

**KAUA'I ISLAND UTILITY COOPERATIVE  
SCOPING DOCUMENT FOR  
2006 INTEGRATED RESOURCE PLAN**

**February 17, 2006**

## I. Introduction

In 1997 Kaua'i Electric (KE), a division of Citizens Communications Company, prepared an integrated resource plan (IRP). Kaua'i Island Utility Cooperative (KIUC) purchased KE in 2002. Neither KIUC nor KE have prepared an IRP since 1997.

KIUC management is in the process of preparing an Integrated Resource Plan. This plan, prepared in accordance with Hawaii Public Utilities Commission's "A Framework for Integrated Resource Planning"(Framework) is scheduled to be completed 2<sup>nd</sup> quarter 2006. The Framework specifies that:

"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."

At the beginning of each planning cycle, KIUC Management will prepare and submit to the Board of Directors a Scoping Document that specifies objectives that the plan will seek to achieve, the planning horizon, and the data and analytic methods that will be utilized.

This document constitutes the Scoping Document for development of the 2006 integrated resource plan.

## II. Objectives to Guide Development of the 2006 IRP

### *Objectives and the KIUC Mission Statement*

According to the *2004 Planning Report*, KIUC's Mission Statement is:

"To provide high quality, reliably and competitively valued electric service in a safe and environmentally responsible manner consistent with sound business practices and the seven cooperative principles, and to improve the quality of life for our members and for Kaua'i."

The IRP Objectives described herein broadly address KIUC's Mission Statement.

### *The Purpose for Objectives*

The purpose for IRP objectives is to provide a focus for the plan. Though much of the IRP development is based on the consumers' need for electricity and the physical resources that can meet that need (utility's mandate to provide "<sup>1</sup>reliable", "<sup>2</sup>adequate", and "<sup>3</sup>secure" resources), there are opportunities to select the resources and strategize

---

<sup>1</sup> Reliability is a measure of how well a system performs its expected function.

<sup>2</sup> Adequacy refers to having sufficient resources to serve loads reliably.

<sup>3</sup> Security is the ability of a system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.

their implementation in such a way that specific objectives can be met. Another way to look at this is, that during the course of plan development, KIUC's staff will be faced with many decisions. These decisions should be made with defined objectives in mind and represent the best combination of resources and strategies for meeting these objectives.

### *Objective Development and KIUC Board of Directors Approval*

When KIUC staff developed the IRP objectives, care was taken not to create any preconceived conclusions. As an example, one might recommend that inclusion of distributed generation (DG) in the IRP should be an objective. Rightfully, DG should be one of the resources to be considered, however, defining this as an objective would indicate a preconceived bias towards distributed generation exist at the onset of planning and might interfere with an objective analysis of other options. A better way to address DG is to state objectives that take into consideration the character of DG, such as, (a) pursue diversification of energy supply, (b) quick recovery after disaster, or (c) optimize system losses.

Objectives must also be measurable. One should be able to state the criteria by which the achievement level of an objective can be determined. All Hawaii utilities are required by the Hawaii Public Utilities Commission (HPUC) to annual provide updates that include the status of each IRP objective.

The Framework also states "The utility may specify any other utility-specific objective that it seeks to achieve through its integrated resource plan." These objectives are the subject of this scoping document and are subject to Board approval. Lastly, the HPUC "may specify other objectives for the utility. Such specifications, if any, shall be included in the order opening a docket for integrated resource planning at the commencement of each planning cycle." As of this writing, the HPUC has not yet opened the 2006 integrated resource planning docket. Subsequently, no HPUC stated objectives have yet been identified.

### *Objective Measures*

Measurement of objective attainment is an important aspect of an IRP. Providing measurable objectives is a way of holding KIUC accountable for their plans to meet their mandate for reliable, adequate, and secure resources while pursuing other non-mandated philosophies such as pursuit of renewable energy, energy efficiency, distributed generation and combined heat and power evaluations.

Measurement of the IRP objectives detailed in Table 1 will be performed on an annual basis to ascertain the levels of achievement of the IRP objectives. Results will be reported in subsequent Action Plan and IRP updates. Most measures are based on the comparison of historical utility records and are consistent with many of the regulatory requirements for reporting of system operational statistics. Thus, KIUC will use baseline

measurements that are already recorded. In addition, KIUC will monitor all measurements in a consistent manner KIUC will, as part of its action plan, further refine and quantify criteria and annual achievement goals for each objective.

*Objective Categories*

The objectives have been categorized to apply to one of five broad categories. The categories are: (1) Overall goal, (2) Reliability, (3) Customer satisfaction, (4) Renewable energy, and (5) Financial. Within each category, one or more objectives have been defined. Each objective is linked to the strategic plan element(s) it addresses. A criterion for measurement has been defined for each objective.

*Objectives*

The IRP objectives, their categories, measurement criteria, and relationships to the KIUC 2006 Strategic Initiatives are summarized in Table 1 below.

**2006 IRP Objectives**

Category	IRP Objective	Aligns with 2006 KIUC Strategic Plan Goal#	Criteria	Measurement
Overall Goal	Provide reliable supply at lowest reasonable cost	3.A.1	Annually - Meet framework requirements for updates/IRP	
Reliability	Quick system recovery after disaster	1.A.1, 1.A.2, 1.B.2	Annually - Review disaster plan and emergency response plan	Continued compliance with standards and policies
	Actionable plan	1.A.1, 1.A.2, 1.B.2	Annually - File IRP or update	Status of DSM/supply side projects
	Diversify energy supply	1.A.3, 1.A.4, 1.A.7	Monthly - Monitor unit and PPA availability by fuel supply	% contribution of each to total availability
	Meet adequacy of supply requirements	1.A.1, 1.A.3	Annually - File Adequacy of Supply statement with PUC	Reserve margin
Customer Satisfaction	Stabilize rates	1.A.4, 1.A.7	Monthly - Track effective rates	% change over time
	Maintain or improve power quality	1.B.2	Annually - Track reported power quality incidents	Number of incidents
	Meet or exceed environmental, health, and safety requirements	1.A.7	Monitor per compliance requirements	Above or below specifications or requirements
	Balance reliability and economics with cultural and social impacts	1.A.6	As activity occurs - Review site selection activity	
Sustainable Energy	Meet or exceed the Renewable Portfolio Standard (RPS)	1.A.3, 1.A.7	Monthly - Monitor renewable generation output	Compare to RPS
	Encourage DSM and energy efficiency	1.A.7	Annually - Report as required by IRP Framework, M&E Plan	kW, kWh saved
	Reduce greenhouse gas emissions		Annually calculate	Ton/Year, lbs/kWh
Financial	Optimize heat rate	1.A.3, 1.B.2	Monthly - Monitor heat rate	% change over time
	Align with Equity Management Plan	3.A.1, 3.B.1	Monthly - Monitor financial reports	Compare to EMP projections
	Optimize system losses	1.A.1, 1.A.2	Monthly - Report system losses	% unaccounted for energy
	Pursue system load factor improvement	1.B.2	Monthly - Report system load factor	% Load factor

Table 1

The above IRP Objectives were approved by KIUC’s Board of Directors during the December 13, 2005 Board of Director Meetings.

### *Special Issues*

In addition to these objectives, KIUC staff also recommends that the 2006 IRP evaluations include the following “special issues”:

- ❖ Due to the age and condition of the GT1 unit, KIUC faces a decision about whether or not to replace the unit.
- ❖ Consideration of a Battery Energy Storage System (BESS) to address power quality, reliability, and production cost issues.
- ❖ Evaluation of distributed generation

### **III. Planning Horizon for 2006 IRP**

The planning horizon for the 2006 IRP will be 20 years, i.e., 2006 – 2025. The 20-year horizon is frequently used in the electric utility industry because it allows consideration of the impacts of any long-lived (e.g., 30 years) major investments that will be identified in this IRP. Shorter planning horizons tend to provide less accurate estimates of the long-term impacts of the investments while longer planning horizons are more expensive to implement.

In addition to the 20-year planning horizon, a 5-year action plan will be developed that identifies future KIUC activities..

### **IV. Data and Analytic Methods to be Used in 2006 IRP**

KIUC Management is planning to use the following technical approaches to perform the 2006 IRP:

1. Forecast loads – KIUC will collect historical load, economic, and demographic data, as well as forecasts of future economic and demographic conditions; and will also hold discussions with government economic development officials and developers about their future plans. KIUC will analyze these data using standard econometric methods to develop probabilistic forecasts of future electric energy requirements.
2. Forecast fuel prices – KIUC will collect historical Hawaii-specific and world fuel price data, as well as forecasts of future world fuel prices, and analyze these data using standard econometric methods to develop probabilistic forecasts of future Hawaii-specific fuel prices.
3. Develop characteristics of potential demand- and supply-side resources – KIUC will assemble comprehensive information about the characteristics, including capital and operating costs and available capacity, of all renewable supply- and demand-side resources appropriate to Kaua’i. In

addition, characteristics data for potential non-renewable supply-side resources will be developed. These data will be collected from standard industry publications as well as surveys of renewable and demand-side management potential in Kauai.

4. Consideration of non-economic and risk factors – Standard practice in electric industry integrated resource planning is to encourage use of specific types of resources through the consideration of non-economic factors that are weighted as part of the overall evaluation of an option and expansion plan. While such weighting necessarily has a degree of subjectivity, the weighting will be done on an open basis and staff will consider input from interested parties. In addition, because uncertainty about future rates is a component of the objective, it will be necessary to specify the degree (or degrees) of risk aversion to be used in the analysis. Typically, risk aversion is expressed as the percentile of the probability distribution that will be protected against, e.g., select resources to protect against the 10 percent worst possible outcome. KIUC Management is planning to use a range of risk aversion levels, ranging from 50 percent (i.e., no risk aversion) to 5 percent.
5. Develop IRP model of KIUC system – KIUC will develop a model of the KIUC system that addresses the following three factors:
  - a. Reliability – For specified loads and resources, the module will calculate the reliability of the system.
  - b. Power Supply Costs – For specified loads, fuel prices, and resources, the module will calculate the annual power supply costs, which consist of capital, fuel, and operations and maintenance (O&M) expenses at the generating stations; and capital and operations costs of demand-side management programs. All costs will consider the time value of money.
  - c. Investment Module – For a specified level of reliability, weighting criteria, and risk aversion level, the module will select the portfolio of resources that minimizes rates at the specified risk aversion level.
6. Execute IRP model and develop alternative resource plans – The model developed in step 5 will be executed a number of times, with varying settings of reliability, criteria weighting, and risk aversion levels. For each such setting, a different resource plan will be developed.

Following development, each plan will be characterized in terms of the objectives listed above, i.e., expected effective rates, uncertainty about effective rates, expected outage levels, financial integrity as specified in

the EMP (e.g., equity / capital ratio), environmental quality (e.g., emissions), and other key metrics.

7. Rank alternative plans and select preferred plan – Of the alternative plans developed in step 6, no single plan will best achieve all six of the objectives. A decision analysis approach will be used to rank the alternative plans in terms of the metrics calculated in step 6 and select the preferred plan.