

## **6.0 Renewable Energy Financial Incentives**

A number of financial incentives are available for the installation of renewable energy and conversion technologies. These incentives can be of great significance because they often make the difference between a non-viable and a viable project, and can substantially influence profitability. Careful thought should be put into determining which incentives apply to each new project, and how to best take advantage of such incentives. The following discussion provides a list of existing and proposed programs that are available to new energy facilities.

It should be noted that the intent of this section is to provide general information on available incentives. Black & Veatch cannot provide tax advice concerning the implications of the specific incentive programs. Furthermore, although many of these incentives are designed as tax credits, it may still be possible for non-taxable entities, such as KIUC, to claim them by establishing facility ownership through a third-party taxable entity or other project structures.

This section describes the federal incentives available to renewable energy projects and other non-government programs designed to capture the value of renewable energy.

### **6.1 Federal Financial Incentives**

The federal government began providing significant incentives for alternative energy during the oil embargo in the 1970s. The government has spent over \$14 billion on research and development activities, in addition to tax and financial incentives for project development and energy production. The federal incentives reviewed for this project include the following

- Section 45 Tax Credit (Production Tax Credit)
- Reduced Depreciation Life
- Renewable Energy Production Incentive (REPI)
- Investment Tax Credit
- Farm Security and Rural Investment Act of 2002 Incentives
- Rural Economic Development Loan and Grant Program
- RUS Electric Loan Program
- High Energy Cost Grant Program
- Tribal Energy Program
- Miscellaneous Loan Guarantee and Grant Programs
- Federal Green Power Purchasing Goal

**6.1.1 Production Tax Credit (Section 45)**

The Section 45 tax credit (Production Tax Credit or PTC) is available to private entities subject to taxation for the production of electricity from various renewable energy technologies. The PTC formerly applied only to the production of electricity from wind, “closed-loop” biomass, and poultry waste, and had expired at the end of 2003. In October 2004, with the passing of the American Jobs Creation Act, the PTC was extended through December 31, 2005 and was expanded to include the following resources:

- “Open-loop” biomass
- Geothermal energy
- Solar energy
- Small irrigation hydropower
- Biomass cofiring
- Municipal solid waste (trash combustion and landfill gas)<sup>46, 47</sup>

Table 6-1 shows the provisions of the production tax credit, as revised by the American Jobs Creation Act.

<b>Table 6-1. Production Tax Credit Provisions.</b>					
<b>Resource</b>	<b>Eligible In-service Dates</b>	<b>Credit Size *</b>	<b>Term (years)</b>	<b>Transferable Credit?</b>	<b>Capacity Req.</b>
Wind	12/31/93 - 1/1/2006	Full	10	No	None
Biomass					
Closed-Loop	12/31/92 - 1/1/2006	Full	10	No	None
Closed-Loop Co-Firing	Before 1/1/2006	Full (% biomass heat input)	10	Yes**	None
Open-Loop	Before 1/1/2006	Half	5	Yes**	None
Livestock Waste	10/22/04 - 1/1/2006	Half	5	Yes**	>150 kW
Poultry Waste	12/31/99 - 1/1/2006	Full	10	No	None
Geothermal	10/22/04 - 1/1/2006	Full (can't also take ITC)	5	No	None
Solar	10/22/04 - 1/1/2006	Full (can't also take ITC)	5	No	None
Small Irrigation	10/22/04 - 1/1/2006	Half	5	No	150 kW – 5 MW
Landfill Gas	10/22/04 - 1/1/2006	Half (can't also take Sec. 29)	5	No	None

<sup>46</sup> Database of State Incentives for Renewable Energy, “Renewable Electricity Production Tax Credit,” available at [www.dsireusa.org](http://www.dsireusa.org).

<sup>47</sup> House Ways and Means Committee, “American Jobs Creation Act of 2004,” available at [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108\\_cong\\_bills&docid=f:h4520enr.txt.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h4520enr.txt.pdf).

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Municipal Solid Waste	10/22/04 - 1/1/2006	Half	5	No	None
Refined Coal	10/22/04 - 1/1/2009	\$4.375/ton	10	No	None

Notes:

\* All PTCs are inflation-adjusted and equaled \$18/MWh (“Full”) or \$9/MWh (“Half”) in 2004.

\*\* The plant operator or lessee may receive the PTC.

Qualifying closed-loop biomass is defined as biomass grown exclusively for energy production. Open-loop biomass includes agricultural livestock waste, any solid, non-hazardous cellulosic waste (e.g., forestry residues, mill residues, tree trimmings, etc.), urban wood waste, and other agricultural wastes. Geothermal energy includes only production of electricity. Small irrigation hydropower refers to hydro generation facilities between 150 kW and 5 MW that generate power in an irrigation canal without the use of dams or impoundments. Municipal solid waste includes power generation with landfill gas and waste-to-energy (WTE) plants. Power generation facilities cofiring biomass with a fossil fuel, such as coal, are also included, provided that the biomass fuel meets the definition of closed-loop biomass.

The window of eligible in-service dates for the PTC varies by technology, but all technologies must currently be placed in service before January 1, 2006 (unless the incentive is extended at a later date). The credit is available for 10 years after the plant is placed in operation (or when the plant applies for the incentive, in the case of cofiring) for wind, closed-loop biomass, and facilities cofiring with closed-loop biomass. The credit is available for 5 years after the plant is placed in operation (or when the plant applies for the incentive, in the case of open-loop biomass) for open-loop biomass, geothermal, solar, small irrigation power, landfill gas, and WTE facilities.

Generally, to qualify for the PTC, a facility must be owned and operated by the taxpayer, and the electricity must be sold to an unrelated party. Not all corporate entities can utilize the tax credit, but for those that can, it serves to reduce their federal tax burden. The income tax credit amounts to 1.5 cents/kWh (subject to annual inflation adjustment and equal to 1.8 cents/kWh in 2004) of electricity generated by wind, solar, geothermal, and closed-loop biomass. The credit is equal to 0.75 cents/kWh (inflation adjusted, equal to 0.9 cents/kWh in 2004) for all other technologies. Any unused portion of the credit may be rolled back one year, or carried forward for 20 years.

The tax credit is proportionally reduced to zero if the national average contract price of electricity from a resource exceeds a “threshold price” of 8 to 11 cent/kWh (subject to annual inflation adjustment). To date, the price of electricity from eligible resources has remained well below the threshold price. However, only wind has taken advantage of the credit so far, and the impact of this provision on higher price resources, such as solar, could be substantial. The credit is also reduced by no more than half for

construction-related grants, proceeds from tax-exempt bonds, subsidized energy financing, and any other credit allowable for property that is part of the project (collectively known as the Section 45 “anti-double-dipping provisions”). The general nature of this language means that the interaction of other federal and state incentives with the PTC is still somewhat unclear, though at least some indication of the IRS’ thinking can be gleaned from reviewing private letter rulings issued to taxable entities seeking specific guidance related to the Section 45 credit.<sup>48</sup> For example, private letter ruling 200311021 implies that state production tax credits will not trigger the Section 45 anti-double-dipping provisions.<sup>49</sup> In general, incentives that provide up-front capital or construction-related support are more likely to trigger anti-double-dipping provisions than incentives that provide production-related support.

A new provision included with the expansion of the PTC allows parties other than the owner to receive the production tax credit for certain technologies. For closed-loop co-firing and open-loop biomass facilities, the plant operator, who is not necessarily the plant owner, may receive the PTC through a lease financing arrangement. For other technologies the owner of the project is the recipient of the PTC.

In the past, this credit has been extremely successful in encouraging development of wind energy but not biomass due to the very restrictive qualifications placed upon biomass before the most recent expansion of technology eligibility. In fact, no biomass plant has taken advantage of the credit to date. However, this will likely change with the expansion of the PTC, which now includes open-loop biomass facilities. A problem with the credit is the seemingly ever present threat of expiration, which promotes boom and bust building patterns. Various long-term extensions of the PTC were included with drafts of the 2003 Omnibus Energy Bill, but other controversial components of the bill prevented it from becoming law.

**Implication for KIUC:** This credit has historically been used to reduce the cost of wind generated electricity by 20-40 percent. The expansion of the credit is very significant, as it now includes all the technologies characterized in subsequent sections of this report. As a tax credit, the incentive has not been directly available to public entities, although alternative project structures could allow the value of the PTC to be captured. Although the credit is only available through 2005, it is expected that this will be extended.

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<sup>48</sup> Ryan Wisner, Mark Bolinger; Ernest Orlando Lawrence Berkeley National Laboratory, “Analyzing the Interaction Between State Tax Incentives and the Federal Production Tax Credit for Wind Power,” September 2002.

<sup>49</sup> It is important to note that private letter rulings apply only to the taxable entity that requested the ruling, and should not be considered general tax guidance or precedent-setting.

### **6.1.2 Investment Tax Credit**

The Investment Tax Credit is a 10 percent federal tax credit for purchases of solar and geothermal energy equipment. Only commercial entities can take this tax credit; there is no corresponding residential tax credit yet (the Bush administration has proposed a 15 percent solar tax credit for homes). Solar equipment eligible for the incentive includes solar electric and solar thermal systems. Up to 25 percent of the energy input to the system can be from non-solar sources (e.g., small gas turbines used to firm production), but this portion does not qualify for the credit.

If an investment in or purchase of solar property has been financed in part or in whole by subsidized energy financing or tax-exempt private activity bonds, then only the unsubsidized portion of the investment or purchase is eligible for the tax credit. For example, if \$25,000 of a \$50,000 purchase of solar property was financed by tax-exempt private activity bonds, then only a credit of \$2,500 can be taken (10 percent of the \$25,000 that was not subsidized). If financing for the entire \$50,000 was subsidized, no tax credit can be taken. Further, the tax credit is limited to \$25,000 per year, plus 25 percent of the total tax remaining after the credit is taken. The credit may be applied to the three preceding years and carried forward 15 years.<sup>50</sup>

As discussed previously, the production tax credit has been expanded to include geothermal and solar technologies. The language of the production tax credit extension does not allow claiming of both the PTC and the ITC. Project developers must choose one or the other. Further, the ITC also interacts with accelerated depreciation, as discussed further below.

**Implication for KIUC:** As with the other tax credits, the Investment Tax Credit is not directly applicable to KIUC. Additionally, for capital intensive solar projects, it is likely not advisable to surrender tax-exempt financing capability for the one-time 10 percent credit.

### **6.1.3 Accelerated Depreciation**

Section 168 of the Internal Revenue Code contains a Modified Accelerated Cost Recovery System (MACRS) through which certain investments in biomass, solar, wind, and geothermal property can be recovered through accelerated depreciation deductions. There is no expiration date on the program. Under this program, certain power plant equipment may qualify for 5-year, 200 percent (i.e., double) declining-balance

<sup>50</sup> US Department of Energy, "Financial Incentives for a Business to Invest in Renewable Energy Systems," available at <http://www.eren.doe.gov/consumerinfo/refbriefs/la7.html>, December 2000, accessed August 19, 2001.

depreciation, while other equipment may also receive (less) favorable depreciation treatment. Renewable energy property that will receive the 5-years MACRS includes:<sup>51</sup>

- Solar property that meets the same standards for eligibility required by the federal 10 percent investment tax credit.
- Wind property, including wind turbines, wind electric generators, storage devices, power conditioning equipment, transfer equipment, and related parts, up to the electrical transmission stage, subject to the same 25 percent limit on dual-fueled equipment required for solar property.
- Geothermal property including equipment used to produce, distribute, or use energy derived from a geothermal deposit, but only in the case of electricity generated by geothermal power, up to the electrical transmission stage.
- Biomass plants 80 MW or less that directly burn at least 50 percent biomass to generate electricity. Equipment that qualifies includes material handling, boilers, pollution controls, and other equipment involved in the production of electricity. If the facility is not considered a qualifying small power production facility, it can still qualify for 7-year, 200 percent declining-balance depreciation on certain equipment. The power plant must burn the biomass directly to qualify. Landfill gas and digester gas are not eligible under this definition.<sup>52</sup>

The accelerated depreciation law also specifies that the depreciable basis is reduced by the value of any cash incentives received by the project, and by half of any federal investment tax credits (e.g., the ITC). This provision has the effect of lowering the depreciable basis to 95 percent for projects that receive the ITC but no other cash incentives.

**Implication for KIUC:** Accelerated depreciation has a significant benefit for taxable entities, especially when combined with the Production Tax Credit above, but would not be applicable to KIUC unless working through a taxable entity.

#### **6.1.4 Renewable Energy Production Incentive**

The Renewable Energy Production Incentive (REPI) program was developed as a public sector counterpart to the PTC (Section 45) discussed previously. The program had

<sup>51</sup> US Department of Energy, "Financial Incentives for a Business to Invest in Renewable Energy Systems," available at <http://www.eren.doe.gov/consumerinfo/refbriefs/la7.html>, December 2000, accessed August 19, 2001.

<sup>52</sup> Keith Martin, "Tax Issues and Incentives for Biomass Projects," available at: <http://www.chadbourne.com/briefings/taxissues/Tax%20Issues%20and%20Incentives%20for%20Biomass%20Projects.htm>, March 1995.

many of the same terms as the Section 45 tax credit, but was slightly less restrictive in its application (e.g., no anti-double-dipping provisions, greater number of renewable technologies eligible). Unfortunately, under-funding of the program offsets the increased scope. Additionally, the REPI authority expired on September 30, 2003, and no legislation has been passed to extend the program for new renewable generators.<sup>53</sup>

The REPI program was authorized under Section 1212 of the Energy Policy Act of 1992 to promote increased utilization of renewable energy sources. The program provided incentive payments for electricity produced and sold by new qualifying renewable energy generation facilities. To be eligible, generating facilities had to be owned by states, state political subdivisions, local government entities (such as municipal utilities), or not-for-profit electric cooperatives. The plant must have started operation between October 1, 1993 and September 30, 2003 to qualify for payments. Qualifying facilities must use solar, wind, geothermal, or biomass (except for municipal solid waste) generation technologies. Biomass sources were not restricted to “closed-loop” systems and the program included power generated from landfill gas.

Under the REPI program, qualifying facilities are eligible for an annual incentive payment of 1.5 cents/kWh (subject to annual inflation adjustment and equal to 1.8 cents/kWh in 2004). The payment is given for a period of ten years after the facility begins operation. The payment is subject to the availability of annual congressional appropriations. Because the amount allocated has been insufficient to cover all requests, payments have been based on a two tier structure. Tier 1 facilities receive priority treatment and consist of facilities that use solar, wind, geothermal, or closed-loop biomass. Tier 1 facilities receive either full payments or pro rata payments if funds are insufficient to cover full payments. The remaining funds, if any, are used to pay requests from Tier 2 facilities. Tier 2 consists of open-loop biomass technologies such as landfill gas, digester gas, and solid biomass burned to generate electricity. If funds are insufficient to make full payments to all Tier 2 facilities, payments are made on a pro rata basis. Any generation for which payment of the REPI is not made due to insufficient funds in a given year may be rolled forward and submitted for consideration in future years.

There are three major problems with the REPI program as it currently exists. First, the REPI program's reliance on annual Congressional appropriations limits its effectiveness as a financial incentive. Second, recent program appropriations have not been sufficient to make full incentive payments for electricity produced by all Tier 1 facilities, let alone Tier 2 facilities. Since 1996, funds have not been sufficient to make full payments to Tier 2 facilities. In fact, for the year 2002, payments of about \$4.8

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<sup>53</sup> DOE Energy Efficiency and Renewable Energy; [www.eere.energy.gov/wip/program/rep.html](http://www.eere.energy.gov/wip/program/rep.html)

million were made to Tier 1 and 2 facilities, while over \$40 million (cumulative, from 2002 and prior years) due to Tier 2 facilities went unpaid (see Table 6-2). Finally, the credit is no longer available for new renewable energy generation facilities coming on-line after September 2003.

As a result, planners of renewable energy generation facilities have often not relied on REPI payments when evaluating the feasibility of projects. The DOE recognizes the problems of the REPI program and has sought and reviewed comments on options to make REPI a more effective incentive. These options would require either regulatory or statutory change and would need significantly higher levels of appropriations, which may be unrealistic. It does not appear that the program will be reinstated for new applications in the near future.

**Table 6-2. REPI Program History.**

<b>Fiscal Year</b>	<b>Qualifying Facilities</b>	<b>Qualified Generation (MWh)</b>	<b>Total Payments</b>	<b>Cumulative Unpaid (Tier 2)</b>
1998	19	528,899	\$4,000,000	\$9,747,420
1999	33	505,857	\$1,500,000	\$15,664,879
2000	33	684,941	\$3,991,000	\$24,755,332
2001	36	700,997	\$3,787,000	\$33,679,732
2002	44	734,115	\$4,815,033	\$40,211,074
2003	NA	NA	\$3,714,920	NA

Source: DOE Energy Efficiency and Renewable Energy website  
<http://www.eren.doe.gov/power/repi.html>.

**Implication for KIUC:** KIUC would qualify for this program had the REPI program been extended. As it stands now this program will seemingly continue to underfund the projects enrolled in the program until it fully expires in 2013.

### **6.1.5 Farm Security and Rural Investment Act of 2002 Incentives**

Among other provisions, the 2002 Farm Bill promotes the use of renewable energy on farms and rangeland through a number of different incentive mechanisms.<sup>54</sup> The following are the sections of the 2002 Farm Bill designed to support the development of renewable energy:

- **Conservation Reserve Program (CRP)** – the bill allows biomass and wind turbine installations to be sited on land enrolled in the CRP, subject to USDA

<sup>54</sup> US Government Accountability Office, *Renewable Energy: Wind Power's Contribution to Electric Power Generation and Impact on Farms and Rural Communities*, September 2004

approval. Siting is contingent upon location, habitat, and purposes of the program. The installation of energy generation equipment does not reduce payments under the CRP.

- **Rural Development Title** – this program allows loans and loan guarantees to be made for renewable energy systems under the Consolidated Farm and Rural Development Act.
- **Business and Industry Direct Loan and Loan Guarantee Program** – the provision expands the program for rural development and allows farmer/rancher equity ownership in renewable energy projects. The limits per project range from \$25 million to \$40 million.
- **Value-Added Agricultural Product Market Development Grants** – this provision expands the definition of the term “value-added agricultural product” to include renewable energy. Consequently, grants up to \$500,000 are now available to assist with feasibility studies, business plans, marketing strategies, and startup capital.
- **Energy Audit and Renewable Energy Development Program** – this section provides for competitive grants for organizations to conduct energy efficiency audits and renewable energy assessments for farmers, ranchers, and rural small businesses.
- **Renewable Energy Systems and Energy Efficiency Improvements** – this provision provides for loans, loan guarantees, and grants to farmers, ranchers, and rural small businesses to purchase and install renewable energy systems.

The primary programs by which the 2002 Farm Bill supports the development of new renewable energy projects are the Renewable Energy Systems and Energy Efficiency Improvements Program and the Value-Added Producer Grant Program.

The Farm Bill of 2002 authorized the Renewable Energy Systems and Energy Efficiency Improvements Program to provide loans, loan guarantees, and grants to agricultural producers and rural small businesses to purchase renewable energy systems and make energy efficiency improvements.<sup>55</sup> Due to time and staffing constraints, the USDA has only offered grants in 2003 and 2004. Public proceedings are ongoing to develop final rules for the issuance of loans and loan guarantees. The program is slated to end in 2007, with a total funding limit of \$115 million. In 2003 a total of about \$21 million in grants were made, with \$60,996 in grant funds going to projects in Hawaii. In 2004 a total of \$22.8 million in grants were issued, but no grant recipients were located in

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<sup>55</sup> Database of State Incentives for Renewable Energy, *Renewable Energy Systems and Energy Efficiency Improvements Program*, available at [www.dsireusa.org](http://www.dsireusa.org)

Hawaii. Final rules on the loan and loan guarantee portions of this program are expected at the end of 2004 or beginning of 2005. At this time, it is unclear what the distribution of grants, loans, and loan guarantees will be in 2005.

The Farm Bill of 2002 also included renewable energy in the definition of value-added farm products. This change makes renewable energy projects eligible for up to \$500,000 in grant funding through the Value-Added Producer Grant (VAPG) program.<sup>56</sup> The program is available for agricultural producers, farmer or rancher cooperatives, agricultural producer groups, and majority-controlled, producer-based business ventures. The grants apply to planning activities and working capital for marketing value added products based on photovoltaics, wind, biomass, hydroelectric, hydrogen, manure digestion, ethanol, and biodiesel technologies and processes. Grants under this program have been administered since 2001, and \$13.2 million was made available for Fiscal Year 2004, with about \$135,000 going to Hawaiian firms. At this time it is not clear what the level of funding for the program will be in 2005.

**Implication for KIUC:** Under one of these programs it may be possible for KIUC to receive grant funding or low-interest loans for development of renewable energy projects. Further, local agribusinesses could utilize the program to develop renewable energy projects to sell power to KIUC more cost effectively. The amount of funding received would be dependent upon the proposed project.

### **6.1.6 Rural Economic Development Loan and Grant Program**

The USDA administers the Rural Economic Development Loan and Grant (REDL&G) program with the goal of spurring rural economic development through government backed loans and grants to rural electric and telephone utilities.<sup>57</sup> Since the program's inception in 1989, loans and grants have been administered to over 1,000 projects for a total of over \$250 million. Types of projects funded include improvements to local businesses, health care facilities, water systems, and renewable energy projects. The source of funding for the REDL&G program is the interest earning differential on the RUS Cushion of Credit Account, which began to decline in the latter part of the 1990's. Subsequently, the National Rural Electric Cooperative Association (NRECA) lobbied for a new source of funding to restore this valuable program. A new source of funding was provided through the 2002 Farm Bill and the program should begin to offer more zero

<sup>56</sup> Database of State Incentives for Renewable Energy, *Value-Added Producer Grant Program*, available at [www.dsireusa.org](http://www.dsireusa.org)

<sup>57</sup> Bob McLaury, *USDA's REDL&G Program: What Its Accomplished. An Even Brighter Future. A Tool to Make it Easier*, Presented at the CFC Forum 2003, available at [http://www.nrucfc.com/conferences/Forum2003/ppt/McLaury-Economic\\_Dev.ppt#1](http://www.nrucfc.com/conferences/Forum2003/ppt/McLaury-Economic_Dev.ppt#1)

interest loans and grants for rural development projects, including renewable energy projects in 2005.<sup>58</sup>

**Implication for KIUC:** This program would indirectly benefit KIUC. This program could be used to obtain inexpensive financing for a customer owned renewable energy projects on the island, but it is too small to directly fund a large-scale KIUC project.

### **6.1.7 RUS Electric Loan Program**

Through direct loans and loan guarantees, the USDA Rural Utilities Service (RUS) provides capital for the construction and maintenance of rural electric generation, transmission, and distribution infrastructure.<sup>59</sup> States, territories, municipalities, cooperatives, and other organizations that provide retail electric service to rural areas are eligible for the program. Investments in renewable energy generating equipment are covered by the Treasury Rate Loan program, which provides loans at the US Treasury interest rate. These loans are available to both retail and wholesale generation providers, and are available for a term of up to 35 years. Normally, this interest rate would not be available to public or private borrowers with even the best credit rating. There is no expected termination date of this program in the foreseeable future.

**Implication for KIUC:** The RUS Electric Loan Program could provide KIUC with low-cost financing for the addition of renewable generation assets. The low-interest loans would inevitably improve the economics of any of the proposed projects for this study.

### **6.1.8 High Energy Cost Grant Program**

The High Energy Cost Grant Program is administered by the Rural Electric Service of the USDA. This program is designed to help mitigate high home energy costs, in excess of 275 percent of the national average, through financial assistance.<sup>60</sup> The program has the authority to fund improvements to generation, transmission, and distribution system improvements; however, recent funding has included on- and off-grid renewable energy systems and implementation of demand-side management and energy conservation programs. States, political subdivisions of states, and agencies organized under state law are eligible to receive funds under this program. In 2003, \$14.9 million in grants were distributed to projects in seven states. In 2004, \$11.3 million in funding was authorized for funding of six projects. A number of conventional and renewable energy projects have been funded in Alaska and on Indian Reservations where the cost of

<sup>58</sup> George Stuteville, *NRECA, White House Agree on REDL&G*, Published in *Electric Co-op Today*, October 29, 2004.

<sup>59</sup> Information of the RUS Electric Program available at <http://www.usda.gov/rus/electric/index.htm>

<sup>60</sup> USDA High Energy Cost Grant Program information available at <http://www.usda.gov/rus/electric/hecgpr/>

energy is often prohibitively high for the relatively low income levels of the populations in these communities. Some projects have also been funded on Hawaii. In 2003, Maui Electric Company received a grant which enabled the sale of solar water heaters. The funding level and proposal requirements for 2005 are expected to be similar to that in 2004.

**Implication for KIUC:** This program is applicable to KIUC with residential rates at nearly triple the national average. This program could be an excellent opportunity for KIUC to receive funding for new generation resources.

### **6.1.9 Tribal Energy Program**

The purpose of the DOE Tribal Energy Program is to promote tribal energy self-sufficiency, economic development, and employment on tribal lands through the use of renewable energy and energy efficiency technologies.<sup>61</sup> The program provides funding assistance for the full range of project development including strategic planning, energy options analysis, capacity building, feasibility studies, educational programs, and project construction. The funding mechanism of the program is through grants to the tribal governments for each of the pre-development and development opportunities. Over the past two years 45 projects have been funded across the US for a total of \$8.4 million. Projects included feasibility studies, project implementation, and other pre-development efforts. There is no current indication of what the funding level will be for 2005 and beyond, but will likely be similar to that in recent history.

**Implication for KIUC:** Proceeds from this program would likely not directly benefit KIUC. Projects could be cooperatively pursued with other eligible parties. Currently the program does not apply to Hawaiian Home Lands. However, it may be possible to approach DOE with a compelling project concept and still receive funding.<sup>62</sup>

### **6.1.10 Miscellaneous Loan Guarantee and Grant Programs**

From time to time various federal agencies such as the DOE, USDA, Environmental Protection Agency, Forest Service and others offer loans, loan guarantees, and grants for the development of renewable energy projects. These loans and grants are often targeted at specific technology development or policy objectives, which tend to change over time. For example, in recent years the USFS has issued grants for projects to selectively thin forests as a forest fire prevention measure. These types of grants generally follow large forest fire seasons which raise the public consciousness of forest

<sup>61</sup> US Department of Energy, *Renewable Energy Development on Tribal Lands*, available at [www.nrel.gov/docs/fy04osti/35509.pdf](http://www.nrel.gov/docs/fy04osti/35509.pdf)

<sup>62</sup> Personal conversation with Roger Taylor, National Renewable Energy Laboratory, Denver, CO, November 10, 2004.

fire prevention. Grant programs are generally advertised with a Notice of Funds Available (NOFA) in the *Federal Register*. At this time it is not possible to forecast exactly which technologies or project types will be supported by federal agencies, and for whom these grants will be applicable.

### **6.1.11 Federal Green Power Purchasing Goal**

The US government is the single largest consumer of energy. With the goal of improving the US government's energy management, Executive Order 13123 was promulgated by President Clinton, which requires federal agencies to increase purchases of renewable energy to a percentage set by the Secretary of Energy.<sup>63</sup> In 2000, Secretary of Energy Bill Richardson set the target for federal agencies at 2.5 percent of electricity consumption by 2005, and 20,000 solar roofs on government facilities by 2010.<sup>64</sup> Since the enactment of this goal, various federal agencies have been active in installing renewable energy projects and purchasing renewable energy to meet this goal. Consequently, government renewable energy use has increased to about 1.25 percent, or about 48 percent of the goal for 2005.

**Implication for KIUC:** This goal may create opportunities for KIUC to work with the local military or other government facilities. Joint projects could be developed, or KIUC could negotiate with the government to be an "anchor tenant" for a new green pricing program.

## **6.2 Valuing Renewable Energy Attributes**

In addition to the government incentive programs described previously, utilities, marketers, and others have developed additional programs to address the sometimes higher cost of renewable energy. This section describes green pricing, green marketing, and tradable renewable energy credits.

### **6.2.1 Green Pricing**

A small but significant percentage of the population is willing to pay extra for electricity generated from "green" or renewable resources. Green pricing of electricity is offered to utility customers in regulated markets. Customers can choose to pay a small premium on their monthly electricity bills to cover the higher cost of renewable energy. Typical premiums for green pricing are 1¢/kWh to 4¢/kWh, but can be much higher for specialty products, such as solar power.

<sup>63</sup> Database of State Incentives for Renewable Energy, *Federal Government – Green Power Purchasing Goal*, Available at [www.dsireusa.org](http://www.dsireusa.org)

<sup>64</sup> President Clinton, *Executive Order 13123 – Greening the Government through Effective Energy Management*, Printed in the *Federal Registry* on Tuesday June 8, 1999.

There are numerous green pricing mechanisms, and almost all are voluntary for the consumer. Consumers can commit to receiving a portion of the bill from renewable sources, paying a set premium per kWh. Participants can purchase blocks of generation (such as 100 kWh) for a monthly price. Some programs are based on voluntary contributions sent in each month at the discretion of ratepayers. Some programs require time commitments from consumers, such as a minimum of one year of purchases.

Contributions can be used for many purposes. Utilities can own renewable projects, purchase renewable power from a third party, purchase renewable energy credits (discussed later), or place the money in a fund to support feasibility, education, and research programs. There are also companies that will provide all the program marketing and energy on a “turnkey” basis. Power for green pricing programs can come from a wide range of renewable sources, and can be from new or existing projects. Limits on the use of funds may be regulated by local state commissions, but there are no national standards enforced.

There is a general disparity between the percent of customers who say they are willing to pay more for green power and those that actually do. Nationally, the average participation rate in utility green pricing programs is only 1.2 percent, with a range for top performers of 4 to 11 percent.<sup>65</sup> A list of the utility top green pricing programs, in term of participants, is included in Table 6-3.

More than 500 utilities offer green pricing programs. According to the Department of Energy Green Power Network, green pricing programs have so far supported the development of over 500 MW of renewable energy, predominately wind and biomass.<sup>66</sup>

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<sup>65</sup> Lori Bird, NREL, “Trends in Utility Green Pricing Programs,” presented at the 9th National Green Power Marketing Conference, October 2004.

<sup>66</sup> US Department of Energy, “Estimates of New Renewable Energy Capacity Serving U.S. Green Power Markets (2003),” available at: [http://www.eere.energy.gov/greenpower/resources/tables/new\\_gp\\_cap.shtml](http://www.eere.energy.gov/greenpower/resources/tables/new_gp_cap.shtml), accessed February 2005.

**Table 6-3. Top Utility Green Pricing Programs by Customer Participation.**

<b>Rank</b>	<b>Utility</b>	<b>Program Name(s)</b>	<b>Participants</b>
1	Xcel Energy	Windsorce, Renewable Energy Trust	43,039
2	Los Angeles Department of Water and Power	Green Power for a Green L.A.	29,677
3	Portland General Electric Company *	Clean Wind, Renewable Usage, Healthy Habitat	26,893
4	Sacramento Municipal Utility District	Greenergy, PV Pioneers I	24,542
5	PacifiCorp *	Blue Sky, Renewable Usage, Habitat Option	23,351
6	We Energies	Energy for Tomorrow	10,760
7	Alliant Energy	Second Nature	9,519
8	Austin Energy	GreenChoice	7,462
9	Tennessee Valley Authority	Green Power Switch	7,364
10	Wisconsin Public Service	SolarWise for Schools, NatureWise	6,157

Source: Energy Efficiency and Renewable Energy Network, February 2005

Note:

\* Marketed in partnership with Green Mountain Energy Company.

**Implication for KIUC:** A green pricing program may be a good method for KIUC to test local desire for renewable energy projects. By implementing such a program, those customers who support renewable energy may do so directly through their monthly electric bill. This reduces rate impacts to other customers, while satisfying the wishes of those who want more renewable energy in the KIUC energy mix.

### **6.2.2 Green Marketing**

Green power marketing is the sale of renewable energy in competitive markets. When a state deregulates its electric market, the consumer can choose an energy provider, and they consequently have the option to choose a green energy provider. Green power is somewhat analogous to other premium products, such as bottled water, and is one of the few ways that power producers can claim to have a differentiated, brand name product. Green marketers are under constant pressure to minimize the premiums they charge while still covering the costs associated with consumer education and the actual marketing of their product. Average premiums charged for green energy vary from around 1¢/kWh to 2¢/kWh. Currently, at least ten states have green energy marketed as a

competitive energy choice, including Texas and Pennsylvania. Perhaps the most recognizable green marketer is Green Mountain.

**Implication for KIUC:** Because the electric power sector is not deregulated in Hawaii, green marketing programs are not applicable to KIUC.

### **6.2.3 Renewable Energy Credits**

As more states (such as Hawaii) and perhaps even the federal government set mandates for renewable generation, markets have arisen to allow local and national trading of renewable power. This power is typically a premium product, traded at higher prices than conventionally generated electricity. Renewable Energy Credits (RECs) can capture the value of this credit and increase revenue opportunities for renewable energy generators.

When a mandate is set for a portion of a utility's generation to come from renewable sources, the utility has two general options: to build a renewable energy plant or to buy power from another company. The purchase of RECs allows a different way to buy the renewable characteristics of a generation source without necessarily purchasing the associated energy. This is accomplished by "unbundling" the environmental benefit from the electricity. The unbundled environmental benefit is known as a REC. RECs are conceptually similar to air pollution credits (e.g. NO<sub>x</sub> credits).

When a renewable generating source is serving as a stand-alone generator, they will sell their power at some market or contracted price. If their current agreement(s) does not specifically include the green aspect of their generation, then the owner may wish to also sell the green attributes of their energy as a REC. The unbundling of the electricity from the green characteristics allows another entity to purchase the green component of the energy (REC) without having to buy the associated electricity.

It is common for questions to arise about the verification of the renewable generation to be purchased. Buyers want to be assured that they are only purchasing power generated from genuine "green" sources. They also want to know that the sale includes only RECs equivalent to actual kWh produced. Some states, such as Texas, have already created their own certification programs to ensure the "quality" of the generation and to avoid generators from selling their RECs more than once (known as double counting). Other organizations, such as Green-e, have also started that offer third-party certification services for renewable power.

Trading of RECs is still relatively immature, although increasing rapidly. Currently, RECs are either used to satisfy voluntary green pricing / marketing programs or used for compliance with state renewable mandates. The voluntary REC market is thinly traded around the country. REC values vary depending on the type of resource;

solar and wind resources have the highest REC values (up to 20 ¢/kWh for solar), while biomass, geothermal, and hydro are much lower.

Texas, Massachusetts, Connecticut and New Jersey all have REC trading markets used to help meet state mandates for renewable energy. In New England, where demand is higher than the current renewable energy supply, REC values are as high as 5 ¢/kWh, which is as much as the base energy value. In Texas, the values are more modest, around 1.5 ¢/kWh.

**Implication for KIUC:** The newly modified renewable portfolio standard for Hawaii creates the potential for KIUC to benefit from renewable energy credits. The isolation of the Hawaiian islands combined with varying population and renewable resource distributions among the islands, makes trading of renewable energy credits a sensible method to comply with the requirements of the RPS. On the one hand, KIUC could purchase excess RECs from other island utilities. This would limit capital expenditures on new renewable energy plants – plants which may not be needed in the near term to meet the island's electrical needs. On the other hand, Kauai has ample renewable resource potential. If new projects were developed, the excess RECs could be sold to other utilities for additional revenue.

### **6.3 Summary**

Federal and state governments have developed a number of policy approaches to support renewable energy development. Table 6-4 summarizes the various incentive programs evaluated in this study. The most prevalent and successful policies have been tax incentives, particularly the federal PTC, and to a lesser extent the ITC and accelerated depreciation. The well-intentioned REPI program had limited success in spurring development because of inconsistent funding. Tax-exempt entities are currently limited to grant and loan programs, of which few exist at present. Moreover, federally-funded grant and loan programs have typically been intended to support small-scale demonstration projects rather than utility-scale deployment. Public utilities therefore draw the greatest benefit from their tax-exempt status and the ability to utilize low cost debt. KIUC may also wish to further investigate the benefits of green pricing programs and renewable energy credits.

**Table 6-4. Renewable Energy Incentives Summary.**

<b>Incentive</b>	<b>Description</b>	<b>Recommendation</b>
<b>Federal Incentives</b>		
Production Tax Credit	1.8 cent/kWh (inflation adjusted) for wind, solar, geothermal, and closed loop biomass electricity. 0.9 cent/kWh credit for open-loop biomass, small irrigation power, and municipal solid waste. Wind and closed-loop biomass receive PTC for 10-years, other technologies receive credit for five years. Taxable entity needs to be part of project structure to claim credit.	Consider power purchase from a taxable third-party developer who can claim the PTC. Investigate alternative project structures to may leverage the PTC and KIUC low interest financing.
Investment Tax Credit	10 percent investment tax credit for new solar and geothermal projects	Not applicable under tax-exempt financing.
Reduced Depreciation Life	5-year accelerated depreciation on alternative energy projects. Requires ownership by taxable entity.	Utilize if taxable entity is involved in project.
Renewable Energy Production Incentive	10-year 1.8 cent/kWh (inflation adjusted) for wind, biomass, geothermal, and solar. This a public entity alternative to the PTC. Subject to annual congressional appropriations and substantially underfunded.	Monitor the status of this program and apply for funding should the program be extended in the future.
2002 Farm Bill	Value-Added Agricultural Product Market Development Grants, and Renewable Energy and Energy Efficiency Improvements programs provide grant, loan, and loan guarantee for development of renewable energy and energy efficiency projects.	Consider applying for development grants for project development and construction expenses.
REDL&G	Program to provide grants, loans, and loan guarantees to agricultural producers and rural small businesses for development of renewable energy projects.	Publicize REDL&G program to coop members.
RUS Loans	The USDA RUS offers low interest loans to rural utilities at US Treasury rates normally not available to public or private borrowers.	Consider applying for RUS financing for renewable energy projects.
High Energy Cost Program	Provides grants for renewable and energy conservation projects to help mitigate high energy costs.	Consider applying for grant funding for development/construction of renewable energy projects.
Tribal Energy Program	Provides grant funding for renewable energy and conservation project pre-development and development activities on Indian Reservations.	Publicize program to the Department of Hawaiian Home Lands and work with the department to investigate grant funding if feasible.

**Table 6-4. Renewable Energy Incentives Summary.**

<b>Incentive</b>	<b>Description</b>	<b>Recommendation</b>
Misc. Loan & Grant Programs	Miscellaneous grants for development of renewable energy projects.	Monitor for potential grant opportunities.
Green Power Purchasing Goal	Goal for federal government facilities to purchase 2.5 percent of electricity from renewable sources by 2005, and 20,000 solar roofs by 2010.	Contact military base and government facilities managers regarding joint development or purchase of renewable energy.
<b>Non-Government Incentives</b>		
Green Pricing	Voluntary program where utility customers pay premium for renewable electricity. Regulated markets.	Consider developing program to test customer demand.
Green Marketing	Voluntary program where electricity customers pay premium for renewable electricity. Deregulated markets.	Not applicable to Hawaii.
Renewable Energy Credits	Tradable credits representing the renewable attributes of electricity – separate from the actual energy. May be used to satisfy voluntary programs or renewable portfolio standard requirements.	Evaluate as a flexible mechanism to meet RPS requirements, or sell excess credits to other Hawaii utilities.