

Integrating Behavior in the Design, Implementation and Evaluation of Energy Efficiency Programs

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Outline of Talk

1. What do we mean by behavior?
2. Behavior and energy efficiency program cycle
3. CPUC white papers on behavior and energy

1. What Do We Mean by Behavior?

Market Perspective

- What is the behavior of key market actors?
- How to influence the behavior of key market actors in the supply chain? [Behavioral change]
- Who are the market actors?
 - Consumers
 - Manufacturers
 - Retailers and distributors
 - Building owners and landlords
 - Architects and engineers
 - Etc.
- What are the strategies?
 - Carbon taxes, carbon credits, financial incentives, education, information, codes and standards

Program Perspective

- Who participates in energy efficiency programs & why?
- Who does not participate in these programs & why?
- How to influence consumers to participate in programs?
- What programs?
 - Private and public utilities
 - Local, state, and federal government
 - NGOs
- What are the strategies?
 - Financial incentives, education, information
 - Feedback, leveraging social norms & social networks, contests

End User Perspective

- What consumers?
 - Residential (single family, multifamily; owners, renters)
 - Commercial (hospitals, offices (small and large), restaurants, hotels & motels, grocery stores, etc.; owners, tenants)
 - Industrial (pulp & paper, cement, plastics, steel, pharmaceutical, etc.)
 - Agricultural (food processors, growers, etc.; small and large)
- A. What energy services do they need?

End User Perspective #2

- B. How can consumers use less energy for getting those services?
 - ♦ How to influence them to reduce their energy use? Focus on operational use of existing buildings [Habitual action; Behavioral change; Conservation behavior; Behavioral Conservation]
 - Residential: Turn off lights in unoccupied rooms, shorter showers, changes in thermostat settings, use ceiling fans coupled with raising thermostat, regularly change HVAC filters, run full loads in dishwasher and laundry, close off unused rooms, close windows when HVAC system is on, use clothes lines
 - Commercial: maintenance (O&M), process/system improvements - improve the efficiency of existing systems: seal ducts, over-haul compressed air systems, HVAC tune-ups
 - ♦ Can we motivate consumers to adopt low-energy lifestyles?

End User Perspective #3

- C. How do consumers decide to invest in energy efficiency? [Purchasing Activities; Technology Choices; Technical Efficiency]
 - ◆ How to influence consumers to make more energy efficiency investments?
 - ◆ What factors/drivers are important? Financial, regulatory, and informational
 - ◆ What barriers are important? Financial, regulatory, and informational
 - ◆ Focus on new purchases of products and services.
 - New homes and offices, appliances, lighting controls (motion sensors), whole house performance retrofit, retro-commissioning
- What are the strategies?
 - ◆ Carbon taxes, carbon credits, financial incentives, education, information (audits), codes and standards
 - ◆ Feedback, leveraging social norms and social networks, contests

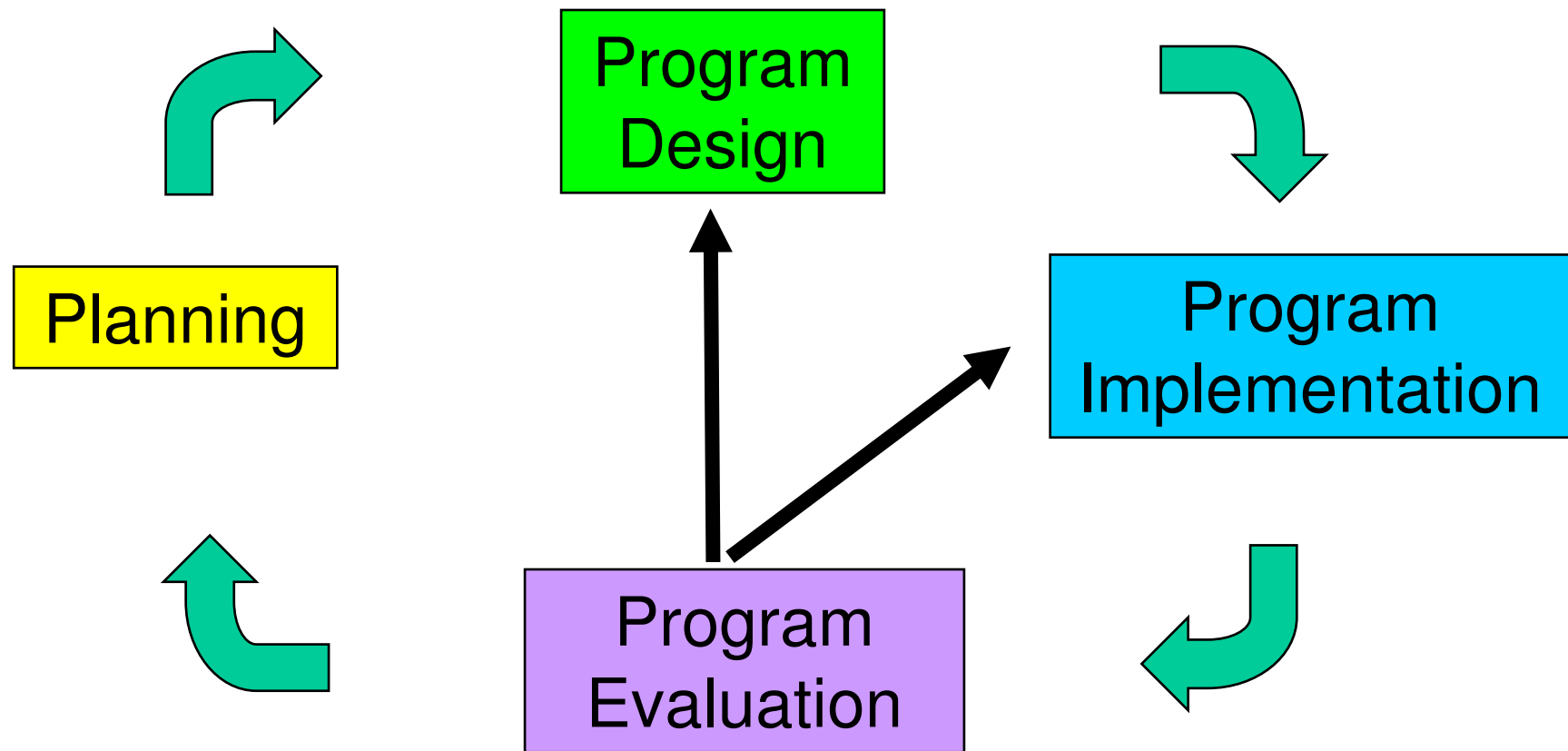
Physical, Social and Cultural Perspective

- Physical and social infrastructure
 - Urban planning
 - Sustainable communities
- Cultural perspective components (from most to least conscious) (the “iceberg perspective”):*
 - Norms - “should/oughts”
 - Values - ideal standards for behavior
 - Symbols - objects or events that stand for something else
 - Classification of reality - shared categories of the complex systems that we inhabit
 - Worldview - how the world is; cognitive basis, beliefs

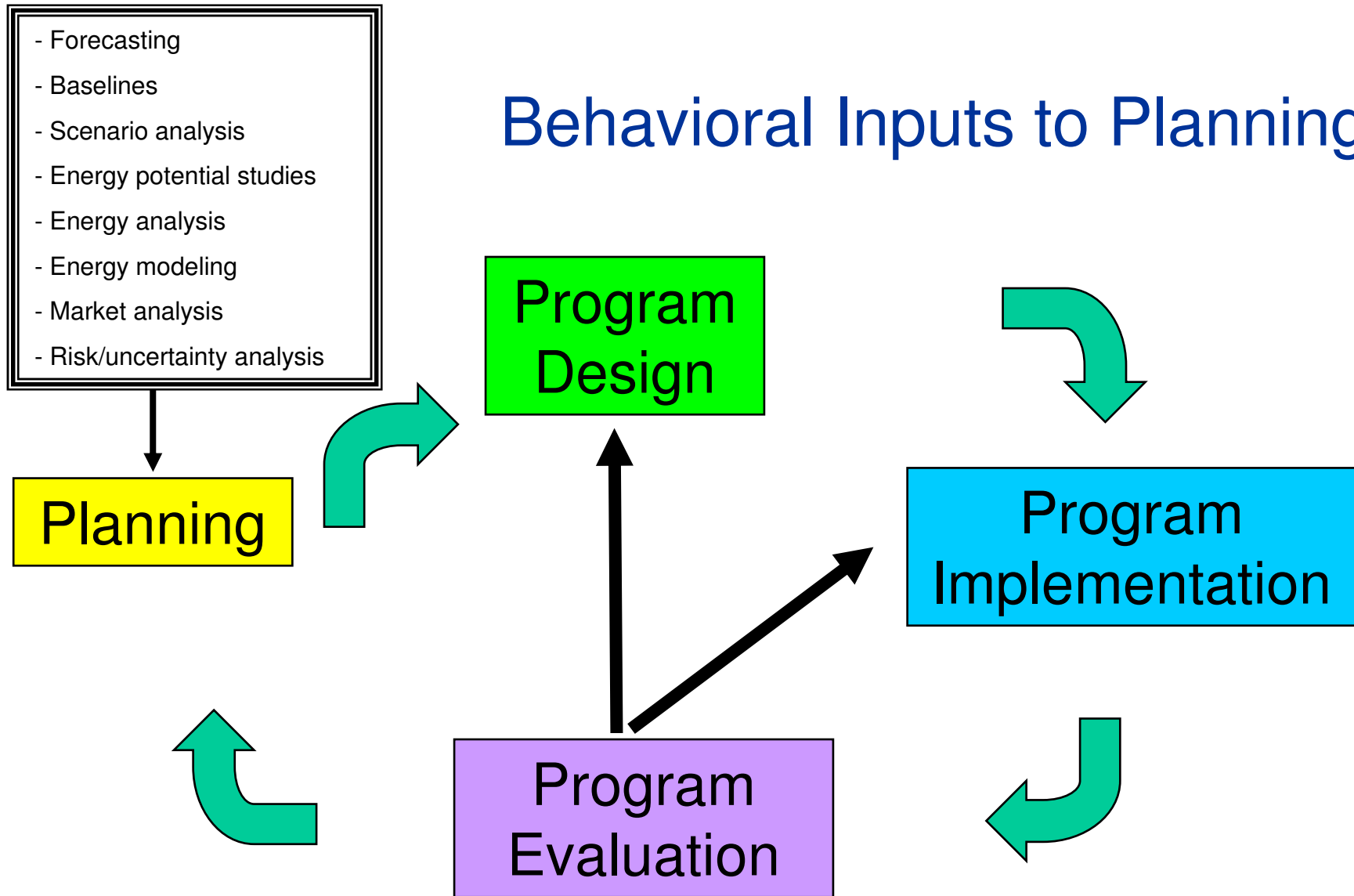
*Thanks to Dr. Tom Love (Linfield College)

2. Behavior and Energy Efficiency Program Cycle

Energy Efficiency Program Planning Cycle



Behavioral Inputs to Planning



Behavioral Inputs to Program Design

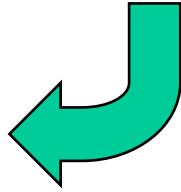
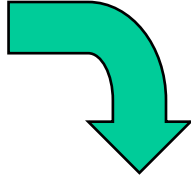
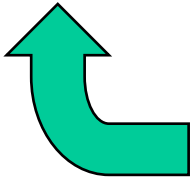
- Market segments
- Program types
- Measures & measure life
- Program participation
- Market stakeholders
- Program & market logic models
- Evaluation needs
- Energy & non-energy impacts
- Cost effectiveness

Planning

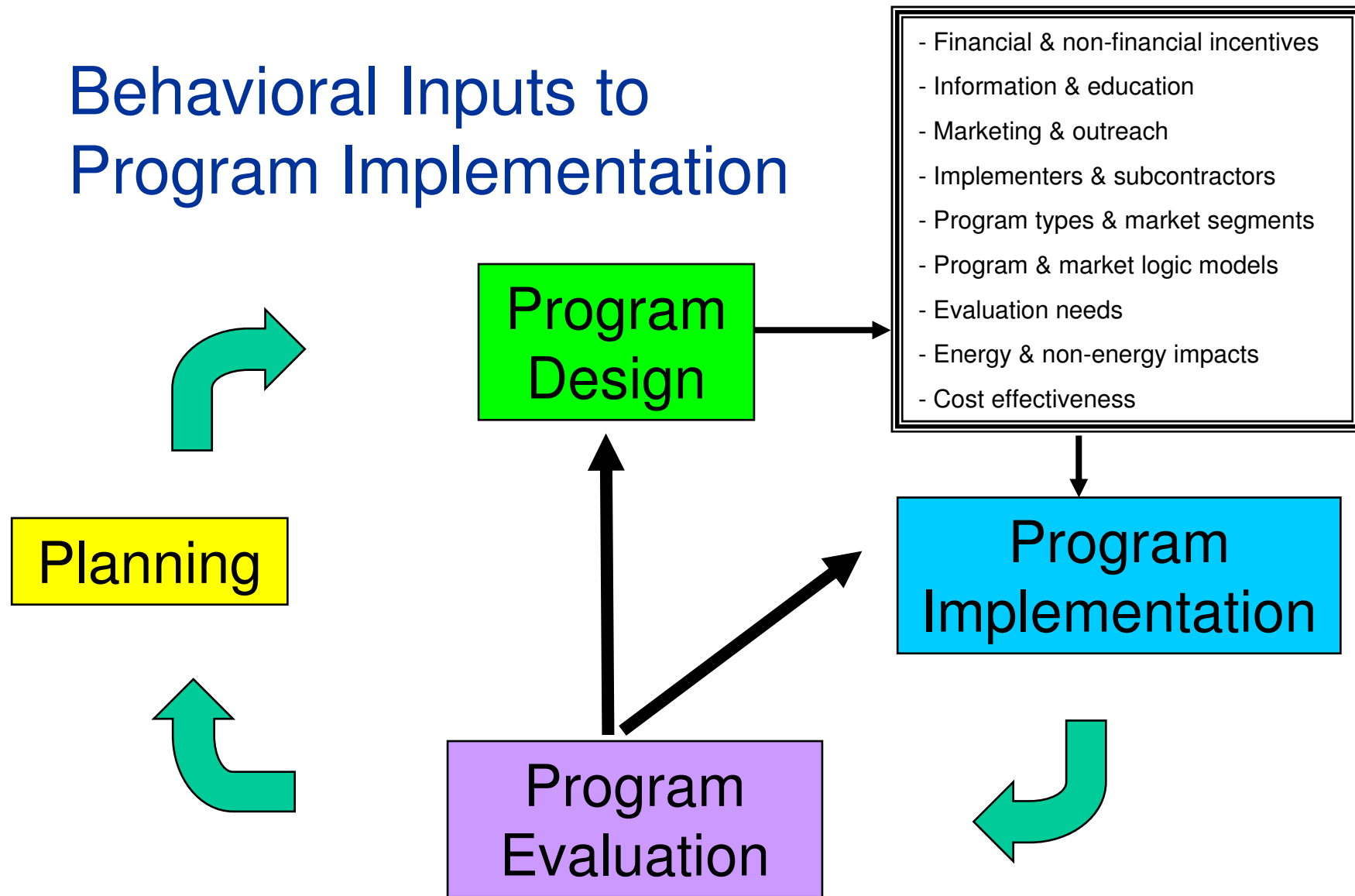
Program Design

Program Implementation

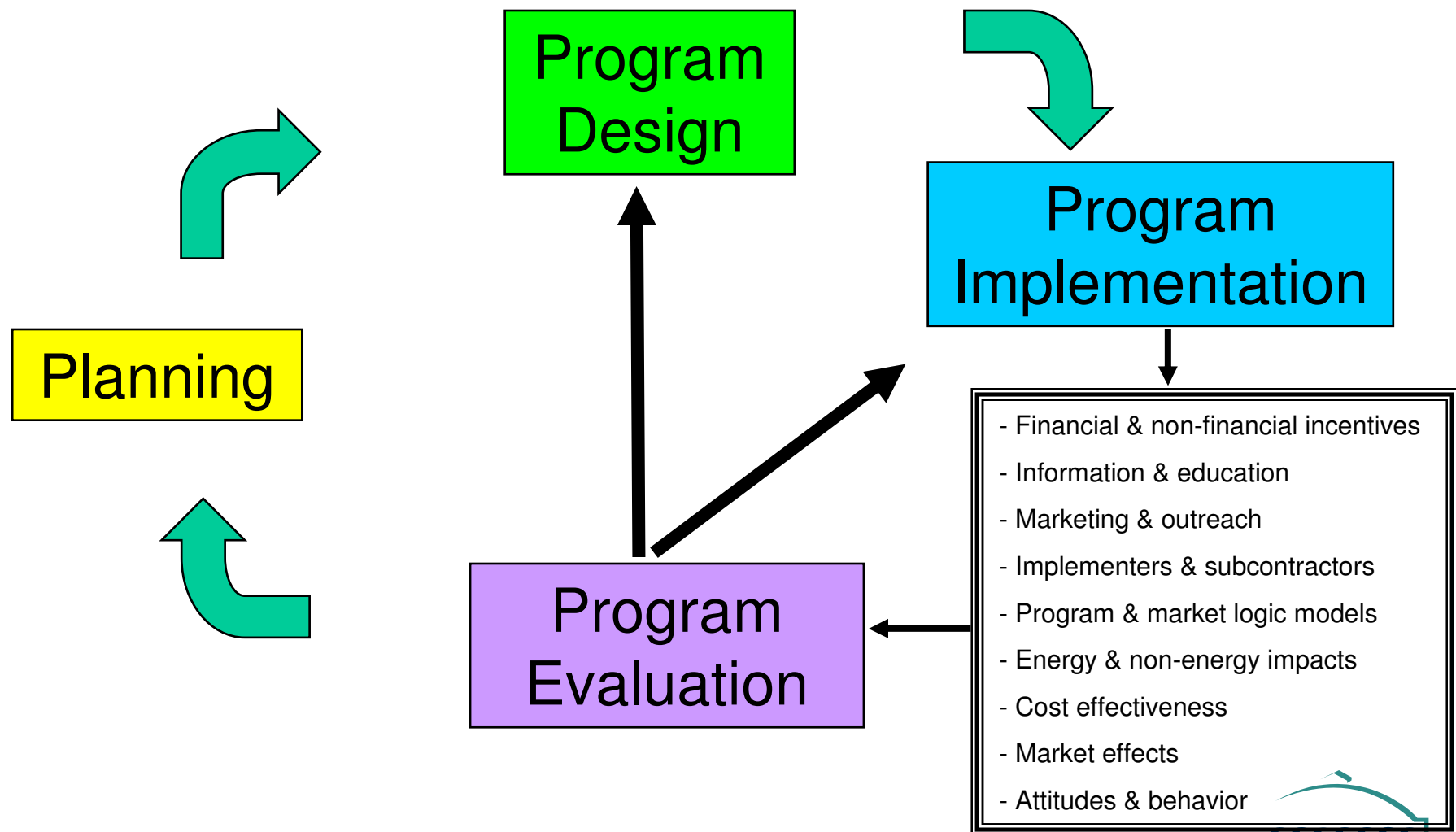
Program Evaluation



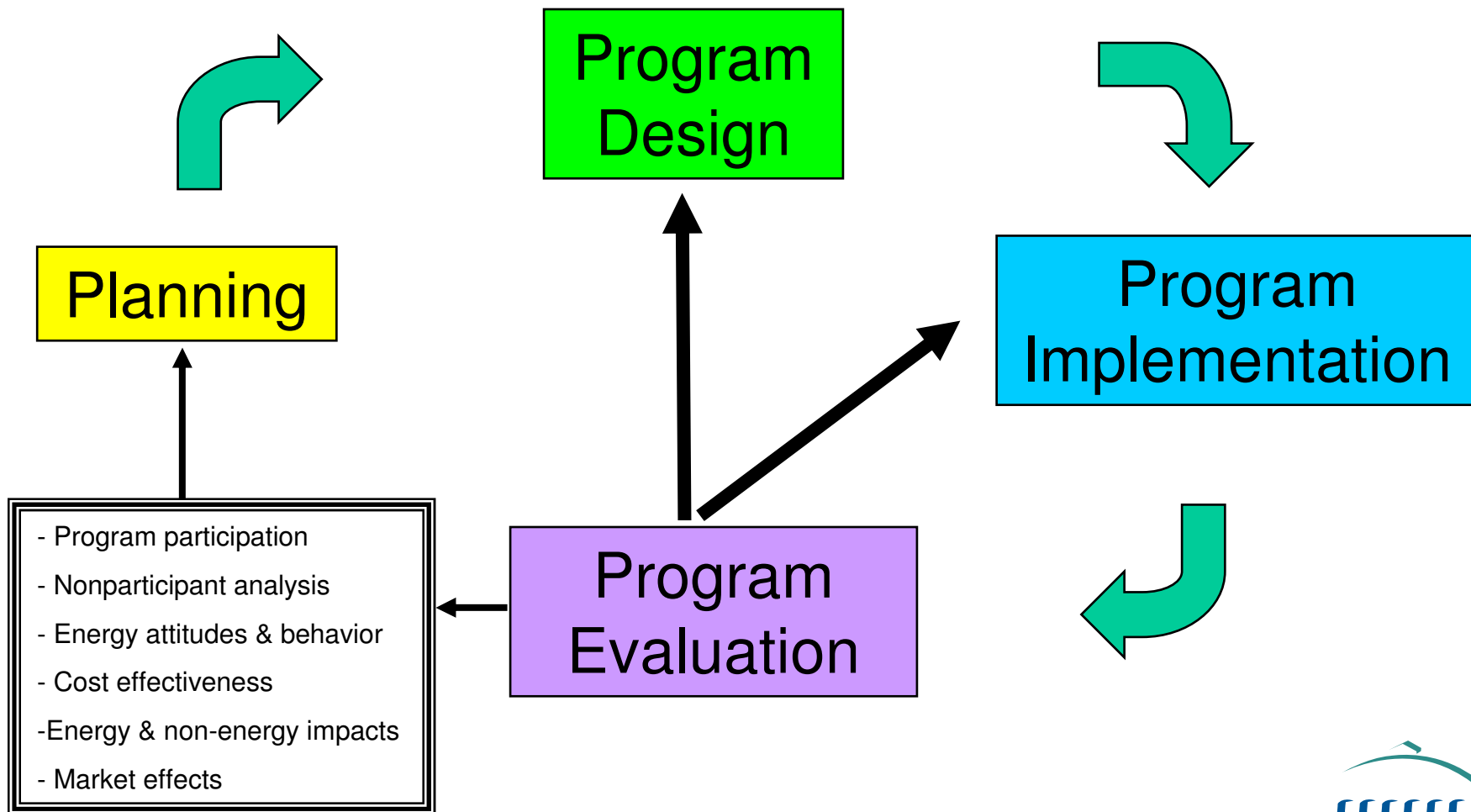
Behavioral Inputs to Program Implementation



Behavioral Inputs to Program Evaluation



Behavioral Inputs to Planning



3. CPUC White Papers

CPUC-Funded White Papers on Behavior and Energy Consumption

1. **Energy efficiency potential studies & behavior***
2. Measurement & evaluation of energy savings & non-energy impacts from energy efficiency behaviors *
3. Process evaluation's insights on energy efficiency program implementation *
4. **Behavioral assumptions underlying energy efficiency nonresidential programs ***
5. Behavioral assumptions underlying energy efficiency residential programs [Loren] *
6. **Market segmentation & energy efficiency program design ****
7. Experimental design for energy efficiency programs *
8. Motivating policymakers, program administrators, & program implementers to pursue behavioral change strategies ***
9. Encouraging greater innovation in the production of energy-efficient technologies & services ***

* Final report being prepared

** Final report, project summary, & presentation available at:
<http://ciece.ucop.edu/energyeff/behavior.html>

*** Draft report being prepared or being reviewed

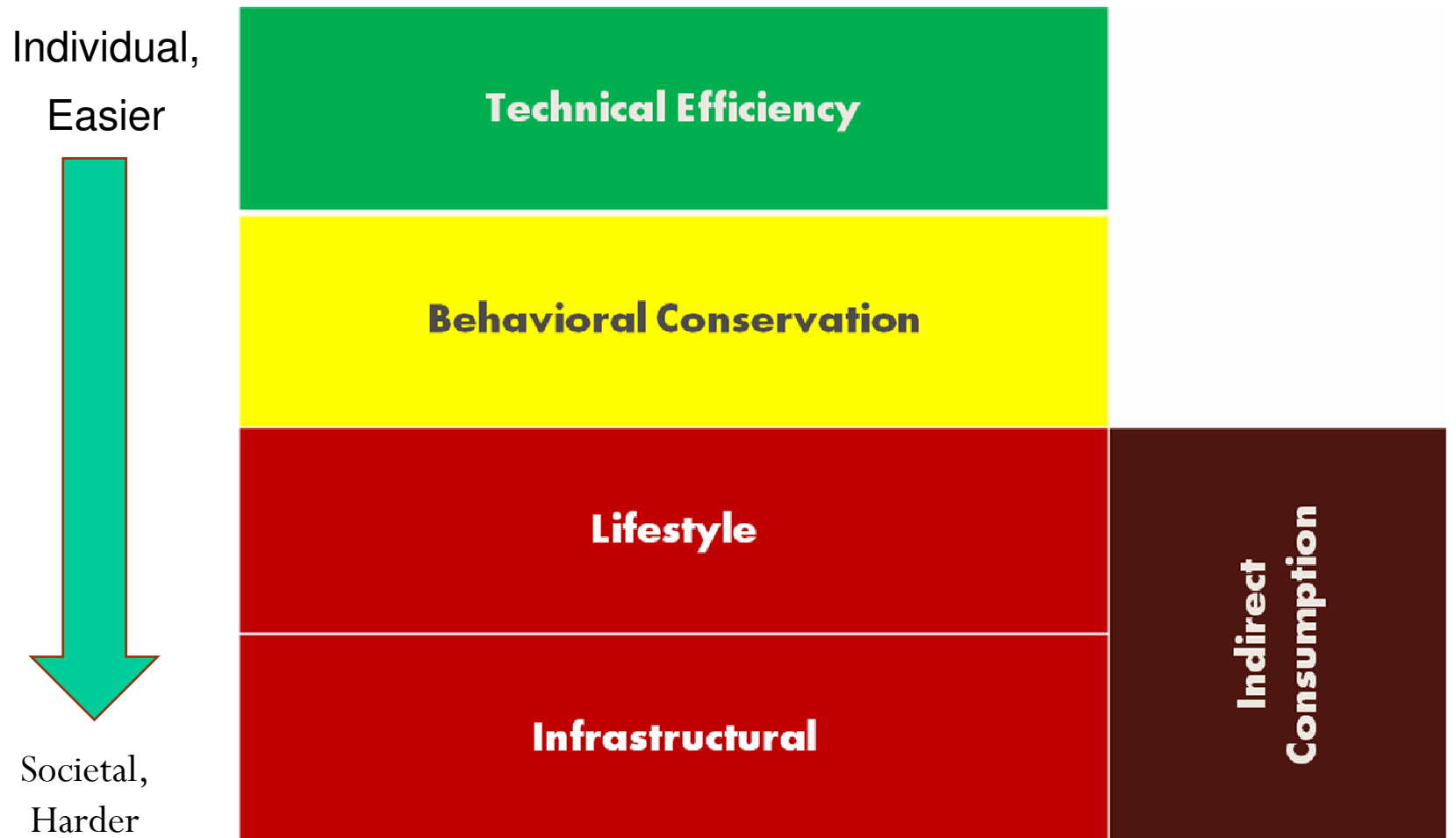
White Papers'

Selection & Development

- Request for Qualifications (RFQ)
- Focus of white papers:
 - What has been learned about the topic?
 - What additional work is needed (RD&D and policy guidance)?
 - Context: CPUC's Long-term Strategic EE Plan
- Review of draft white papers
 - Review by peer reviewers & CPUC Energy Division staff
- Final products (on CIEE website):
 - Final white paper
 - Two-page summary
 - Presentation to CPUC Energy Division staff
 - Presentation at public workshop

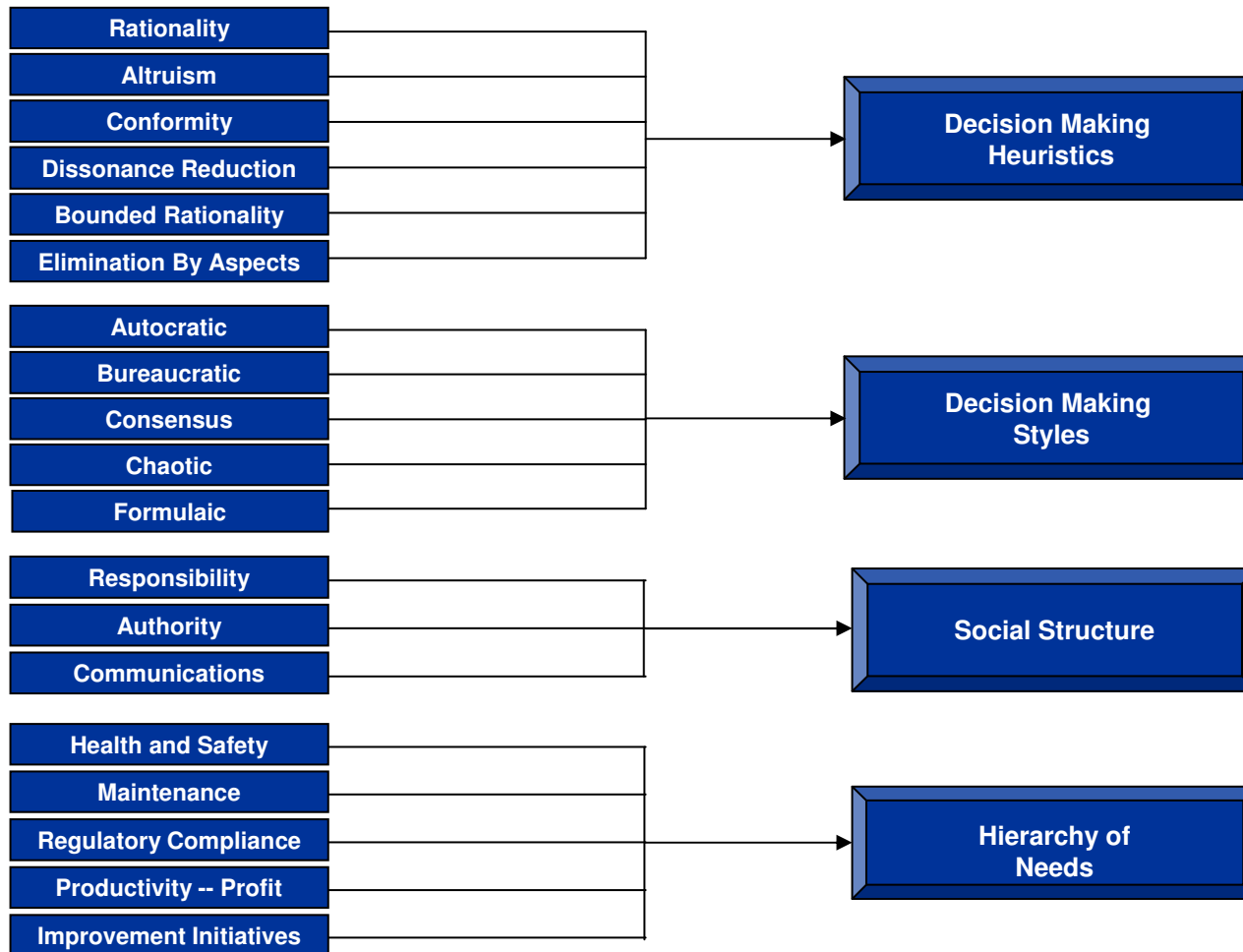
Energy Efficiency Potential Studies

(Lead Author: Mithra Moezzi)



Behavioral Assumptions: Non-Residential Sector

(Lead Author: Michael Sullivan)



Market Segmentation (Lead Author: Steve Moss)

□ To Integrate or Not to Integrate:

- Consumer products don't typically take care of "all your personal hygiene needs."
- Health maintenance organizations provide comprehensive care, but different institutional/financial model.
- Some populations will embrace integrated approaches; others won't.

To Be Placed on CIEE Mailing List to Receive Notices about Final Reports and Presentations (public workshops) on White Papers on Behavior and Energy Consumption:

Go to CIEE Website: <http://ciee.ucop.edu>

Go to “Research Opportunities”

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Ideas for Next Set of White Papers ??

Time for Questions

