



KIUC Integrated Resource Planning

**A Process for Meeting the
Electrical Needs of Kauai's
People**



Integrated Resource Planning

- **Also known as “IRP” or “Expansion Planning**
- **Required by the Hawaii Public Utilities Commission**
- **Guided by the “IRP Framework”**



Integrated Resource Planning: Goal

“The goal of integrated resource planning is the identification of the resources or the mix of resources for meeting near and long-term consumer energy needs in an efficient and reliable manner at the lowest reasonable cost.”



IRP: Concept

- **Set objectives**
- **Determine needs over the 20-year period**
- **Identify resources**
- **Mix resources in multiple plans**
- **Analyze plans**
- **Rank and select preferred plan**



IRP: 4 Steps

- **Planning**
 - **Performed every 3 years for a 20-year horizon**
- **Programming**
 - **Action plan covering a 5-year period**
- **Implementation**
 - **Execution of the action plan**
- **Evaluation**
 - **Determine effectiveness in meeting objectives**



2006 IRP Objectives

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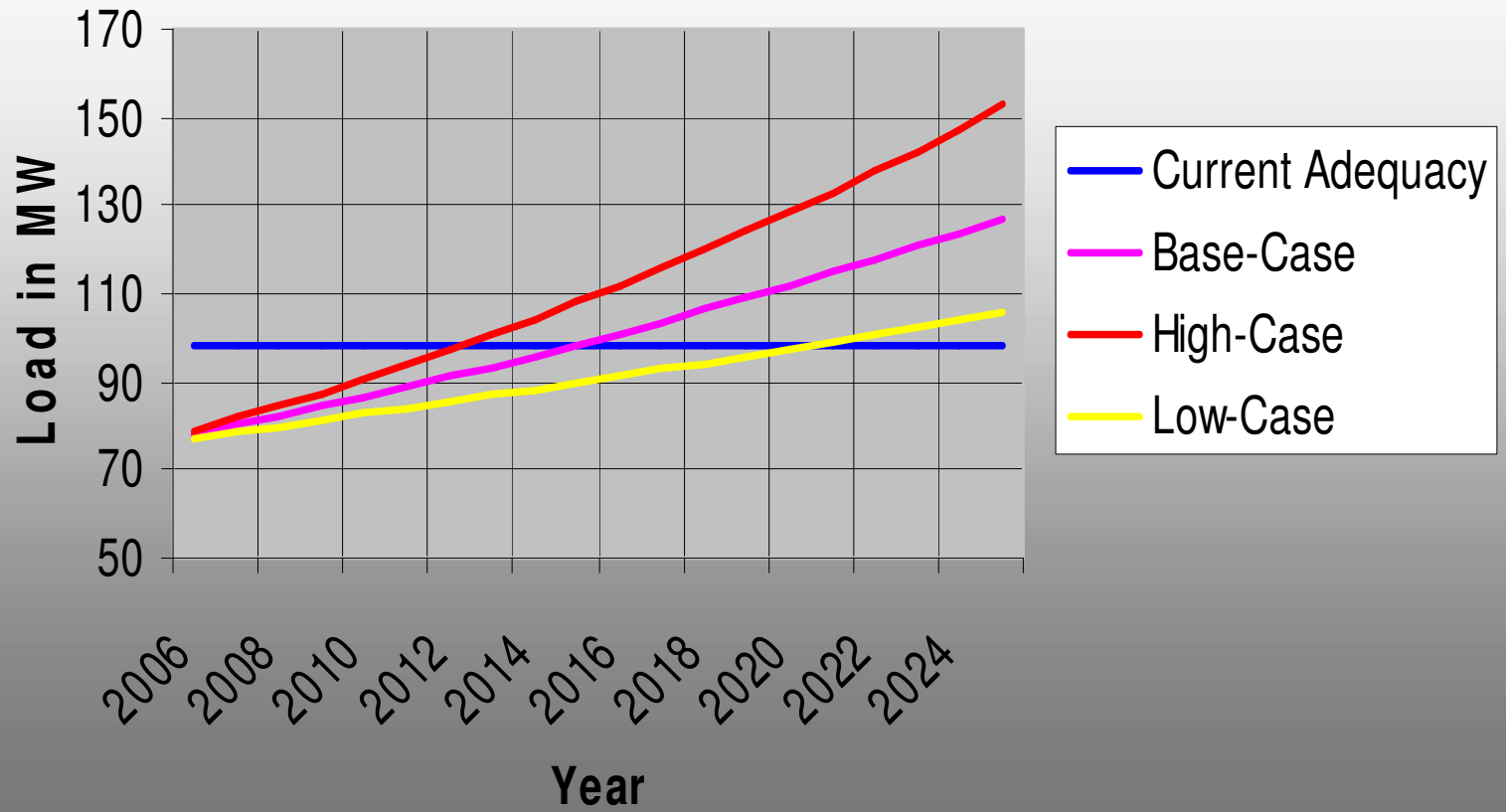
Category	IRP Objective
Overall Goal	Provide reliable supply at lowest reasonable cost
Reliability	Quick system recovery after disaster
	Actionable plan
	Diversify energy supply
	Meet adequacy of supply requirements
Customer Satisfaction	Stabilize rates
	Maintain or improve power quality
	Meet or exceed environmental, health, and safety requirements
	Balance reliability and economics with cultural and social impacts
Renewable Energy	Meet or exceed the Renewable Portfolio Standard (RPS)
	Encourage DSM and energy efficiency
Financial	Optimize heat rate
	Align with Equity Management Plan
	Optimize system losses
	Pursue system load factor improvement



2006 IRP Power Needs Forecast

- **Forecast power Kauai's power requirements over a 20-year period.**
- **Work with County of Kauai, developers, and local entities to determine future growth outlook.**
- **Create a “range of forecast” consisting of base, high, and low growth scenarios**

Load Forecast Scenarios

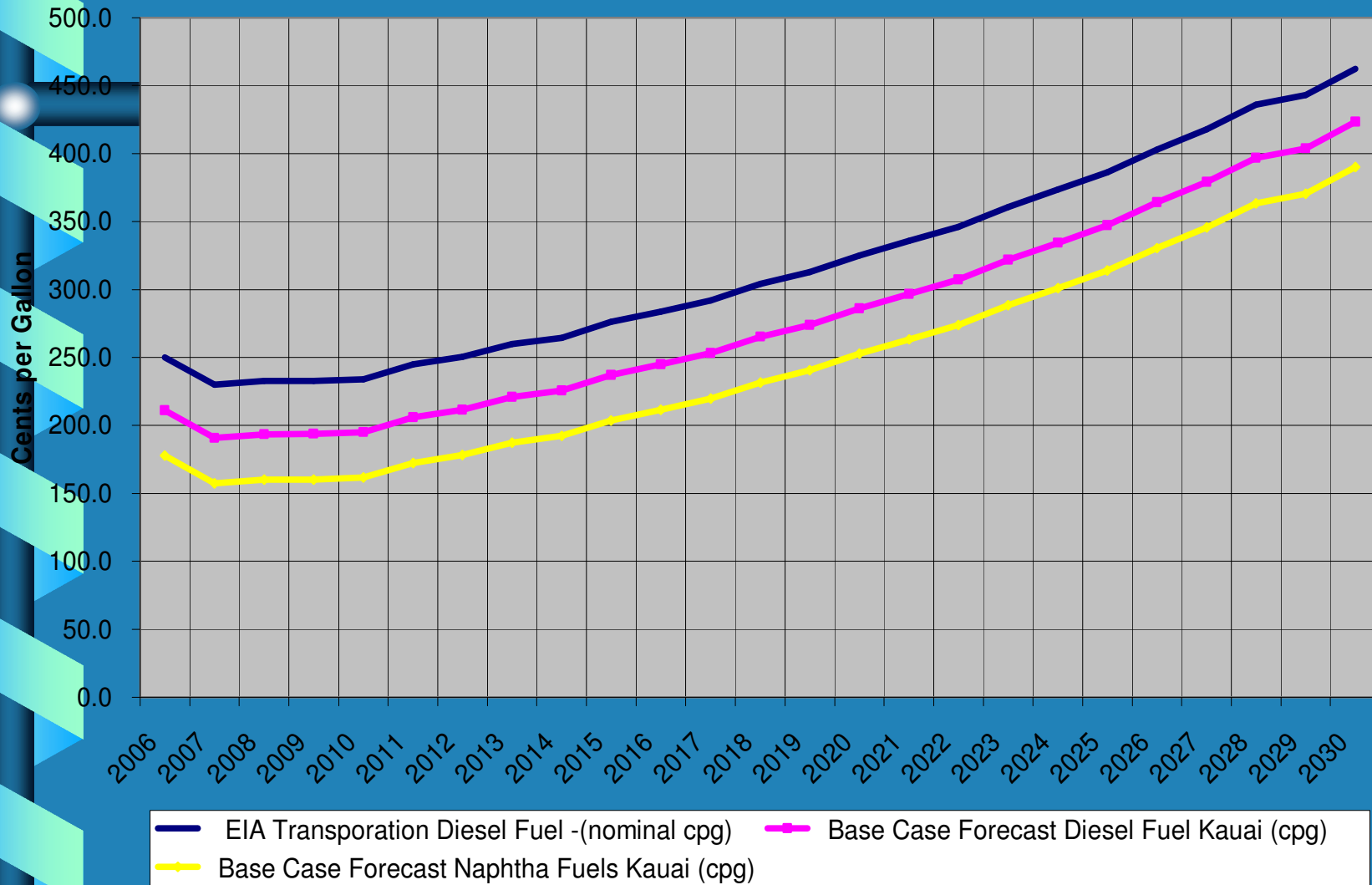




2006 IRP Fuel Forecast

- **Forecast cost of fuel over 20-year period**
- **Performed by Stillwater Associates of Irvine CA.**
- **Forecasted for various fuel types**
 - **Diesel**
 - **Naphtha**
 - **Biodiesel**
 - **Coal**

2006 IRP Fuel Forecasts





2006 IRP Resources

- **Generation or “supply-side” resources**
- **Energy Efficiency or “demand-side” resources**



Transition to Renewable Energy

- **Reduce dependency on imported fuel**
- **Stabilize electric rates**
- **Accomplish in a “low risk” manner**
 - **Cost is an issue**
 - **Power reliability is an issue**
 - **Power stability is an issue**



Three-Level Approach

- **Improve generation and consumer efficiency**
- **Implement replacement fuels**
 - **Converts current units to renewable resources**
 - **Mitigates “stranded assets” problem**
- **Pursue new renewable generation projects**



Generation Efficiency

- **Improve heat rates**
 - **New oil-fired units must be efficient and capable of burning biofuels.**
 - **New units must be dispatchable to displace older, less efficient units.**
 - **Identify sources of “waste heat” and convert to usable energy.**



Customer Efficiency

- **Continue to pursue energy efficiency programs.**
- **Provide consumer education, encourage responsible attitude towards efficiency energy use.**
- **Create incentives for efficient use of energy.**



Fuel Replacement

- **Determine potential for existing equipment to burn biofuels.**
- **Identify sources for biofuels.**
- **Encourage local “feedstock” production.**
- **Current KIUC efforts to incorporate biofuel use in existing generation equipment**



New Renewable Energy Projects

- **KIUC's current opportunities to engage in Purchase Power Agreements with 4 renewable energy developers.**
- **Future development of firm capacity sources**
- **Timing of next required capacity is in our favor right now.**



IRP Supply-Side Resources

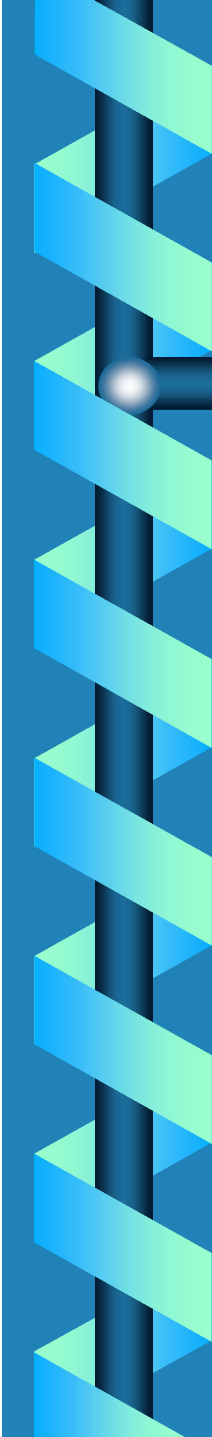
**Conventional (Biofuel
Compatible) and
Renewable Resources**

Supply Side Options - Conventional

Technology	Net Plant Capacity, MW	Net Plant Heat Rate, Btu/kWh
Simple Cycle CT	5 to 25	8,645 to 11,970
Simple Cycle DE	2 to 22	8,328 to 8,905
Combined Cycle CT	6 to 63	7297 to 9,629
Combined Cycle DE	12 to 37	7,711 to 7726
Thermal Steam	30	12723 to 13,322
Waste Heat Recovery	2.63 to 3.72	N/A
GT-1 Repowering	26 to 29	8235 to 9,066
STIG	26	9,371

Supply Side Options - Renewable

Technology	Net Plant Capacity, MW	Net Plant Heat Rate, Btu/kWh
Biomass	20	15,400
Landfill Gas	0.8	11,500
Waste-to-Energy	7.3	18,700
Hydroelectric	0.3 to 6.6	N/A
Wind	2 to 6.6	N/A



“Green Energy” Programs

- **Net Metering**
- **Solar Water Heating**
- **Green Rates**



IRP Demand-Side Resource

**Energy Efficiency Programs
and Incentives to be More
Efficient**



Current Programs

- **Commercial Retrofit Program**
 - Available since 1998
 - As of 12/31/2005: 1,135 audits performed
 - Provides services to all classes of commercial and industrial customers.
 - Also addresses new construction opportunities



Current Programs

- **Residential Programs**
 - **Appliance rebates**
 - **Solar water heater loan and rebates**
 - **New customer CFL giveaway**
 - **Home visits provided on request**



In Summary...

- **KIUC efforts encompass a comprehensive range of resources**
- **KIUC is striving to maintain a balance between cost, power reliability, and lessened fossil fuel dependency**
- **KIUC uses the IRP process to identify, analyze and implement resources in the most effective way possible.**