Cornell University
Agricultural Experiment Station

Sustainable Campus Operations
Adopting a Culture of Sustainability

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www.cuaes.cornell.edu

ESS 2011, Estes Park, CO

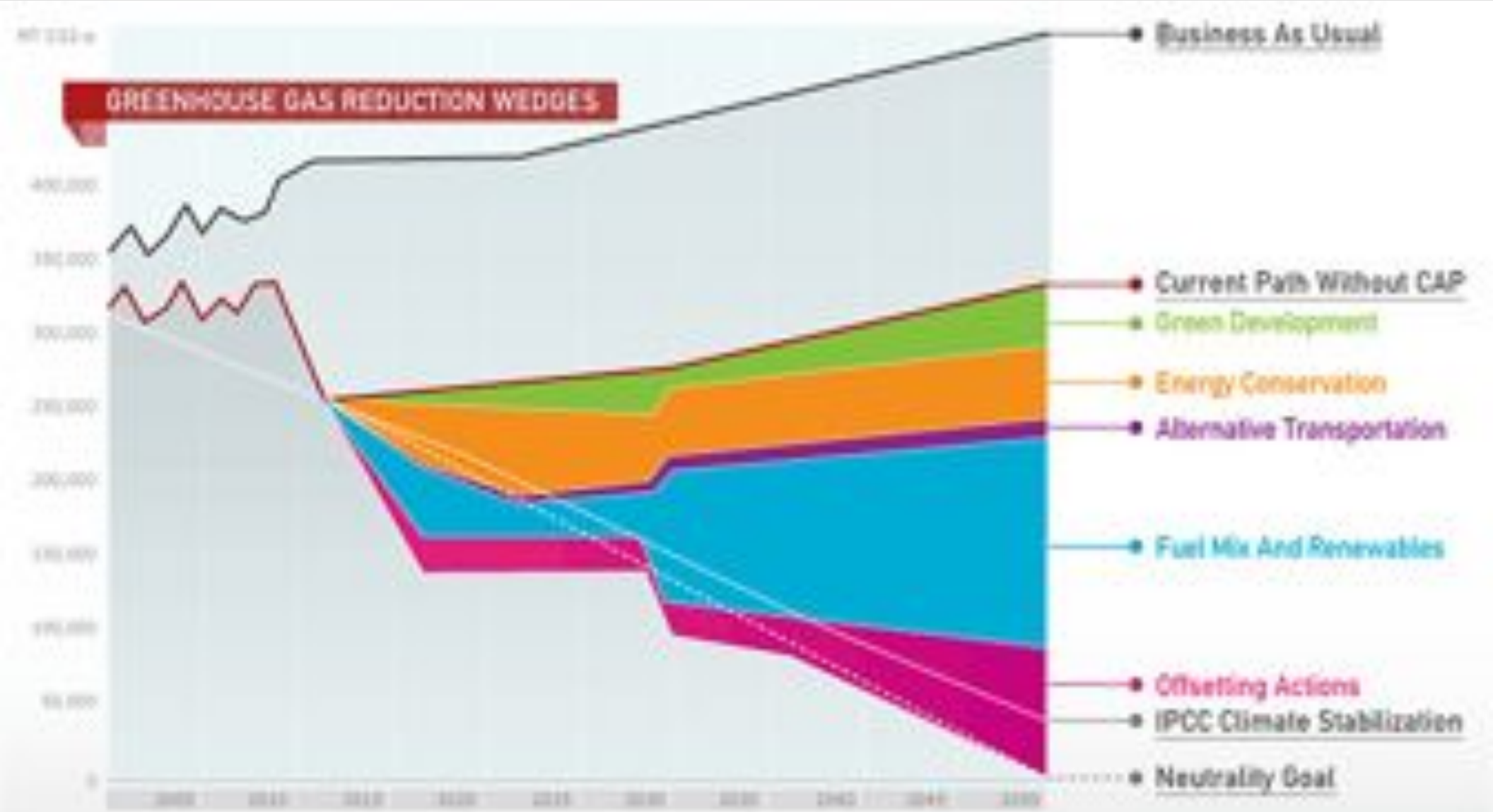
Sustainability

"Meeting the needs of the present without compromising the ability of future generations to meet their own needs"

UN Brundtland Report

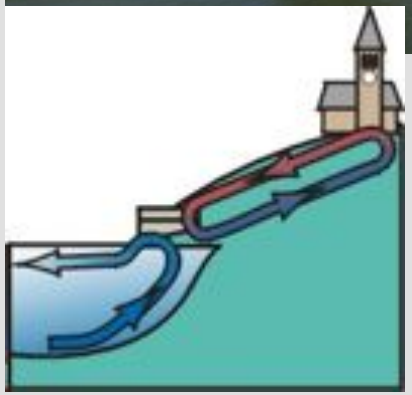
Cornell Climate Action Plan

CUAES figures prominently in the Cornell Climate Action Plan



Cornell Operations

Lake Source Cooling



LEED buildings

Cornell's Ongoing Commitment to Sustainability

- President's Sustainable Campus Committee
  - Oversees all aspects of sustainability in campus operations and facilities (faculty, staff, students)
  - Focus areas: energy, climate, water, food, waste, buildings, people, land, purchasing and transportation

- Atkinson Center for a Sustainable Future (ACSF)
  - Advances multidisciplinary research in Energy, the Environment and Economic Development
  - $80 million gift makes ACSF permanent
  - Venture Fund grant program
  - Faculty cluster hires

Cornell University Agricultural Experiment Station, Ithaca (CUAES)

- Consolidation of multiple departmental operations - 2008
- Primarily supported with state funds, not Hatch
- Six farms – 2400 acres
  - Vegetables, field crops, ornamentals, organic…
  - Student run farm
- 55 staff
- Greenhouses – 4 acres
- Plant growth chambers – 130
- Forested properties
- 4 acre compost facility, 6,000 tons/yr
- Supports research, teaching, extension

CUAES Adopting a Culture of Sustainability

- Economic, environmental, social sustainability
- Emphasis on cost reductions, efficiencies, carbon footprint
- Staff empowered (generate ideas, implement)
  - Sustainable Action Team
  - Promote professional development/leadership
- Partnerships with faculty and Cornell operations
- A model

Plant Growth Chambers

130 units ranging from 9 to 108 feet^2

Up to $28,000/unit/yr to operate

Growth Chambers

$3,400 Investment

Idea from Sustainable Action Team

Results:

- $567,000 grant – NYSERDA
- Retrofit 22, plus 35 coolers
- ROI < 4 years
- $157,000 savings/yr
- Drastic labor savings
- CO_2 reduction – 520 tons/yr
- Improved quality of service

Greenhouses

- $2.1 million – Cornell Utilities
- Retrofit 47 units – heating, lighting, controls
- ROI < 4-6 years
- $258,000 savings/yr
  - 40% reduction - electricity
  - 35% reduction – steam
- Improved plant care conditions
  - Only needed benches lit
  - Adjust light intensity
  - Optimal temperatures

To Mow or Not to Mow?

Grounds Department, Horticulture and CUAES

- CUAES mows 100 acres of lawns – Fuel, labor, carbon
- Why?

- Tested grass mixes (fescues)

- 2012 mowing schedules & heights
  - High use: 2-4”
  - Moderate use: 5-7”
    - 40% savings
    - Fescues
  - Little traffic: 1/yr
  - No traffic: reforest/repurpose

Farms to Dining – Locally Grown

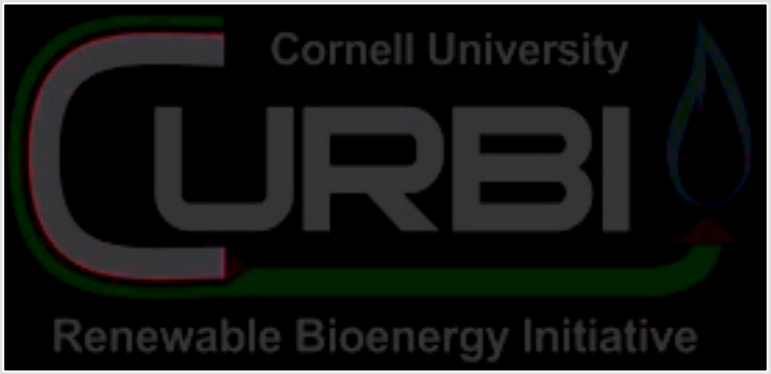
- Local CUAES Farms – Cornell Dining
- Several tons of fresh produce delivered: Potatoes (guard rows), sweet corn, squash, mixed greens and more
- Without compromising support for research

And More

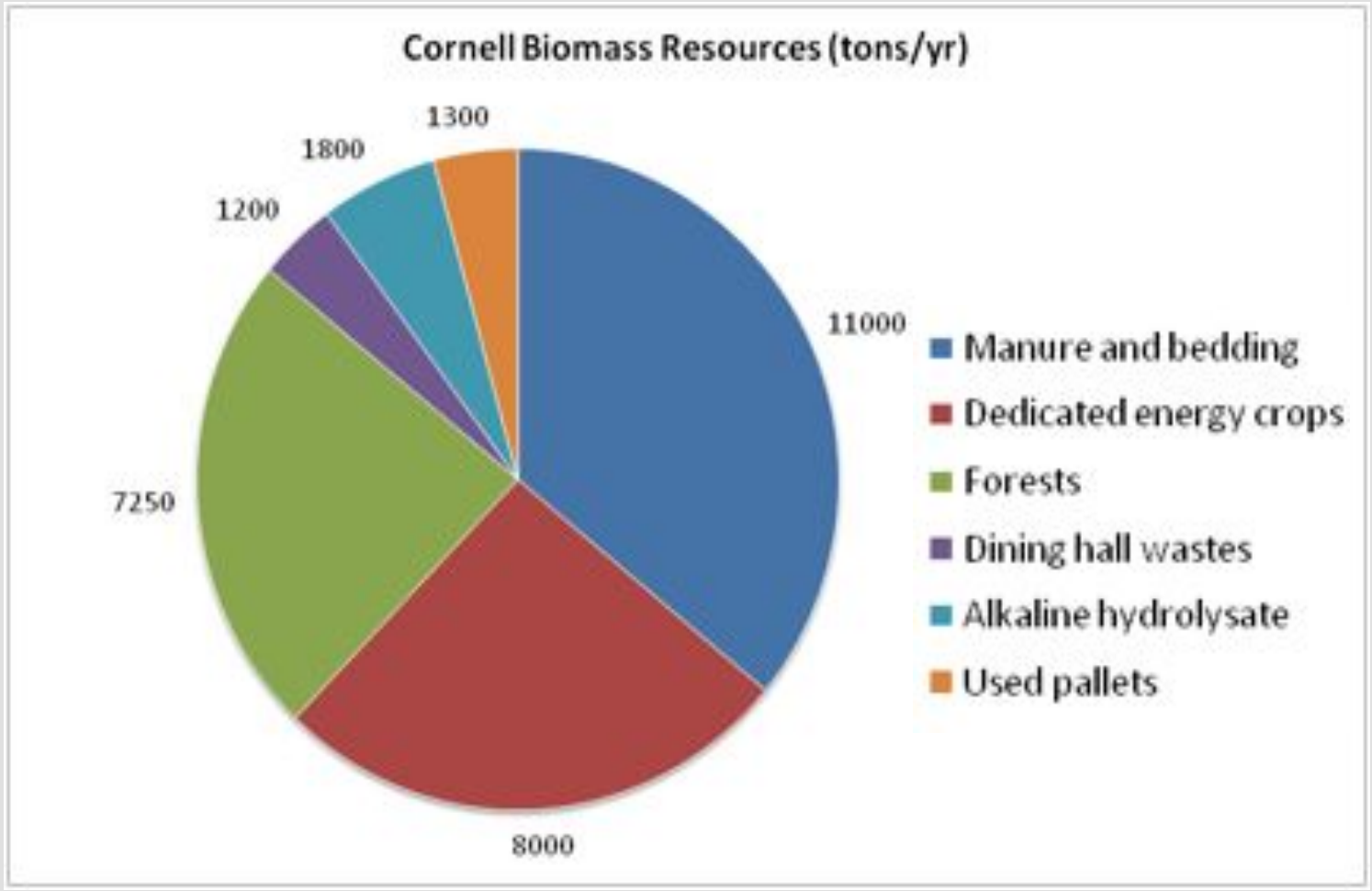
- ✓ Winter building closure - $6,000/yr, no trash pickup, water coolers off, employees happier
- ✓ Seasonal drying oven shut down - $4-5,000/yr
- ✓ Windbreak installed – 25% reduced buildng heating costs
- ✓ Reforested 5 acres – 11.5 tons CO_2 sequestered/yr
  - Planning more
- ✓ Autoclave pots vs. recycling - $6,000
- Pellet furnace – saving $8,000/yr fuel, ROI 9 months
- 300 incubators @ $876/ea. – implement BMP's (future)
- Energy audits – all outlying facilities (2012)
  - Replace inefficient water heaters, furnaces…
- Unlimited Opportunities

Cornell University
Renewable Bioenergy Initiative

- Using local (CUAES) biomass
- A living, learning laboratory - teaching, research, extension, economic development –
  - Five complementary renewable energy technologies: anaerobic digestion, slow pyrolysis, direct combustion, dry fermentation, waste oil to biodiesel
  - Model with wide application
  - Multiple collaborations
  - Feasibility completed



Cornell University Renewable Bioenergy Initiative



Converting Cornell biomass to:
Multiple biofuels, heat, power, co-products

CURBI's Future

- Estimated cost - $9.2 million
- Converts 35K tons biomass
  - Heat to greenhouse - $1 million
  - Biochar – 2600 tons, $1.3 million
  - Carbon footprint reduction – 10K tons CO_2
  - Private-public partnerships
- But cheap natural gas, economic turndown
- 2005 vs. 2011

Energy Conservation in CALS Buildings
- CALS Green -

- Lead by CUAES
- Communications, Human Ecology, Utilities, AES's
    - Emphasis motivating behavioral change
        - Education
        - Motivation
        - Repetition
        - Permanent change
- Initial survey – 67% response (3400 academics, staff)
- 6 buildings, various uses/energy demands
- Model for rest of Cornell, SUNY System, beyond
- Change in culture

CALS GREEN

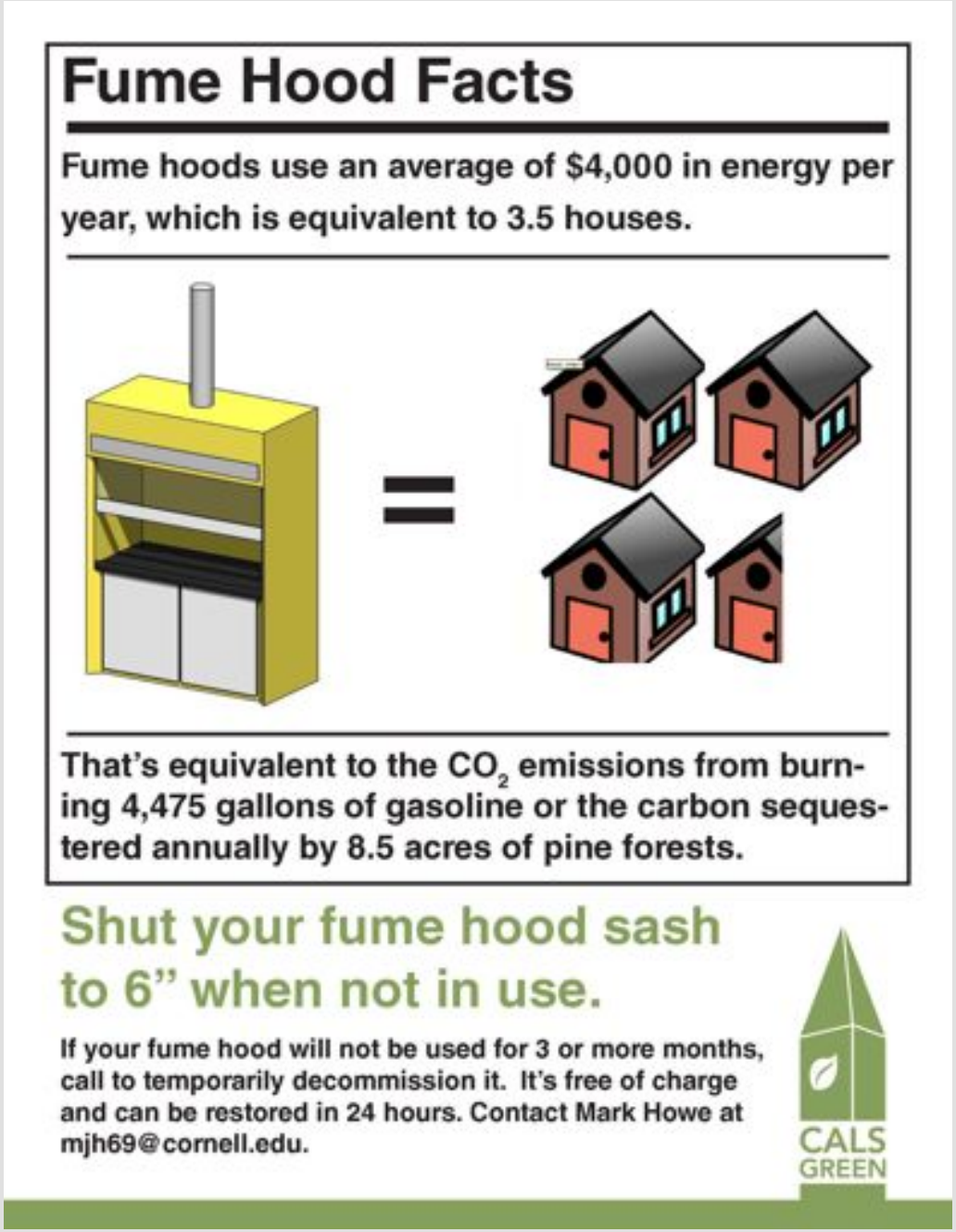
Understanding Audience
Pre-Pilot Construction Survey Highlights

- Consistent support for conservation and high levels of awareness
- Opportunity: *"It is not my responsibility to help Cornell reduce it's energy use."* 85% disagreed or strongly disagreed.
- Challenge: *"If I wanted to, I could reduce my energy use at work."* 12% disagreed, 30% neutral, 45% agreed.

Total pledged savings (as of 9/16/11): 1,613,079.49 lbs CO2, $179,487.30

CALS Green – Laboratories

- Lab outreach program
  - Lab survey, first round: 80 labs, approx. 50% in participating buildings
  - Follow up survey to reach remaining labs
- Preliminary results
  - 75% of surveyed labs had fume hood sash heights below 10”, 6” optimum
  - 40% of labs containing more than 2 fume hoods had inactive third fume hood; fume hoods - $4,000/yr, $7.5 million at Cornell
  - 65% of freezers and refrigerators are more than 10 years old



The Human (Social) Dimension
Sustainable Action Team (SAT)

- Empowering people - Top down support for bottom up ideas
- Turn to staff for sustainability - ideas/opportunities
- Monitors and records results
- Many projects are the result of the work of the SAT
- Recent press emphasized role of staff – recognition!

Cornell University
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Sustainability Action Team - SAT

Sustainability Action Team - SAT

Who we are:

A CUAES staff-led initiative, that relies on the experience of office, farm, greenhouse and growth chamber staff to improve sustainability

What we do:

- Identify opportunities to increase sustainability
- Initiate & facilitate sustainable practices & projects
- Model practices for others

Project Highlights:

Tightened buildings at all farms
Weather stipping doors, sealing windows, adding insulation, replacing windows and overhead doors, and more.

Autoclaving pots and trays at greenhouses
Collected data on energy use and cost for sterilizing and reusing greenhouse pots. Benefits include cost savings, reduced waste and landfill.

Greener Growth Chambers (GC)
Monitored electrical consumption of GC. Retired 25 units (saving $72,000 annually) renovated others. New signs alert user to energy use, resulting in much prompter shut off, when not in use.

Afforestation project at Freeville Farm
Planted 5050 trees on five acres of idle land, to reduce mowing and increase carbon sequestration.

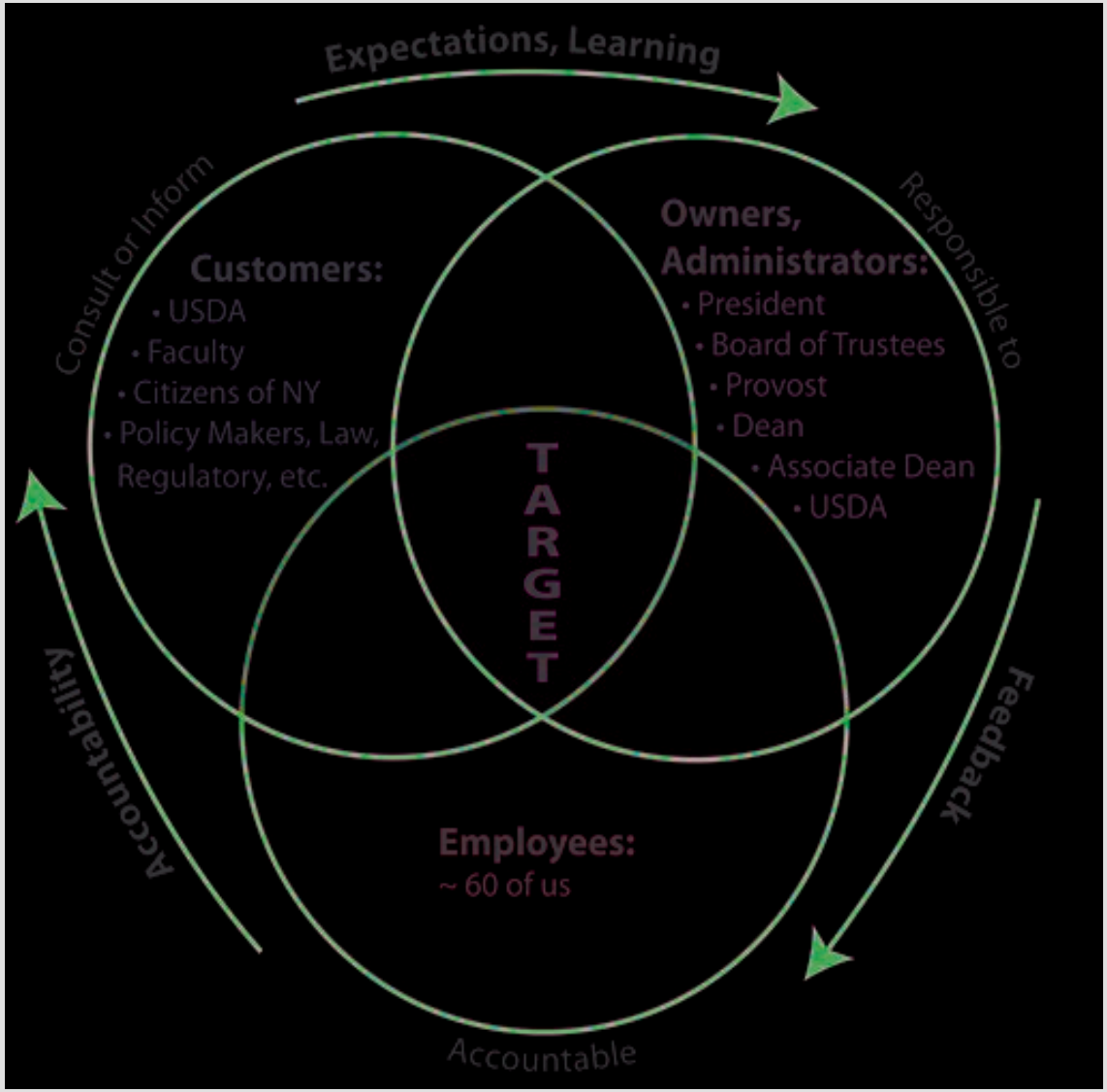
Improved greenhouse lighting
Installed photosensors to greenhouses, to keep lights from being on all day. Added manual switches where needed.

Your SAT representatives:
Paul Cooper, Nick Van Eck, Steve McKay, Tim Dodge, Paul Stachowski, Garry Tennant, Don Schaufler, Betsy Leonard, Glenn Evans, Anja Timm, Lauren Chambliss

Your ideas or suggestions:

The Human (Social) Dimension Setting Priorities – Line of Sight

- The challenge - doing less with less
- “Being killed with opportunities”
- Driven by vision, mission and goals
- Tracks progress
- A model



Thank you!
Be sustainable!