Energy Strategic Plan:

Energy Independence and Carbon Neutral Campuses

Los Angeles Community College District

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Los Angeles, California USA

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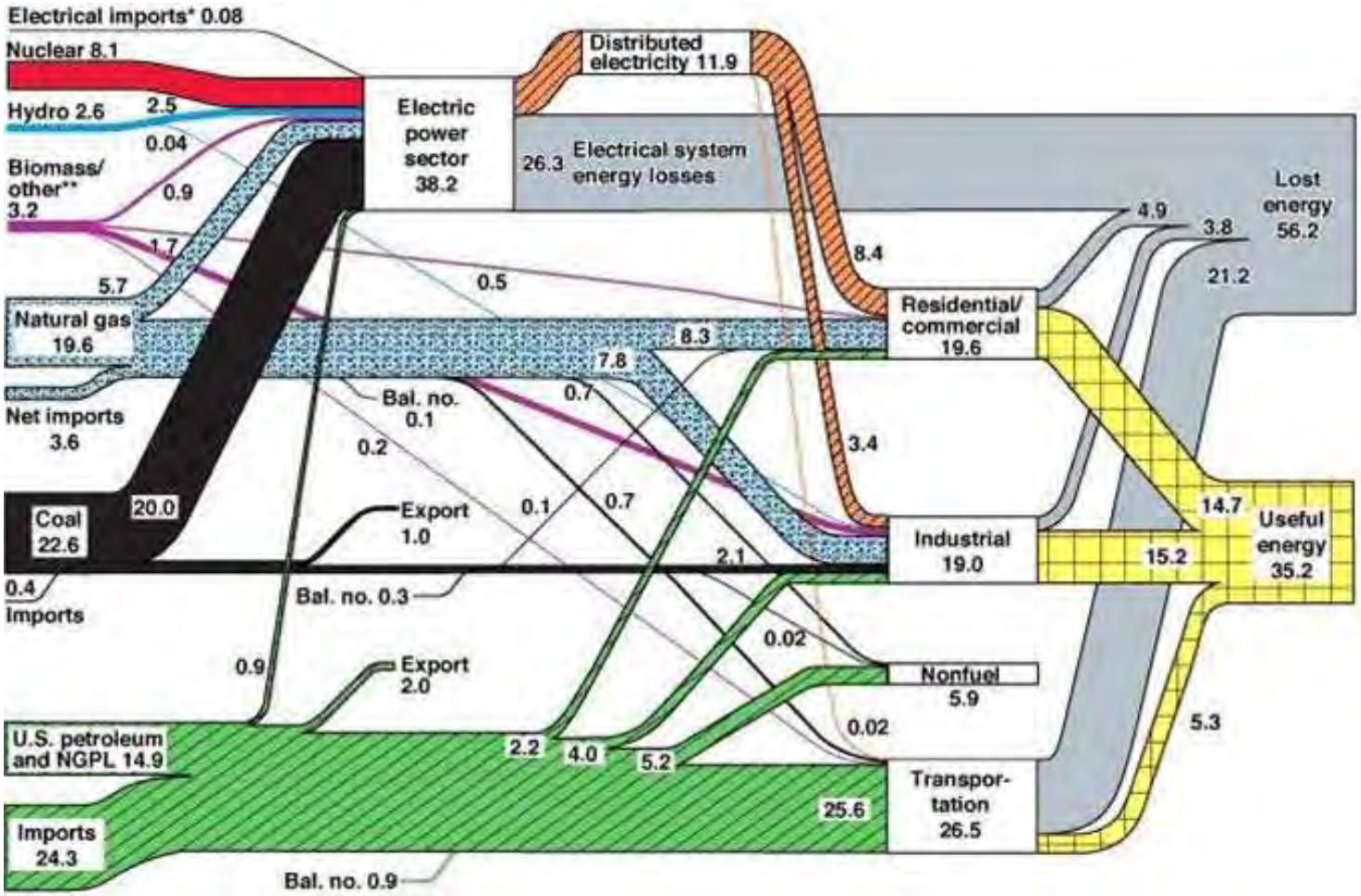
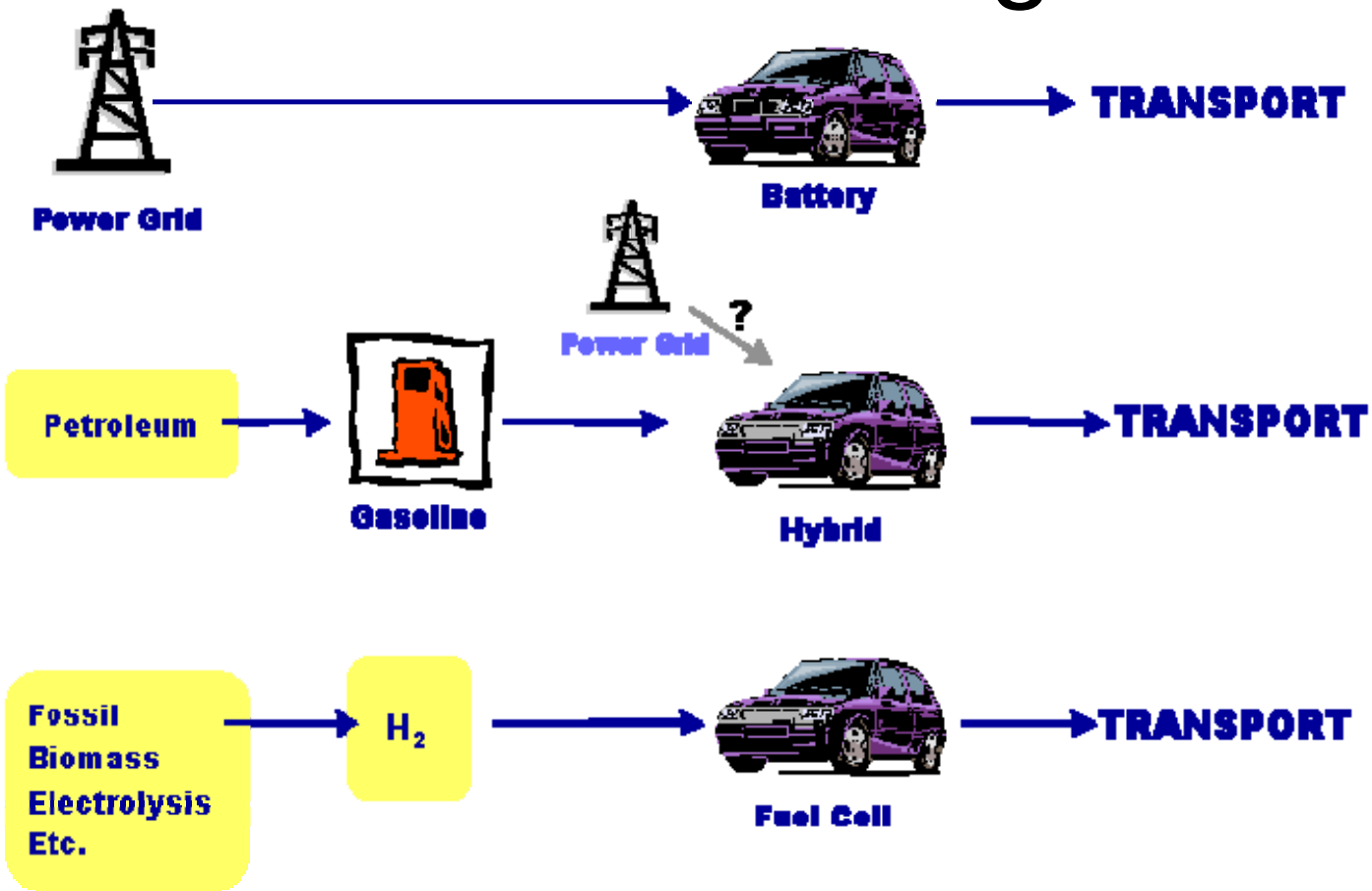
Los Angeles Community College District (LACCD)

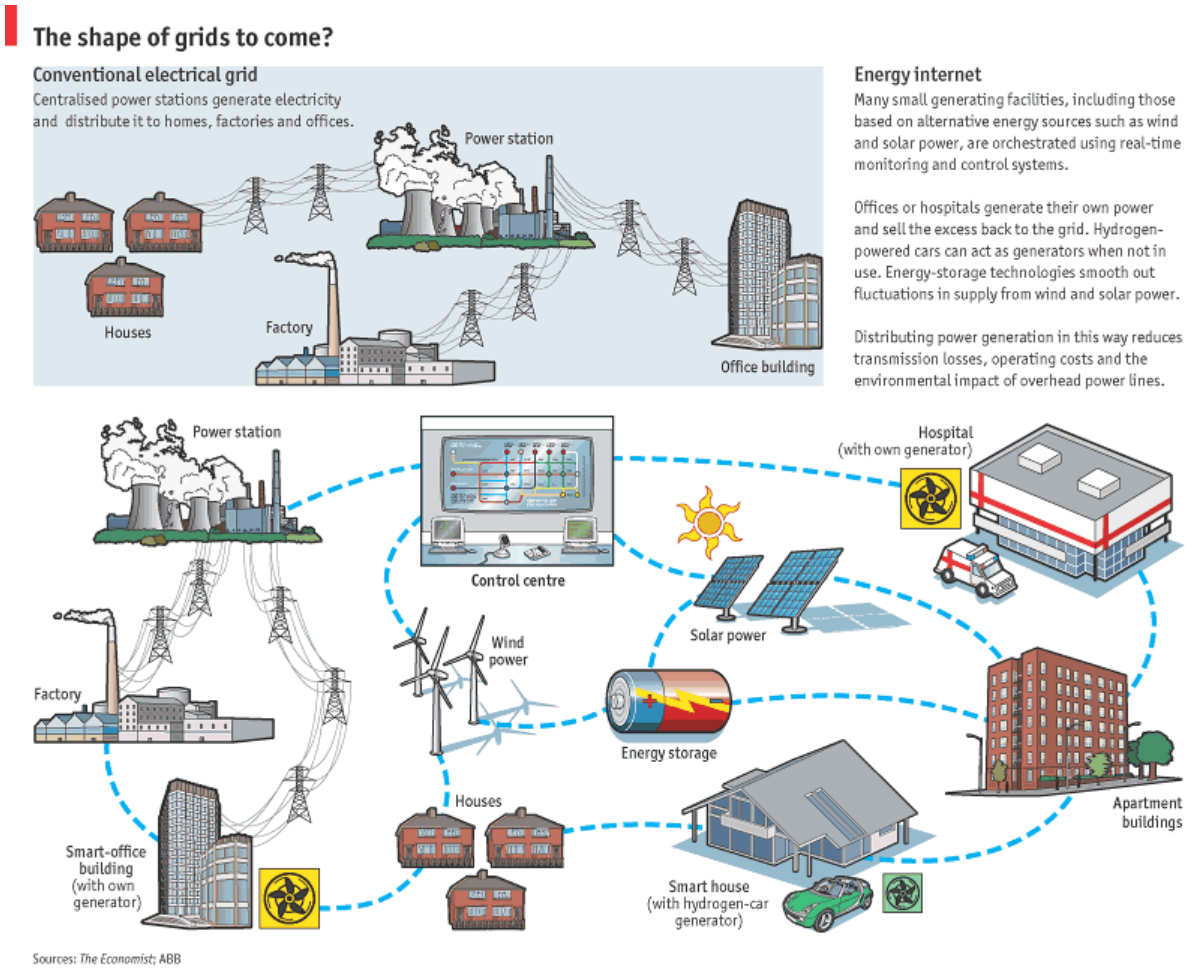
Net Primary Resource Consumption ~97 Quads



Transition to Commercial Green Technologies



Energy Infrastructures:
central grid and on-site generation



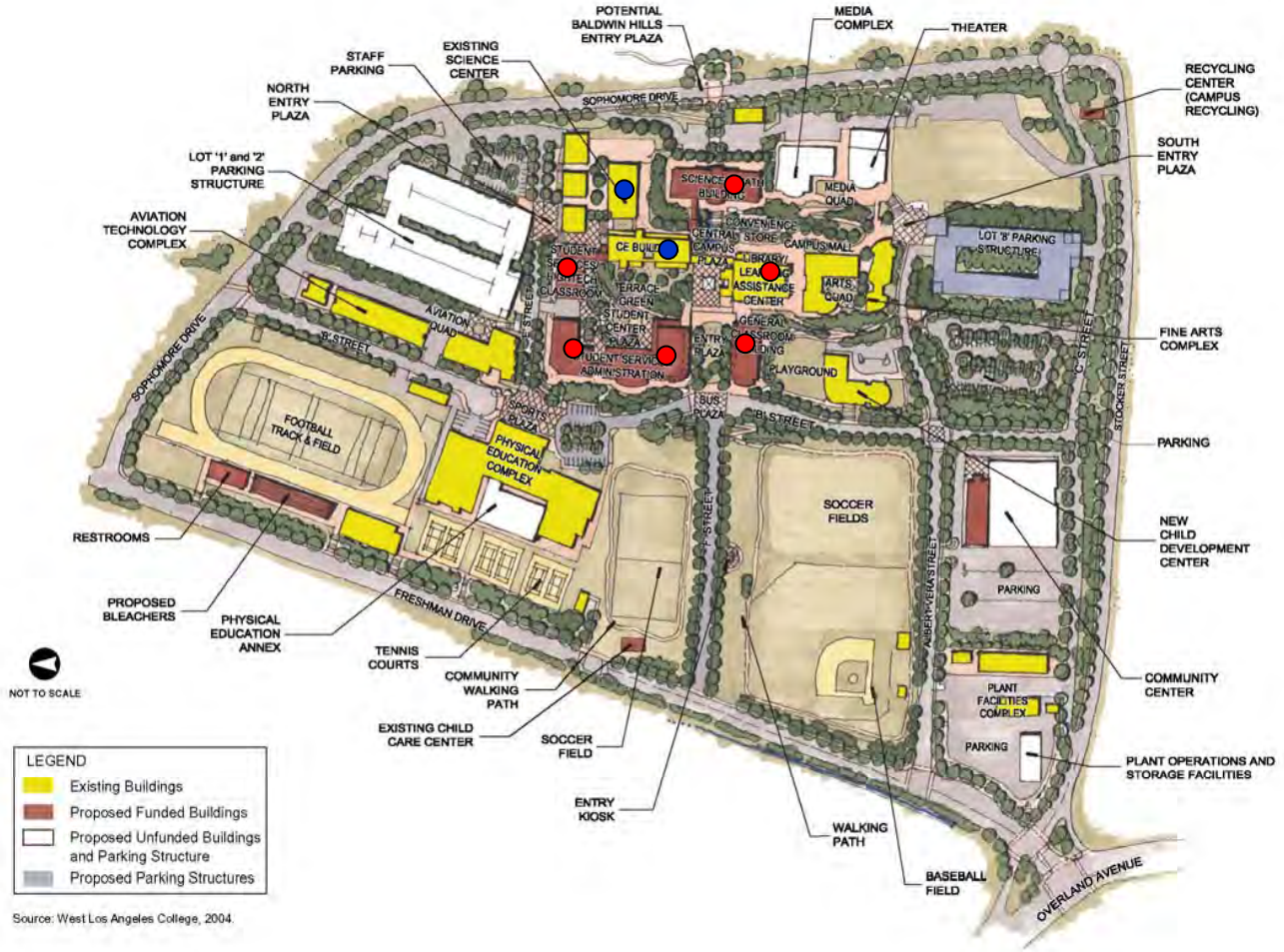
LACCD Comprehensive **Energy Strategic Plan**

A Paradigm Change

1. Efficient Renewable Energy Central Plants
2. Performance and Conservation Contracts
3. Renewable Energy Systems per campus (e.g. 1 MW Solar PV)
4. Sustainable Development Curriculum

West Los Angeles College

Central Plant Baseline



Source: West Los Angeles College, 2004.

Total Elec. Consumption

7,216,762 kW

Total Gas Consumption

5,961 MMBtus

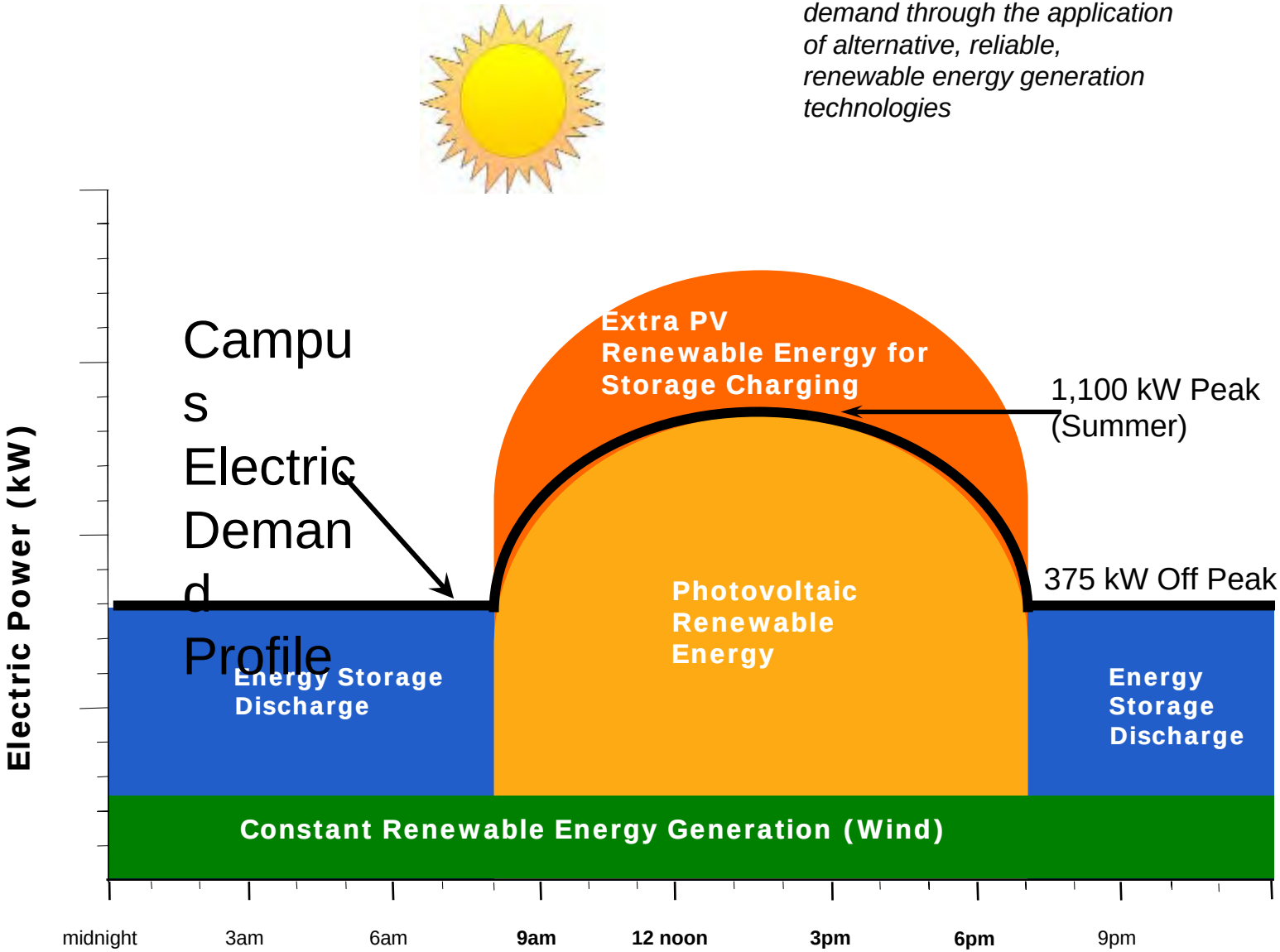
Total Water/Sewer
34,625 kgals

LACCD Energy Initiative

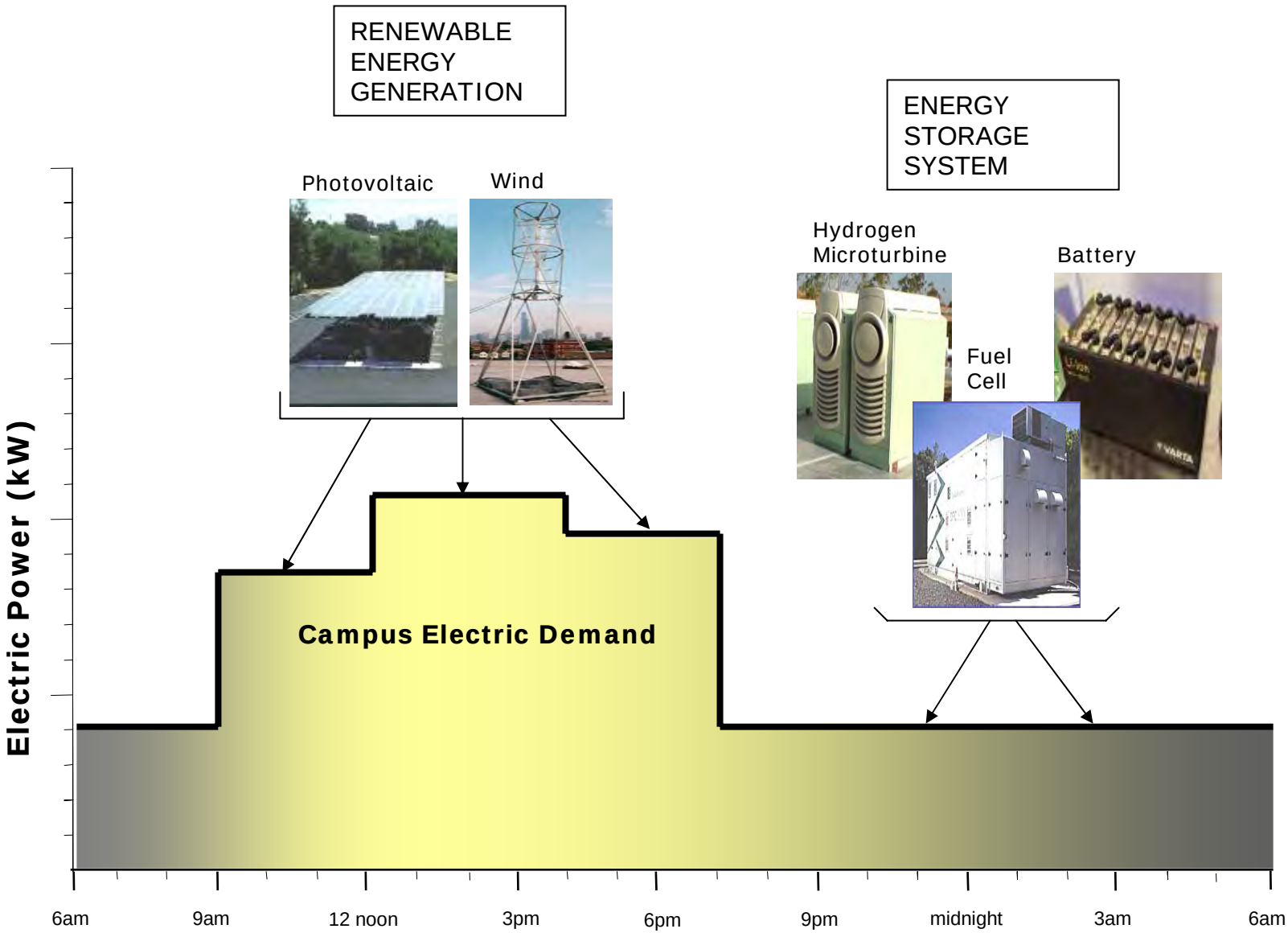
- Photovoltaic 3rd Party Arithmetic
  - Federal Energy Credit – 30%
  - Rapid Depreciation – 25 %
  - Utility Incentives – 20 %
  - Green Tag Sale – 5% (?)
  - Bulk Procurement – 10 % (?)
  - 10 Cents on the Dollar !!!

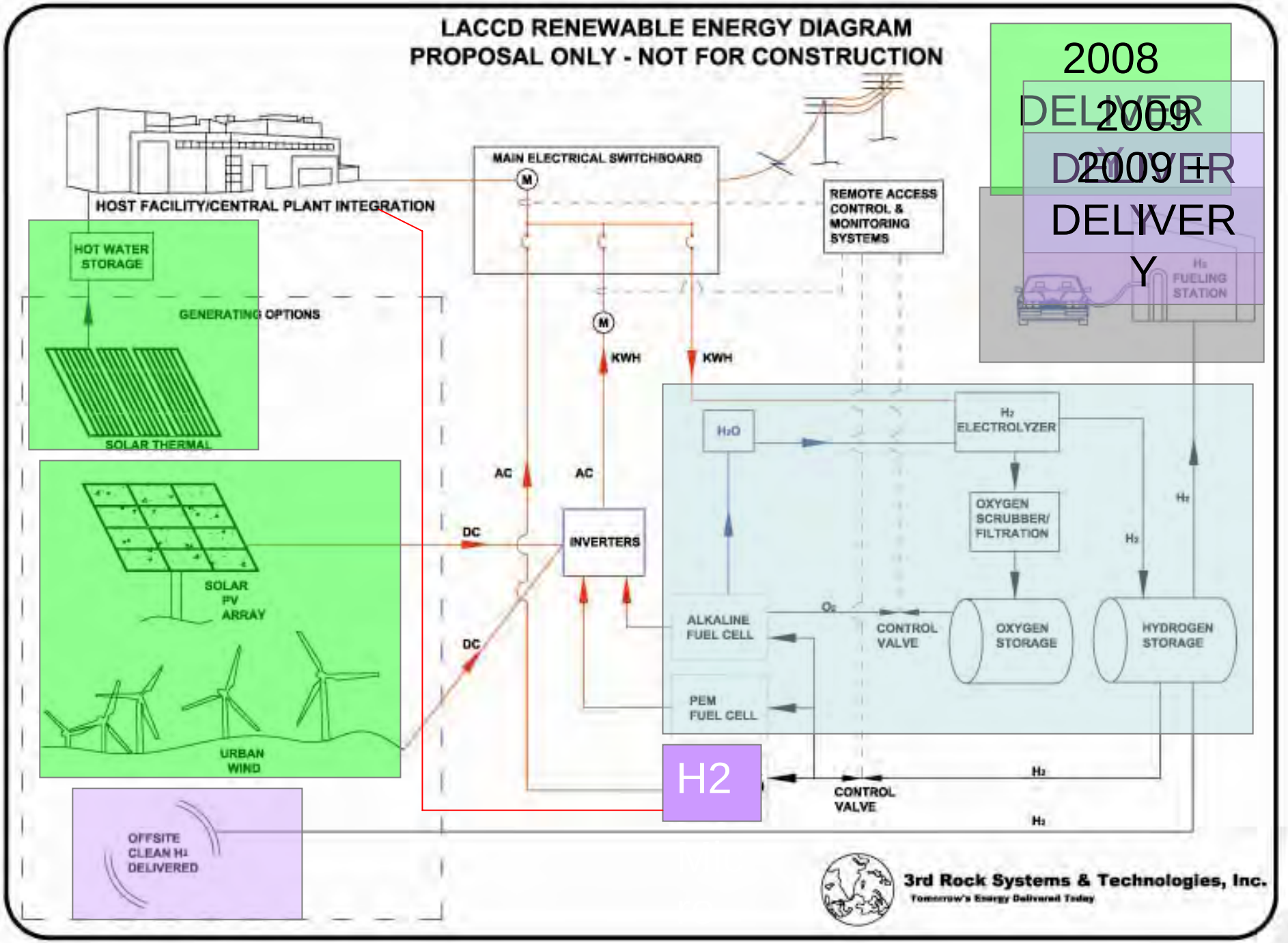
Technology Overview

To eventually fulfill the campus' daytime and nighttime energy demand through the application of alternative, reliable, renewable energy generation technologies



Technology Overview



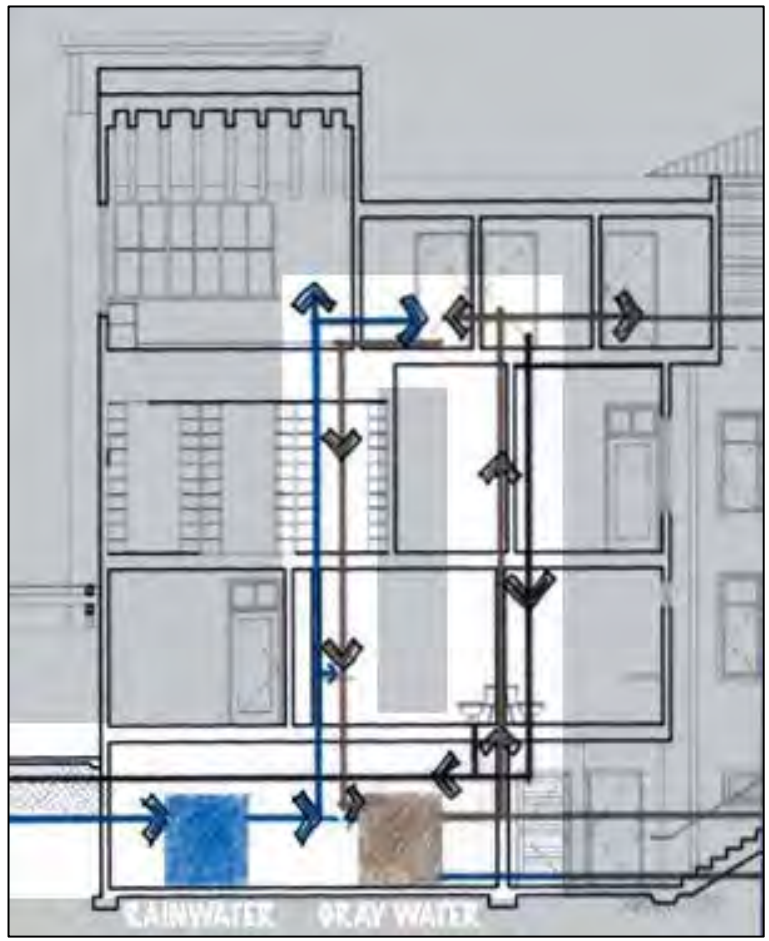

LACCD RENEWABLE ENERGY DIAGRAM
PROPOSAL ONLY - NOT FOR CONSTRUCTION
2008
2009 +
DELIVERY
HOST FACILITY/CENTRAL PLANT INTEGRATION
MAIN ELECTRICAL SWITCHBOARD
REMOTE ACCESS CONTROL & MONITORING SYSTEMS
HOT WATER STORAGE
GENERATING OPTIONS
SOLAR THERMAL
KWH
KWH
AC
AC
DC
DC
INVERTERS
SOLAR PV ARRAY
URBAN WIND
H2O
H2 ELECTROLYZER
OXYGEN SCRUBBER/ FILTRATION
ALKALINE FUEL CELL
PEM FUEL CELL
CONTROL VALVE
OXYGEN STORAGE
HYDROGEN STORAGE
H2
CONTROL VALVE
OFFSITE CLEAN H2 DELIVERED
H2 FUELING STATION
3rd Rock Systems & Technologies, Inc.
Tomorrow's Energy Delivered Today

Performance Contracts

- Retrofit all energy consuming elements for maximum efficiency
- Use conservation features in all buildings
- State of the art and new technologies
- Metering and Monitoring Systems
- Funding from Private Sector
- Aggregate through detailed technical audits
- Guaranteed Payback within existing utility charges
- Funds from California Public Utility Commission

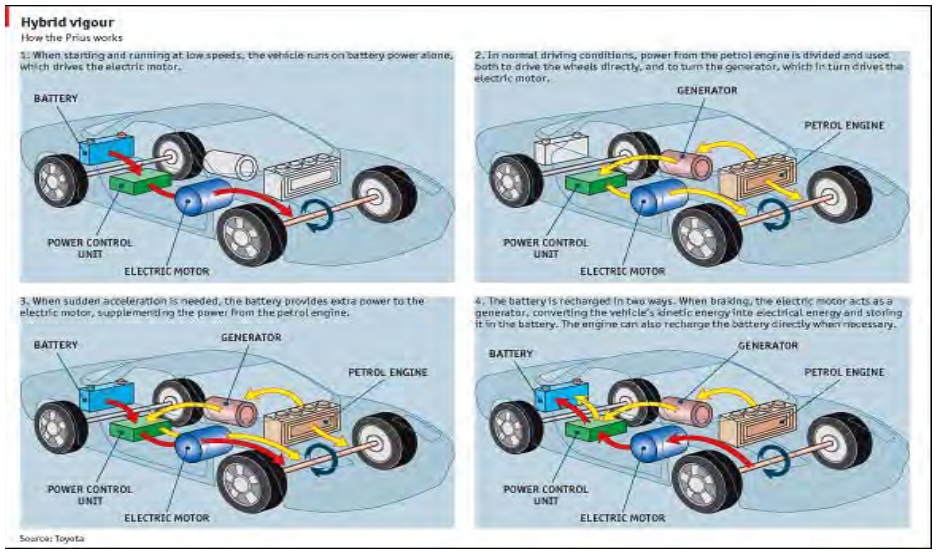
Green Building Hybrid Systems NRDC (Santa Monica)

- Water recycling & conservation
- Solar panels, natural light, energy efficient fixtures and appliances
- Recycled/recyclable materials in furniture & construction
- Platinum LEED



Commercialization of Transitional Technologies

Economist
Technology Quarterly Special Section
4 December 04, pp: 1-39
"Why the Future is hybrid" p. 26-30.



Renewable Energy Systems:
e.g. One Megawatt Solar / PV

- Third party to install
- Parking Lots and Roofs
- Buildings as integrated or add-ons
- DWP and Edison Solar / PV incentives
- California Public Utility Commission -- $3 billion over 11 years
- National Energy Act (05) with incentives in 06
- Aggregated buying of systems
- Hybrid systems with storage and future technology innovations

Solar Roof Photovoltaic

Vacuum Tube Heat-pipe Collectors and Architectural Design Possibilities

Sustainable Development Curriculum

- Civic-Markets or the public non-profit sector as market driver
- Build on different Campuses with basic focus
- Courses as certificated, licenses and degrees
- Career opportunities and training for jobs, new companies and advanced degrees
- Collaborate with unions, private businesses, public, government and non-profit sectors
- Provide actual experiences on campus through building programs
- Sustainable Development Curriculum: solar, wind, geothermal, hybrids, etc as well as new businesses, accounting, operations and maintenance

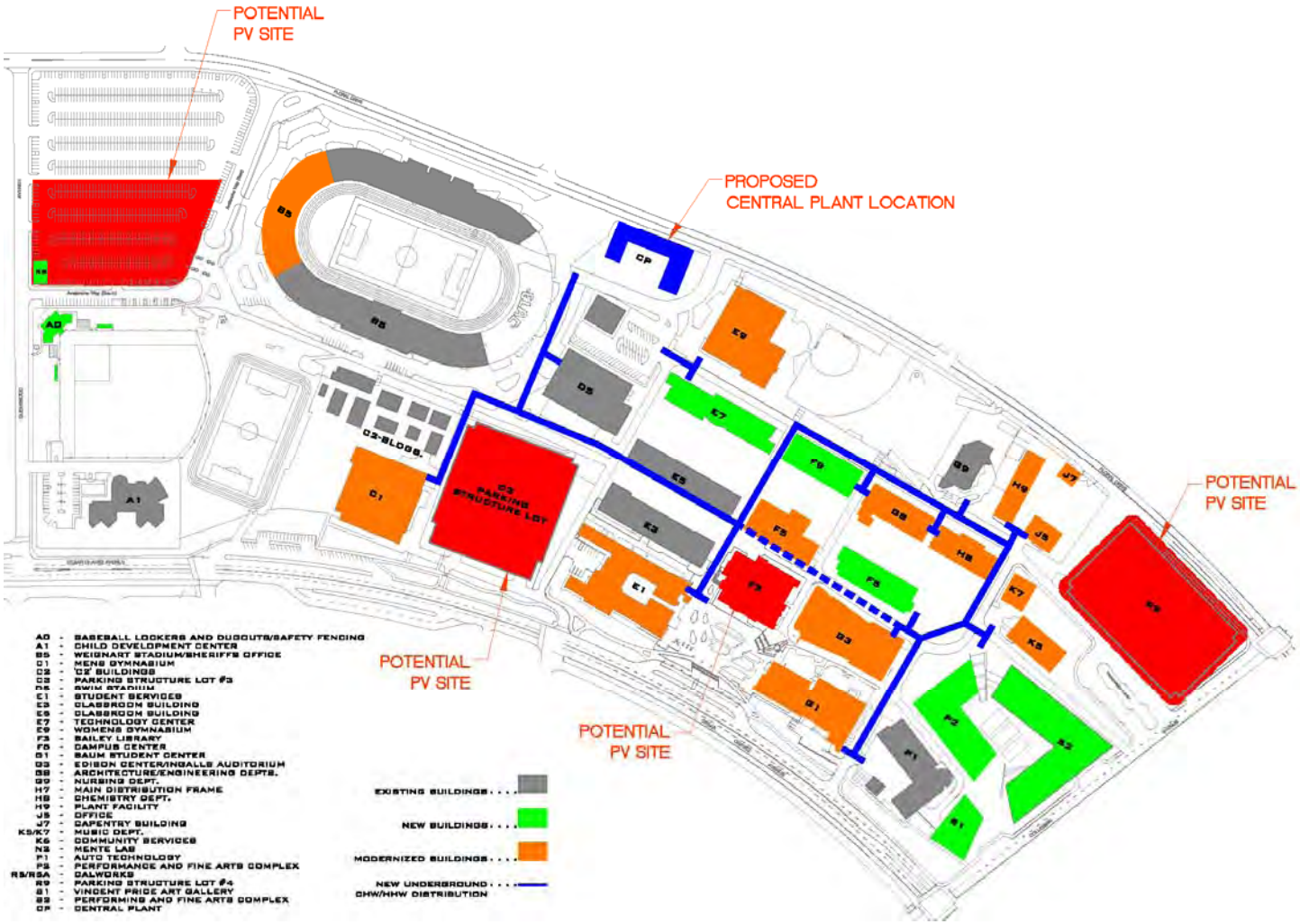
Moscone Center:

Jobs and training for solar installation (2004)

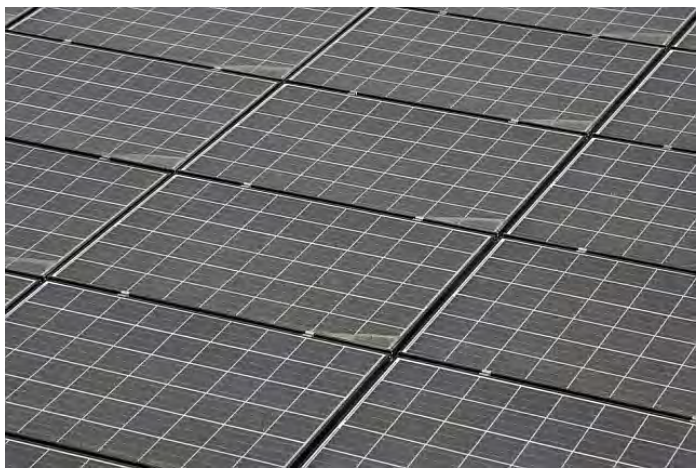
East LA College Campus

Central Plant and Solar/PV 1 MW

Location/Utility Routing



“Flipping the Switch at East Los Angeles College”



Wind Mill Power

Costs are competitive with natural gas

Constructing the NorthWind® 100 in Kotzebue, Alaska

- Wind Power uses wind to create electricity
- Accounts for around 1% of California's electricity supply
- On-site wind power
- Case in point: farms and town in N. Europe
- The turbine technology and costs have changed.
- Hybrid Systems and Integrated
- On-site Generation
- *Courtesy of California Energy Commission and Distributed Energy Systems 2006*

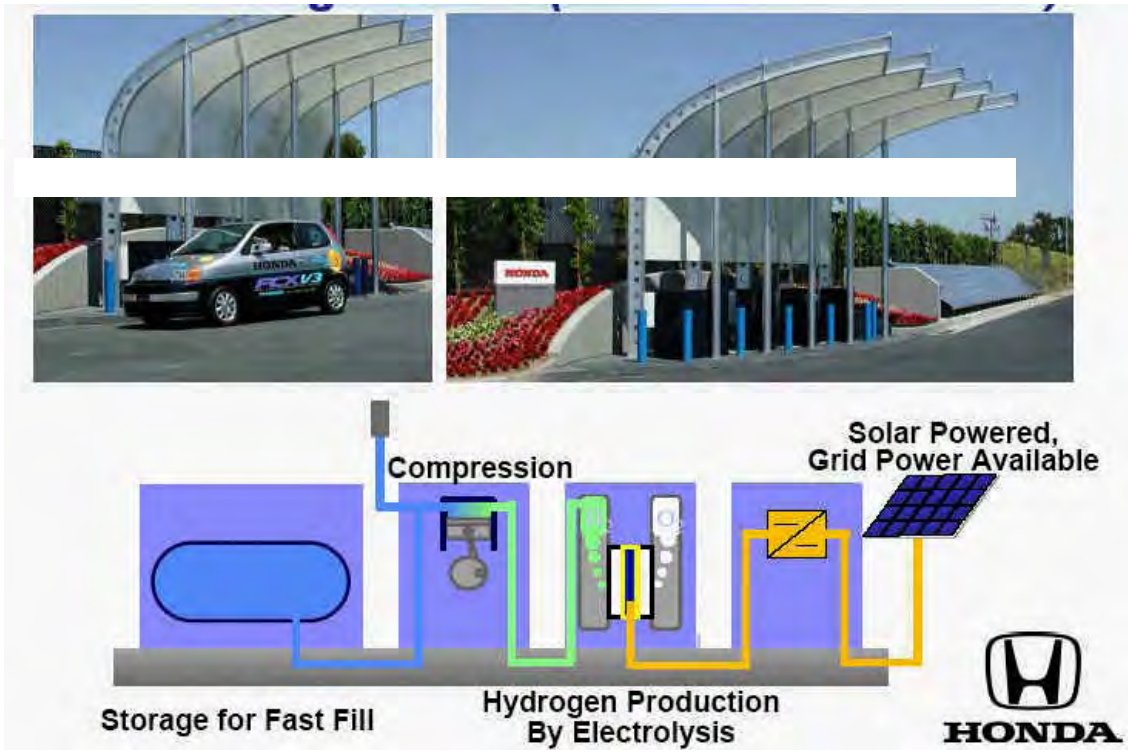
First LEED Building Ribbon Cutting

- LA Valley M & O Building – 30 + 6
  - Sustainable Site – 6 Points
  - Water Efficiency – 3 Points
  - Energy and Atmosphere – 10 Points
  - Material & Resources – 3 Points
  - Indoor Environmental Quality – 7 Points
  - Innovation and Design – 1 Point

Los Angeles Valley College

New M&O and Sheriff Station

Green Hydrogen Fueling Station:Torrance, CA



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