California Energy Commission

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IEPR Energy Demand Forecast: Process and Methodology

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IEPR Forecast Process

- Biennual forecast, with updates as needed for resource adequacy proceedings
- Demand Forms and Instructions requested from LSEs at the end of the year prior to forecast
- Workshop on forecast assumptions (February 2011)
- Preliminary forecast/workshop (May 2011)

IEPR Forecast Process

- Revised forecast/workshop (August 2011)
- Adoption later in the year (November 2011)
- Feeds into LTPP and into Energy Commission infrastructure assessment
- Forecasts will address uncommitted component

IEPR Forecast

- Key outputs (8 planning areas and statewide)
  - Electricity and natural gas consumption
  - Electricity sales and net energy for load
  - Peak demand
  - Energy savings by source
  - Private supply (self-generation)

IEPR Forecast

- Key inputs
  - Survey data (UECs, saturations)
  - Econ-demo assumptions
  - Energy prices
  - QFER sales data
  - Program data (efficiency, self-gen)

IEPR Forecast Methodology

8 Planning Areas for Electricity

- Burbank/Glendale
- Imperial Irrigation District
- LA Department of Water and Power (LADWP)
- Pacific Gas and Electric (PG&E)
- Pasadena
- Southern California Edison (SCE)
- San Diego Gas and Electric (SDG&E)
- Sacramento Municipal Utility District (SMUD)

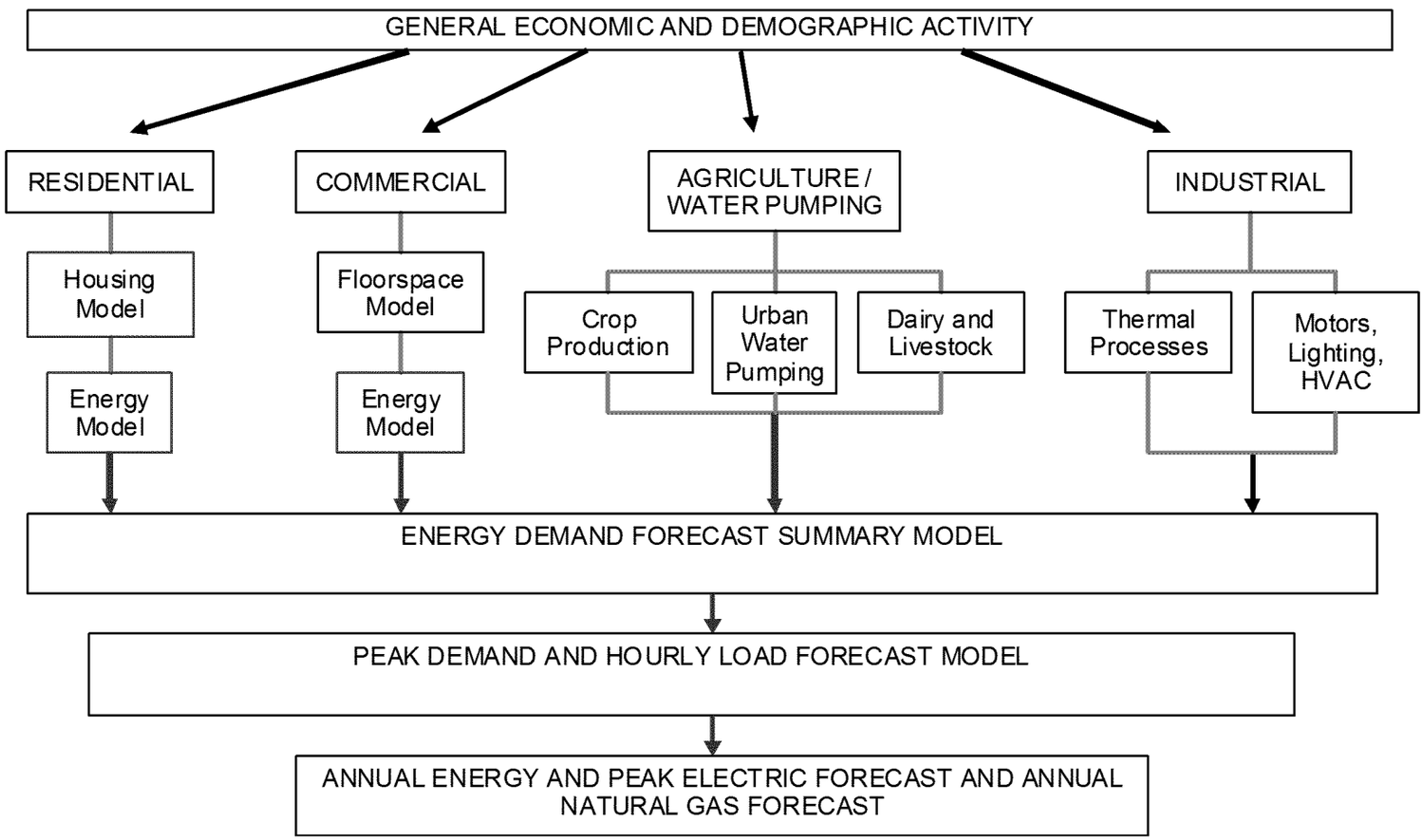
IEPR Forecast Methodology

Individual sector models for:

- Residential (end use)
- Commercial (end use)
- Industrial (econometric/end use)
- Agricultural (econometric)
- Transportation, communications, and utilities and street lighting (trend)

Summary and Peak models

Demand Forecast Structure



End-Use Models
Residential and Commercial

- Basic units: homes by type and square footage of commercial floor space by building type
- End-use level (lighting, cooling, cooking, etc.)
- Unit energy consumption times saturation times number of units
- UECs change over time with efficiency, price, income

Econometric Models

- Used for economic scenario analysis in 2009 IEPR forecast
  - Residential
  - Commercial
  - Industrial
  - Peak
- Integrate into current methodology

Electric Vehicle Forecast

- Calcars Model
  - Vehicle choice/quantity model
  - Choices among conventional gasoline, hybrid, diesel, natural gas, ethanol, dedicated electric, plug-in hybrid
  - Choice based on vehicle and HH characteristics
  - Estimates VMT and fuel use by vehicle type
- Critical input: projected vehicle characteristics

End-User Natural Gas Forecast

- By planning area: PG&E, SCG, SDG&E, and other
- Does not include natural gas used by utilities or others for electric generation
- Forecast produced with same models as electricity
- Updating natural gas efficiency program impacts

Energy Efficiency/Savings (Committed)

- Utility and Public Agency Efficiency Programs
- Building and Appliance Standards
- Naturally Occurring Savings

Building and Appliance Standards

- Energy Commission forecasting models incorporate building and appliance standards through changes in inputs
- End-use consumption per household in the residential sector and end-use consumption per square foot in the commercial sector
- To measure the impact of each individual set of standards, staff removes the input effects from standards one set at a time

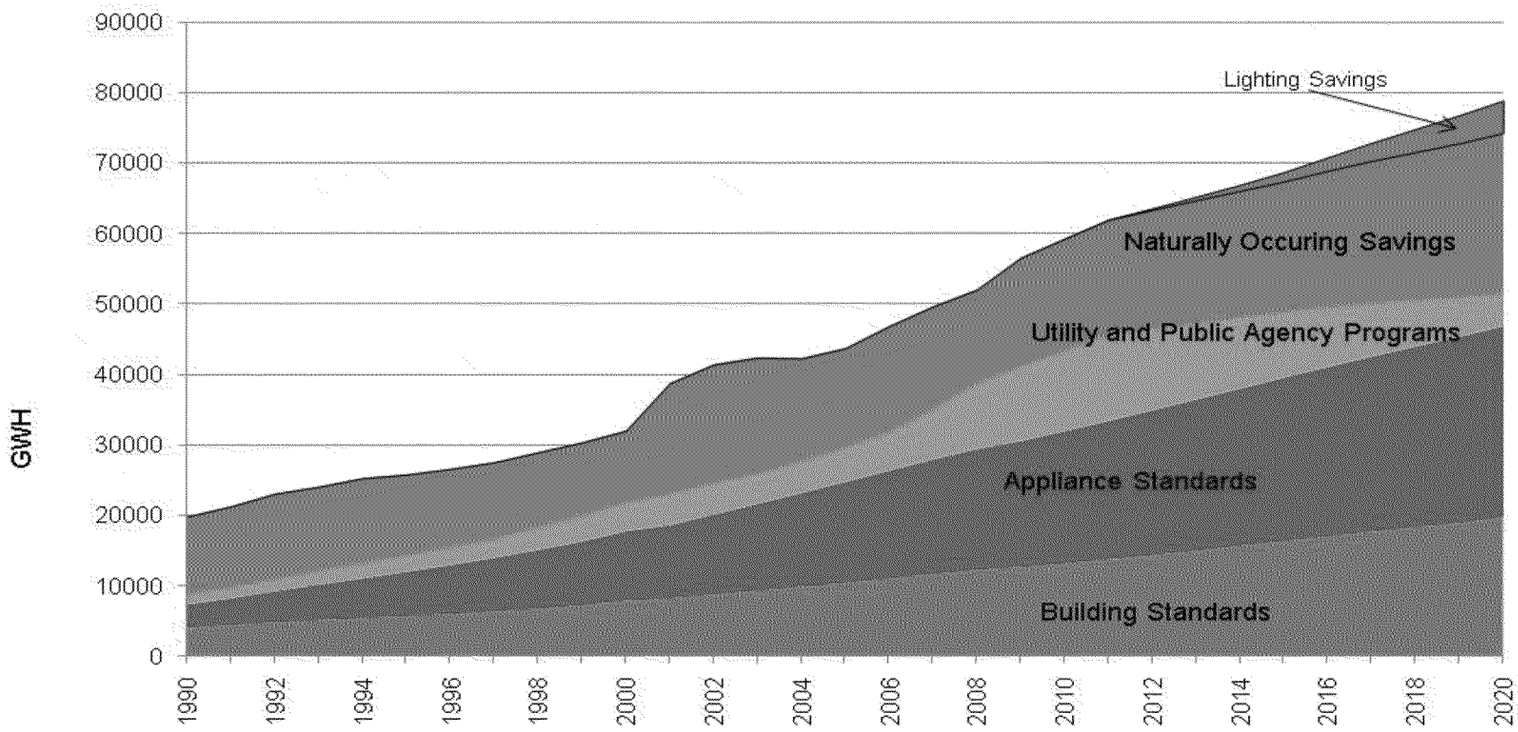
Efficiency Program Impacts

- Some impacts incorporated in models, others through “post-processing”
- Adjust reported program impacts for free-ridership (net-to-gross) and realization rate
- 2011 IEPR forecast will include IOU program impacts through 2012, POU impacts through 2011

Naturally Occurring Savings

- Meant to capture load impacts of changes in energy use not directly associated with standards or efficiency programs
- Focus on impacts that could overlap with programs and standards
- Includes impacts of rate changes (price effects) and lighting savings
- Terminology: taxonomy work

Electricity Consumption Savings by Category



Self-generation

- ERP, CSI, SGIP, NSHP, POU Programs
- Big industrial and commercial users
- Photovoltaic and solar water heating system residential predictive model for 2011 IEPR forecast
- Trend analysis for other technologies/sectors

For 2011 IEPR Forecast

- Incorporate RASS
- Incorporate CEUS
- Statistically adjusted calibration
- Price elasticities
- Econometric models
- PV predictive model

For 2011 IEPR Forecast (efficiency)

- Incorporate 2006-08 EM&V study results
- Update natural gas efficiency program impacts
- Overlap between standards and programs
- New standards
- Industrial efficiency program savings
- Price elasticities
- Macro-consumption metric?

For 2011 IEPR (uncommitted efficiency)

- Estimate the *incremental* impacts of likely efficiency initiatives for the 2013-2022 period not incorporated in the IEPR forecast, accounting for overlap between these initiatives and efficiency savings in *IEPR* forecast
- Adopted SESAT model
- 2009 IEPR included IOUs only; 2011 IEPR will also include LADWP and SMUD

Efficiency Programs: Outstanding Issues

- Attribution
- Measure decay
- “Take back” and “rebound” effects
- Impact of economy on utility programs

DMME Effort

- Multi-resolution modeling paradigm
- Incorporation of uncertainty
- Transparent IEPR process
- Higher quality input data