Why Lighting?
Greenhouse Gas Emissions by Sector

Buildings use the bulk of electricity in the US
The Problem

- Inadequate and inflexible switching is often and results in significant energy waste
  - One switch may control the lights for many occupants (unclear ownership)
  - Switches are often not conveniently located
  - Switching often does not work well with daylight patterns
- Lighting has important load shedding (demand response) potential, but most buildings lack adequate controls
**System Overview**

- Wireless controller
- Desktop, mobile, or wall mounted switch
- Light or motion sensor

**System components**

- Mote with relays, current sensors
- Ballast
- Power supply
- Wireless controller
- Light sensor
- Motion sensor

- to lamps
Control flexibility

Switches can be operated by either a local switch or through a central control system.

Installation

- ~5 minutes per fixture
- No tools required
Pilot project results

Number of Lights On

Pre-Installation                 Post-Installation

65% Energy Savings

Lighting Groups

Perimeter Daylight Group
Lighting Groups

Paul's Workspace

Benefits

- Lighting energy reduction (automatically measured)
- Significant demand response potential
- Increased user satisfaction
- Maintenance advantages
- Reconfigurable (lower churn costs)
- Eliminates need for hard-wired switches
WSN issues

- Line-powered control nodes
- Battery-powered sensors, switches
- Reasonably dense network (6m² per node in open plan offices)
- Extremely cost sensitive
- Sensing and control
- Communication topology
  - Multiple gateways
  - Base to any/all
  - Any to base
  - Any to all
  - Over-the-air programming

Adura Milestones

- California Energy Commission PIER EISG grant to UC Berkeley
- Developed, manufactured & installed prototype units
- Raised $185K in angel funding
- Won California Clean Tech Open Energy Efficiency prize ($133K)
- First product ship Q2 2007, orders in place
- Research grant from California Energy Commission for 2007-08
Questions

charlie huizenga
charlie@aduratech.com

zach gentry
zach@aduratech.com

josh mooney
josh@aduratech.com