

Topic 5: Alternative Scenarios Simulation

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Discussion Points

- **Simulation Model**
 - Production Modules
 - Financial Modules
- **Alternative Scenarios Simulation**
 - Objective
 - Approach
 - Outputs

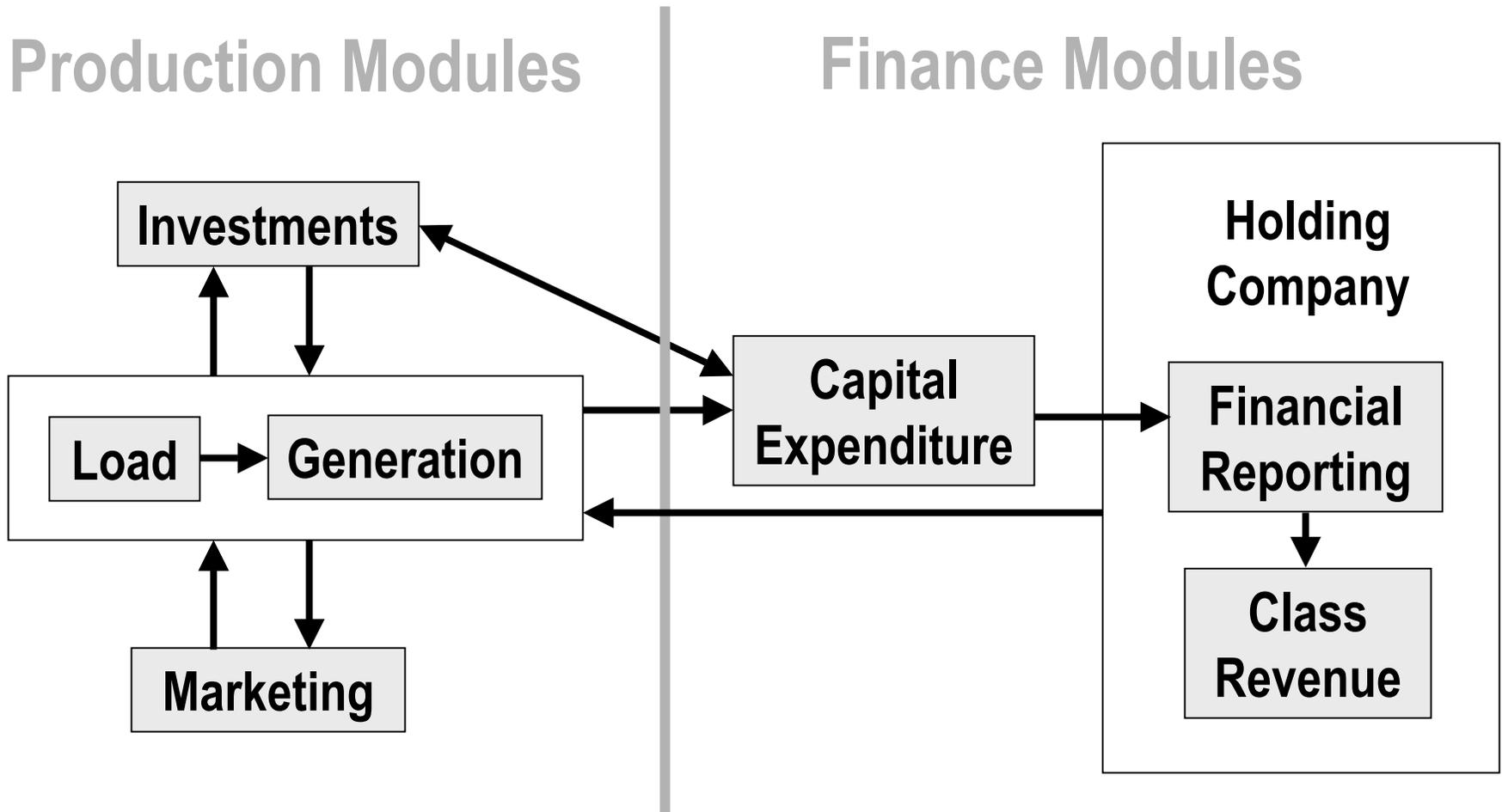


Simulation Model

Simulation Model Components

- **Production Modules (4)**
 - Load
 - Generation
 - Investments
 - Network trade
- **Finance Modules (4)**
 - Capital expenditure
 - Financial reporting
 - Class revenue/tariffs
 - Holding company

Model Schematic





Alternative Scenarios Simulation

Objective

- **Capture the operations of power markets in Hawaii over several future years under alternative regulatory regimes, such as PBR**
- **Simulation of island power markets**
 - Hawaii
 - Oahu
 - Maui
 - Molokai
 - Lanai
 - Kauai
- **Study period: 20 to 30 years**

Approach

- **Generation mix constrained to satisfy RPS**
- **Future consumption patterns**
- **Future opportunities for utilities to earn a reasonable rate of return**

Forecasts

- **Load profiles**
- **Fuel prices & supplies**
- **Generation & transmission capacity additions**

Scale, Timing, & Location of Investments

- **Gathering of suggestions on the scale, timing, & location of generation & transmission investments**
- **Simulation of renewable energy investments as part of a least-cost expansion plan**
 - **Consistent with the RPS**
 - **Encourages investments in renewables**

Alternative Regulatory Regimes

- **Replacement of cost-of-service regulation with alternative regulatory regimes, such as PBR, throughout the study period**
- **Variety of incentive regulatory regimes**
- **Alternative regulatory tools**
 - **Price caps**
 - **Revenue caps**

Price Caps & Investments

- Under price cap, tariff grows at a pre-determined rate
- Future revenues = $f(\text{load})$
- Future profits = $f(\text{tight cost control})$
- Future capital expenditures = $f(\text{future profits})$
- Future prospects of satisfying RPS = $f(\text{future capital expenditures})$

Financial Measures

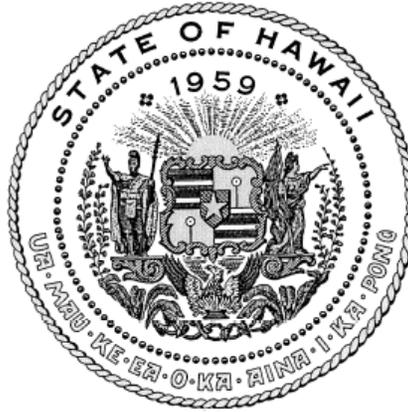
- **Possibly applied to preserve an opportunity for the utility to earn a reasonable rate of return**
- **Possibly applied if the utility is adversely affected by the effort to satisfy the RPS**
- **Social cost of satisfying the RPS under a particular PBR regime**

Penalties & Rewards

- **Non-compliance due to neglect or incompetence**
- **The need for a penalty if & when non-compliance occurs**
- **Nature, scope, & duration of penalties**

Outputs

- **Forecast of future conditions in island power markets**
- **Forecast electric utility rate designs**
- **Meaningful forecasts assuming alternative regulatory regimes, such as PBR**



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