pool function
- Will need engineering review of Arts and/or Multi-purpose Buildings; possible structural upgrades





Solar Water Heating Options



- Plastic panels (tubes)
- Common pool heating
- 1.25 lbs per sq ft
- \$125-250K (indoor pool)
\$150-300K (outdoor pool)
- Savings: > \$12K/yr
- Payback: ~10-20 years
- Glazed panels
- Durable, locally made
- 4-5 lbs per sq ft
- \$187K (indoor pool)
\$385K (outdoor pool)
- Savings: > \$12K/yr
- Payback: ~20 years

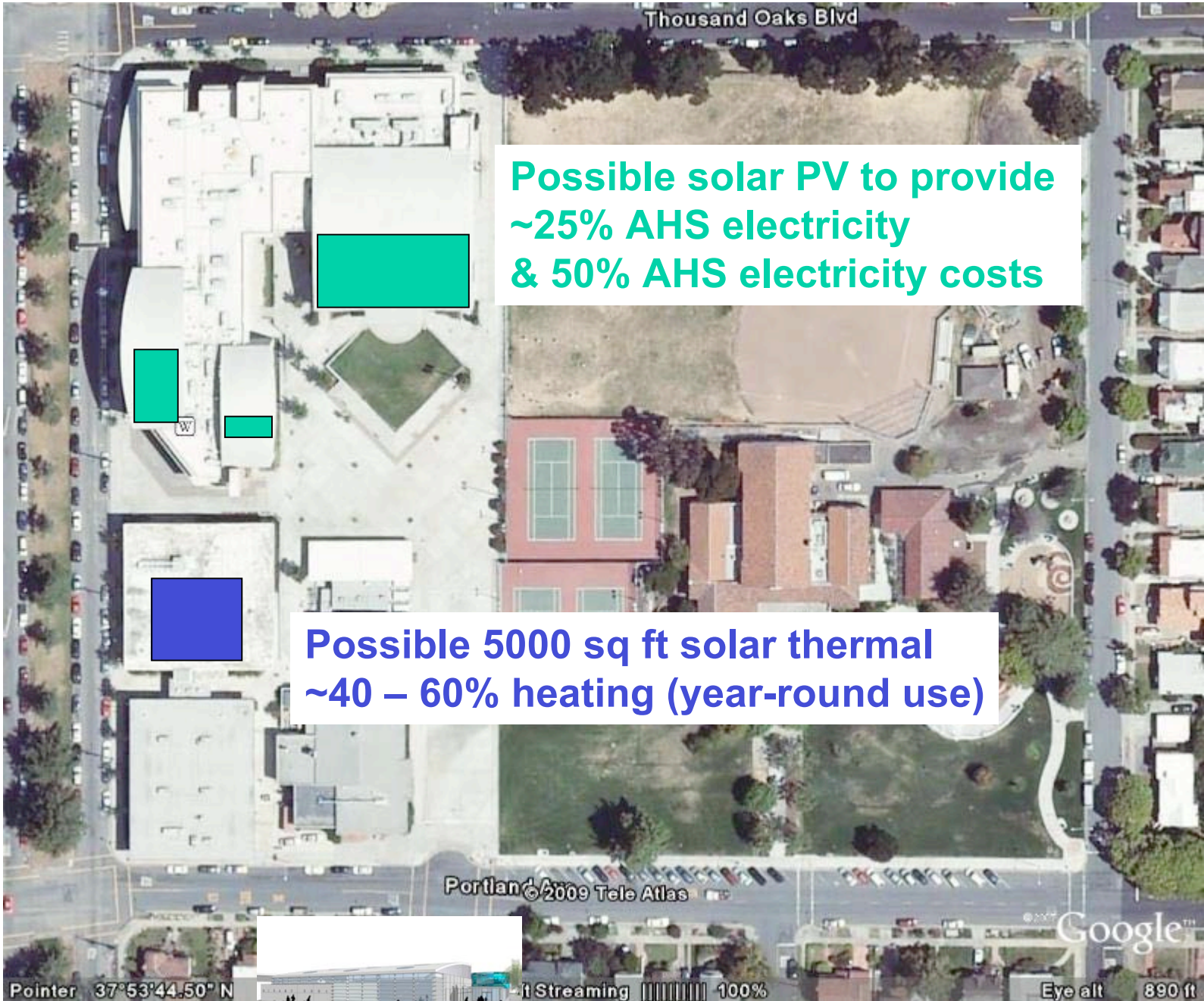
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Solar Photovoltaic



- Schools qualify for federal stimulus funding; swimming pools do not
- Application process for stimulus package remains vague – joint with other agencies
- Expected installation costs: \$662 K (separate project from Measure E)
- Years 1-5 annual savings: \$75K per year
- Payback period: 9 years

(All costs are approximate. Actual returns may vary)



Possible solar PV to provide
~25% AHS electricity
& 50% AHS electricity costs

Possible 5000 sq ft solar thermal
~40 – 60% heating (year-round use)



DSA Must Approve All Projects



DIVISION OF THE
STATE ARCHITECT
DEPARTMENT OF GENERAL SERVICES

GRID NEUTRAL:
Electrical Independence for California
Schools and Community Colleges

- New pool design has flexibility to accommodate solar - architect and engineer will design pool roof trusses to support solar hot water or photovoltaic panel load before bid
- Some unknowns - multipurpose building roof was modernized in 2000 – need to confirm load capability – art building may also be a possibility

February 1, 2009



Pool Chemicals

- Projected annual costs of pool chemicals: \$15,000 - \$17,000, mostly for chlorination
- Are all necessary? Can pH be controlled with CO₂ only (eliminate muriatic acid = HCl)?
- Concerns about odors and skin/eye irritation => desire for chlorine-free pool
- Can we improve swimming experience and reduce ongoing costs?
- We examined multiple no-chlorine alternatives: all are more expensive, most do not meet public health standards
- One low-chlorine alternative stands out

California Health and Safety Code Requirements for Public Pools



- Must maintain a constant disinfectant residual at all points throughout pool
- Minimum 1 part per million (ppm) chlorine
- Provision for accepting other disinfectants if you can demonstrate a readily measurable residual that is as effective as chlorine and is not dangerous to public health



What Alternatives to Chlorination Must Do

- Chlorine both disinfects and oxidizes wastes (sweat and urine)
- Most alternatives either disinfect or oxidize – and must be combined with something that has a measurable residual
- Bromine is only alternative that disinfects, oxidizes, and has measurable residual – but costs much more than chlorine



Some Alternatives Do Not Meet All Requirements for Public Pools

- Ionization (silver, copper) – disinfect but don't oxidize, no measurable residual
- Ozone – oxidizes and may disinfect (more effective than chlorine against Giardia and Cryptosporidium), but no measurable residual
- These alternatives are effective when used for public drinking water – may be used in private pools - in public pools supplement but do not replace chlorination



Salt Water Systems Meet Public Health Requirements But Cost and Maintenance Are Major Concerns

- Chlorine can be generated from salt water – not chlorine-free, but feels softer
- Requires saltwater (3000 - 6000 ppm) – inconsistent info on corrosion
- High initial costs but lower chemical costs
- Periodic servicing and maintenance requirements – difficult to quantify
- Appears to have fallen out of favor locally

UV Systems Can Complement Chlorination and Improve Pools

- Inexpensive (~\$30K-\$60K, low maintenance costs)
- Removes chloramines (source of odors and eye burn – byproduct of chlorine and nitrogen-containing wastes)
- Improves swimming experience
- Effective against Giardia and Cryptosporidium
- Not needed in outdoor pools (ventilation and sun's UV remove chloramines)
- Public education about hygiene is also needed

