
The Foothill College
Science Learning Institute

- **Goal:** An innovative program to attract students to STEM and develop a life time interest in Sustainability
- **Sustainability:** the development of systems that provide the necessities for civil society and the infrastructure for society in efficient and renewable ways that minimize adverse impact on the earth
- **The Science Learning Institute (SLI)** is creating:
  - Interdisciplinary courses where students must meet as a cohort to engage in activities
  - STEM courses taught through innovative pedagogical
  - "Living Laboratories" and “Service Learning”
  - New emerging work force career paths

Benefits to Students

- Critical thinking applied to broad range of disciplines
- Example Transfer Majors:

Applied Economics	Regional Planning/GIS
Architecture	Facility Planning
Environmental Engineering	Entrepreneurship
General Engineering	Applied Economics & Policy
Biology & Society	Ecology
Law & Public Policy	Natural Resources

- Addresses General Ed as well as major's courses
- Flexibility in transfer colleges as well as majors
- Possibility for civil service & internships on CV

Foothill Campus as a Lab

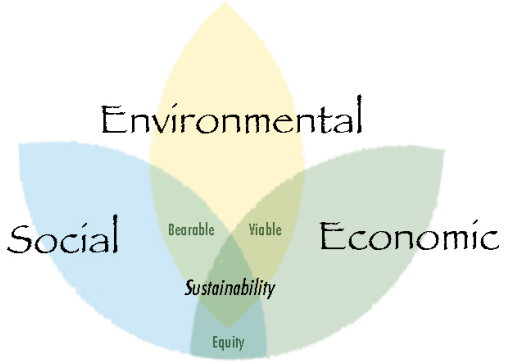
SLI Student New Ways of Thinking

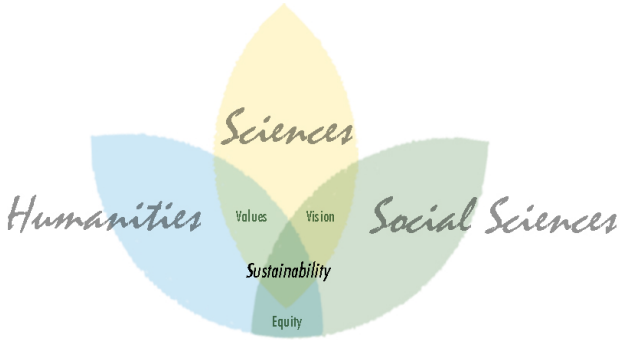
- **Resource management:** new material cycles; recycling technologies; waste as resource; reuse of products;
- **New and renewable materials:** biopolymers and other materials inspired by nature; intelligent materials;
- **Water:** Supply issues; treatment technologies; recycling technologies; consumption patterns; new technologies
- **Energy sources & performance**: Solar photovoltaic and thermal; wind; geothermal; biomass; biofuel
- **Policy and decision-making:** Sustainable methods; sustainability indicators life cycle assessment; role and impact of policy and regulations; and
- **Education and outreach:** Teaching new disciplines

Foothill College Center for a Sustainable Future

- **Student Service & Portfolios and Capstone Projects:** Integration of well established campus program with SLI Sustainability program with a common goal.

  Applied to education across the curriculum at Foothill, sustainability can also be centered at the confluence of three constituent parts. Creating closer relationships between divisions and departments through collaboration and partnership is key to the integration of sustainable principles on campus. The Center for a Sustainable Future will provide a springboard to foster these relationships.





Current Courses

- **ENGR40 – Introduction to Clean Energy Systems:** Introduction to clean energy technology. Overview of industry, environmental and economic considerations, and key research/policy areas for clean and sustainable energy solutions.
- **BIOL9/9Lab Environmental Biology:** Environmental biology and a survey of the biological and ecological principles. Global, national and local perspectives on current issues and impacts of human population growth.
- **BIOL13 Marine Biology:** Introduction to biology using marine animals, plants and ecosystems. Major emphasis given to the ecology and conservation issues with examples drawn from California marine life.
- **ANTH12 Applied Anthropology:** Help students understand and solve problems arising as a result of culture change, modernization and globalization. Major areas of study include anthropology and advocacy, anthropology and law, and land and resource management.
- **GEOG12 Introduction to Geographic Information Systems (GIS):** Study of GIS and its applications to spatial data management.

Courses in Progress

- **ENGR39 – Energy, Society, and the Environment:** Guides the general education student through humanity's efforts to harness and generate energy, for industry, work, habitat and recreation.
- **ENGR41 – Power Systems:** Introduces student to the field of modern power systems, from electrical power generation to transmission and distribution to electrical power networks in buildings.
- **ENGR42 – Solar PV Systems:** Introduces student and to the field of photovoltaic technology, including design, fabrication technology, commercial applications and grid incorporation.
- **ENGR43 – Smart Energy Systems (Smart Grid)**: Introduces student to the emerging field of smart energy systems, active power management, and ‘smart grid’.
- **ENGR101 – Building Science and Performance Engineering (tbd):** For technical professionals to develop skills and competencies in applying financial and investment strategies to evaluate and upgrade energy systems in commercial and industrial buildings.

Sample Campus Energy Analysis

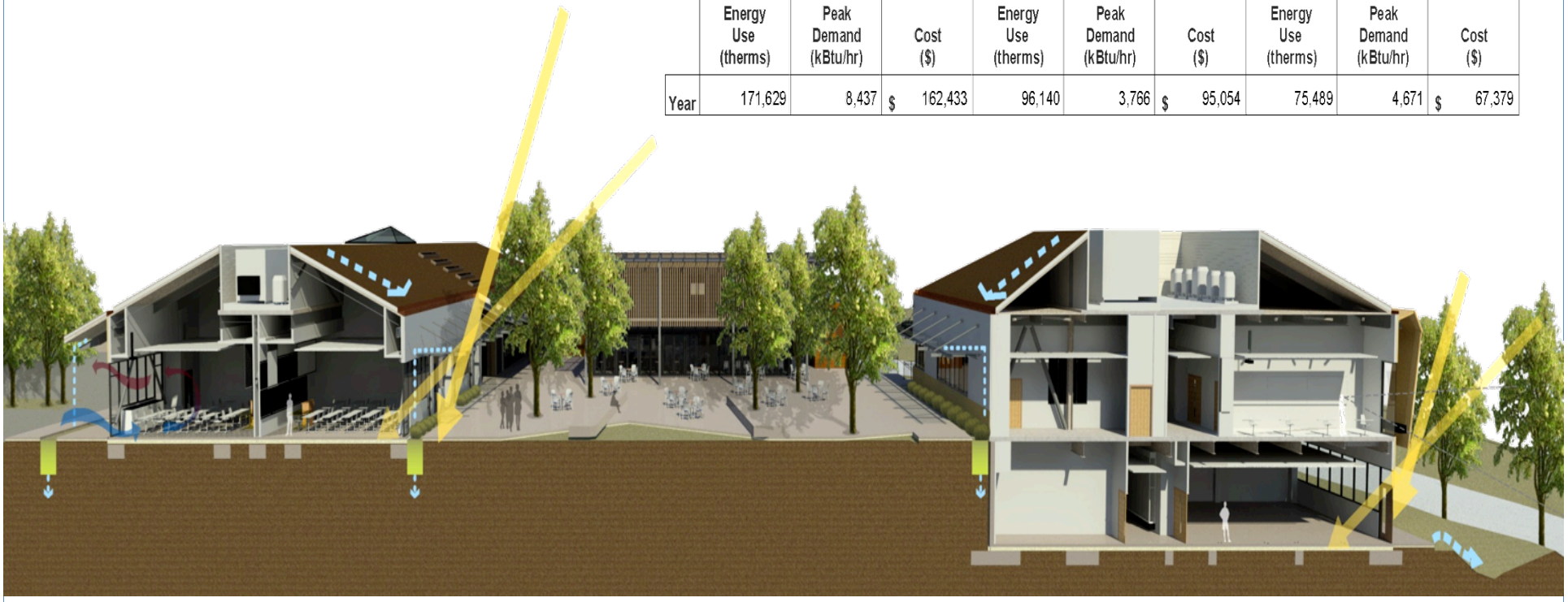
ENERGY USE AND COST SUMMARY — ECON-1

Rate: PG&E E-19-S **Fuel Type:** Electricity

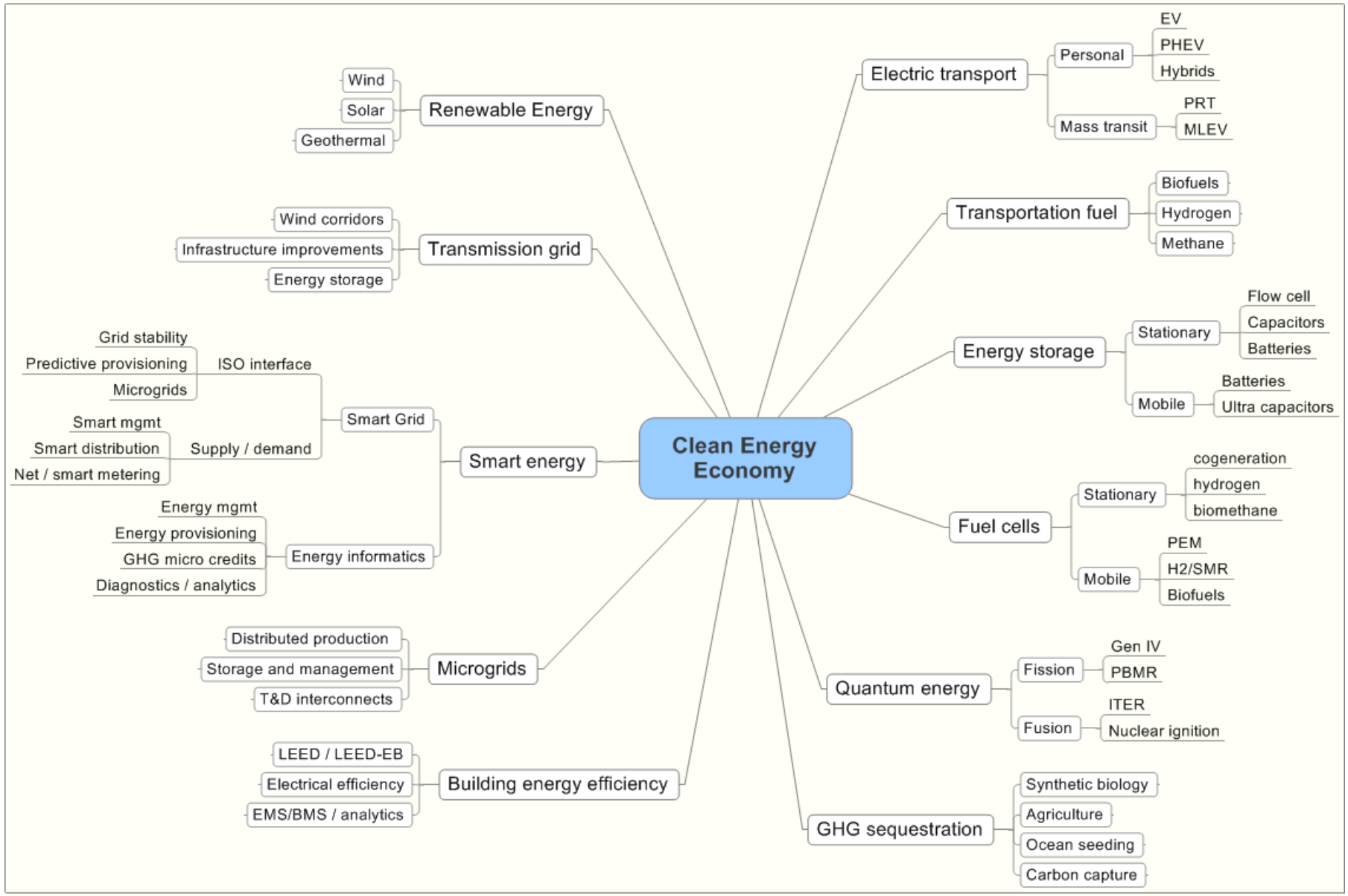
	STANDARD			PROPOSED			MARGIN		
	Energy Use (kWh)	Peak Demand (kW)	Cost ($)	Energy Use (kWh)	Peak Demand (kW)	Cost ($)	Energy Use (kWh)	Peak Demand (kW)	Cost ($)
Year	6,108,059	1,688	$ 771,086	4,643,133	927	$ 555,227	1,464,925	762	$ 215,859

Rate: PG&E G-NR1 **Fuel Type:** NaturalGas

	STANDARD			PROPOSED			MARGIN		
	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost ($)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost ($)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost ($)
Year	171,629	8,437	$ 162,433	96,140	3,766	$ 95,054	75,489	4,671	$ 67,379



Vision a Clean Energy Framework – Environmentally and Economically Sustainable



Potential Courses

- **Some new opportunities; for example:**
  - **Environmental Chemistry,**
  - **PV Sales & Green Entrepreneurship**
  - **Resource Impact on Society, and**
  - **Sustainability Engineering.**
- **Living labs might include:**
  - **Installation of power meters on campus buildings,**
  - **Creating a GIS database of Los Altos and Foothill**
    - **resources and environment,**
    - **power usage**
  - **Cleaning local water and land resources, and**
  - **Increasing transportation access to campus.**

Future

- **Articulation:**
  - **UC Santa Cruz: Engr39 & Engr41 based on their existing courses**
    - **Sustainability Engineering and Ecological Design (SEED)**
  - **UC Davis: Engr39 incorporates UCD course materials & labs**
  - **Purdue Engineering Community Service program (EPICS)**
  - **Arizona State University's School of Sustainability (SOS)**
  - **University of Michigan's Global Change minor**
  - **Submit to CSU and UC for 2013**
- **Workforce:**
  - **Partnered with NOVA**
    - **Train displaced workers in solar and building performance**
  - **Create dual paths for transfer and workforce**
  - **California partnerships for DOL TAA grants**

SLI Support

- **Lab and Campus:**
  - **PV and wind platform for analysis and hands on experience**
  - **Living garden on hill in 8000 complex**
  - **Equipment for analysis**
- **Advisers and Internships**
  - **Access to community projects and Green partners**
  - **Internships for student portfolios and worker CVs**
- **Curriculum**
  - **Release time to create new courses in program**
  - **Incorporate Fine & Language Arts into Capstone Projects**
  - **Partnerships with other colleges to build green system**
  - **One Year Sustainability Chairs in different disciplines**

SLI Support for Curriculum

- **Krause Center for Innovation**
  - **Develop K-12 mini-course materials**
  - **Professional development materials**
  - **Outreach to high schools**

Thank you for supporting
Foothill College's
Science Learning Institute