Berkeley Planning Commission
February 14, 2007

Jim Krupnick
Laboratory Project Management Officer
Topics

- Background
- Motivation
- LRDP Summary
- Impacts
Lawrence Berkeley National Laboratory

Only multi-program Lab sited next to a university campus
- Collaboration
- Partnerships
- Support of UC education mission

Berkeley Lab
202-acre main site

UC Berkeley
Berkeley Lab Staff (2006)
3,359 staff plus visiting researchers = 4,515 adjusted daily population

- Scientists and Engineers: 649
- Faculty: 274
- Post docs: 305
- Graduate Students: 326
- Undergraduate Students: 191
- Support Staff: 568
- Technical Staff: 1346
- Faculty: 274
- Post docs: 305
- Graduate Students: 326
- Undergraduate Students: 191
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- Technical Staff: 1346
FY 2006 Funding: $517M
(approximately 80% Department of Energy)

- DOE: $397M
- NIH: $42M
- Others: $78M

Categories:
- Biological & Environmental
- NIH
- Other Work for Others
- Other DOE
- Computing
- Physics & Fusion
- Basic Energy Sciences
What drives our development? Aging Infrastructure

- 100 buildings and 47 trailers
  - 36% require modernization or retrofit
  - 18% not suitable for future use
- Life Safety and seismic deficiencies
- Unsuitable for modern science
What drives our growth? Science

Helios
Berkeley Lab’s attack on the energy problem

Advanced Light Source
National User Facility

CRT
Computational Research and Theory
Roger Kornberg, 2006 Chemistry Nobel Prize work was done at the ALS; Rod MacKinnon, 2003 Nobel Prize, also takes his data here
Buildings to Support Science at the Advanced Light Source

ALS User Support Building

ALS Guest House
Helios
Berkeley Lab’s Attack on the Energy Problem

Plants → Cellulose → Cellulose-degrading microbes → Methanol, Ethanol, Hydrogen, Hydrocarbons

Engineered photosynthetic microbes and plants → Artificial Photosynthesis → Electricity → Electrochemistry

Photo-voltaics
Sunlight to energy via Bio-mass

Sunlight

$\text{CO}_2, \text{H}_2\text{O},$ Nutrients

Biomass

Chemical energy

More efficient use of water, sunlight, nutrients.

Drought and pest resistant

Improved conversion of cellulose into fuel.
New organisms for biomass conversion.
Feedstock Development

Maximize photosynthesis and productivity

Problem: Feedstock grasses (*Miscanthus* and Switchgrass) are largely unimproved crops
Sunlight to Energy via Bio-mass

Sunlight

$CO_2, H_2O, \text{Nutrients}$

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New organisms for biomass conversion.
Termites have many specialized enzymes for efficiently digesting lignocellulosic material. These enzymes include cellulases and hemicellulases, which break down complex sugars such as glucose, fructose, and sucrose into simpler mono- and oligomers. During fermentation, these sugars are further processed into acetate, hydrogen ($H_2$), and carbon dioxide ($CO_2$).
The CRT program

- Strengthen the partnership with UCB computational and engineering programs
- Move the NERSC program back to the main site
- 143,000 square feet of computer floor and office space
After Hurricane Katrina, the Army Corps of Engineers used NERSC’s supercomputers to study how to rebuild Gulf Coast levees to better protect cities against surging waves driven by hurricanes.
Berkeley Lab scientists are using supercomputers to create full-scale simulations of lean-burning flames to study how internal combustion devices can be designed to burn less fuel and create fewer pollutants.
NERSC’s massive data archive is used to store – and make accessible – one of the world’s largest repositories of data used for predicting global climate change.
2006 Long Range Development Plan (LRDP)

- Comprehensive physical planning guide for the next 20 years (2006 to 2025)
- Science-driven facilities, modest growth, sustainable development
- Commitment to listen and respond to local concerns
  - Reduced growth in space, population, and parking
  - Transportation demand management (TDM) and follow-up traffic study
## Reduced Growth Projections

<table>
<thead>
<tr>
<th></th>
<th>Occupied space (gsf)</th>
<th>Population</th>
<th>Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Original Plan</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2003 baseline</td>
<td>1,760,000</td>
<td>4,375</td>
<td>2,300</td>
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<tr>
<td>New construction</td>
<td>1,240,000</td>
<td></td>
<td></td>
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<tr>
<td>Demolition</td>
<td>(440,000)</td>
<td></td>
<td></td>
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<tr>
<td>Net increase</td>
<td>800,000</td>
<td>1,150</td>
<td>600</td>
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<tr>
<td><strong>Original Projection</strong></td>
<td>2,560,000</td>
<td>5,525</td>
<td>2,900</td>
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</tbody>
</table>

|                      |                      |            |         |
| **Current Plan**     |                      |            |         |
| 2003 baseline        | 1,760,000            | 4,375      | 2,300   |
| New construction     | 980,000              |            |         |
| Demolition           | (320,000)            |            |         |
| Net increase         | 660,000              | 1,000      | 500     |
| **Total**            | **2,420,000**        | **5,375**  | **2,800** |
Traffic and Transportation Issues

Berkeley Lab will dedicate resources to focus on transportation demand management

Developing new transportation demand management (TDM) plan in coordination with City of Berkeley Transportation Department

- Commitment to minimize peak hour trips:
  - Commuters
  - Trucks (Deliveries/Construction)
- Improved bus use
- Annual monitoring and focused studies of transportation improvements

40% rate of mass transit/carpool use - one of the highest in the Bay Area
Follow-up Comprehensive Traffic Study

Re-evaluate traffic impacts
At the earlier of:

- 10 years
- Cumulative increase of 375 parking spaces above the baseline in 2003

Hearst/La Loma-Gayley Rd intersection at 5:30 pm
Land Use Plan

Protects natural and visual resources, provides flexibility for siting facilities, minimizes visibility of development

- **28%** Perimeter Open Space
- **60%** Research and Academic
- **12%** Central Commons & Support Services
Planned Growth in an Environmentally Sensitive Way

- Rustic hillside landscape - native & non-native vegetation
- Riparian habitat protected
- Filter views with screening trees
- Ornamental landscape areas

Goal of reducing vegetation fire load
Coverage Area for Fire Station 19 at Berkeley Lab
Automatic Aid District
Impacts Identified in Draft Environmental Impact Report

Significant and unavoidable environmental impacts

- Aesthetics / visual
- Air quality
- Cultural resources
- Construction noise
- Transportation
2006 LRDP Timeline

- Revised Notice of Preparation issued Nov 2003
- 2006 Draft LRDP & Draft EIR issued Jan 22, 2007
- Review & Comment Period: Jan 22 – Mar 23
- Berkeley Planning Commission Feb 14
- Draft EIR Public Hearing Feb 26
- Seek UC Regents approval July or Sept 2007
Science-Driven Planned Growth
2006 Long Range Development Plan (LRDP)

Questions?