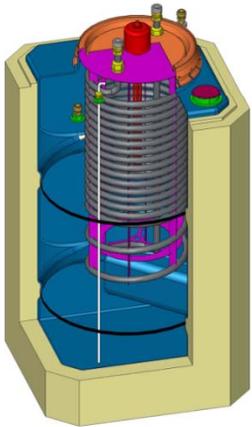
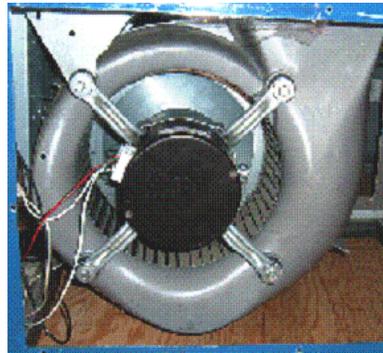


PIER Buildings Group Potential Research Initiative Workshop - February 23, 2012



Agenda

Time	Topic
1:30 p.m.	<ul style="list-style-type: none"> • Introductions • Purpose of Workshop • PIER Background, Legislation and Policy drivers • California Energy Use Overview
2:00 p.m.	<p><u>Technical Research Categories</u></p> <ul style="list-style-type: none"> • Codes and Standards Advancements • Technology Innovations • Cross Cutting - Zero-Net Energy Buildings/Low Income Housing
3:15 p.m.	<p><u>Administrative Topics</u></p> <ul style="list-style-type: none"> • Scoring Criteria • Solicitation Funding and Schedule • Public Comments
3:30 p.m.	Wrap up and Next Steps
3:45 p.m.-5:00 pm	Informal Researcher Discussions

Introductions



PIER Buildings Program- Who are we?



Brad Meister



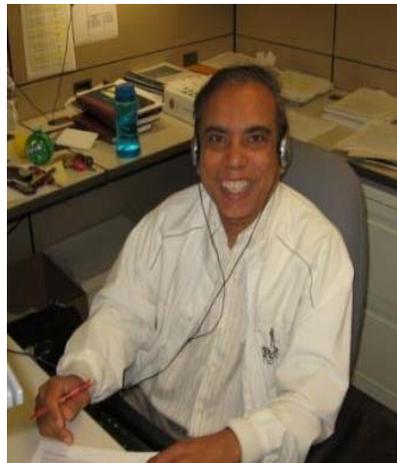
Dustin Davis



Jeffrey Doll



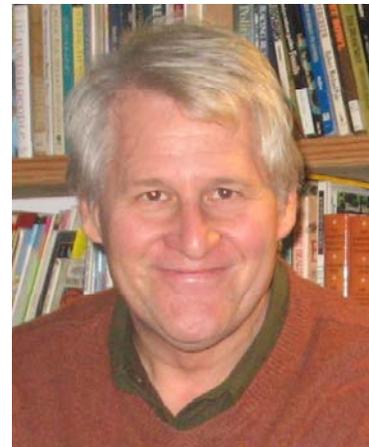
Heather Bird



Golam Kibrya



David Weightman



Chris Scruton



Leah Mohney

Who Are You? - Introductions



Why are we here?

Purpose of the workshop, background, policy drivers



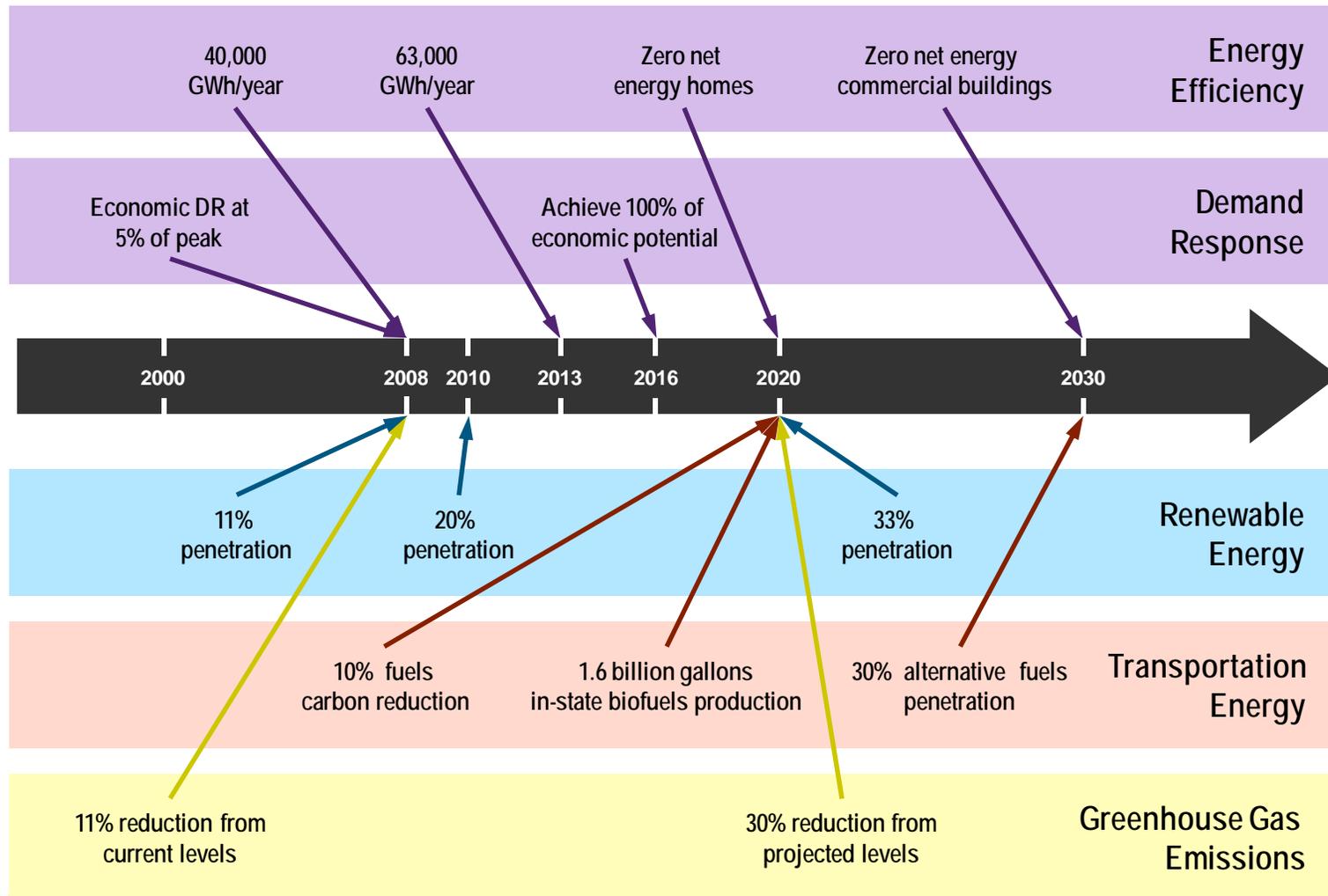
PIER Background

- **Purpose of Workshop:** Discuss our plans for an upcoming solicitation on building energy efficiency research and to get your input
- **Ratepayer Funded Program**
 - Research to power our clean energy future
 - Advance science and technology
 - RD&D projects that are not adequately provided for by competitive and regulated energy markets.
- **Program Research Areas:**
 - Energy Efficiency & Demand Response
 - Renewable Energy
 - Smart Infrastructure

The intent of this solicitation is to fund coordinated RD&D that:

- Provides an opportunity for diverse experts in this field to build partnerships and move forward in a coordinated fashion, thus building upon past work, taking advantage of synergies, and avoiding unnecessary duplication; and,
- Brings together a research team that is comprised of individuals with administrative, research, and market expertise to ensure that the research program is managed effectively and efficiently, and maximizes the likelihood that the research results will be adopted by the market.

Policy Drivers

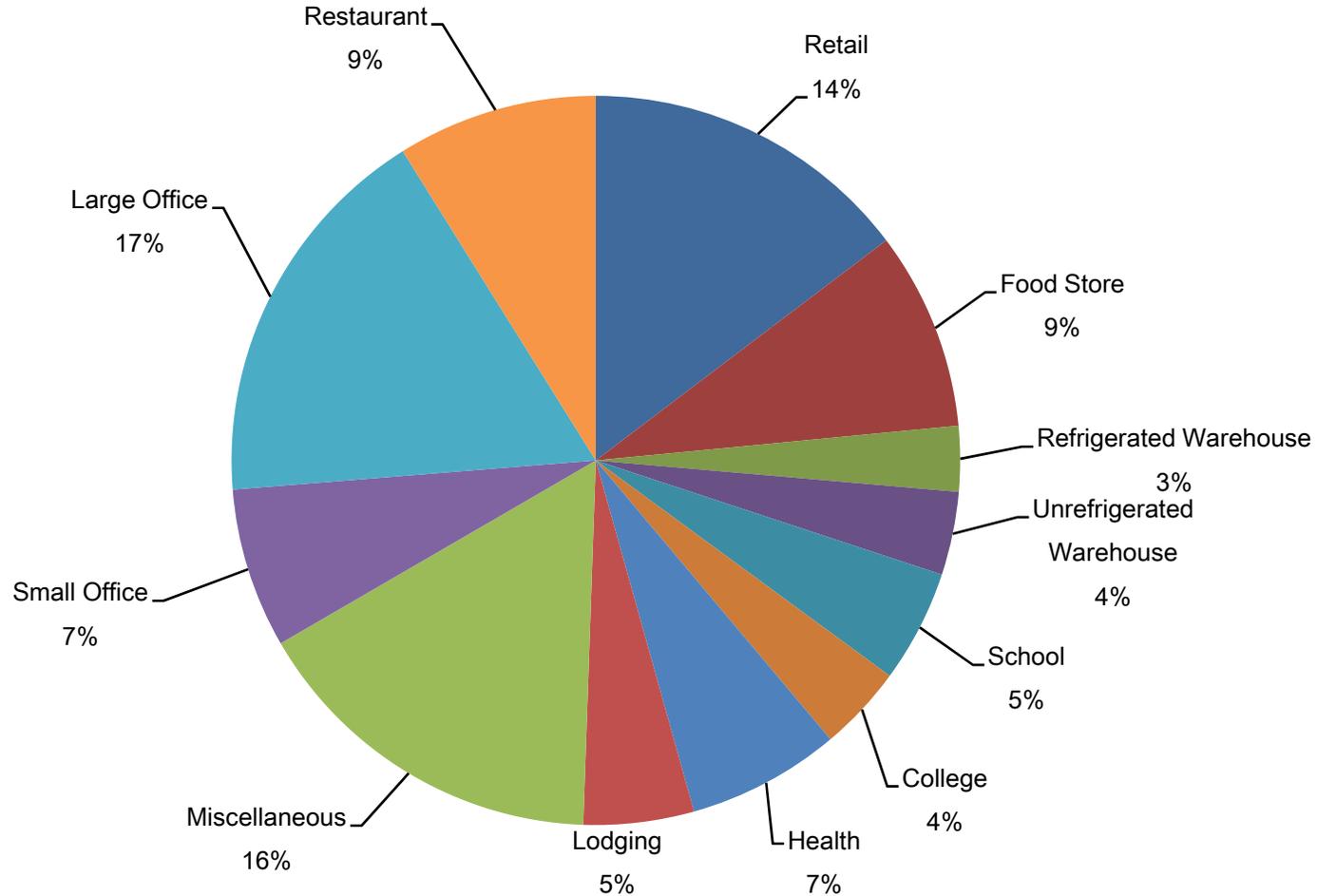


California Energy Use Overview



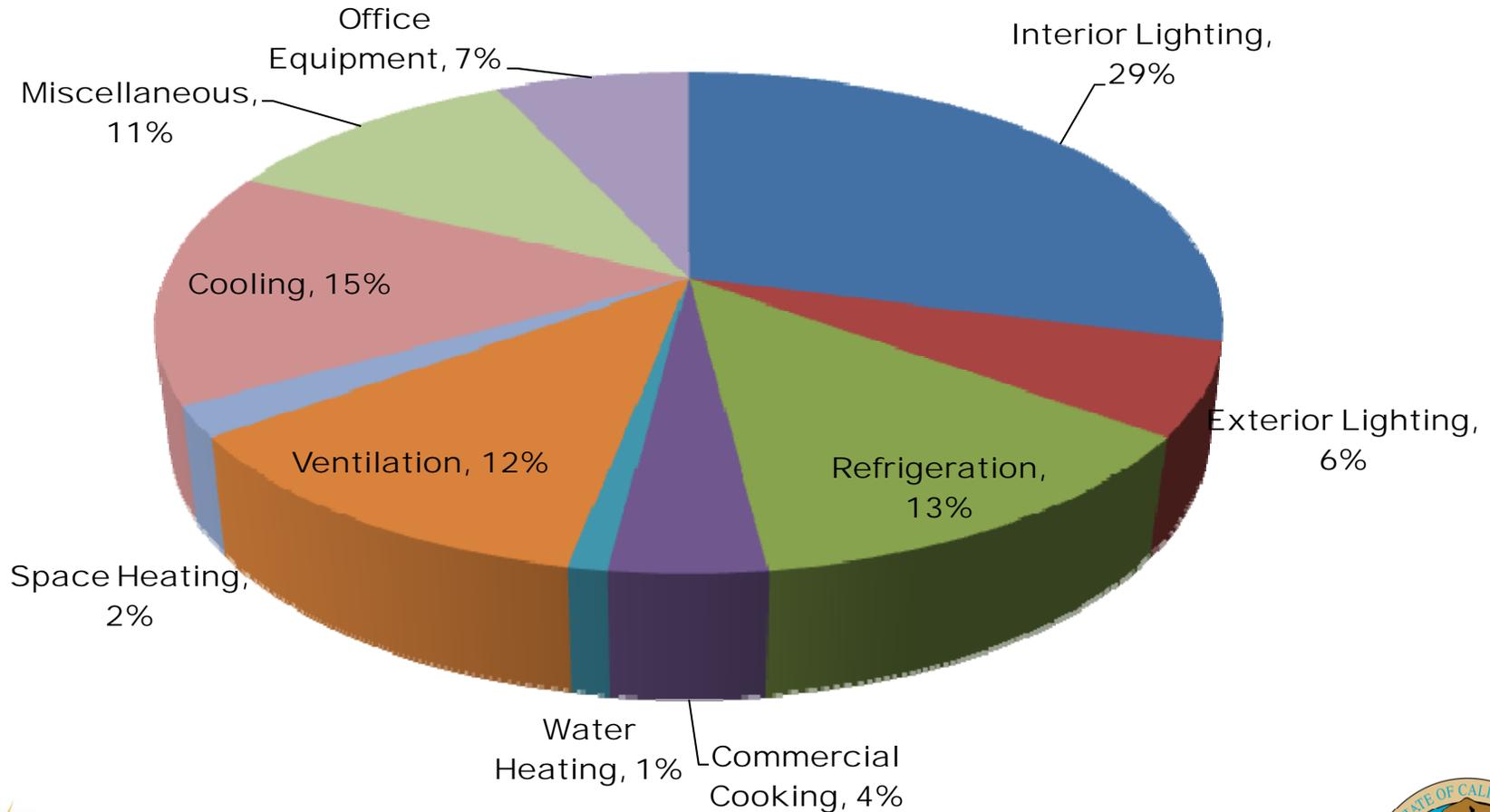
California Energy Use

Commercial Electric Consumption by Building Type

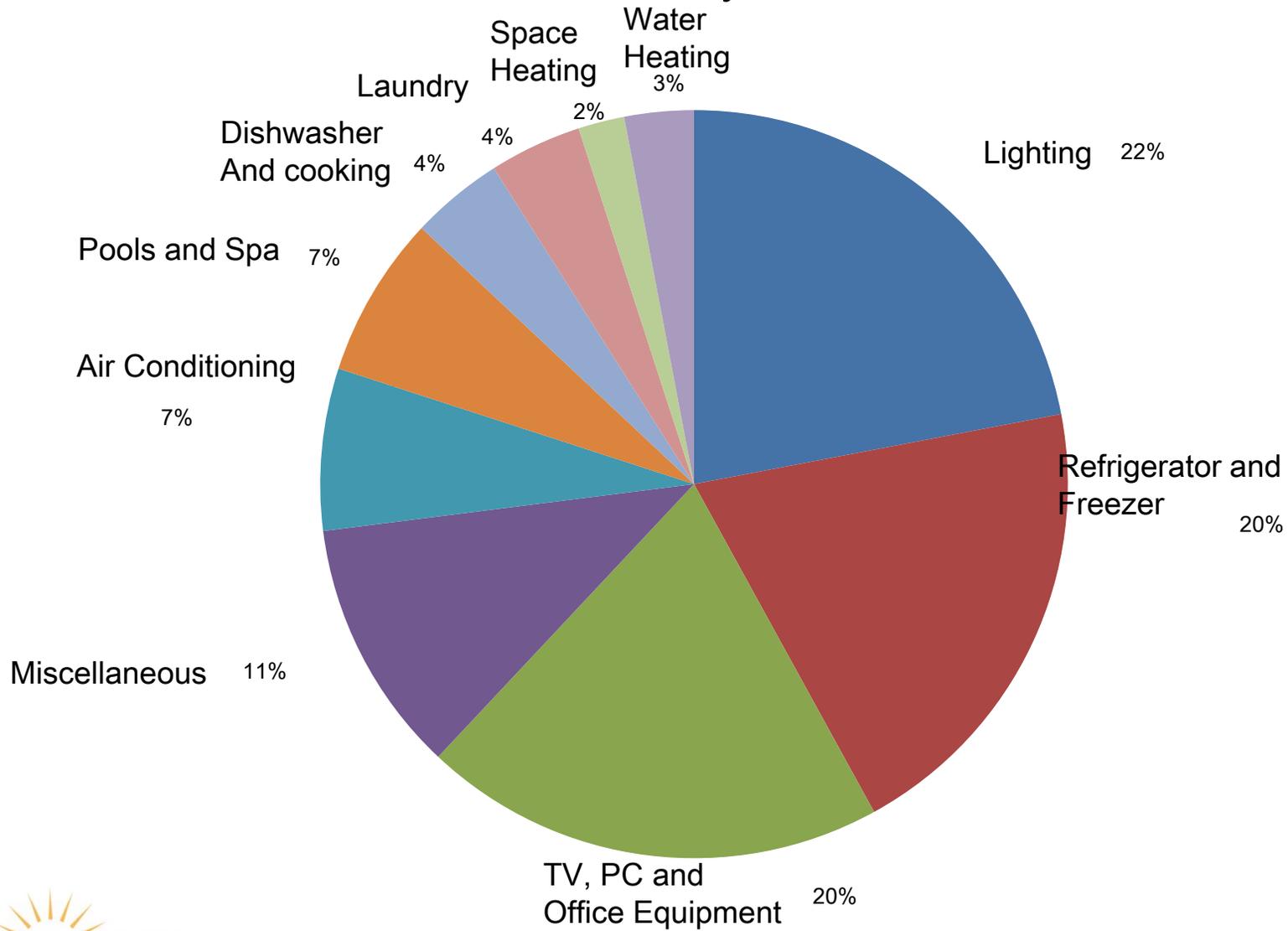


California Commercial End-Use Survey Report 2006

California Commercial Building Electricity By End Use (2003)



Residential Electricity End Use - 2009

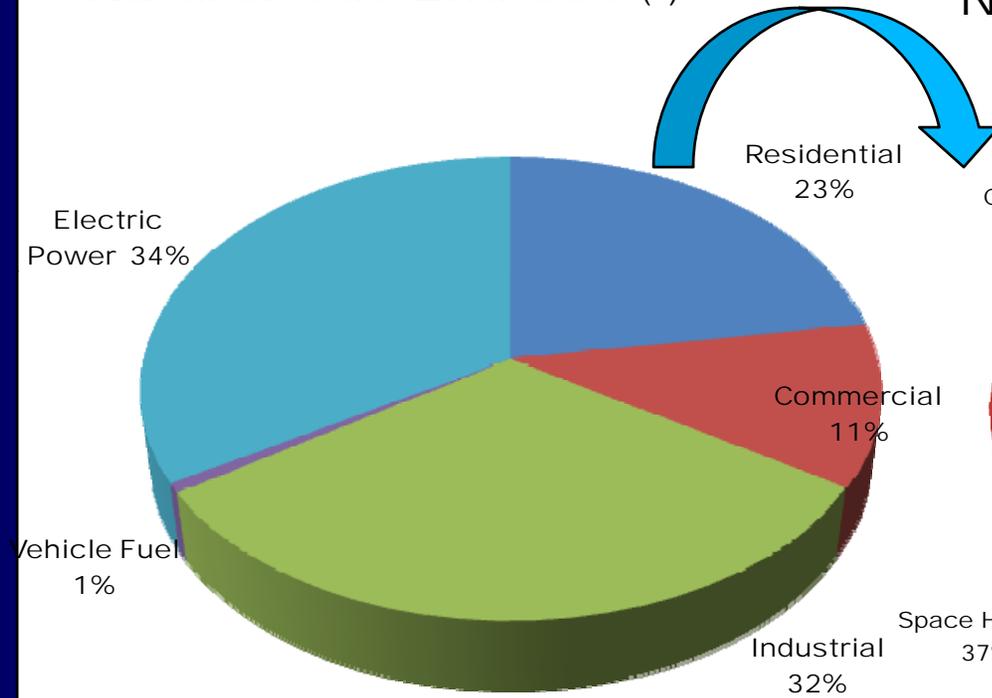


Source: 2010 Residential Appliance Saturation Survey

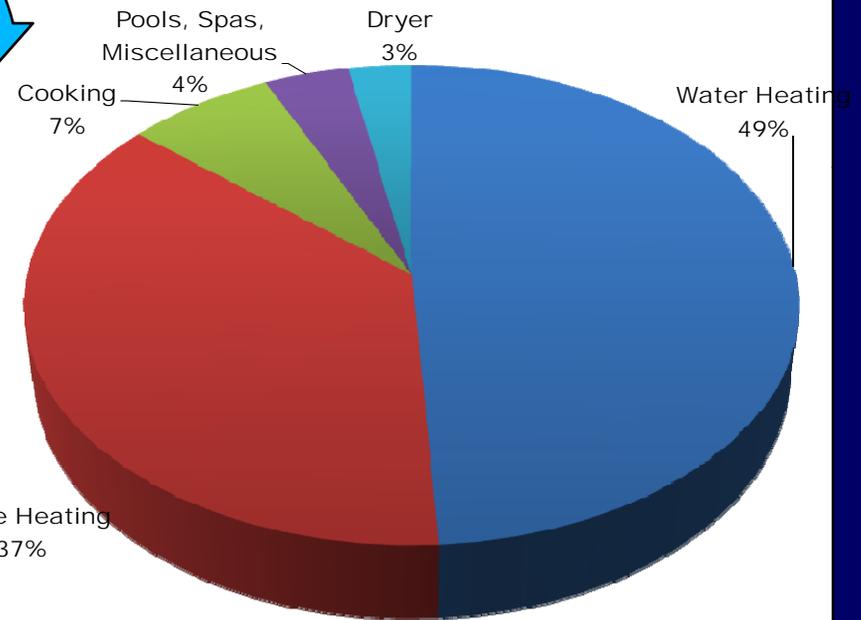
California Energy Use

Natural Gas Use in California

Natural Gas End Use (1)



Natural Gas Residential Use (2)



(1) http://www.eia.gov/naturalgas/annual/pdf/table_032.pdf
(2) 2009 California Residential Appliance Saturation Study (RASS)

Questions/Comments?



Technical Research Categories



Electric Technical Research Categories

- **Funds available \$1,600,000**
 - **Codes and Standards Advancement**
 - **Technology Innovations**

Codes and Standards and Technology Advancement

Goal: Research to advance and improve the energy efficiency of equipment and reduce costs to consumers and/or that informs the Building and Appliance Energy Efficiency Standards (T-24, T-20). Research must advance science and technology

Examples/Objectives:

- Improve the efficiency of a variety of plug load devices
 - Displays and Monitors
 - Game Consoles
 - Home Area Networks
 - Internal Power Supplies
 - Smart power outlets
 - Video conferencing equipment
 - Low power mode for electric plug load devices
- Field Studies that directly support future Building and Appliance Energy Efficiency Standards

Codes and Standards and Technology Advancement

- **Develop compliance options that advance science and technology and help building/facility operators achieve the state's ZNE and energy efficiency goals, such as:**
 - **HVAC diagnostics**
- **Develop technologies to reduce water consumption and options for gray water reuse**
 - **Water efficiency in landscaping, appliances and end-use devices**
 - **Cost-effective residential/commercial grey-water systems and or dual plumbing demonstrations**

Natural Gas Technical Research Categories

- **Funds available \$8,000,000**
 - **Codes and Standards Advancement**
 - **Technology Innovations**

Codes and Standards and Technology Advancement

Goal: Research to advance and improve the energy efficiency of equipment to reduce energy use and cost and/or contribute to the Building and Appliance Energy Efficiency Standards (T-24, T-20). Research must advance science and technology.

Examples from 2011/12 Budget Plan and proposed 2012/13 Plan:

- **Food service:**
 - Range top-develop an advanced high efficiency gas-fired range top that will be energy efficient and meet the needs of commercial kitchens
 - Refrigeration- develop refrigeration heat recovery system and demonstrate its energy efficiency potential for preheating domestic water;
 - Hot water - determine hot water loads in commercial restaurants; test water heaters in commercial restaurant applications to identify potential problems with both tankless and high efficiency condensing water heater

Codes and Standards and Technology Advancement

Examples (continued):

• Hot Water and Distribution

- Support field assessment and testing of tankless water heaters in both residential new construction and retrofit applications.
- Assess high efficiency combined space and water heating equipment.
- Improve efficiency and develop ultra low NOx hot water heaters
- Develop cost-effective retrofitting approaches for hot water distribution systems
- Investigate potential savings and benefits of installing multiple water heating tank systems for residential and commercial buildings
- Evaluate high-efficiency hot water distribution systems to support technically appropriate code development (new construction)

Codes and Standards and Technology Advancement

Examples (continued):

- **Hot Water and Distribution**

- Characterization of Hot Water Consumption in Small Commercial facilities via field test data collection and analysis
- Showerhead research
- Improve shower heads to allow lower future flow rates (2 or 1.5 gallons per minute) to reduce energy and water use in residential and commercial buildings (e.g., hospitality).

Codes and Standards and Technology Advancement

Examples (continued):

- **Advanced Energy Efficient Wall /Roof Assemblies**
 - Non-framed wall assemblies
 - Innovative roof systems such as panelized systems
- **Advanced Energy Efficient Heating Systems**
 - Hydronic heating – improving efficiency and overcoming technical and economic barriers
 - Conventional gas furnaces
 - Find cost-effective ways to improve efficiency
 - Develop heat exchangers that better resist the corrosive products of combustion
 - Develop ultra-low NOx equipment
- **Advanced Building Envelope Sealing**
 - Develop and field test cost effective high efficacy envelope sealing methods that can reduce air leakage and energy loss in existing buildings.

Codes and Standards and Technology Advancement

Examples (continued):

- **Thermally Driven Chillers**

- Develop nonresidential performance modeling rule sets for a compliance option for thermally driven chillers that are on 100% natural gas and any combination of solar heat, waste heat, and bio-gas

- **Solar Thermal**

- Design, develop and demonstrate the next generation solar systems using a lower cost high performance collector and/or improved performance tank.

Category: Crosscutting-Zero Net Energy Buildings and Low Income

Goal: Research to help achieve the deployment of cost-effective Zero Net Energy (ZNE) Buildings in existing and new construction, including low-income housing and whole building technology integration principles

ZNE Buildings = The amount of energy provided by on-site renewable energy sources is equal to the amount of energy used by the building annually for electricity and natural gas.

Funds Available: \$3,000,000 (electric);
\$1,000,000 (natural gas)

Zero-net Energy Buildings – Possible Research Areas

- **Demonstrations of cost-effective integrated advanced emerging energy efficiency and renewable technologies suitable for retrofits or new construction**
 - **Examples: lighting, novel applications of Direct Current (DC) technologies, HVAC, envelope, modular or pre-fabricated building component manufacturing, passive house designs**
- **Analysis and monitoring of existing ZNE buildings, develop roadmap for ZNE buildings and link with future development/action**
- **All demonstrations must be completed by March 30, 2015**
- * **Note: Demonstrations must be done within Investor-Owned-Utility (IOU) Service Territories: PG&E, SCE, SDG&E or So Cal Gas**

Low Income Housing

- **Definition: Housing that serves Californians who earn less than 80% of their area's median income**
- **Goals**
 - **Affordable lowest cost, low energy use/ft² single and multi-family homes – new construction and retrofits**
- **Possible ideas**
 - **Demonstrations of cost-effective integrated advanced emerging energy efficiency and renewable technologies**
 - **Integration of demonstrations with novel financing mechanisms**
- **All demonstrations must be completed by March 30, 2015**

Example of a previous project can be found at:

<http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2010-035>

Questions/comments/project ideas?



Administrative Topics:

Typical Proposal Sections and Scoring Criteria



Typical Proposal Elements

- **Problem Statement: discusses the issue(s), previous work, current status of the research, potential market penetration and estimation of rate payer benefit(s) (e.g., energy and cost savings, jobs created)**
- **Goals and objectives of the proposed project**
- **Narrative and Scope of Work with deliverables**
- **Schedule of Products and Deliverables**
- **Market connections, partners, and cost share**
- **Qualifications and Experience of the Research Team**
- **Research cost and line-item budget**

Example Scoring Criteria

- Does the project address important energy issues?
- Is the proposed work covered by existing or previous research?
- Is the outcome of the research likely to benefit California ratepayers?
- Will the research advance subject matter science, technology or knowledge?
- Does the research team have the needed qualifications, experience and mix?
- Are the budget and schedule commensurate for the scope?
- Will the research affect or help transform the market?

● Is there cost share?

Other Potential Considerations

- **Minimum amount of funding to California Based Entities (CBE)**

Definition: A CBE is a corporation that either has its headquarters or an office in California AND Substantially manufactures the product or substantially performs the research within California.

- At least 60% of PIER funds must go to CBEs
- **Funds Spent in California**
 - At least 60% of PIER funds must be spent in CA
 - **More spent in CA = Higher Score**

Other Potential Considerations

- **Weighted Average Loaded Labor Rates**
 - **Determine average loaded rate for team**
 - **Lower average loaded rates = higher score**
 - **Loaded rates include direct labor, fringe, general and administrative costs, indirect overhead and profit**
- **Match Funds**
 - **All travel must be covered by match funds**
 - **Higher scores for more match funding**

Other Potential Considerations

1. **Planned solicitation is targeted for private sector entities. All applicants must be willing to use the Standard PIER Terms and Conditions ***
2. **Applicants can be either a single contractor or a team**
 - A team consists of a prime contractor and sub contractors
 - Teaming is encouraged
3. **Agreement Size Range: \$750,000 to \$2 million**
4. **Multiple projects in each agreement**
 - An agreement can have multiple projects of various funding amounts.

* <http://www.energy.ca.gov/contracts/pier.html#piergeneralinfo>

Questions/comments?



Administrative Items: Solicitation Funding and Schedule



Tentative Funding Amounts

Funding Source	Tentative Amount
Electric	
- Electric Research	\$1,600,000
- Zero-net Energy and Crosscutting	\$3,000,000
Total Electric	\$4,600,000
Natural Gas	
- Natural Gas Research	\$8,000,000
- Zero-net Energy and Crosscutting	\$1,000,000
Total Natural Gas	\$9,000,000
Estimated Grand Total Funding	\$13,600,000

Tentative Schedule

Public Input Workshop	February 23, 2012
Release Program Opportunity Notice	Early April 2012
Pre-Proposal Workshop	Mid April 2012
Deadline to Submit Proposals	Mid June 2012
Notice of Proposed Awards	Early August 2012
Energy Commission Business Meeting Approval of Awards (or sooner)	December 2012

All projects must be completed by March 30, 2015

Questions/comments?



Attendees Input, and ideas



Additional Information

Websites

- <http://www.energy.ca.gov/research/buildings/index.html>
 - **Describes the building program focus areas**
- <http://www.energy.ca.gov/research/buildings/projects.html>
 - **Lists building program research projects by focus area**
- <http://www.energy.ca.gov/publications/searchReports.php?pier1=Buildings%20End-Use%20Energy%20Efficiency>
 - **Lists of PIER research reports**



Contact:

- **If you have additional questions, please email them to David Weightman at dweightm@energy.ca.gov by Friday, March 2, 2012**
 - **After this date, next opportunity to ask questions will be at the bidder's conference**
- **All materials (Questions and Answers and comments) from this Workshop will be posted at the following website under February 23:**
<http://www.energy.ca.gov/research/notices/index.html#02232012>



PIER Buildings End-Use Energy Efficiency

916-327-1631



Thanks for your ideas!

