STAKEHOLDER MEETING

HAWAII ENERGY STRATEGY 2007

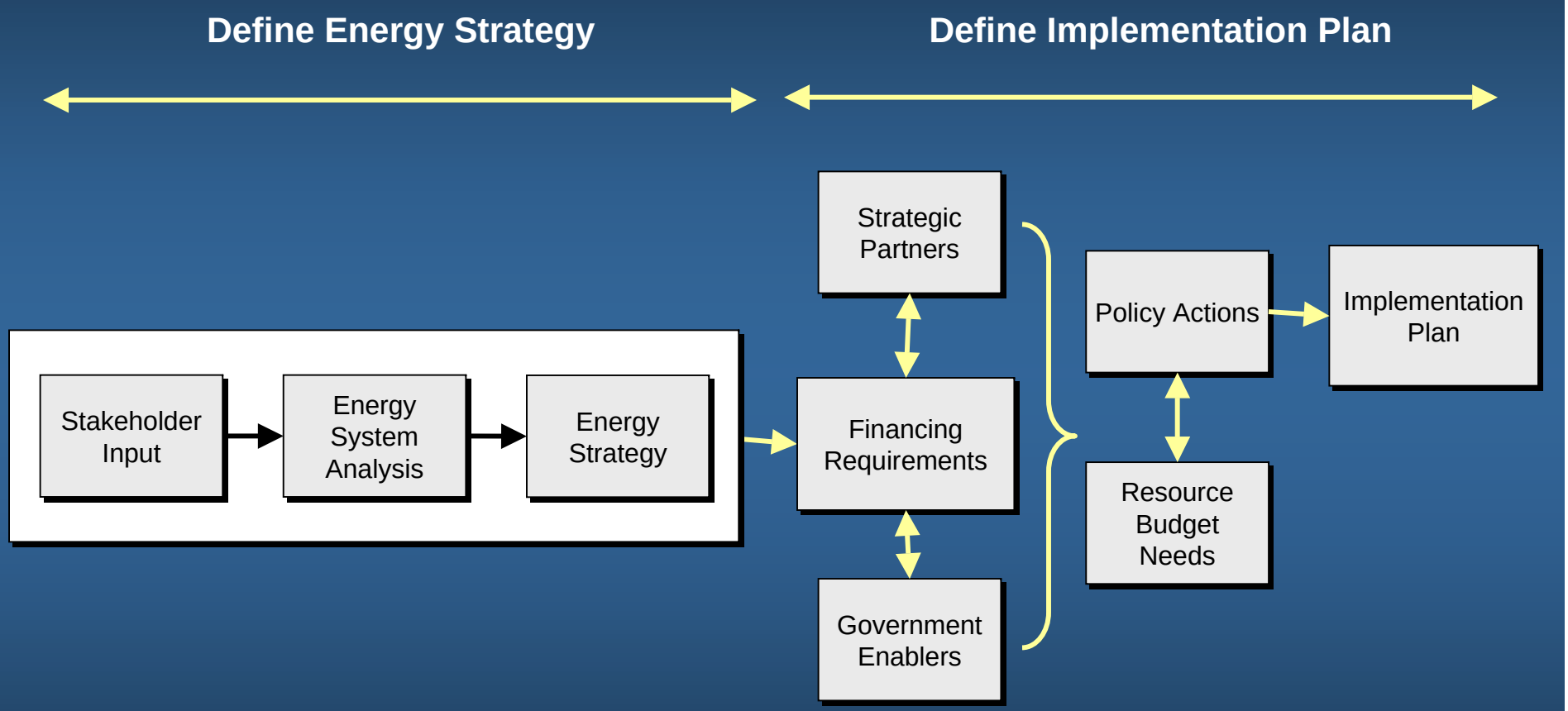
Honolulu
July 6, 2006

Agenda

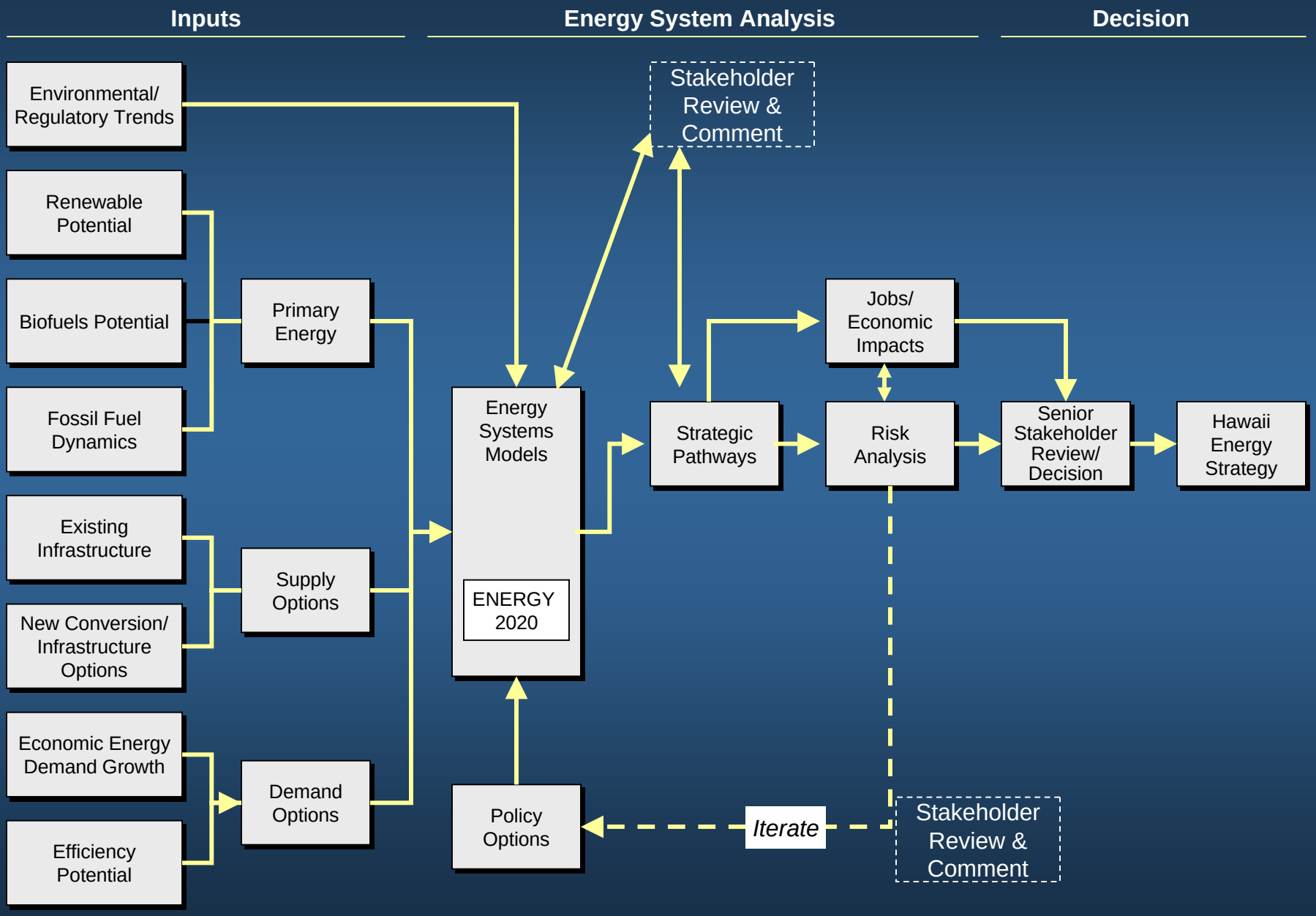
- RMI Approach and Work Plan
- ENERGY 2020 Data Gathering
- Stakeholder Participation

RMI Approach and Work Plan

RMI's Approach: Strategy & Action



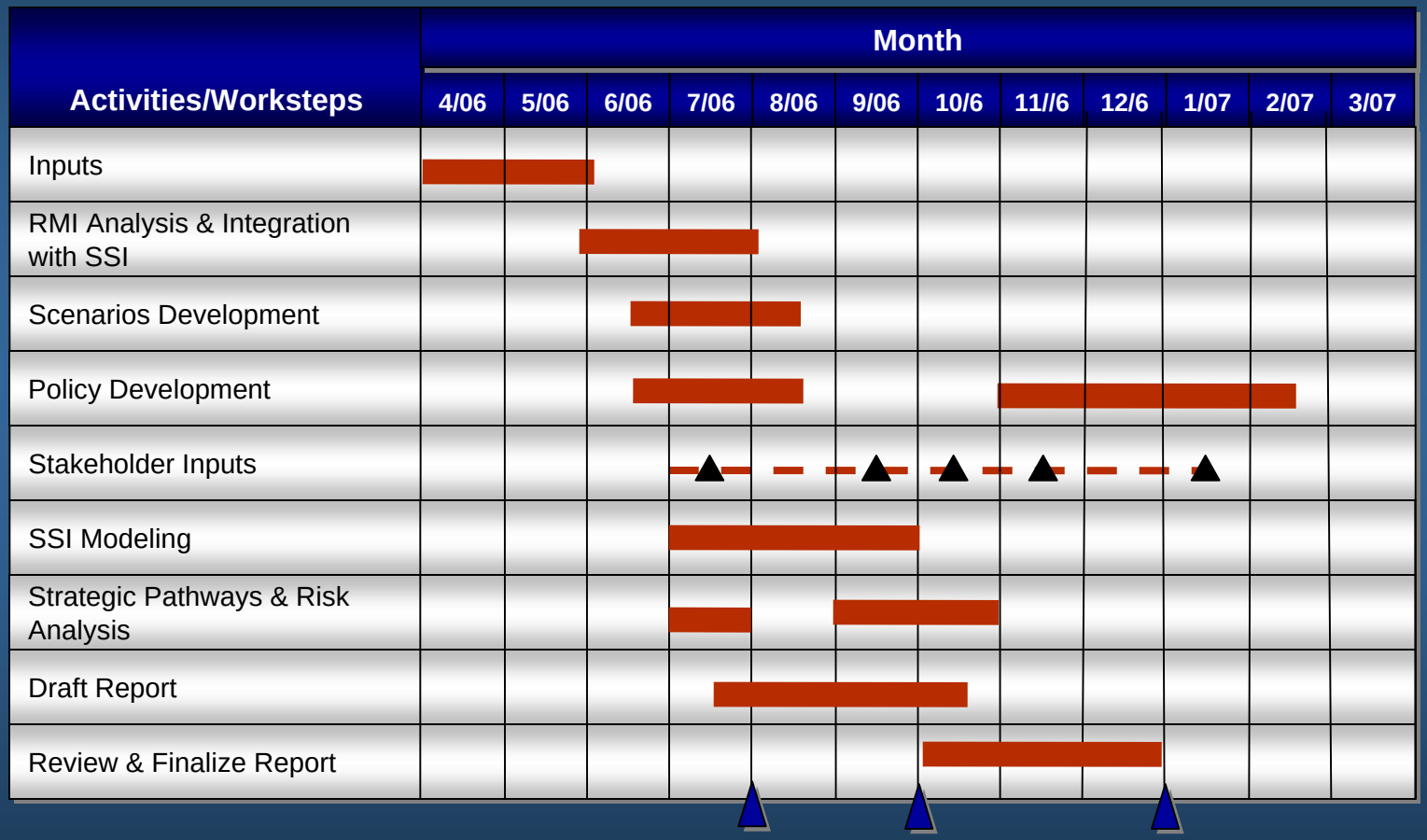
RMI's Approach for Defining Hawaii's Energy Strategy



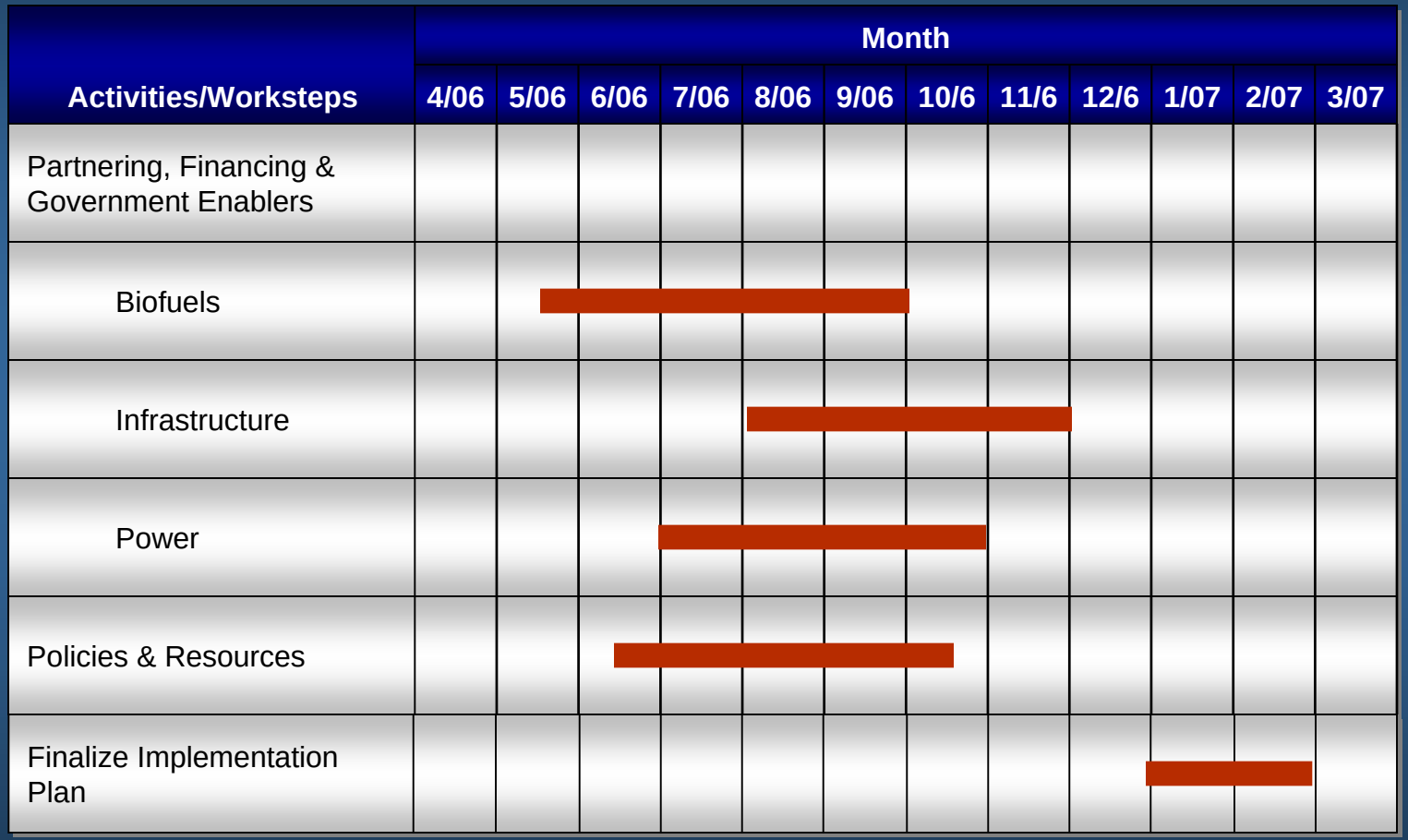
Integrated Energy Strategy

- The objective is to develop a strategic road map based on decision analysis, offering choices not a deterministic single "answer"
- RMI uses quantitative risk analysis
  - Define the underlying volatility of fossil fuels
  - Evaluate the value of renewables and efficiency hedges
- Portfolio analysis will be used to define the efficient frontier
- Use multi criteria analysis to allow for transparent evaluation of tradeoffs
- Final road map will provide a more dynamic series of actions and decisions to strategically manage the uncertainties in the energy world

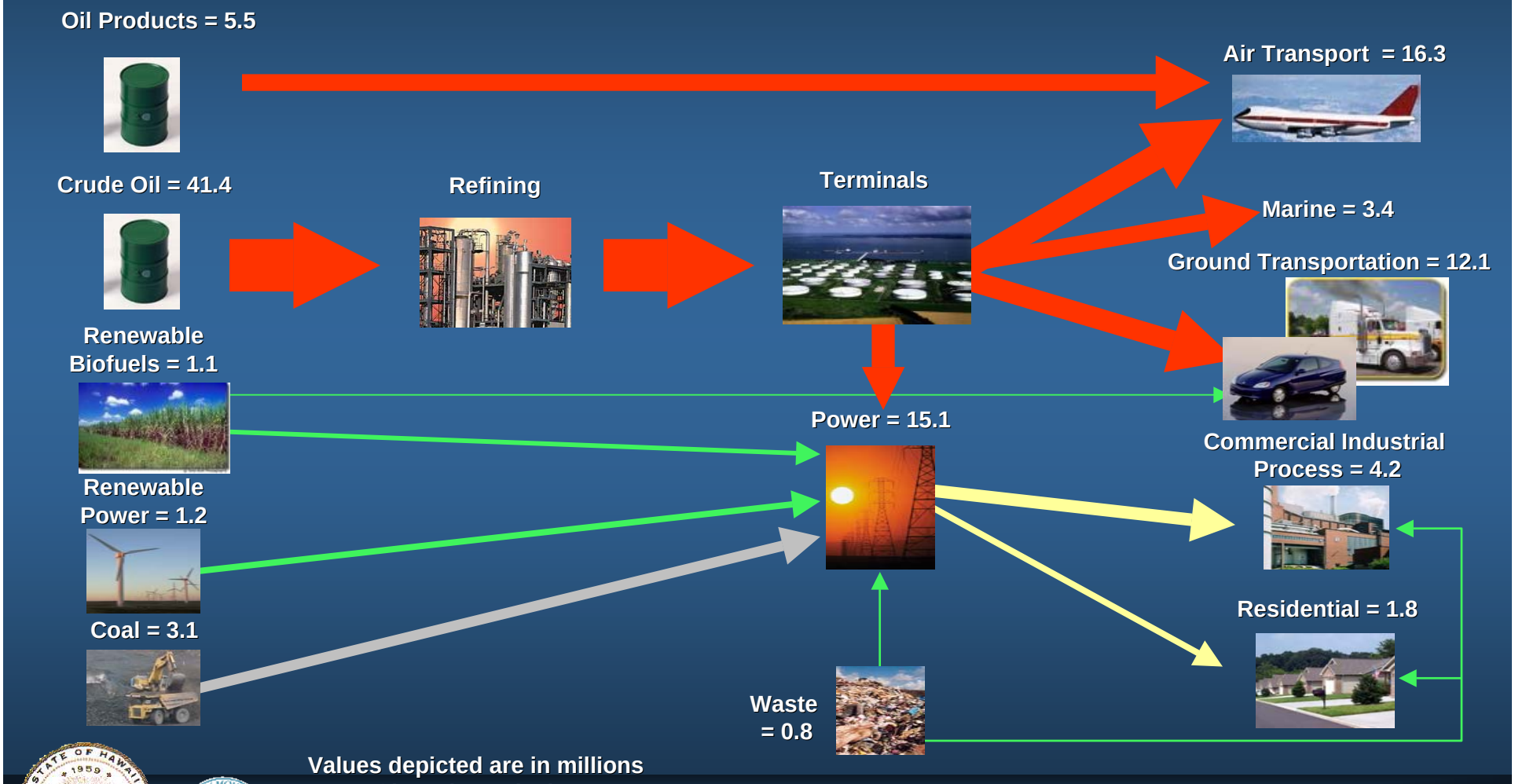
The Hawaii Energy Strategy Timeline



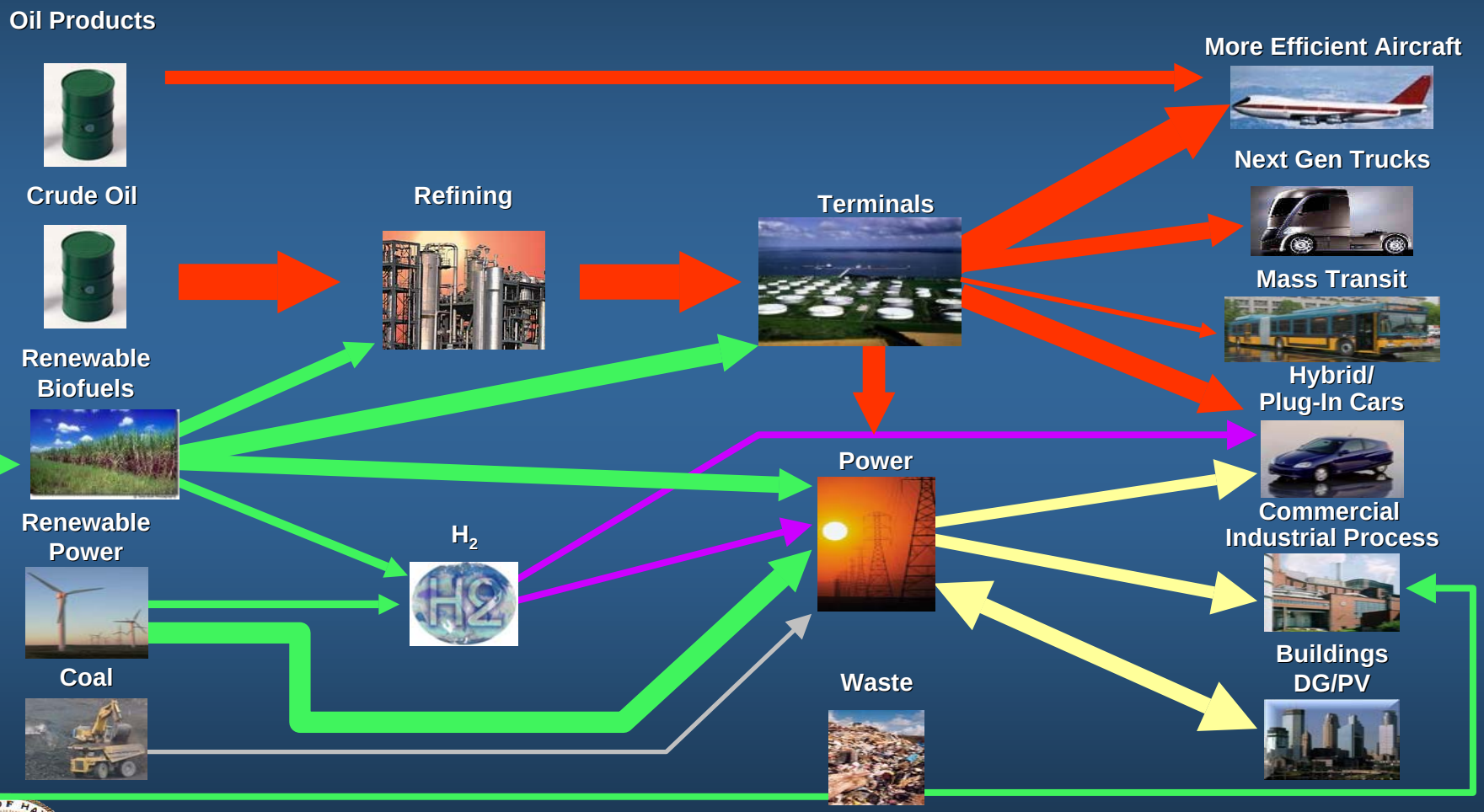
The implementation timeline will run in parallel to provide real world inputs and focus on the critical actions



Hawaii's current energy system is 90% dependent on oil - 2004



The questions we must answer is how much less dependent on oil could our future energy system be by 2020—and how do we get there?



Source: RMI analysis. Note - Marine not shown

RMI will test strategic pathways vs. three scenarios

- **Adequate Supplies: Moderate Long Run Prices**
  - EIA base primary fuel price forecast (AEO 2006)
  - No disruptive technological change until 2020
- **Constrained World: High Fuel Prices and Climate Change Regulation**
  - EIA high case primary fuel price forecast
  - US adopts CO_2 regulation
  - High prices accelerate disruptive technological change
- **Commodity Cycle Fuel Price Forecast**
  - Cyclical primary fuel price forecast (high, then low)
  - High prices create demand-side response that lowers demand for oil

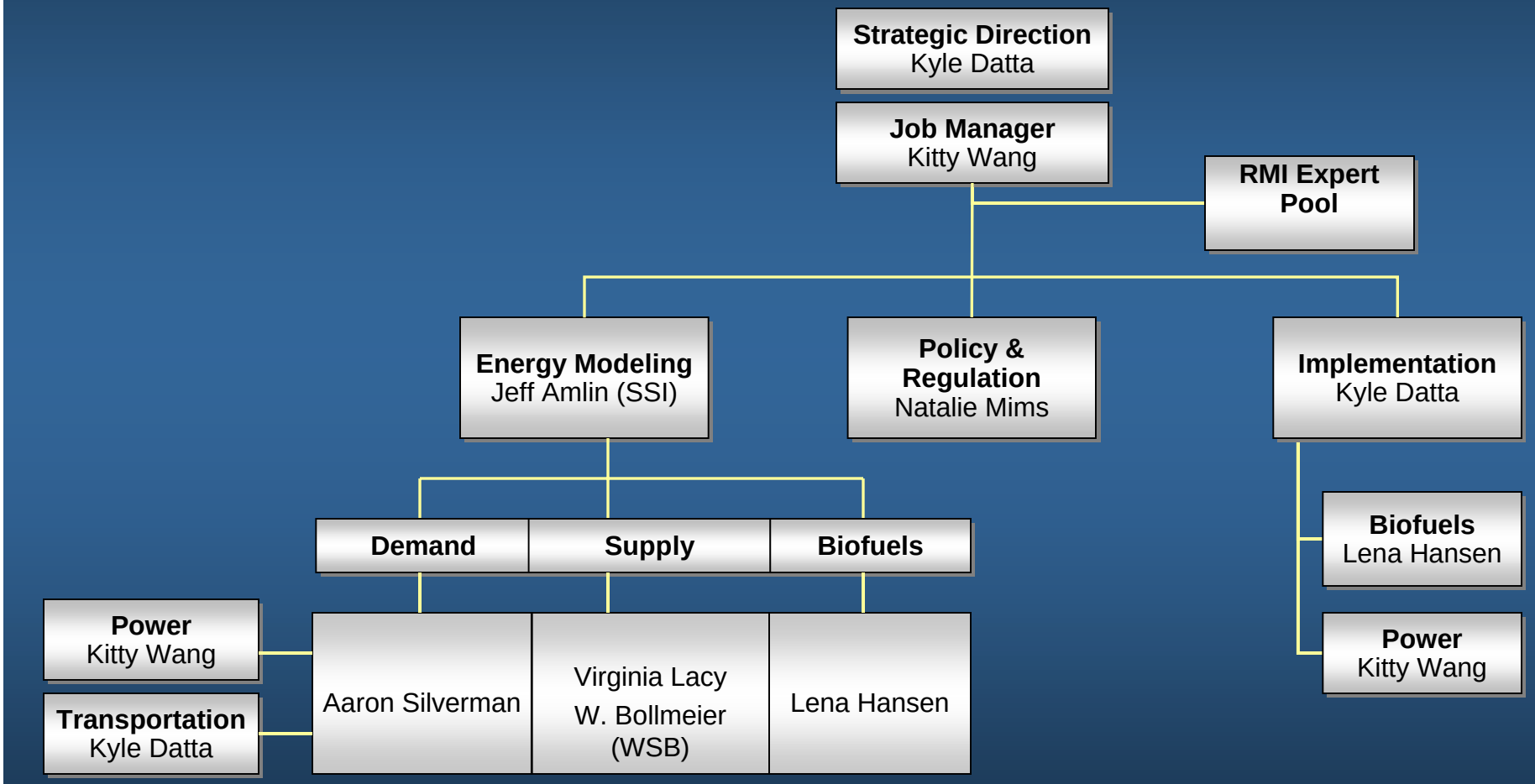
Policies and Regulations

- Given the 2006 legislative session passage of much of “Energy for Tomorrow”/Majority package in four bills, RMI proposes to develop recommendations for policies and regulations in two phases
- Phase 1: RMI will identify the legislative or policy proposals that did not pass the last session that merit reconsideration. These may be tested for their quantitative and qualitative impact
- Phase 2: Subsequent to quantitative analyses for HES 2007, RMI will recommend additional policies and regulatory proposals to DBEDT.

RMI Consortium Roles

	RMI	RMI Expert Pool	SSI
Energy Strategy & Policy Development	✓	✓	✓
Renewable Portfolio Standard Development	✓	✓	✓
Transportation Energy Policy	✓	✓	✓
Biofuels Technology & policy	✓	✓	
PUC Docket Analyses	✓	✓	
IRP Analysis	✓	✓	✓
Expansion of Energy Databases and Analytic Capabilities	✓	✓	✓
Technical & Analytic Report Writing	✓	✓	✓
Legislative Testimony	✓	✓	
Drafting Legislation & Policy	✓	✓	

RMI Team Organization



RMI HES Team

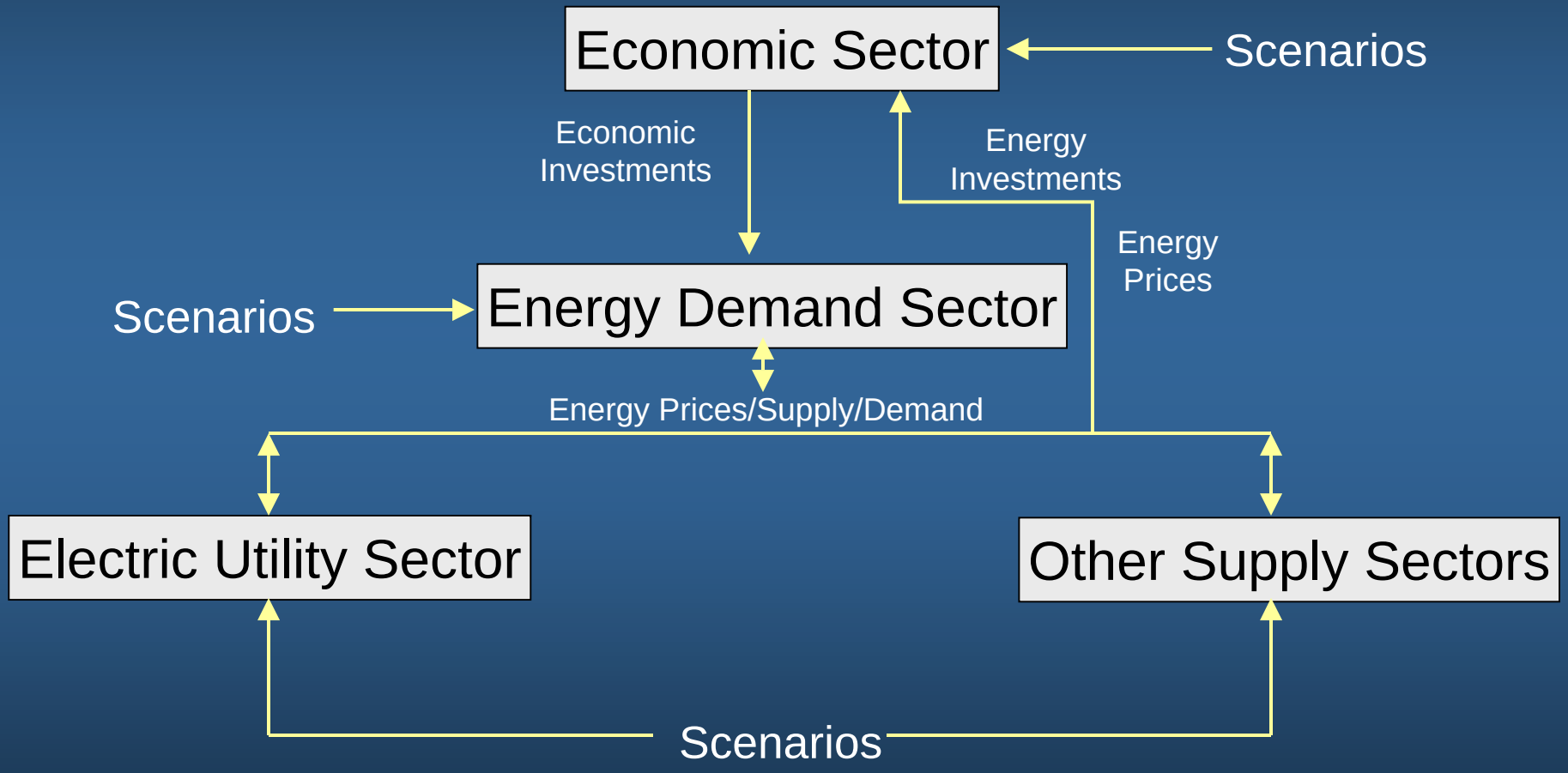
- Kyle Datta - Senior Director
- Kitty Wang - Principal
- Lena Hansen - Consultant
- Virginia Lacy - Consultant
- Natalie Mims - Fellow

ENERGY 2020

ENERGY 2020 Behavioural Model

- Dynamically describes the behaviour of both energy suppliers and consumers for all fuels and for all end-uses
- Decisions are endogenous to the model
- Flexible policy scenario analysis capability

ENERGY 2020 Overview



ENERGY 2020 Analysis Distinction

- **Not Optimization**
  - Want to know risk not hopes; dynamics not static solution
- **Not Classical Econometrics**
  - Need to robustly focus on unprecedented actions and events
- **Causal Dynamics**
  - Time Delays and Feedback Dynamics
  - Psychology, Statistics, Engineering, Economics
  - Simulates actual as opposed to assumed responses

ENERGY 2020 Demand Concepts

- Energy demand is derived demand from economic activity
  - Classified by residential, commercial, industrial and transportation sectors
- Capital Stock Vintages (Stocks and Flows)
- Marginal Decisions
- Process and Device Efficiency
- Fuel Choice
- End Uses

ENERGY 2020 Electric Supply

- Capacity Expansion – simulate construction of new capacity based on need and/or prices
  - Conventional
  - Renewable (RPS)
- Production Costing – dispatch electric plants based on marginal costs and other operational factors (i.e. must run conditions)
  - Utility
  - IPP (purchased power agreements)
- 20 Types of Generating Plants
- Financial Accounting – simulate regulatory rate making procedure to forecast electric prices

ENERGY 2020 Work Plan

- Update historical data
  - Opportunity for DBEDT SID to define data approach and own future updates
- Model Enhancements
  - RMI analysis of whole system efficiency potential and technology step changes
- Model Calibration
- Scenario Development
  - RMI/DBEDT to define three scenarios for overall energy markets
- Generate forecast (July/August)
- Policy analysis (September)

Stakeholder Process

HES Approach: Open Communication and Participation

- DBEDT and RMI believe that collaboration with stakeholders will create a better HES
- Helps ensure that the energy strategy process is understood
- Stakeholder participation provides a number of benefits:
  - Identification of stakeholder needs
  - Real world insights and technical input
  - Broader perspective on relevant issues and problem framework
  - Critical sounding board for alternative strategies

Today's Objectives

- Obtain comments and answer questions on our approach and seek recommendations for refining the work plan
- Gather feedback to ensure we are aware of and establish communication with current efforts by others in Hawaii regarding energy strategy, policy, and regulation
- Solicit assistance in obtaining additional data for use in ENERGY2020
- Describe plans for future communication with stakeholders as the project develops.

How to provide your input to HES

- Oral questions and answers, comments, and suggestions at this and subsequent meetings
- Staff will summarize oral inputs on flip charts and include in meeting record
- Advantage of oral discussion is synergy of ideas from multiple parties, and to discuss areas of disagreement
- Send in written comments, preferably via email
  - Best way to ensure your input is accurately reflected (recommend following up oral inputs with email input)
  - Easiest for us to manage
  - Please send by July 15, 2006
  - Please email comments to: HES2007@rmi.org

Future Stakeholder Meetings

Present and discuss initial ENERGY2020 Results	Late September
Present and discuss strategic options and strategic paths under consideration for recommendation	Late October
Review and comment on policy options and recommendations for implementation plan	Late November