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Energy Efficiency a Brief History

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California Public Utilities
Commission

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Overview of Presentation – US Energy Efficiency History

- ✓ **Origins** of national policies
- ✓ State **beginnings**
- ✓ California **incubation** of energy efficiency
- ✓ Discussion of implementation models that **evolved** over this period





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Energy Efficiency in the United States - National

National motivation was launched by **CRISIS**

- The **1973 oil embargo** and ensuing **energy crisis** proved to be a game changer in the U.S.
- It exposed the U.S. to global vulnerability because of unstable energy supplies and, combined with other factors, ushered in a period of high inflation.
- President Jimmy Carter issued the first executive order regarding energy efficiency and presented Congress with a National Energy Plan in 1977.
 - “**conservation is the quickest, cheapest, most practical source of energy.**”
 - formation of the Department of Energy (DOE).
- These early policies tended to focus on **educational efforts**, **financial incentives**, and **national energy efficiency standards**.

Source: The History of Energy Efficiency by the Alliance to Save Energy

https://www.ase.org/sites/ase.org/files/resources/Media%20browser/ee_commission_history_report_2-1-13.pdf



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Energy Efficiency in the United States - National

- Energy Policy Act of 2005 (EPAAct 2005)
 - first major energy law in over a decade, not long after NE blackout
 - included several energy efficiency provisions: **appliance standards**, new **tax incentives**, and **federal energy management changes**.
- Energy Independence and Security Act (EISA) of 2007 was passed.
 - response to high **energy prices** and climate change concerns.
 - Provisions included raising corporate average **fuel-economy standards**, increased appliance and equipment **efficiency standards**, new light **bulb efficiency standards**, authorization of **industrial efficiency** programs, etc
- The American Recovery and Reinvestment Act (ARRA) of 2009.
 - This law's purpose was to **stimulate the economy** in the face of the Recession
 - provided the **single largest investment in energy efficiency in U.S. history**, allocating more than \$25 billion for energy efficiency

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Energy Efficiency in the United States - National

Evaluation and Research activities have evolved
along side the national policies and initiatives

- **Federal Programs are Reporting out Progress and Evaluating**
 - “16TH SEMI-ANNUAL REPORT TO CONGRESS ON APPLIANCE ENERGY EFFICIENCY RULEMAKINGS - IMPLEMENTATION REPORT: ENERGY CONSERVATION STANDARDS ACTIVITIES”
 - “LIHEAP Case Study on Energy Burden for FY 2005”
 - “Evaluation Prompts ENERGY STAR Program to Replace Web Tool, Saving 90 Percent of Annual Costs”
- **National Research Labs are alive and well continuing a significant contribution to the industry and knowledge base**

“...providing the Nation with
strategic scientific and
technological capabilities”



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Energy Efficiency in the United States - Stateside

States have largely led the charge on energy efficiency for the past 30 years.

- The top ten states in 2013 included: Massachusetts, California, New York, Oregon, Vermont, Washington, Rhode Island, Connecticut, Minnesota, Maryland
- Among the bottom ten were Mississippi, Wyoming, and North Dakota.
- States as a whole have pressed ahead with energy-efficiency policies and programs; with significant increases recently.
- New rules from the Environmental Protection Agency (federal) regarding carbon regulations may result in additional activity at the state level.

Source: The History of Energy Efficiency by the Alliance to Save Energy

https://www.ase.org/sites/ase.org/files/resources/Media%20browser/ee_commission_history_report_2-1-13.pdf



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Energy Efficiency in the United States - Stateside

Evaluation and research activities tagged along to:

- Track progress against policy goals or targets
- Quantify and validate the savings
- Understand what's working and what's not working
- Conduct primary research (lab, market, or potential)

Widely accepted that “successful policy design must also include an evaluation of state and stakeholder priorities, in order to establish buy-in and minimize the opportunities for failure.” -NREL

States set aside 1%-8% of program budgets on evaluation

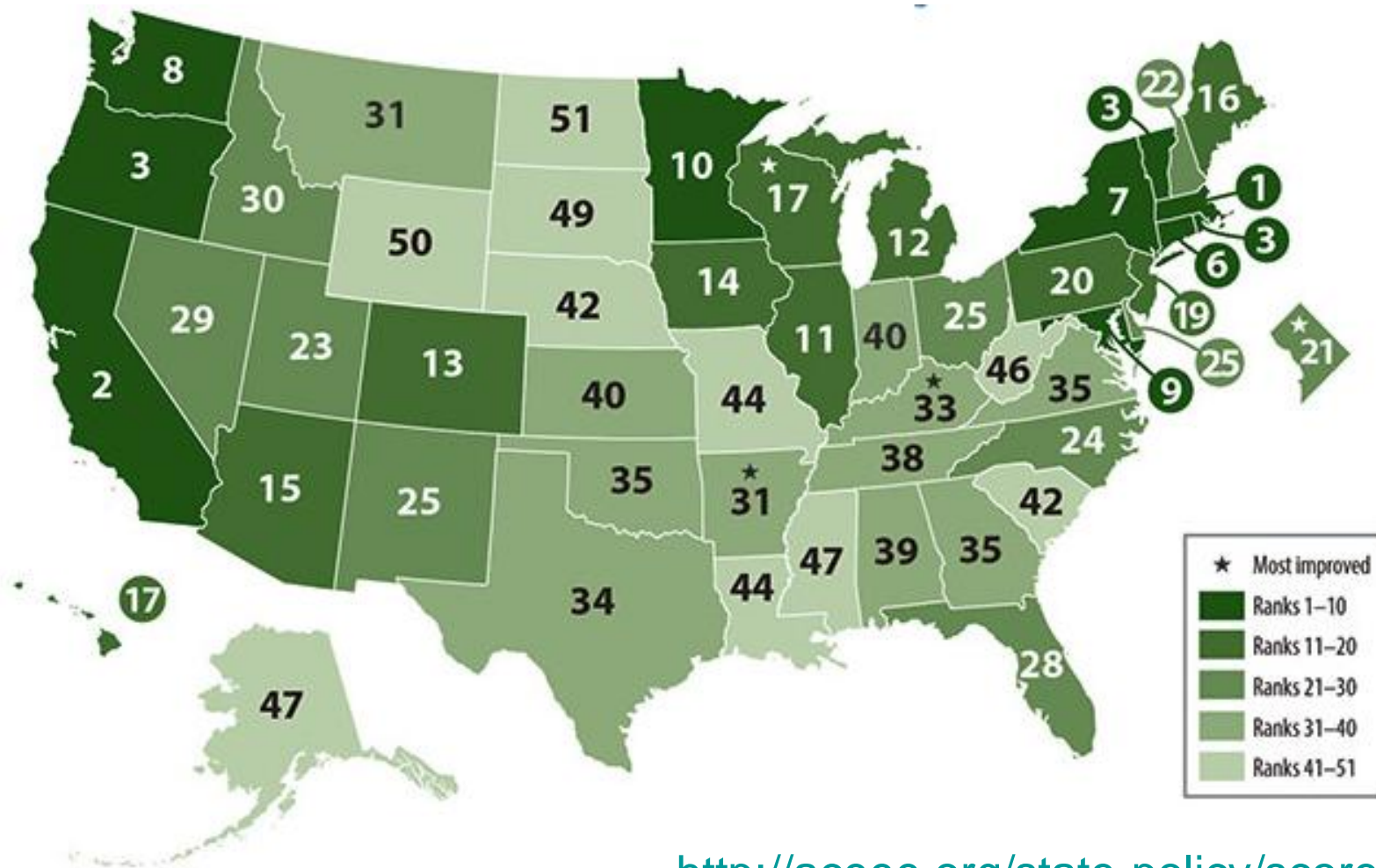


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Energy Efficiency in the United States - Stateside



<http://aceee.org/state-policy/scorecard>



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Energy Efficiency in the United States - Stateside

But WHY do they do it?

Energy Trust of Oregon

Efficiency Vermont

California Energy Action Plan (2003 Update)

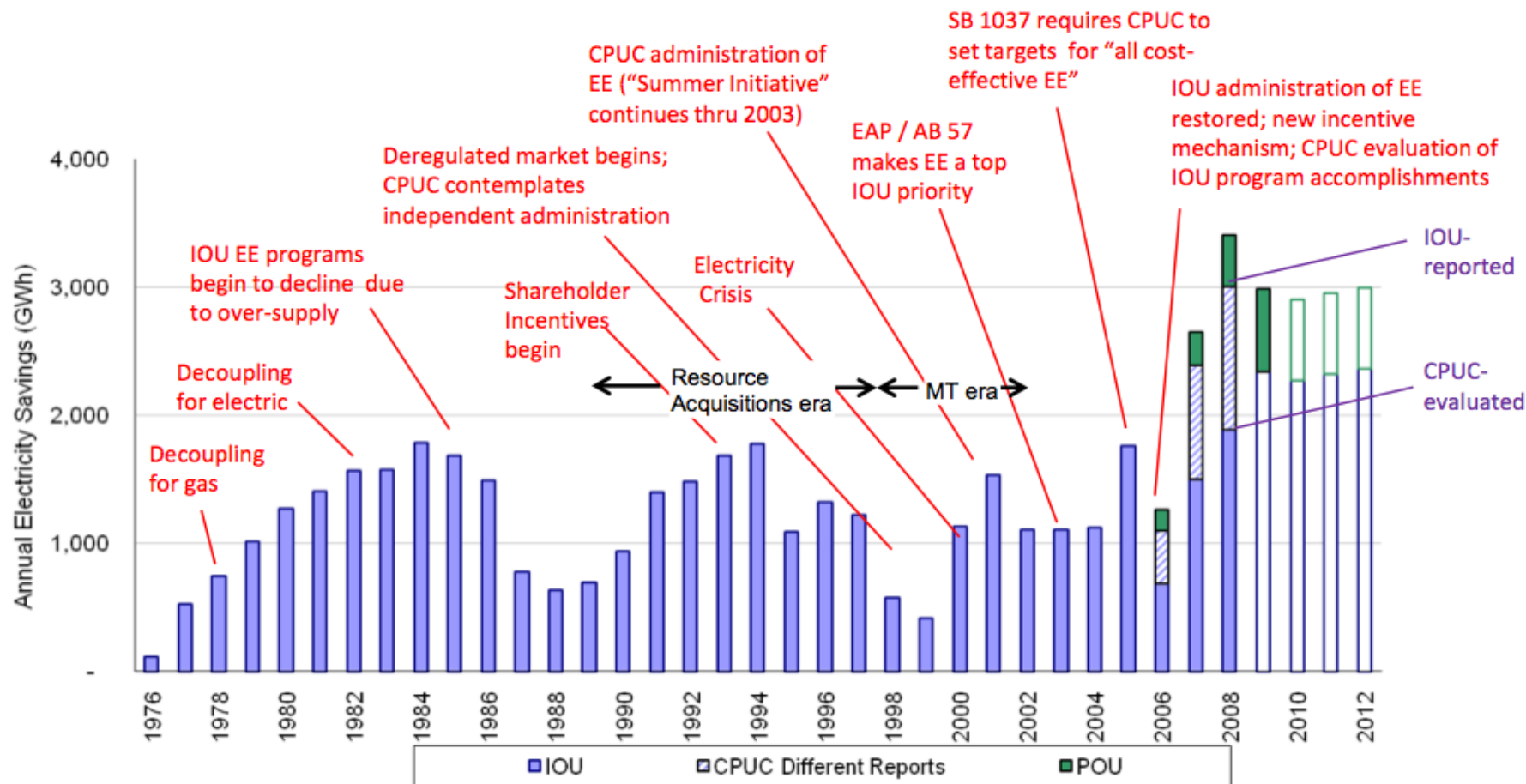
"Cost effective energy efficiency is the resource of first choice for meeting California's energy needs. Energy efficiency is the least cost, most reliable, and most environmentally-sensitive resource, and minimizes our contribution to climate change." + Public Utility Code Sec 454.5

improve New York's economy and environment.

development

- ✓ Protect our **environment**
- ✓ **Control** Wisconsin's growing **demand** for electricity and natural gas

Energy Efficiency Policies in California



Source: Natural Resources Defense Council (NRDC), as modified by Energy Division 12/2012
Data is not available for post 2008, only estimated potential are available.

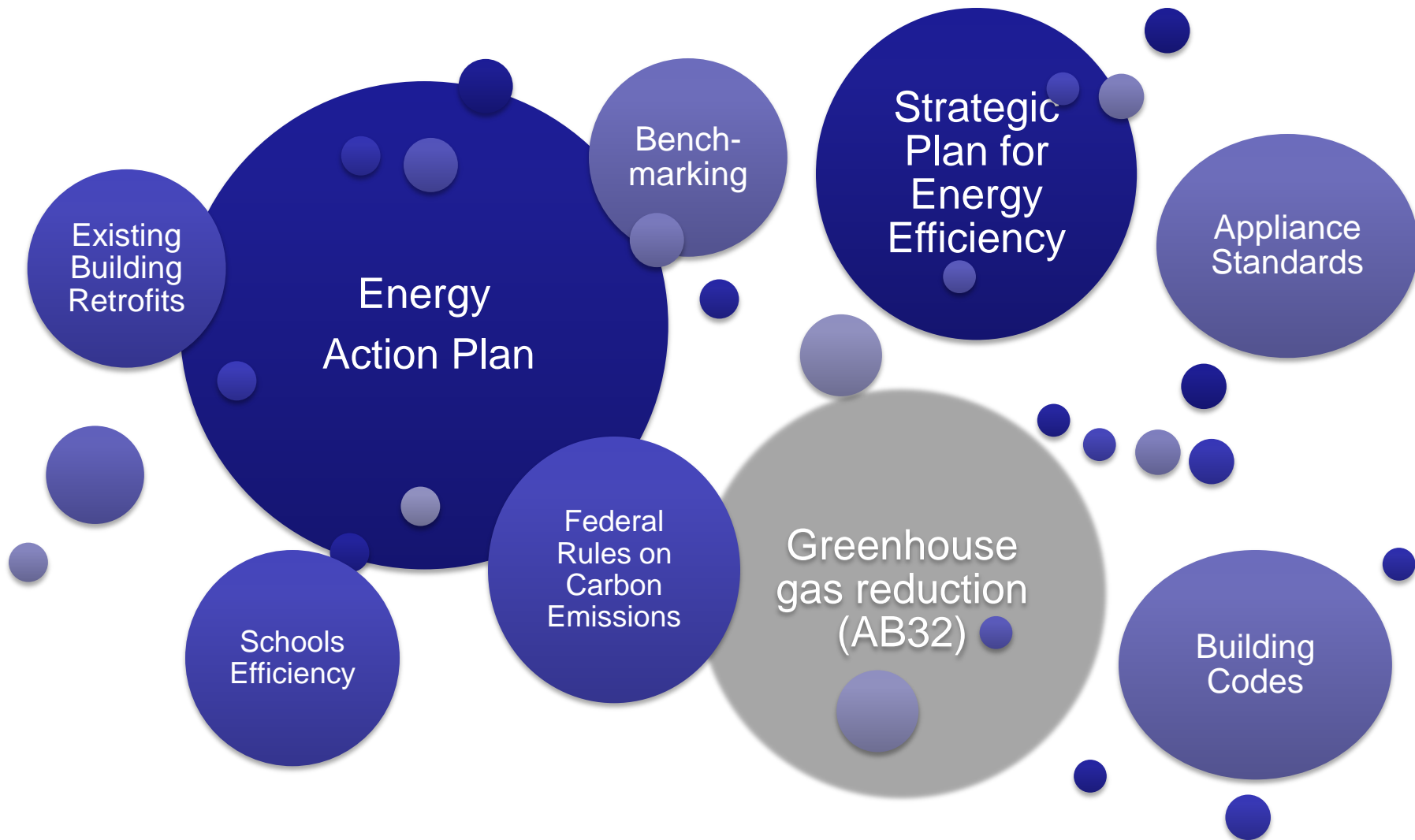


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Multiple Policy Drivers in California





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Evaluation Measurement and Verification - California

Consistent support for evaluation and research since the establishment of the programs

Investor Owned Utility Energy Efficiency Programs

- Responsibility for evaluation was originally in the hands of the utilities to improve programs use internally
- In 2005 this responsibility was shifted to the Energy Division in the California Public Utilities Commission which enabled:
 - Consolidation of results, cross-utility comparisons, public access
 - strengthened resources of the regulator to inform and enforce policy

Statewide Research Program

- PIER now EPIC program dedicated to primary research
 - grant structure, universities and national labs typically conduct
 - Technology development, building codes, behavior analysis



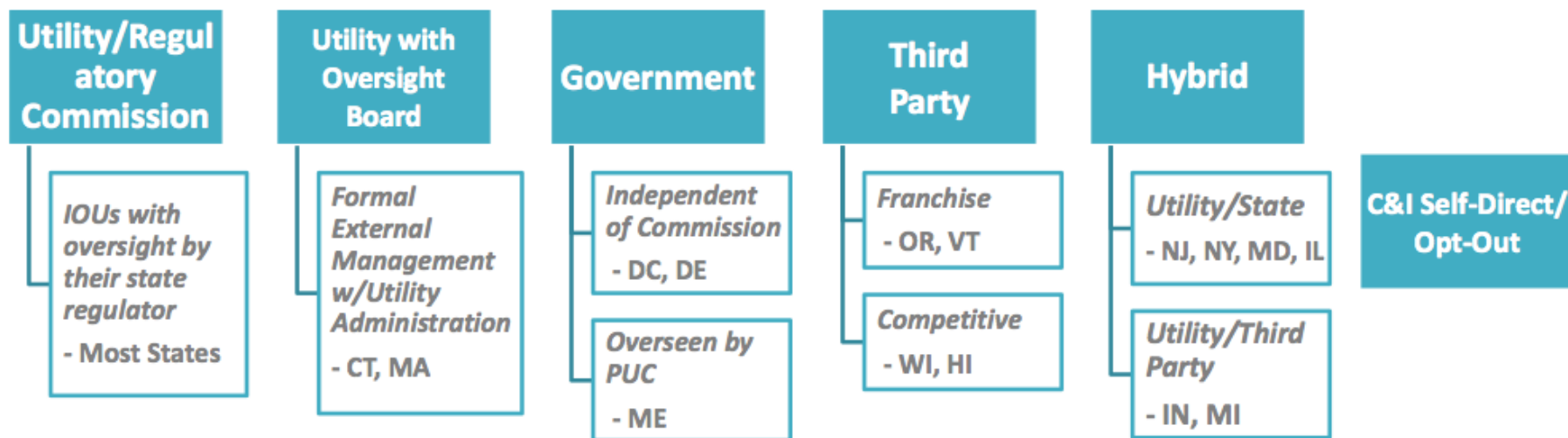
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Energy Efficiency in the United States - Stateside

- State implementation models vary significantly as a result of their autonomy and varying needs
- Lawrence Berkeley National Lab prepared a comparative summary which lays out multiple implementation structures



Source:

Chuck Goldman & Steven Schiller Lawrence Berkeley National Lab



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California - Regulatory Oversight of Energy Efficiency

- Investor Owned Utilities administer energy efficiency programs with CPUC approval and oversight
- California Public Utilities Commission's roles:
 - Establishes policy guidance specific to:
 - Energy efficiency savings goals
 - California Energy Efficiency Strategic Plan
 - Energy Savings Performance Incentive (ESPI)
 - Approve portfolio budget applications (currently on a 2-year cycle);
 - Review program designs and strategies
 - Review energy savings assumptions
 - Oversee Evaluation, Measurement & Verification

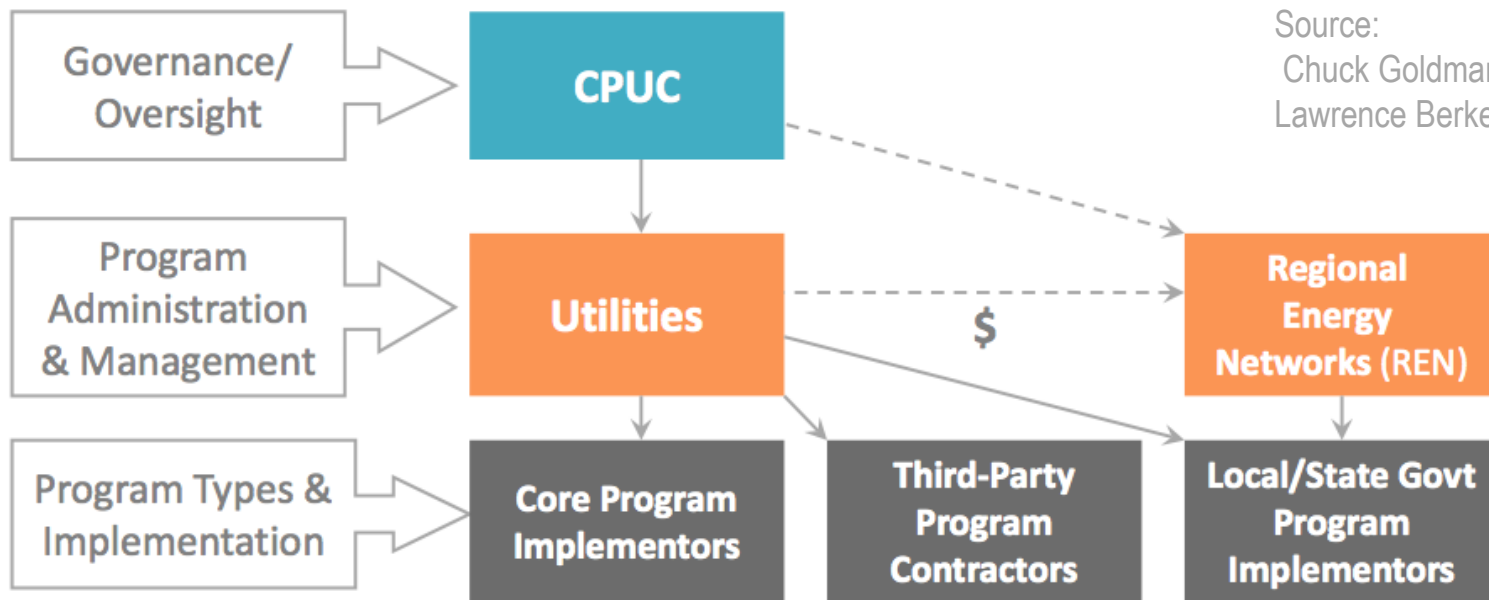


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Energy Efficiency Administration: California *utility/regulatory commission*



Source:
Chuck Goldman & Steven Schiller
Lawrence Berkeley National Lab

- Utility Administration with IOU-specific advisory groups
- Three Program Categories: Core, Third-Party & Local/State Government
 - 20% of EE budget reserved for programs designed & administered by third parties
 - Both IOUs and RENs run RP-funded local government programs



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Administrative Options & Selection Criteria

Context: What Does it Take to Administer and Deliver EE Programs?

- **General Administration and Coordination**
 - Contracts with primary contractors; outreach and reporting to public, state agencies, legislature, etc.
 - Infrastructure for data management, accounting, funds transfers and payments, IT systems, confidentiality compliance, etc.
- **Goal Setting, Portfolio and Program Development and Planning, and Budgeting**
 - Facilitate public goal setting and planning and input process; establish overall portfolio of programs with definition and balancing of budgets, cost-effectiveness, goals, etc.; and define general goals and metrics, descriptions, and budgets for individual programs
 - *Define a framework, maintain long-term stability*
- **Portfolio and Program Administration and Management**
 - Manage budget and sub-contracts for individual programs; provide basics of program designs; provide oversight, guidance, support, corrections, etc. to implementers; provide marketing for overall portfolio
- **Impact, Process and Market Evaluations**
 - Establish evaluation framework
 - Provide for market assessments, potential studies, impact and process evaluations, and cost-effectiveness assessments (which are often done by third-party evaluators)

Source:

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Lawrence Berkeley National Lab



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Administrative Options & Selection Criteria

- **Primary Factors to Consider in Choosing Among Administrative Options:**
 - Clarity of purposes, funding and structure
 - Stability of portfolio over time
 - Support among key stakeholders
- **Detailed Criteria (discussed in next three slides)**
 - Compatibility with broader public policy goals
 - Accountability and oversight
 - Administrator effectiveness
 - Transition issues
 - Support with stakeholders, regulators and policy makers

Source:

Chuck Goldman & Steven Schiller
Lawrence Berkeley National Lab



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Energy Efficiency Programs Target Market Barriers

Cost

- Financial rebates for efficient technologies, financing/loans to pay over time with savings

Awareness and knowledge

- Education programs for primary school or adults, marketing campaigns

Behaviors

- Peer pressure, and other creative social norms adjustment tactics

Professional skills

- Skilled labor training programs to enable trades people to provide specific services

Rules and regulations

- Codes and Standards which require compliance with certain efficiency levels



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For More Information

History of Energy Efficiency (Alliance to Save Energy, 2013)	https://www.ase.org/sites/ase.org/files/resources/Media%20browser/ee_commission_history_report_2-1-13.pdf
State Energy Policies - ACEEE	http://www.aceee.org/sector/state-policy
Energy Efficiency Policy in the United States: Overview of Trends at Different levels of Government (NREL 2009)	http://www.nrel.gov/docs/fy10osti/46532.pdf
California Energy Commission – Research (PIER-EPIC)	http://www.energy.ca.gov/research/index.html http://www.energy.ca.gov/2014publications/CEC-500-2014-008/CEC-500-2014-008.pdf
Energy Efficiency Program Administration: Options and Issues (Chuck Goldman and Steve Schiller, LBNL, 2014)	[in folder]
Energy Efficiency Proceeding and Past Decisions at the CPUC	http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Current+Proceeding+Activity.htm
Department of Energy Energy Efficiency and Renewable Energy	http://energy.gov/eere/office-energy-efficiency-renewable-energy