Berkeley Lab - Innovative Fleet Ideas, Goal Performance & Challenges

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Happy Juneteenth !!

**Juneteenth**: observed on June 19 to remember when Union soldiers enforced the Emancipation Proclamation and freed all remaining slaves in Texas on June 19, 1865.

This day is an opportunity for people to celebrate freedom and equal rights in the United States.
LBNL Site Information

- Located on hilly terrain on 200-acres above the UC Berkeley Campus
- Site not accessible directly by public transit
- Parking: 2 people / space: alternative commuting options are needed
- About 50% of LBNL staff do not drive alone to work
Fleet Performance Criteria per SSPs

- Increase AF use 10% yearly; FY 2005 to FY 2015
- Reduce fleet petroleum fuel use 2% yearly; FY 2005 to FY 2020
- By FY 2020 and thereafter, at least 75% of light duty vehicle purchases must be AFV’s
Increased AF Use – Performance

- Increase AF use 10% yearly; FY 2005 to FY 2015
- Berkeley Lab is increasing AF use, but, there are challenges:
  - 15 Hybrids require UL gasoline, not an AF
  - LSEVs (GEMs) Improve AF use
  - Shuttle fleet B20; B05 in winter due to poor performance in climbing the LBNL hills
  - Shuttle routes expanded to help free up parking spaces; FY 2005 = 184,316 miles; FY 2012 = 279,514 mile (51% increase) more miles, more fuel, lower “B%” ➔ lower overall AF use

Average increase FY 2005 to FY 2012 = 26% per year
Reduce Petroleum Fuel Use – Performance

- Reduce petroleum use 2% yearly; FY 2005 to FY 2020
- Berkeley Lab has not reduced petroleum fuel use enough; challenges are related to those of increasing AF usage:
  - 15 Hybrids require UL gas, an non-AF
  - Shuttle fleet B20 B05 in winter due to poor performance
  - Shuttle route frequencies increased. Ridership increased, but: Overall, diesel fuel use has increased

Average decrease FY 2005 to FY 2012 = 1.4% per year short of the 2% per year goal
75% New LDVs to be AFV’s – Performance

- FY 2012 Light Duty Vehicle Purchases: 18 AFVs of 19, met the goal with 95%
- LBNL’s 153 AFVs:
  - E85 Flex Fuel: 73
  - Electric LSEVs: 65
  - Hybrid Sedans: 15
- Concerns:
  - LSEV’s (GEMs) high O&M cost due to Berkeley Lab’s vertical topography: discontinuing new purchases; seeking alternatives
  - Hybrids are AFV’s, but don’t use AF (meeting one goal helps violate another)
FY 2013 Reduce Fleet 35% – Performance

- LBNL achieved the 35% fleet reduction goal in 2010, in spite of adding 56 LSEV / GEMs to the inventory that fiscal year. (Note: LSEV’s are not included in vehicle counts for goal)

- LSEV’s (GEMs) have replaced many service vehicles and are easy to park.

- Craft workers assigned “service” GEMs

- Administrative and Science Organizations share GEMs; they are signed out as-needed
Electric Vehicles

- Chrysler “GEM” electric vehicles
- FY05 < 1% fleet were EVs, now 29% of Fleet (65) are electric vehicles (all GEMs)
- Can park almost anywhere
- Multiple configurations replaced sedans & craft vehicles
- Charging stations ID’d site wide (120 volts)

Lesson learned: one GEM charging per outlet!
GEM EVs – Lessons Learned & Issues

- **LBNL’s Hills:** upgraded GEM motors to 7.0 HP from 5.4 HP standard motors due to overheating
- **Specify Gel Batteries:** found that lead-acid batteries lose their charge over weekends
- **Develop Charging Infrastructure First:** Assure adequate charging stations available prior to acquiring GEMs or other EVs. GEM chargers trip out when under voltage – often due to 2 GEMs plugged into the same outlet, GEM charging must then be reset to resume charging
- **LBNL Suspending Additional GEM purchases, because:**
  - Costly repairs needed beyond 3-month maintenance schedule, due to Berkeley Lab’s vertical site; probably more suitable for flatter terrain
  - Safety concerns re collisions: limited to onsite use only
Vehicle Fleet

- Reduced 34 vehicles from FY05 to present during Lab growth period (~ 300,000 GSF under construction now)

- Reduction due to:
  - Increased management scrutiny of need for vehicles
  - Vehicle sharing across divisions

- Fleet utilizes E85 fuel & electric power for LSEVs (GEMs) for onsite usage
Right-Sizing Vehicles

- LBNL is beginning to use Lean management principles to right-size and organize craft vehicles

- Selected full size service vehicles retained
Reducing Parking Demand and Scope 3 Commuter based GHG Emissions

- Shuttle Bus service brings employees and visitors up the hill from public transit hubs in Berkeley
  - Expanded routes and operating schedule
  - GPS installed to provide arrival times NextBus
  - Bicycle racks on all shuttle busses (8 bikes per bus)

- Commuter Incentive Programs
  - Zimride – online ride matching service
  - Guaranteed Ride Home
  - WageWorks – pretax payroll deduction for BART
Buses

- Recently converted bus services from in-house to contract
- After contracting and increasing frequency, ridership has increased by 15%, somewhat reducing pressure for parking spaces
- Service provided throughout the site, downtown Berkeley, UC Campus, and local public transit stations
- M-F 6:20am-7:30pm; recently expanded to 9:30pm
- Free wifi on buses provides ability to work during commute
- Newer, safer buses run on biodiesel
- Bike racks on front and rear accommodate 8 bicycles
- 58,500 riders per month
- 3,250 bicyclists per month
- Filled to capacity during commute hours
- “Chaser Bus” added during peak times to minimize wait time; on call by shuttle drivers who reach bus capacities
NextBus

- NextBus GPS system installed on all buses uses global positioning to determine when next bus will arrive at each stop
- Allows riders to know when the next bus will arrive by phone, computer, PDA and digital kiosks
- Live map of current bus locations available online
GPS

- Global Positioning System (GPS) devices installed in fleet vehicles
- Efficiently monitor usage to ensure sufficient utilization
- Eliminates manual usage tracking
- Ability to track vehicle destinations
Bicycling to Work

- LBNL provides showers and bike racks throughout the site
- Buses hold 8 bicycles each
Zimride (Carpool Service)

- Lab paid service providing carpool matching
- Private company matches LBNL and UC, Berkeley employees for carpools based on location, schedule, and other preferences
- Added UC, Berkeley’s 38,224 students and faculty recently; potential rides expanded from LBNL’s ~ 4,000 employees
- Easy to use, online rideshare social network service
- 678 employees registered with Zimride
Guaranteed Ride Home

- LBNL participates in **free** Alameda and Contra Costa County sponsored programs for employees who use public transportation or carpool and need to get home right away for valid reasons:
  - Illness
  - Family crises and emergencies
  - Unscheduled overtime
  - Missed rideshare trip

- Only Requires pre-enrollment
Take Aways …

- Its Juneteenth today – celebrate USA’s freedom
- Increased AF Use comes with challenges:
  - Hybrids, AFV’s won’t take AF
  - Biodiesel use is hard to maintain
- LSEV’s are AFV’s, use electricity, an AF, but they are:
  - Costly to purchase and maintain
  - Best suited to level topography
  - Should have Gel type batteries rather than lead-acid
  - Not suited for replacements for all standard vehicles
  - Not as safe as standard highway rated vehicles