Recommendations of Air Pollution Prevention Forum to Increase the Generation of Electricity from Renewable Resources

Table of Contents

Executive Summary

The 1990 Amendments to the Clean Air Act created the Grand Canyon Visibility Transport Commission (GCVTC) to make recommendations to the Environmental Protection Agency on how to protect visibility in many western national parks and wilderness areas. The Commission, which made its recommendations in 1996, was comprised of the governors of eight states (Arizona, California, Colorado, Nevada, New Mexico, Oregon, Utah and Wyoming) as well as the President of the Navajo Nation, the Chairman of the Hopi Tribe, the Pueblo of Acoma Governor and ex-officio members from the Environmental Protection Agency, the Bureau of Land Management, the National Park Service, the U.S. Forest Service and the U.S. Fish and Wildlife Service. The governors, together with western tribal leaders, have created a Western Regional Air Partnership (WRAP) to implement the Commission's recommendations. The WRAP has created forums or committees to implement specific recommendations.

The WRAP Air Pollution Prevention (AP2) Forum has been charged with implementing the Commission's renewable energy recommendations. With regard to renewable energy, the GCVTC recommended that: "The goal of the states in the Transport Region should be to achieve annual additions in order that renewables will comprise 10% of the regional power needs by 2005 and 20% by 2015" (the 10/20 goals). See the WRAP web site at http://www.wrapair.org for more information. In keeping with the requirements listed in the WRAP bylaws, the AP2 Forum is made up of representatives from a variety of stakeholder groups, including state government, tribal government, the public at large, environmental organizations, small business, the fossil fuel industry and the renewable energy industry. A complete listing of the Forum's membership is provided in Appendix C.

In April 1999, the Environmental Protection Agency issued its final regional haze regulations for the protection of visibility in 156 national parks and wilderness areas across the country.[1] This final "Regional Haze Rule" requires each state to prepare a State Implementation Plan (SIP) and includes a separate section (Section 51.309) which allows nine western states (Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah and Wyoming) participating in the GCVTC to implement a regional approach to reducing haze. As part of this regional approach, these nine states are required to include in their SIPs a variety of information addressing renewable energy production and consumption, as well as an outline of the programs and policies which each state will rely on to work towards meeting the GCVTC's 10/20 goals. Under Section 51.309, the state SIPs must be submitted to EPA by no later than December 31, 2003.

The 10/20 goals are ambitious by any standard. For example, as shown in Appendix F, in

[1] *Federal Register*, Vol. 64, No. 126, pages 35714-35774 (July 1 1999).

1998 approximately 4.6 percent of the electricity consumed in the WRAP region was generated from renewable resources. Approximately 5.4 percent of the electricity consumed in the nine "transport region" states as defined by Section 51.309 of the Regional Haze Rule (Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming) was produced by renewables. This indicates that meeting the 10/20 goals would, at the least, require almost double the amount of renewable energy production by 2005.

This report presents recommendations from the AP2 Forum on policies and programs states can adopt to meet the GCVTC's 10/20 renewable energy goals. The information contained herein is designed for use by each of the states in the GCVTC region in developing their SIPs under the Regional Haze Rule.

The report is organized into four main sections. Section I provides baseline information on state-by-state renewable energy capacity and production in the West, as well as a summary chart of current state policies to promote the use of renewables and information on state-by-state total electricity capacity and production. This information is required to be included in the SIPs under Section 51.309(i-v) of the Regional Haze Rule. Section II provides a definition of renewable energy developed by the AP2 Forum. This definition was developed after consulting legislative definitions developed in several western states. Section III of this report outlines a menu of policies and programs which states and the federal government can implement to help promote the growth of renewable energy technologies. Examples of such policies include renewable portfolio standards, system benefits charges, tax incentives and green marketing. Section IV of this report contains the AP2 Forum's recommended portfolio of the programs listed in Section III. A description of such a portfolio of programs is required under Section 51.309(vi) of the Regional Haze Rule. It is intended that this portfolio of policies also be used to help guide the preparation of SIPs for states in the GCVTC region in order to maximize these states' potential for meeting the 10/20 goals for renewable energy.

In summary, the Forum finds that meeting the 10/20 goals can be best accomplished through the adoption of aggressive state policies which provide financial incentives for renewable energy production and consumption. (*See Section IV of this report for the Forum's full recommendations and cost analyses*). Most notably, the Forum believes an aggressive renewable portfolio standard (RPS) and a system benefits charge (SBC) are the most effective state policy options in encouraging the growth of renewables. The Forum recommends that every state adopt at least one of these two "core" financial incentive policies to promote the use of renewable energy sources. In addition, states should adopt policies to ensure that every electricity consumer has the opportunity to choose to purchase renewable energy products through a viable green market or green pricing program. Such policies include: consumer information disclosure rules and power labeling programs; establishing a regional generation tracking system; adopting consumer protection guidelines; and establishing consumer education programs.

The Forum also believes that complementary action by the federal government is needed to achieve the 10/20 goals because of the significant presence of the federal government in the WRAP region and the need to avoid inter-regional competition that would disadvantage those regions moving ahead with policies and incentives to expand the production and use of renewable energy. The Forum therefore recommends that states support: 1) a national RPS; 2) development and extension of federal tax credits for renewables; and 3) a mandatory federal agency renewable energy purchase requirement.

As part of the process of developing its recommendations to states on strategies to meet the 10/20 goals, the AP2 Forum felt it important to develop some rough estimates of the financial impacts of meeting the goals as well as estimates of contributions toward the goals various policy options could make. *These rough estimates are included in greater detail in Section IV of this report*. More detailed information concerning the assumptions and calculations used to estimate the costs and contributions of the policy mechanisms can also be found in the spreadsheet attachment in Appendix E.

In general, the Forum concludes that the least-cost strategy to meet the 10/20 renewable goals is for the western states and federal government to undertake a major effort to develop the region's wind resources, together with additional cost-effective renewable resources such as geothermal and biomass that may be available locally. The levelized differential cost of this development is estimated to be 2.5 cents per kilowatt-hour, with an uncertainty of perhaps " 1 cent/kwh.

Assuming that the differential cost of renewable development is 2.5 cents per kilowatt-hour, meeting the 20% goal would result in an average increase in electricity prices of 5 mils/kWh. At this unit cost, the total annual differential cost of meeting the goal is of the order of $4 billion, a substantial sum equivalent to approximately 10% of current electric revenues in the WRAP states. As discussed in Section III, a variety of policy mechanisms may be used to meet the goals and allocate these costs to electricity providers and their customers.

The Forum estimates that, altogether, voluntary private purchases (from green marketing and green pricing programs) of renewable electricity may support approximately 3% of the amount needed to meet the 20% goal. Rough estimates also suggest that federal and state government purchases together could meet about 4% of the 20% goal, and federal and state governments are encouraged to demonstrate their commitment to attaining the 20% renewable goal by committing to purchase 20% of their electric requirements from renewable resources by the year 2015.

However, given the relatively small contributions expected from voluntary private and public purchases, the Forum concludes that in the absence of dramatic and unexpected changes in the cost of electricity from renewable and/or conventional resources, policy mechanisms such as the RPS or SBC, as discussed in Section III, will be required to attain the 20% goal. It is estimated that between 90-95 percent of the 2015 WRAP 20% renewables requirement will need to be met with one or the other of these two

policy options. Assuming that the differential cost of renewables is the same in either program, the region-wide cost of meeting 90-95 percent of the 2015 renewable energy target through either an RPS or SBC would be in the range of 3.5-3.7 billion dollars in 2015. The Forum estimates that these costs would increase average regional electricity prices by 4.5-4.75 mils/kWh.

Finally, the Forum notes that certain types of policies can act to narrow the cost differential between renewable energy and conventional fossil fuel-fired generation. In particular, emission cap-and-trade programs, which place a monetary value on emissions, narrow the cost differential between those technologies that emit air pollutants and those, like renewables, that do not.
The WRAP is currently working to design a region-wide sulfur dioxide emissions cap-and-trade program. The Forum estimates that such a program could act to narrow the cost differential between renewable resources and conventional fossil fuel resources by 1-3 mils/kWh. In 2015, this could lower the region-wide cost of meeting the renewable energy goal somewhere in the range of $160-475 million per year, thus reducing the total estimated $4 billion cost of meeting the 20% WRAP target by 4-12%.

Questions or comments on this report can be directed to Forum Co-chairs Jeff Burks (nroerp.jburks@state.ut.us; 801/538-5428) or Hap Boyd (rboyd@enron.com; 661/823-6734).

Glossary

Cap and Trade A cap-and-trade program would establish a "cap" on specified pollutant emissions. Under such a program, each affected emission source is allocated a fixed number of tradeable emission credits, subject to the constraint that at any given time the total number of credits in the region must not be greater than the level of the cap. To comply with its allocation, a source would be required either to reduce its emissions or to purchase credits from an over-complying source.

Class I Area The Clean Air Act defines mandatory "Class I" federal areas as certain national parks (over 6,000 acres), wilderness areas (over 5,000 acres), national memorial parks (over 5,000 acres), and international parks that were in existence as of August 1977.

CREPC Committee on Regional Electric Power Cooperation

DOE Department of Energy

EIA Energy Information Administration

EPA Environmental Protection Agency

EPRI Electric Power Research Institute

ESP Energy Service Provider

FERC Federal Energy Regulatory Commission

GCVTC Grand Canyon Visibility Transport Commission

IEEE Institute of Electrical and Electronics Engineers

IOU Investor-Owned Utility

IPP Independent Power Producer

kWh Kilowatt-hours

MTF Market Trading Forum

MWh Megawatt-hours

NAAG National Association of Attorneys General

PURPA Public Utility Regulatory Policies Act

Pancaking Pancaking of transmission rates occurs when power is shipped through the transmission systems of several utilities and the shipper must pay a separate fee for each system the power crosses.

Postage Stamp Rates
Postage stamp transmission rates allow power to move throughout the transmission system for one fee (much as the stamp on a letter enables the letter to be delivered anywhere in the U.S.).

RPS Renewable Portfolio Standard

RTO Regional Transmission Organization

SBC System Benefits Charge

SIPs State Implementation Plans

WRAP Western Regional Air Partnership

I. Baseline Information

Section 51.309 of the Environmental Protection Agency's Regional Haze Rule outlines requirements which must be included in each state's first regional haze implementation plan to address regional haze visibility impairment in the 16 Class I areas covered by the GCVTC report. Section 51.309(d)(8) of the Regional Haze Rule specifically addresses state implementation plan (SIP) requirements regarding air pollution prevention, and outlines specific information which is to be included in each SIP addressing the use of renewable energy and energy efficiency measures to prevent air pollution. This baseline information is necessary to evaluate progress toward the GCVTC's goal that renewable energy will comprise 10 percent of the region's electric power needs by 2005 and 20 percent by 2015.

The following table summarizes the renewable energy information requirements under Section 51.309(d)(8).

Information Item
Item 1. An initial summary of all air pollution prevention programs currently in place.
Item 2. An inventory of all renewable energy capacity and production in use or planned as of 2002 (expressed in megawatts and megawatt-hours).
Item 3. Total energy generation capacity and production for the state.
Item 4. Percent of total energy generation capacity and production that is derived from renewable energy.
Item 5. The state's anticipated contribution toward the 10/20 goals (based on the programs and policies each state relies on to achieve its renewable goals).
Item 6. Programs which provide incentives that reward efforts that go beyond compliance and/or achieve early compliance with air pollution related requirements.
Item 7. Programs to preserve and expand energy conservation efforts.
Item 8. The identification of specific areas where renewable energy has the potential to supply power where it is now lacking and where renewable energy is most cost-effective.
Item 9. Projections of the short- and long-term emissions reductions, visibility improvements, cost savings, and secondary benefits associated with the renewable energy goals, energy efficiency and air pollution prevention activities.

Item 10. A description of the programs relied on to achieve the state's contribution toward the 10/20 goals and a demonstration of the progress made toward achievement of the renewable energy goals in the years 2003, 2008, 2013, and 2018. This description must include documentation of the potential for renewable energy resources, the percentage of renewable energy associated with new power generation projects implemented or planned and the renewable energy generation capacity and production.

The following discussion of the information items listed in the table above have been organized into three categories:
a) an explanation of why the information is required;
b) identification of the source of the data, limitations on the data and areas where the data needs to be improved; and
c) a summary of the current data.

Item 1: <u>An initial summary of all air pollution prevention programs currently in place</u>

a) Information summarizing the air pollution prevention programs to address renewable resources that are currently in place is required under Section 51.309(d)(8)(i) of the Regional Haze Rule. This information should also prove to be a useful benchmark in assessing those policies and programs which western states have already identified as tools which can be used to promote the use of renewable energy and in the reduction of air pollution.

b) The data presented were provided by the National Renewable Energy Laboratory. Unless otherwise noted, the data are current through November 1999.

c) <u>Summary of Data</u>

The data presented in the following table provide state-by-state information summarizing the status of a variety of energy policy programs designed to promote the use of renewable resources. The table also indicates whether each state's electric utility industry has been restructured to allow for retail competition. The energy policy programs addressed in the table include renewable portfolio standards (RPS), system benefits charges (SBC), net metering, green pricing, and the use of financial incentives such as tax incentives, low-interest loans, government rebates and state agency purchasing requirements. An in-depth, state-by-state breakdown of these policies and programs is presented in Appendix A.

Renewable Energy Policies and Programs in the Western States						
State	**Restructuring**	**RPS**	**SBC**	**Net Metering**	**Green Pricing**	**Financial Incentives**
Arizona	Yes	TBD*	Yes	Yes	Yes	Yes
California	Yes	No	Yes	Yes	Yes	Yes
Colorado	No	No	No	Yes**	Yes	Yes
Idaho	No	No	No	Yes	No	Yes
Montana	Yes	No	Yes	Yes	Yes	Yes
Nevada	Yes	Yes	No	Yes	Yes	Yes
New Mexico	Yes	No	Yes	Yes	Yes	No
North Dakota	No	No	No	Yes	No	Yes
Oregon	Yes	No	Yes	Yes	Yes	Yes
Utah	No	No	No	No	No	Yes
Washington	No	No	No	Yes	Yes	Yes
Wyoming	No	No	No	No	No	No

* To Be Determined.

** Net metering exists with certain utilities, including Public Service Company of Colorado.

Items 2 and 3: An inventory of all renewable energy capacity and production in use or planned as of 2002 (expressed in megawatts and megawatt-hours) and total energy generation capacity and production for the State

a) Information providing an inventory of all renewable energy capacity and production in use or planned as of 2002 is required under Section 51.309(d)(8)(i) of the Regional Haze Rule.

b) Some of the data presented were provided by the National Renewable Energy Laboratory's Renewable Electric Plant Information System (REPiS) database. The database is available on the Internet at http://www.eren.doe.gov/repis/ . REPiS contains information on operating as well as planned renewable energy units and covers the following types of renewable energy technologies: biomass, geothermal, hydroelectric, photovoltaics, solar thermal, and wind. The database provides data only on plant capacity and does not provide information on energy production. Data on the renewable electric units in REPiS are current through September 1999, except for wood and hydro power, for which the data are current through 1998, and in some specific cases, through mid-1999. Information on planned units covers the period from 2000 to 2013, although some planned units do not have an identified on-line date.

The data in REPiS are derived from publicly-available sources, including federal and state government publications and reports; trade association data sources; trade press literature such as weekly newsletters; and personal communications with industry and government officials. No surveys were conducted to collect the data. Information in the database was primarily collected through a massive literature search. One limitation to the data provided is that it only includes electric grid-connected renewable energy sources. Off-grid renewable energy sources and projects are not included in the database. Another limitation with the data lies in the fact that although it includes renewable energy facilities which are currently in the planning stages, there is no assessment of the probability of these systems ever coming on line.

Information on total electric capacity, total net electric generation and current renewable generation is taken from data provided in the Energy Information Administration's *Electric Power Annual 1998, Volumes I-II*. EIA renewable electricity generation data are derived from two principal sources: 1) Form EIA-759, "Monthly Power Plant Report;" and 2) Form EIA-860B, "Annual Electric Generator Report - Nonutility." Form EIA-759 is sent to all utilities, while form EIA-860B is required of all nonutility generating facilities exceeding 1 megawatt capacity (including facilities which meet FERC standards as a "qualifying facility (QF)," as well as independent power producers (IPP)). Off-grid and small on-grid applications are not captured in EIA's data. According to EIA, QFs and IPPs are only required to file regulatory reports at the time of their intention to become a grid electricity-producing facility.

EIA does not collect data on non-electric applications of geothermal energy such as crop drying and groundwater heat pumps. A study prepared for the U.S. Department of Energy by the Oregon Institute of Technology, Geo-Heat Center, indicates that non-electric uses of geothermal energy amounted to nearly 16.2 trillion Btu in 1997. EIA also does not collect information on direct energy uses of wind (e.g., water-pumping). Such data can be further limited by: 1) coverage issues (the list of survey respondents may be incomplete or double counting may occur); 2) the nonresponse of parties surveyed; and 3) errors made in estimating the values for missing data. In addition, neither EIA nor the REPiS database identify or differentiate electric capacity or generation from facilities which may be considered "low-impact" hydroelectric facilities.

c) Summary of Data

The shaded states in the table below (Montana, North Dakota, and Washington) are in the WRAP region but are outside of the nine-state transport region.

Inventory of Renewable Energy Capacity and Production and Total Energy Capacity and Production[2]

	Capacity				Energy	
State	**Total Electric Capacity (in MW)**	**Current Renewable Capacity Including Hydropower Facilities (in MW)**	**Current Renewable Capacity Excluding Hydropower Facilities (in MW)**	**Additional Renewable Capacity Planned as of 2002 (in MW) [Excluding Hydro]**	**Total Net Electric Generation (In MWh)**	**1998 Renewable Generation Reported to EIA (In MWh)**
Arizona	**16,642**	**2,993.9**	**1.5**	**2.8**	**81,299,241**	**821,000**
California	**44,493**	**18,687.5**	**5,498.5**	**587.4 [474.5]**	**114,926,213**	**21,827,000**
Colorado	**6,979**	**1,195.9**	**31.4**	**.15**	**35,242,343**	**0**
Idaho	**2,393**	**2,616.4**	**98**	**.06**	**11,978,079**	**525,000**
Montana	**5,084**	**2,464.7**	**12.3**	**0**	**27,616,913**	**45,000**
Nevada	**5,901**	**1,218.9**	**168.1**	**260**	**26,552,567**	**1,569,000**
New Mexico	**5,627**	**80.7**	**.74**	**5**	**29,119,353**	**0**
North Dakota	**4,913**	**527.6**	**9.8**	**0**	**30,518,976**	**2,000**
Oregon	**9,919**	**8,502.4**	**296.8**	**1,000 [0]**	**46,352,310**	**479,000**
Utah	**5,131**	**334.7**	**47**	**34.3 [30]**	**35,160,477**	**160,000**
Washington	**24,590**	**20,988.6**	**305.5**	**70.8 [37]**	**97,127,552**	**1,382,000**
Wyoming	**6,378**	**367.1**	**69.9**	**38.1**	**32,372,654**	**2,000**

[2] The information sources for this table are as follows:
Column 1 is derived from the EIA's Electric Generating Unit Inventories of January 1, 1998.
Column 2, Column 3 and Column 4 are derived from the REPiS Database (1999). The REPiS data does not include off-grid generation or facilities which may be classified as "low-impact" hydro.
Column 5 is derived from EIA's Form 759 (1998 Data).
Column 6 is derived from EIA's Form 759 (1998 Data) and EIA Form 860B (1998 Data) and includes *gross* renewables generation from U.S. nonutility generating facilities and *net* generation from U.S. electric utility generators. Included in the renewables numbers is "wood waste," which EIA defines as including black liquor, pitch, peat, railroad ties, sludge wood, wood waste, spent sulfite liquor, red liquor, agricultural byproducts, fish oil, landfill gas, municipal solid waste, sludge waste, straw, tires, waste alcohol, solid byproducts and tall oil.

Item 4: Percent of total energy generation capacity and production derived from renewables

a) Information providing the percent of total energy generation capacity and production that is derived from renewable energy is required under Section 51.309(d)(8)(i) of the Regional Haze Rule.

b) The information in the table below is based on the summary of data presented in Item 3 above. Therefore, the same caveats and data limitations apply.

c) Summary of Data

Montana, North Dakota, and Washington are in the WRAP region but are outside of the nine-state transport region.

	Capacity			Energy		
State	**Total Electric Capacity (in MW)**	**Current Renewable Capacity Excluding Hydropower Facilities (in MW)**	**Percent of Total Electric Capacity Supplied by Renewables**	**Total Net Electric Generation (In MWh)**	**Current Renewable Generation (In MWh)**	**Percent of Total Electric Generation Supplied by Renewables**
Arizona	**16,642**	**1.5**	**.009**	**81,299,241**	**821,000**	**1**
California	**44,493**	**5,498.5**	**12.4**	**114,926,213**	**21,827,000**	**18.9**
Colorado	**6,979**	**31.4**	**.45**	**35,242,343**	**0**	**0**
Idaho	**2,393**	**98**	**4**	**11,978,079**	**525,000**	**4.4**
Montana	5,084	12.3	0.2	27,616,913	45,000	0.2
Nevada	**5,901**	**168.1**	**2.8**	**26,552,567**	**1,569,000**	**5.9**
New Mexico	**5,627**	**.74**	**0.013**	**29,119,353**	**0**	**0**
North Dakota	4,913	9.8	0.2	30,518,976	2,000	.007
Oregon	**9,919**	**296.8**	**2.9**	**46,352,310**	**479,000**	**1**

	Capacity			Energy		
State	**Total Electric Capacity (in MW)**	**Current Renewable Capacity Excluding Hydropower Facilities (in MW)**	**Percent of Total Electric Capacity Supplied by Renewables**	**Total Net Electric Generation (In MWh)**	**Current Renewable Generation (In MWh)**	**Percent of Total Electric Generation Supplied by Renewables**
Utah	**5,131**	**47**	**0.9**	**35,160,477**	**160,000**	**.46**
Washington	24,590	305.5	1.2	97,127,552	1,382,000	1.4
Wyoming	**6,378**	**69.9**	**1.1**	**32,372,654**	**2,000**	**.006**

Item 5: <u>Anticipated state contribution toward the 10/20 goals (based on the programs and policies each state relies on to achieve its renewable goals)</u>

a) Information providing the anticipated state contribution toward the 10/20 goals is required under Section 51.309(d)(8)(i) of the Regional Haze Rule.

b) Information under this item must be developed by each state following its selection of a portfolio of programs which will be utilized to meet the 10/20 goals. It should be noted that Section 51.309(d)(8)(vi) requires that, to the extent that it is not feasible for a state to meet its contribution to the regional 10/20 goals, the state must identify in progress reports to EPA the measures implemented to achieve its contribution and an explanation as to why meeting the goals was not feasible.

There are significant assumptions involved in determining anticipated state-by-state contributions to a regional renewable energy goal. For example, at present there is only limited experience with many of the programs and policies (e.g., system benefit charges, renewable portfolio standards, green pricing and green marketing) that are being adopted to increase renewable energy production and use. It will take time to acquire experience with such programs that is sufficient to make sound judgments about how such programs and policies will affect renewable energy generation and consumption.

Additionally, at present, there is no regional mechanism for apportioning credit for a state or tribe's contribution to the 10/20 goals that result from activities that either promote renewable energy production facilities or promote consumer demand for renewable power. As with other aspects of the

GCVTC regional haze recommendations, the challenge of meeting the renewable energy goals is how to assign responsibility for solving a regional problem to individual states and how to coordinate state activities to meet the goal in the most efficient way possible. Section IV of this paper contains the Forum's recommendations with regard to determining a state's contribution to the overall regional renewable energy goals.

c) To calculate each state's contribution to the regional 10/20 goals, a regional generation tracking system will be necessary to track renewable power. Such a tracking system would enable states to determine both where renewable power is generated and where it is consumed. Such a system will preclude double counting of renewable energy generation and consumption. See Section IV of this report for the Forum's recommendation on a regional generation tracking system.

Item 6: Programs which provide incentives that reward efforts that go beyond compliance and/or achieve early compliance with air pollution-related requirements

a) Information on programs which provide incentives that reward efforts that go beyond compliance and/or achieve early compliance with air pollution-related requirements is required under Section 51.309(d)(8)(ii) of the Regional Haze Rule.

b) The major program that would provide incentives that reward efforts to go beyond the 10/20 goals or to achieve the goals earlier than 2005/2015 would be a regional haze emissions cap-and-trade program. As discussed under Section IV, the Forum is recommending that any regional haze cap-and-trade program provide emission credits for new renewable energy generation and that such credits may be earned in advance of the triggering of the cap-and-trade program.

c) As recommended by the Forum in Section IV, renewable energy generators would earn emission credits at the rate of 2.5 tons per megawatt of new renewable capacity brought on line.

Item 7: Programs to preserve and expand energy conservation efforts

This item is to be addressed by the AP2 Forum in a separate report addressing energy efficiency issues. According to the AP2 Forum *Workplan*, the Forum will: "1. Examine barriers restricting the penetration of energy-efficient technologies and adoption of energy conservation practices in the region; 2. Identify and evaluate economic incentives, legislative actions and regulatory policies that will increase investments in energy efficiency, including actions currently underway in all or parts of the region...; and 3. Recommend market-based incentives and public policies that will increase the energy efficiency of the region's energy production and end-use sectors."

Item 8: <u>The identification of specific areas where renewable energy has the potential to supply power where it is now lacking and where renewable energy is most cost-effective.</u>

a) Information providing the potential state contribution toward the 10/20 goals is required under Section 51.309(d)(8)(iv) of the Regional Haze Rule.

b) Information under Item 8 is taken from a joint project of DOE's Office of Power Technologies, Energy Efficiency and Renewable Energy and the Electric Power Research Institute which produced the December 1997 report *Renewable Energy Technology Characterizations*. The DOE/EPRI report also included nationwide maps (shown below) which depict resource potential for wind, photovoltaic, solar thermal, biomass, and geothermal energy.

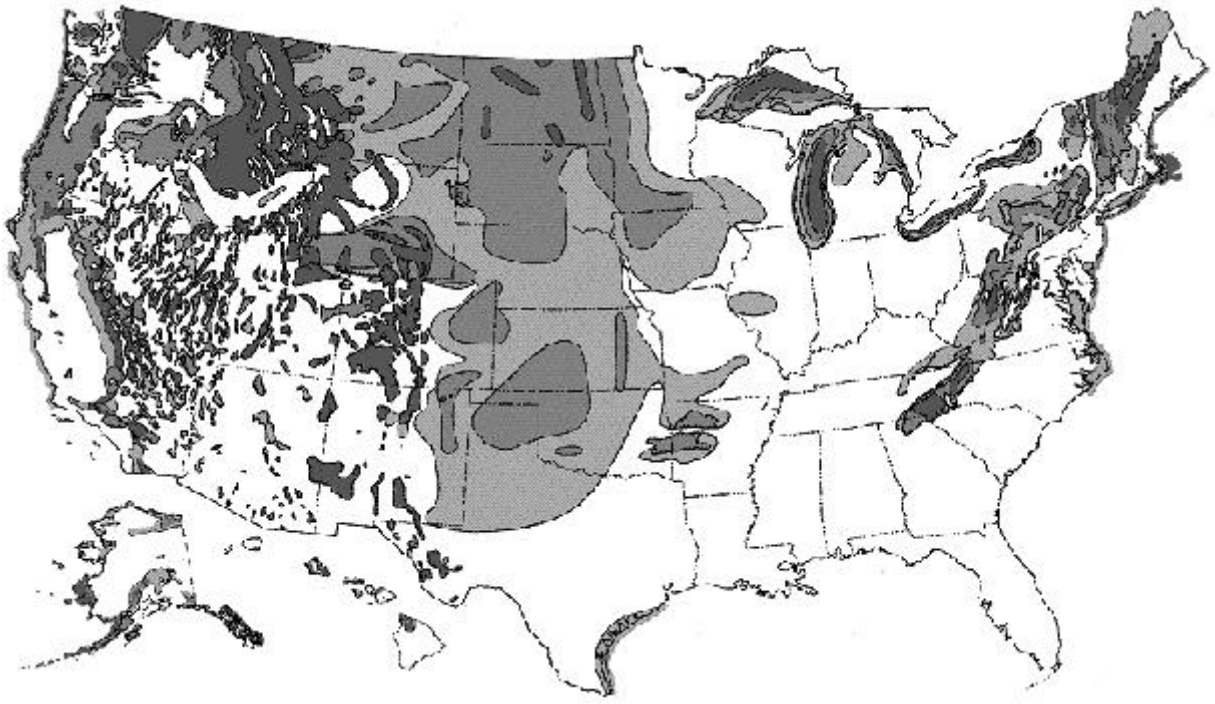
c) In general, the West has some of the most abundant high-quality renewable resources in the world, and is particularly well positioned to take advantage of a variety of renewable resource technologies. For instance, as the map below shows, western states contain much of the nation's class 5-7 wind power, the category which has the highest energy potential and lowest production cost. The West also contains some of best solar resources in the country. The southwestern United States in particular offers potentially the best development opportunity for solar thermal electric technologies in the world.

The higher quality geothermal resources (both hydrothermal and hot dry rock) are also predominantly located in the West. Development of hydrothermal resources for electric power has been centered in California, Nevada, Utah and Hawaii. Most of the western United States contains hot dry rock (HDR) resources, with the highest grade HDR resources most likely located in California and Nevada.

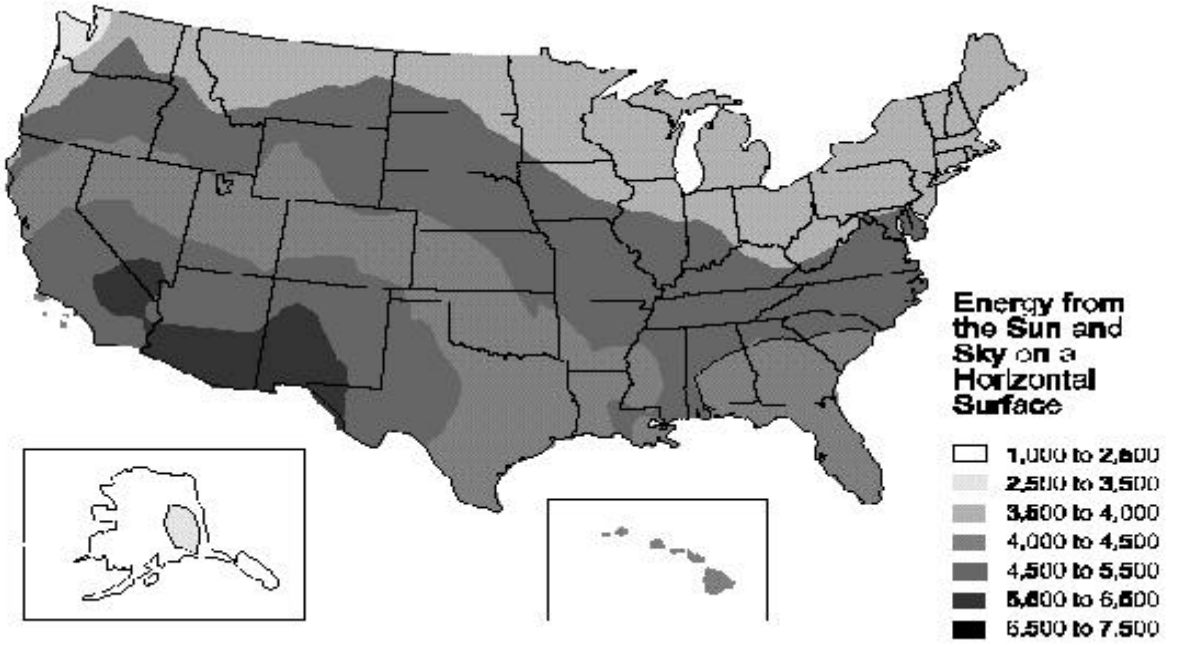
Due to the arid nature of much of the West, the potential for biomass energy production may be more limited in this region than in other parts of the country. Of the western states, California is one of the largest users of biomass energy. Feedstocks include lumber mill residues, in-forest residues, agricultural wastes and urban wood waste. Large-scale dedicated feedstock supply systems designed solely for use in biomass power plants do not exist in the U.S. today on a commercial basis. Landfill gas provides an additional potential biomass energy source in the West. The Environmental Protection Agency estimates that over 700 landfills across the United States could install economically viable landfill gas recovery systems, although only about 140 such facilities are currently in place. In California, with federal tax credit support, landfill gas projects have shown themselves to be capable of producing energy on a cost-effective basis competitive with conventional energy sources.

U.S. Wind Energy Resources

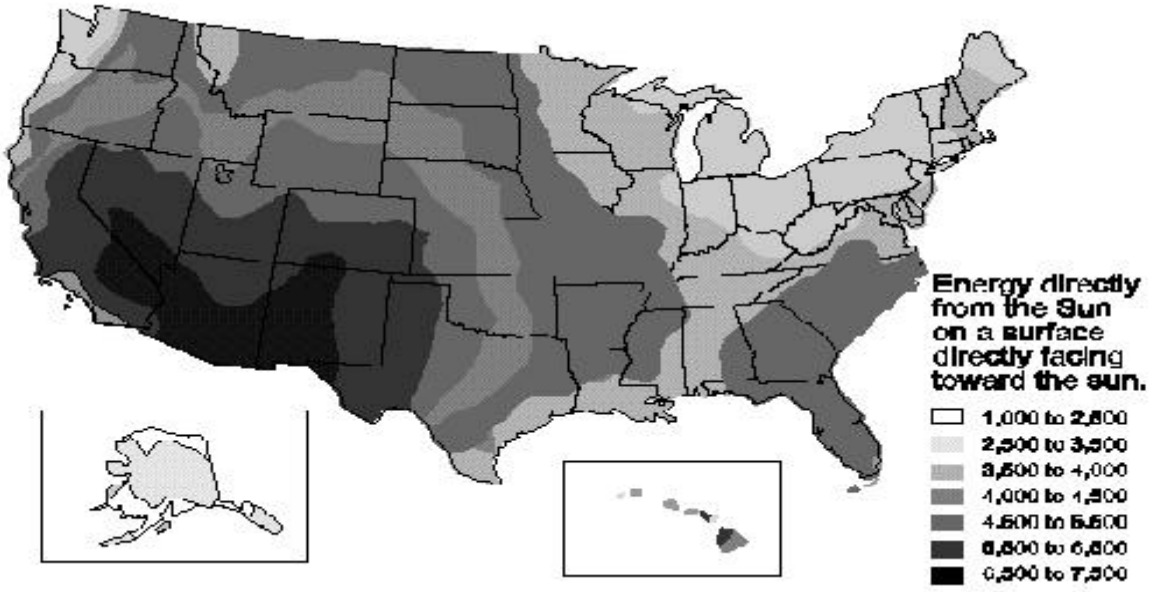
Wind Power Class	Wind Energy Resource Potential	Wind Power Density at 30 m [W/m²]
3	Moderate	240-320
4	Good	320-400
5-7	Excellent	400+



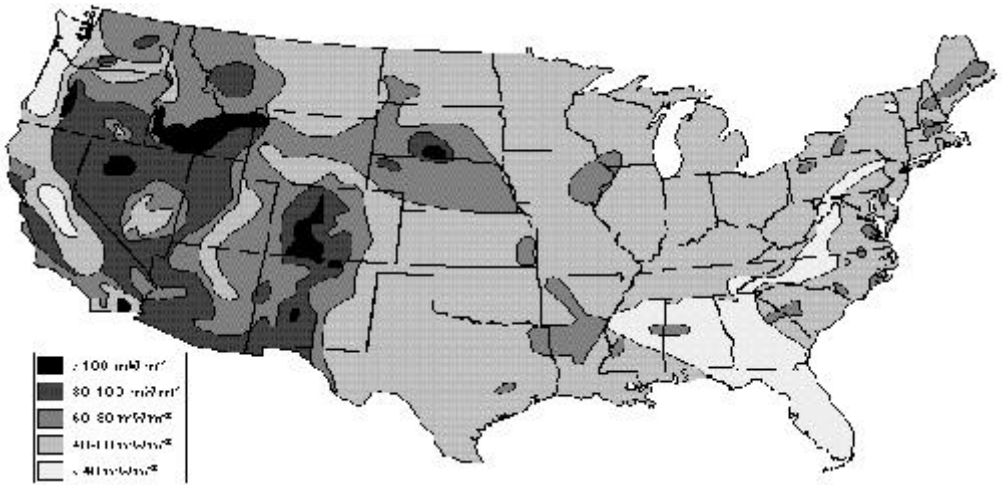
Global Insolation Resource for Crystalline-Silicon and Thin-Film PV Systems



Direct Normal Insolation Resource for Concentrator PV Technology

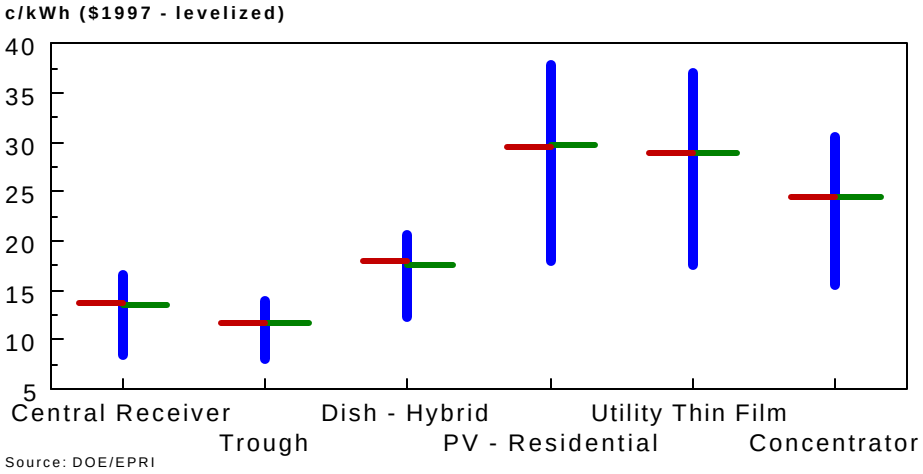


Geothermal Resource Quality in the U.S.



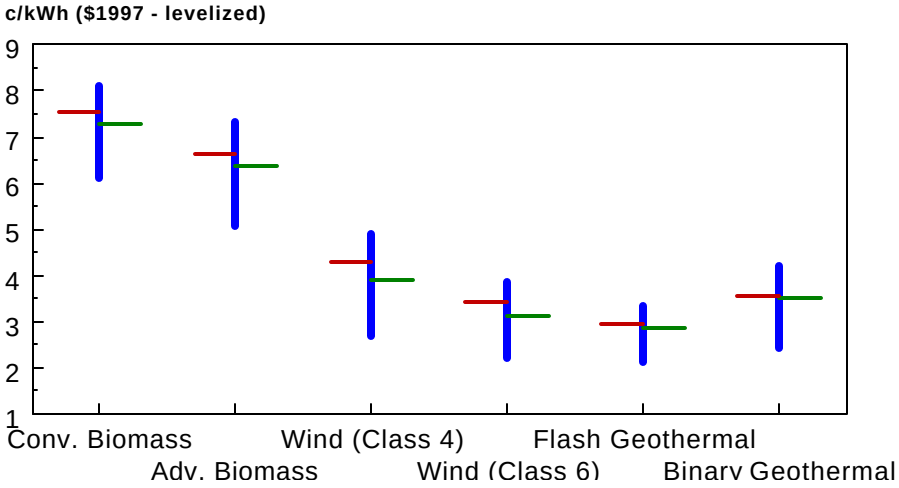
The following charts, prepared by the National Renewable Energy Laboratory and based on data found in the DOE/EPRI *Renewable Energy Technology Characterizations* report, show the range of estimated levelized cost for different technologies with different ownership for the year 2000. The lowest end on the vertical bar represents costs for a municipal utility. The top of the vertical bar is the cost for an Independent Power Producer. The left horizontal bar is the cost for a regulated Investor-Owned Utility (IOU) and the right horizontal bar represents costs for a GenCo. IOUs and municipal utilities employ a cost-based revenue requirements approach, while the other two use a market-based rate of return approach. One of the major differences is the favorable tax treatment that municipal utilities receive. Under various electric restructuring bills that have been proposed in Congress, this tax structure may change thus raising the lowest point on the vertical bar. It should also be noted that other ownership structures may lead to lower costs in some cases than the ones modeled here. For example, financing residential photovoltaics through home loan-type financing may be less costly than any of the alternatives presented.

Projected Cost of Energy from Solar Energy Technologies - 2000



Source: DOE/EPRI

Projected Cost of Energy from Renewable Energy Technologies - 2000



Item 9: Projections of the short- and long-term emissions reductions, visibility improvements, cost savings, and secondary benefits associated with the renewable energy goals, energy efficiency and pollution prevention activities.

a) Information providing the potential state contribution toward the 10/20 goals is required under Section 51.309(d)(8)(v) of the Regional Haze Rule.

b) Estimates of the visibility improvements and secondary benefits associated with progress toward the 10/20 goals will depend upon the type, quantity, location and operational characteristics of the renewable electricity generating facilities that are constructed. Most new generation in the WRAP region will be natural gas-fired. Natural gas-fired generation has low sulfur dioxide and particulate emissions, and relatively low nitrogen oxide emissions, depending on the emission controls used.

Thus, electricity from new generating facilities using renewable resources would be expected to supplant new gas-fired generation. However, new renewable generating faciliites may replace some existing coal-fired generation. This may occur, for example, when the combined supply of wind generation and coal-fired generation exceed electricity demand. Because there is no marginal fuel cost associated with the wind generator, the wind generator would be expected to operate while the coal generator backs down its generation. When and if this occurs is very location-specific. Without running a costly Western Interconnection electricity system model and making numerous assumptions, it is not possible to estimate the degree to which new generation using renewable resources would supplant existing coal-fired generation.

The WRAP Air Quality Modeling Forum (AQMF) will develop methodologies for estimating the short- and long-term emission reductions and visibility improvements based on estimates of the amount of renewable energy generation and use. The Air Quality Modeling Forum is charged with the responsibility to identify, evaluate the performance of, and apply mathematical air quality modeling planning tools which are used to quantify the effects of alternative emission management options upon the air quality of the western United States.

As input to the Air Quality Modeling Forum's work, the AP2 Forum suggests that scenarios be developed to reflect three different assumptions. The assumptions should be that new renewables generation will supplant gas-fired generation: 1) 80 percent of the time; 2) 90 percent of the time; and 3) 100 percent of the time. [*The AP2 Forum is awaiting input from the staff of the California Energy Commission and the Northwest Power Planning Council on the reasonableness of these assumptions*.]

c) To be developed by the WRAP Modeling Forum. [*There are some differences of opinion as to the nature of the projections required by the phrase "secondary benefits," as provided in Section*

51.309(d)(8)(v) of the Regional Haze Rule. For instance, it is unclear whether projections should be included regarding economic development and job creation as a result of increasing the use of renewables.]

Item 10. A description of the programs relied on to achieve the State's contribution toward the 10/20 goals and a demonstration of the progress made toward achievement of the renewable energy goals in the years 2003, 2008, 2013, and 2018. This description must include documentation of the potential for renewable energy resources, the percentage of renewable energy associated with new power generation projects implemented or planned and the renewable energy generation capacity and production.

a) Information containing a description of the programs relied on to meet each state's contribution toward the 10/20 goals is required under Section 51.309(d)(8)(vi) of the Regional Haze Rule.

b) Demonstration of progress - Most of the programs that states may rely upon to make a contribution to the 10/20 goal are described in Section III of this report. To date, there is little experience with many of these programs thus it is not feasible to make precise estimates of the future impacts of these programs on renewable energy generation and consumption. "Back-of-the-envelope" estimates of the potential cost and impact of these programs are discussed later in this report. The impact of these programs will change over time as the cost of renewable energy declines as a result of technology improvements.

Documentation of the potential for renewable energy resources: The potential for renewable energy generation is described above under Item 8.

Documentation of the percentage of renewable energy associated with new power generation projects implemented or planned and the renewable energy generation capacity and production: In the near-term, documentation of new renewable energy generation and consumption may be derived from information sources described in Items 2 and 3 (i.e., the Energy Information Administration and the National Renewable Energy Laboratory). In the long-term a generation tracking system, as recommended in Section IV, would provide accurate documentation of existing renewable energy generation and consumption by state. This information could be used to more accurately estimate the impact from planned generation projects.

Once a state's contribution to the regional goal is determined, the next step is to ascertain the extent to which the state's renewable energy programs are helping to meet its contribution. The Forum recommends that, where renewable energy generation is located in one state but consumed in another state, the credit for specific renewable generation or consumption be allocated between states according to the degree to which each state's programs contributed to the economic feasibility of the

generation project. The Forum believes that programs to increase renewable energy generation and consumption should not be limited to generation within the state. Instead, a policy or program should count toward a state's contribution so long as it induces increased renewable energy production or consumption anywhere within the region.

c) In Section IV of this paper, the AP2 Forum provides a recommended package of policies and programs which are designed to optimize a state's contribution to the 10/20 goals.

II. Definition of "Renewable Energy"

Varying definitions for renewable energy have been adopted in legislation by several western states. Section 51.309 of the Regional Haze Rule provides for a regional approach to reducing air pollution by increasing the use of renewable technologies to produce energy. Such a regional approach requires that the work of the WRAP AP2 Forum be conducted utilizing a uniform definition of what constitutes "renewable energy." Definitions developed by several western states were examined by the Forum. These western state efforts are contained in Appendix B. The AP2 Forum used the following definition of renewable energy.

WRAP Air Pollution Prevention Forum Definition of "Renewable Energy"

"Renewable energy" means electricity generated by non-nuclear and non-fossil low or no air emission technologies using resources that are virtually inexhaustible, reduce haze, and are environmentally beneficial. The term includes electricity generated by wind energy technologies; solar photovoltaic and solar thermal technologies; geothermal technologies; technologies based on landfill gas and biomass sources, and new low-impact hydropower that meets the Low-Impact Hydropower Institute criteria. Biomass includes agricultural, food and wood wastes. The term does not include pumped storage or biomass from municipal solid waste, black liquor or treated wood.

III. Potential Actions Which Can Help States Reach the 10/20 Goals

This section of the Air Pollution Prevention Forum's report is designed to provide a menu of the potential policy actions which are available to states in promoting the use of renewable energy. The Forum began its work identifying these potential actions by requesting an initial study of some of the barriers which currently exist to expanding the use of renewables in the WRAP region and an initial draft list of potential actions which can be taken to overcome such barriers. This initial study resulted in the production of a white paper on renewables titled, "Increasing the Use of Renewable Energy in the WRAP Region." Tribal issues were also given a preliminary assessment in the white paper. This paper is available on the Forum's Internet site at http://www.westgov.org/wieb/ap2forum/whitepap/final2.htm.

Following the development of the white paper, the Forum developed an expanded list of actions which can be taken by states and tribes to promote the use of renewable resources in the WRAP region. It should be noted that the issues surrounding opportunities to increase the use of renewables on tribal lands are *not* addressed in this report at this time. Due to the unique sovereign status of American Indian Tribes, these tribal issues will instead be addressed in a separate report being prepared by the WRAP's Tribal Issues Work Group.

The Forum determined that the actions available to states to promote the use of renewables could best be broken down into two major subsections:

A) Actions to provide financial incentives for renewables; and
B) Actions to improve market efficiency.

Within subsection "A" addressing actions to provide financial incentives for renewables, the Forum identified the following policy options: 1) implementation of a renewable portfolio standard; 2) use of a systems benefits charge; 3) tax incentives for renewables; and 4) opportunities for state and local governments to purchase electricity generated from renewable energy for government use.

Within subsection "B" addressing actions to improve the efficiency of the market place, the Forum has identified the following potential options: 1) developing green power markets; 2) use of consistent and accurate power labels and generation tracking; 3) reform of electricity transmission and distribution policies; 4) a sulfur dioxide emissions cap-and-trade program; and 5) enhancing the siting process for renewable power facilities.

The Forum also recognizes that there are unique opportunities and niche markets for renewables in the WRAP region, including opportunities to increase the use of renewables on tribal lands. It should be noted that the issues surrounding opportunities to increase the use of renewables on tribal lands are *not* addressed in this report at this time. These tribal issues will instead be addressed in a separate report being prepared by the WRAP's Tribal Issues Work Group.

This section of the Forum's report provides a series of brief overviews of the policy actions identified above. Each overview provides:
a) A description of the policy action, how it would work, and what would be required for implementation;
b) A discussion of the public policy rationale for the option;
c) An identification of where the policy or similar policies have been implemented and the experience with the policy;
d) A discussion of the political feasibility of achieving whatever actions are necessary to implement the policy;
e) A discussion of the costs of the policy and the contribution the policy could make to the 10/20 renewable energy goals;
f) A discussion of how the policy fits with a competitive electricity market;
g) A discussion of the potential linkages between the proposed policy option and other potential policy options, including those linkages which may be especially complementary or detrimental to other options; and
h) Identification of areas requiring further inquiry.

A) Actions to Provide Financial Incentives For Renewables

Electric generation from renewable resources is, in most cases, currently more expensive than generation from competing non-renewable resources. Public policies can provide incentives for development of renewable resources by: 1) adopting regulatory standards, such as a renewable portfolio standard, requiring that a certain percentage of electricity sold by energy service providers (ESPs) be from renewable resources; and 2) by providing financial incentives sufficient to allow renewable generation projects to compete in wholesale energy markets. Such incentives can be provided through funding generated by system benefits charges, through government tax incentives, or through the government purchase of renewables. To minimize uncertainty for financial institutions involved in financing renewable energy projects, government commitments to such programs should be made for an extended, multi-year period.

Section Outline:
1) Renewable Portfolio Standard (RPS)
2) System Benefits Charge (SBC)
3) Tax Incentives
4) Government purchases

The following table summarizes the status of state financial incentives in the WRAP region.

Renewable Energy Financial Incentives in the Western States							
State	**RPS**	**SBC**	**Production Tax Credit**	**Income Tax Credit**	**Property Tax Credit**	**Sales Tax Exemption**	**Gov't Purchase Policy**
Arizona	TBD*	Yes	No	Yes	No	Yes	No
California	No	Yes	No	No	No	No	No
Colorado	No	No	No	No	No	No	Yes
Idaho	No	No	No	Yes	No	No	No
Montana	No	Yes	No	Yes	Yes	No	No
Nevada	Yes	No	No	No	Yes	No	No
New Mexico	No	Yes	No	No	No	No	No
North Dakota	No	No	No	Yes	Yes	No	No
Oregon	No	Yes	Yes	Yes	Yes	No	No
Utah	No	No	No	Yes	No	No	No
Washington	No	No	No	No	No	Yes	No
Wyoming	No	No	No	No	No	No	No

*To Be Determined

1) <u>Renewable Portfolio Standard (RPS)</u>

a. Description: The "renewable portfolio standard" (RPS) is a statutory or regulatory requirement that each retail electricity provider obtain a certain percentage of its electricity supplies from approved renewable generators. The RPS can be given flexibility by allowing retail providers to satisfy the requirement collectively through a system of tradable credits. Thus a provider with a renewable component of its energy portfolio that exceeds the standard would be allowed to sell excess credits to a provider that is deficient. It is possible, however, that neither electricity from renewable resources nor renewable credits are available to a retail provider to meet the RPS at reasonable cost. To deal with this possibility, RPS programs generally include a cost-capping mechanism through which deficient retail providers can pay a fee into a publicly-managed fund based on the amount of renewable energy or credits that the provider was unable to obtain. These funds are then used to provide financial incentives for development of renewables.

b. Public Policy Rationale: Proposed new electrical generating facilities in the western United States are almost exclusively fueled by natural gas. With gas prices near historic low values, capital intensive generation from renewable resources cannot compete in wholesale markets with gas-fired and coal-fired generation without additional sources of revenue. However, fossil-fueled electric generation contributes to regional haze and other environmental problems, the public cost of which is not reflected in electricity prices. States have generally rejected mechanisms such as taxation that would raise the price of fossil-fueled generation to reflect the cost of environmental "externalities." The alternative is to adopt policies that offset the cost differential of renewable generation and ensure that an appropriate

fraction of states' electrical supplies are generated from environmentally-preferable renewable resources. By allowing each provider to choose whether to purchase electricity from renewable generators or purchase renewable credits from others, an RPS program can effectively utilize market forces to provide a least-cost means of meeting the standard.

c. Similar Policies: An RPS has been adopted in eight states, including: Connecticut, Maine, Massachusetts, Nevada, New Jersey, Pennsylvania, Texas, and Wisconsin. Arizona is in the process of deciding whether to implement an RPS. Credit trading programs are also being considered in several of these states. As of the end of 1999, no RPS program was operational. However, with several programs scheduled to begin in 2000, most of the above states have begun to focus their efforts on policy design and implementation issues. An RPS program is similar to requirements for a minimum percentage of low-income housing in new residential developments or recycled content in paper.

RPS Policies Established at the State Level[3]

State	**Renewables Standard**	**Status as of October 1999**
Connecticut*	Class I or II Technologies: 5.5% in 2000, 7% in 2009; plus Class I Technologies: 0.5% in 2000, 6% in 2009	Licensing regulations related to RPS complete. Current regulations exempt utility standard-offer service providers from meeting RPS.
Maine	30% in 2000 and thereafter. It should be noted that the Maine RPS includes forest biomass generators, certain hydro facilities and "high-efficiency" cogeneration systems already serving the New England grid. Since Maine's current electricity mix already contains 45-50 percent renewable energy (without cogen) the RPS is considered unlikely to foster any new renewable energy generation.	Many design details finalized.
Massachusetts	1% new renewables in 2003, 4% in 2009, and then increasing by 1%/year	RPS design process begins in fall 1999. Not clear whether RPS legislation requires the preservation of existing renewable energy supply.
Nevada	0.2% in 2001, 1% in 2009; 50% of RPS must come from new solar	One utility exempted until 2005. Nevada PUC considering comments filed in March 1999.
New Jersey*	Class I or II Technologies: 2.5%; plus Class I Technologies: 0.5% in 2001, 4% in 2012	Interim regulations scheduled to be finalized in late 1999 and will last for 18 months.
Pennsylvania	For PECO, West Penn, and PP&L territories, 20% of residential customers served by competitive default provider will be served by 2% renewable energy in 2001, increasing by 0.5%/yr; for GPU, 0.2% RPS in 2001 for 20% of all default customers, increasing to 80% of all default customers in 2004	Requirement imposed by service territory.
Texas	New and existing renewables: 1,280 MW by	Draft regulations published in October 1999. Will

[3] "Emerging Markets for Renewable Energy: The Role of State Policies During Restructuring;" Ryan Wiser, Kevin Porter, and Steve Clemmer (Submitted to *The Electricity Journal*, *October 1999*).

	2003, 2,880 MW by 2009	require 2,000 MW of new renewables by 2009.
Wisconsin	0.5% in 2001, increasing to 2.2% in 2011	RPS developed under wholesale—not retail—competition. 0.6% of RPS can come from renewable energy facilities installed before 1998.

* In Connecticut and New Jersey, distinctions are made between "Class I" and "Class II" technologies, and purchase requirements for each class are imposed. The definition of Class II renewable technologies is broad, including existing hydropower and municipal solid waste facilities. The Class I definition is more restrictive, and excludes hydropower and municipal solid waste facilities.

d. Political Feasibility: Western states have taken different approaches to electricity industry restructuring. Without exception, however, distributors of electrical energy to end-use customers remain less regulated by states. All states retain the authority to require that retail providers of electricity provide financial support for environmentally-preferable generation from renewable resources at a reasonable cost. Adoption of portfolio standards is perhaps more difficult than policies such as a system benefits charge since the estimated cost of meeting the standard is somewhat uncertain at this time due to limited empirical data. Legislatures are reluctant to impose a new government mandate, required in the portfolio standard, on an industry that is being deregulated. A relatively new complication is the ability of consumers to provide direct financial support through so-called "green markets." Legislative bodies may be inclined to rely exclusively on retail markets to provide financial support for renewable development rather than provide government support as a matter of public policy.

e. Costs and Benefits: Increased reliance on renewable power provides benefits that are important but difficult to quantify. They include reductions in air pollution such as regional haze. A diverse mix of energy sources is also valuable as a hedge against future fossil-fuel price increases and concerns related to global warming. However, the cost of meeting an RPS is at least somewhat uncertain. To avoid this problem, RPS programs usually include a cost-capping mechanism. Funds raised through the RPS cost-capping mechanism can be used to provide incentives for continued development of renewable resources such as: 1) making payments per kWh of electricity generated from renewable resources to developers who win in a bidding system for financial incentive payments; 2) underwriting loan guarantees or low-interest loans to renewable energy developers; and 3) making direct payments to retail customers who buy electricity generated by renewable resources.

To enhance effectiveness and reduce costs, a state RPS should allow renewable energy sold to in-state customers to count towards the RPS requirement regardless of whether the energy was generated from an out-of-state producer. This would allow energy producers to locate their renewable energy facilities in the best (and lowest cost) locations regardless of where the RPS is adopted. A tracking system would be necessary to verify the origin of wholesale energy supplies sold by retail providers. See Section IV for additional information on the costs and benefits of an RPS.

f. Effects on Competition: An RPS by definition has an effect on competition in that it is a government mandate that all suppliers must provide a certain percentage of renewable power to their customers. Utilizing renewable credit trading provisions can make an RPS more compatible with retail

competition in electricity markets. On a societal level, an RPS helps to more efficiently allocate resources and level the proverbial playing field by offsetting the price advantage enjoyed by providers of electricity from non-renewable resources that share responsibility for regional haze and other environmental problems.

g. Interaction with Other Policies: The portfolio standard approach establishes a separate competitive wholesale market for renewable electricity from which retail providers purchase mandated supplies. Implementing an RPS also requires: developing a tracking system to verify the origin of wholesale energy supplies sold by retail providers; oversight of a renewable credit trading program; and management of funds paid by deficient retailers to provide alternative incentives for renewable development.

A generation tracking system would be needed to verify claims that power being sold is from a renewable energy generator and that the power is not being sold more than once. In addition, actions taken to improve the efficiency of the marketplace (e.g, transmission and distribution reform, facility siting reform, a cap-and-trade system) would be beneficial in lowering the cost of complying with an RPS. Presumably, electricity from renewable resources would be used to meet both a state RPS and a federal RPS requirement. An RPS can also create a conflict to opening electricity markets to customer choice because it places a requirement to obtain power from renewables on all potential product choices in the electricity market.

h. Further Work: States can be expected to be reluctant to establish regulatory requirements to promote renewable development if they perceive that such policies put businesses in their state at a competitive disadvantage to those in states with lower requirements. States should be encouraged to work cooperatively to establish a regional plan for renewable development that includes a common mechanism to provide the necessary incentives and shares costs equitably among states. If states decide that adopting an RPS makes sense, they should consider supporting a federal RPS to help minimize inter-regional competition. In addition, the diverse renewable resource policies that have been established in the western states should be monitored to determine their effectiveness in promoting renewable development.

2) <u>System Benefits Charge (SBC)</u>

a. Description: System benefits charges are used to collect funds from all electricity consumers to support "public benefit" programs, including programs to promote the use of renewable energy sources. SBCs are typically proposed as a volumetric fee on electricity use, such as a cents per kilowatt-hour "adder." Unlike the RPS, which is a requirement placed on electricity suppliers, the SBC is directly imposed on all electricity consumers.

b. Public Policy Rationale: The SBC has a similar policy rationale as the RPS. Renewable resources cannot compete in wholesale markets with gas-fired and coal-fired generation without additional sources of revenue. However, fossil-fueled electric generation contributes to regional haze and other environmental problems, the public cost of which is not reflected in electricity prices. States have generally rejected mechanisms such as taxation that would raise the price of fossil-fueled generation to reflect the cost of environmental "externalities." The higher cost of electricity from renewable resources can at least partially be overcome through publicly-funded financial incentives.

Expenditure of SBC funds should result in renewable electricity production, not merely investment in plant. If the renewable "adder" is sufficient, new renewable projects will be built to participate in increasingly competitive wholesale markets. Moreover, funds can be awarded through an auction process to projects requesting the smallest adders, which maximizes renewable generation incentivized with limited funds. SBC funds can also be used to provide loan guarantees, low-interest loans and other instruments that reduce the cost of capital for renewable developers.

c. Similar Policies: System benefits charges that support renewables have been adopted in 13 states (see the following table). Annual SBC funding for renewable energy ranges from roughly $2 million in Montana to approximately $135 million in California.[4] There are also many examples of fees on certain goods and services to provide funds for incentives, such as deposit fees on bottles that provide subsidies for recycling operations.

The greatest experience with system benefit charges in the WRAP region to date is in California. The California SBC will collect $540 million over four years. SBC funds are distributed among several programs. The new technologies account ($162 million) is used to fund a production incentive based on a competitive solicitation process, with a cap of 1.5 cents/kWh. There were 55 winning bidders in the auction, including 300 megawatts of wind, 157 megawatts of geothermal, 70 megawatts of landfill gas, 12 megawatts of biomass, 1.0 megawatt of digester gas and 1.0 megawatt of small hydro. The average price bid was 1.2 cents/kWh.

SBC Policies Established at the State Level[5]

State	Level of Support for Renewables	Status as of October 1999
Arizona	Arizona requires utilities to create system benefits funds to support low income, demand-side management (DSM),	Affected utilities are to file for review of the SBC every three years.

[4] "Emerging Markets for Renewable Energy: The Role of State Policies During Restructuring;" Ryan Wiser, Kevin Porter, and Steve Clemmer (Submitted to *The Electricity Journal, October 1999*).

[5] Information in this chart was provided by: 1) the National Renewable Energy Laboratory (See Appendix A) ; and 2) "Emerging Markets for Renewable Energy: The Role of State Policies During Restructuring;" Ryan Wiser, Kevin Porter, and Steve Clemmer (Submitted to *The Electricity Journal, October 1999*).

State	Level of Support for Renewables	Status as of October 1999
	environment, renewables, and nuclear powerplant decommissioning programs as well as nuclear fuel disposal, consumer education, and public benefits R&D.	
California	$135 million/year for 4 years beginning in 1998.	45% used to support existing renewables; 30% to support new renewables; 10% to support solar and other emerging renewables; 15% to support green power market.
Connecticut	Approx. $14 million/year in 2000; $30 million/year in 2004 and thereafter	Working on implementation. May invest in renewables projects outside of state.
Illinois	$5 million/year for 10 years beginning in 1999; possible that an additional $250 million clean energy trust will fund renewables	Ongoing grant and rebate programs. Likely to be under-subscribed in 1999 as program gears up.
Massachusetts	Approx. $26 million/year from 1998 on	Litigation preventing fund disbursement. Possible legal settlement by end of 1999.
Montana	Approx. $2 million/year from 1999-2003 Montana's "universal system benefits charge" sets funding level at 2.4% of each utility's 1995 retail sales revenue. At least 17% of the utility's annual system benefits funding must be spent on low income and weatherization programs.	The charge became effective January 1, 1999 and will remain in effect until July 1, 2003 unless modified. Utilities receive credit against SBC allocation for expenses on programs covered under the SBC; state administers remaining funds.
New Jersey	Approx. $34 million/year from 2000-2007	Working on implementation. Financial incentives for renewables to be determined by NJ Board of Public Utilities and Department of Environmental Protection.
New Mexico	SBC of 0.3 mills per kWh; Up to $4 million dollars of the total funds can be used for investments in renewable technologies.	No specific duration of fund though restructuring law provides for reconsideration of whether financial support for renewables should continue.
New York	$15 million over 3 years beginning in 1999	Primary focus is on wind and solar. Wind and solar RFPs already released.
Oregon	Oregon's restructuring law requires electric service providers to charge all customers a 3% "public purpose charge" for a period of 10 years for funding energy conservation programs, low-income weatherization assistance, and the development of new renewables.	Retail loads of more than 1 MW receive credit for internal public purpose expenditures. Nineteen percent of the expected $60 million-per-year fund is to be used to cover "above-market costs of new renewable energy resources."
Pennsylvania	$11 million/year fund, including renewables, from 1999-2003; Renewable Energy Pilot Fund raises $3.9 million/year for 1999-2000	Renewable Energy Pilot focused on solar. Discussions on allocation of $11 million/year fund not yet complete, but perhaps half will be used for renewable energy.
Rhode Island	Approx. $2 million/year from 1998-2002	Funds distributed through RFP process. Program has funded resource studies, wind investigations, and photovoltaic projects and programs.
Wisconsin	Approx. $3.6 million/year from 1999 on	Department of Administration to establish requirements and grant application procedures. Sunset review planned in 2004/5.

d. Political Feasibility: The number of states that have adopted fee/incentive programs demonstrates that, at some level, there is public support for renewable resource development. However, the levels of financial incentives for renewables that have been adopted are generally minimal and are unlikely to result in significant progress toward the 10/20 goals adopted in the GCVTC recommendations. Political debate on fee/incentive programs generally revolves around the size of the fee and the benefits that incentives will provide. There is also concern about imposing a "tax" on customers as part of the deregulation process. A relatively new complication is the ability of consumers to provide direct financial support through so-called "green markets." Legislative bodies may be inclined to rely exclusively on retail markets to provide financial support for renewable development rather than provide government support as a matter of public policy.

e. Costs and Benefits: Increased reliance on renewable power provides benefits that are important but difficult to quantify. They include reductions in air pollution, including regional haze. A diverse mix of energy sources is also valuable as a hedge against future fossil-fuel price increases and concerns related to global warming. Cost of these programs depends on the level of renewable resource development desired. Depending on the resource base available, technologies, and federal program levels, the above-market cost of electricity (i.e., the cost of production minus the market price) from many renewable resources is in the 2 – 4 cent per kilowatt-hour range. Assuming that sufficient sources of renewables are available at these prices, meeting the 10/20 renewable goal would increase the average price of power in the West by less than one cent/kWh.
See Section IV for additional information on costs and benefits.

f. Effects on Competition: The SBC as discussed here is generally more compatible with retail competition in electricity markets. It can be targeted to address specific market barriers or to specific technologies. On a societal level, such a program helps to more efficiently allocate resources and levels the proverbial playing field by offsetting the price advantage enjoyed by providers of electricity from non-renewable resources that share responsibility for regional haze and other problems.

g. Interactions with Other Policies: The SBC approach differs from the RPS approach in that the SBC does not establish a separate competitive wholesale market for renewable electricity from which retail providers purchase mandated supplies. SBC policies can therefore be effective whether or not significant retail sales of renewable electricity occur. For example, California uses SBC revenues to provide financial incentives for both producers of renewable power and retail consumers making purchases. State policymakers could avoid some of the problems associated with overlap between an RPS and SBC by designing their programs to prevent projects that receive SBC funds from selling power to RPS markets. State policymakers could also design an SBC program to focus funds on renewable technologies and markets that are unlikely to be encouraged by the RPS (such as those technologies which are currently further from being cost-competitive with conventional energy sources).

h. Further Work: States can be expected to be reluctant to establish incentives/fees to promote renewable development if they perceive that such policies put businesses in their state at a competitive disadvantage to those in states with lower requirements. States should be encouraged to work cooperatively to establish a regional plan for renewable development that includes a common mechanism to provide the necessary incentives and shares costs equitably among states.

In addition, the diverse renewable resource policies that have been established in the western states should be monitored and evaluated to determine their effectiveness in promoting renewable development.

3) Tax Incentives

a. Description: Tax incentives can be used to alleviate the often high costs associated with developing renewable energy facilities. A variety of tax incentives can be used to help reduce the capital-intensive costs of constructing new renewable energy facilities and to encourage investment in renewable energy technologies. In the West, states have already adopted numerous tax incentives, including: production tax incentives, personal and corporate income tax credits, sales tax exemptions and property tax incentives. Production tax incentives generally provide credits against the income tax owed based on the energy yield of an installed renewable energy system. Income tax credits can be provided for individuals, partnerships or corporations making investments in renewable energy systems or facilities to manufacture renewable energy equipment. Sales tax incentives generally exempt from taxation equipment used to produce electricity from renewable resources. Property and equipment tax incentives often provide a tax exemption for the value added by a qualified renewable energy source installed on a residential, commercial or industrial building.

b. Public Policy Rationale: The higher cost of electricity from renewable resources can at least partially be overcome through tax incentives and tax exemptions. Proposed new electrical generating facilities in the western United States are almost exclusively fueled by natural gas. With gas prices near historic low values, capital intensive generation from renewable resources cannot compete in wholesale markets without financial assistance. However, fossil-fueled electric generation contributes to regional haze and other environmental problems, the public cost of which is not reflected in electricity prices. States have generally rejected tax policies that would raise the price of fossil-fueled generation to reflect the cost of environmental "externalities."

c. Similar Policies: In the West, several states have opted to use tax incentives to promote renewables, including: Arizona, Idaho, Montana, Nevada, North Dakota, Oregon, Utah and Washington. (See Appendix A of this report for a complete listing of western state financial incentive policies).

On the federal government level, the Energy Policy Act of 1992 contained a renewable energy production tax credit which applies to wind energy and certain types of biomass energy facilities. At the end of 1999, this federal tax credit was extended to the end of 2001.

In addition, President Clinton has proposed bioenergy and bioproducts tax incentives to accelerate the development and use of bio-based technologies in order to help meet environmental challenges like global warming. Included in the proposal are tax credits for electricity produced from biomass which would: extend for 2.5 years the current "closed-loop" biomass credit which provides a 1.5 cent per kilowatt-hour tax credit for facilities placed in service before January 1, 2002; provide credits for "open loop" biomass facilities by expanding the definition of biomass eligible for the 1.5 cent production tax credit to include certain forest-related resources and agricultural and other sources for facilities placed in service from 2001 through 2005 and would also provide a 1.0 cent credit for electricity produced from 2001 through 2003 from facilities placed in service prior to July 1, 1999; provide a credit for co-firing biomass and coal by adding a 0.5 cent per kilowatt hour tax credit for electricity produced by co-firing biomass in coal plants from 2001 through 2005; and provide credit for methane from landfills by adding a 1.5 cent per kilowatt-hour credit for electricity produced from qualifying facilities.

State	**Renewable Energy Tax Policies in Western States** (*See Appendix A for more information*)
Arizona	Allows a personal or corporate income tax credit of 10% of the cost of construction of a qualified environmental technology manufacturing, producing or processing facility. Provides a personal income tax credit of 25% of the cost of a qualified solar or wind energy device. A credit of up to $1,000 can be claimed the year the system is installed. If the credit exceeds a taxpayer's liability in that year, the unused portion of the credit may be carried forward for up to five years. The state also has a retail sales tax exemption of up to $5000 for solar and wind energy equipment.
Idaho	Allows a personal income tax deduction of 40% of the cost of a solar, wind or geothermal device used for heating or electricity generation. Taxpayers can deduct 40% of the cost in the year of installation and 20% three years thereafter. The maximum deduction in any one year is $5,000. Eligible technologies are passive solar space heat, active solar water heat, active solar space heat, solar thermal electricity, photovoltaics, wind, and geothermal.
Montana	Provides a 35% corporate or personal income tax credit for any individual, partnership or corporation making an investment of $5,000 or more in wind energy systems or facilities to manufacture wind energy equipment. The state also exempts qualified renewable energy sources from property tax for up to 10 years following installation. The exemption is applied based on the "value added" by the system. The exemption applies to systems valued at up to $20,000 in the case of a single-family residential dwelling and $100,000 in the case of a multi-family residential dwelling or a nonresidential structure. Qualified equipment includes active and passive solar, geothermal, wind, and low-emission wood or biomass combustion devices. Allows individuals to claim an income tax credit up to $250 of the cost of installing of a geothermal energy system. This credit is available for three years following installation. The credit may not be applied retroactively or carried forward.

State	Renewable Energy Tax Policies in Western States (*See Appendix A for more information*)
Nevada	Provides a property tax exemption equal to the value added by a qualified renewable energy source installed on a residential, commercial or industrial building. Qualified equipment includes solar, wind, geothermal, solid waste converters and hydro power systems. This exemption applies for all years following the installation. Provides a property tax exemption for any business that generates electricity from recycled material and is found by the Commission on Economic Development to "have as a primary purpose the conservation of energy or the substitution of other sources of energy for fossil sources of energy." Provides a property tax exemption for property used to generate electricity from solar energy. A personal property exemption may be taken for up to 10 consecutive years, and a real property exemption can be taken for up to 20 years. The exemption does not apply to residential property or property used for the production of electricity from solar systems prior to July 1, 1997.
North Dakota	Provides a local property tax exemption for any solar, wind or geothermal energy device (whether stand alone or part of a conventional system). This exemption applies for five years after installation. The incentive is currently provided for systems under 100 kW in size, although the Attorney General's office is expected to issue an opinion regarding whether this is an appropriate interpretation of the law. Allows taxpayers to deduct five percent (5%) of the cost of equipment and installation of a geothermal, solar or wind energy device for a period of three years. The incentive is currently provided for systems under 100 kW in size, although the Attorney General's office is expected to issue an opinion regarding whether this is an appropriate interpretation of the law.
Oregon	Provides a thirty-five percent (35%) Business Energy Tax Credit of up to $100,000 for the construction of systems on business facilities that produce energy from renewable resources, provide energy savings, or recycle waste. Eligible renewable energy technologies include solar, wind, hydropower, geothermal, and biomass. Qualifying systems must replace ten percent (10%) or more of electricity, gas, or oil used in the facility where installed if the system supports in-house energy needs. The program also includes a "pass through" option, allowing Oregon's investor-owned utilities to claim the tax credit granted for certain projects. In return, that utility pays the customer (the project installer) an up-front cash payment equal to the net present value (NPV) of the credit—about 28% of the project cost. The state also provides a personal income tax credit based on the first-year energy yield of an alternative energy device (photovoltaics, solar space heating, passive solar, solar water heating, and geothermal systems) installed on an individual's primary or secondary dwelling. The credit was initially set at 48¢/kWh, but dropped to 40¢/kWh in 1998. The credit is capped at $1,000 as of 1998 and is scheduled to sunset in 2001. Oregon also provides a property tax exemption for the value added by renewable energy devices installed on any property (residential, commercial or industrial). Qualifying renewable energy devices include: solar, geothermal, wind, water or methane gas energy systems for the purpose of heating, cooling or generating electrical energy. The exemption does not apply to property owned or leased by anyone directly or indirectly involved in "the production, transportation or distribution of energy."
Utah	Provides a corporate or personal income tax credit for renewable energy systems installed on commercial and residential buildings. Eligible technologies include active and passive solar systems, photovoltaics, biomass, hydropower, and wind. For residential buildings owned by a business, the credit is 25% of the cost of installation of a system up to a maximum credit of $2,000 per system. For commercial systems, the credit is 10% of the cost of installation up to $50,000. The credit was extended after it expired in 1996, and the new credit expires on January 1, 2001.

State	Renewable Energy Tax Policies in Western States (*See Appendix A for more information*)
Washington	The state provides an excise tax exemption for qualifying high technology manufacturers, including alternative energy resource companies, from the state corporate excise tax. The exemption is 100% with no limit and sunsets in 2004.

d. Political Feasibility: Providing tax incentives for electricity generated from renewable resources requires legislative action. Some tax incentives may also involve the budgeting process. Mechanisms involving budget processes are not as effective, since the inherent uncertainty in these processes increases financial risk and hence costs. In the era of smaller government, tax incentives for these types of programs generally have an uphill battle to get approved.

e. Costs and Benefits: The capital intensive nature of renewable resource development makes sales and property tax exemptions especially effective in reducing the cost of capital required for renewable development. State income tax credits may or may not be useful depending on federal policies and the tax liabilities of renewable developers. Tax incentives should be made for an appropriate multi-year period to minimize uncertainty for investors and financial institutions involved in development.

Federal tax incentives would be potentially more cost-effective and beneficial to renewable technologies than state tax incentives. This is due to the fact that a federal incentive would apply regardless of where a renewable energy facility is sited, and would therefore allow renewable energy developers to locate new facilities in those areas of the country with the highest quality (and lowest cost) resources. Lower income tax rates and the deductibility of state taxes under the federal income tax reduces the value of a state income tax credit relative to a federal income tax credit.

f. Effects on Competition: Tax incentives are not incompatible with increased competition in electricity markets. Similar to other financial incentive mechanisms, tax policy can function to help level the playing field between energy sources by offsetting the cost and price advantages enjoyed by providers of electricity from non-renewable resources that share responsibility for regional haze and other environmental problems.

g. Interactions with Other Policies: Tax incentives can help make investing in renewable energy technologies less costly, and would therefore work positively in aiding investors to meet the goals established by an RPS. A 1.5 cent federal production tax credit would reduce the cost of implementing other financial incentives such as RPSs and government purchase requirements.

h. Further Work: States should be encouraged to work cooperatively to establish a regional plan for renewable development that includes a common mechanism to provide the necessary incentives and shares costs equitably among states. In addition, the diverse renewable resource policies that have

been established in the western states should be monitored and evaluated to determine their effectiveness in promoting renewable development.

4) Opportunities for Governments to Purchase Electricity Generated from Renewable Energy for Government Use

a. Description: A method to increase the consumption of electric power generated by renewable energy is to harness the tremendous buying potential of federal, state, and local governments. Although electricity from renewable energy is usually more expensive than that from conventional sources — a trend expected to continue into the foreseeable future — air quality gains can be made by developing renewable energy resources. Government can expand the use of renewable energy through its purchasing power.

Government typically purchases goods and services through a competitive bidding process. In the electricity procurement process a preference could be given to renewable energy. This could be done by: the government agency requiring that the offerer (power vendor) include a certain percentage of renewable energy in the electricity provided; the government agency issuing a solicitation for a specific amount of renewable energy; the government agency designating a fixed dollar amount to be used to purchase renewable energy electricity; or a government agency using the savings achieved through conservation efforts to acquire electricity generated from renewable resources. To enable government agencies to purchase electricity generated by renewable resources at the lowest cost possible, a "renewable electricity purchase credit" trading program should be adopted. Under such a program, agencies would receive credits for purchasing electricity from renewable resources in excess of a purchase requirement. The credits could be sold to agencies that did not meet the purchase requirement. Federal agencies could trade credits among federal facilities located in the WRAP region or throughout the nation.

For most states this would require a mandate from the governor or state legislature or a directive from the general services arm of the state. For the federal government similar actions would be needed by the President, Congress or the General Services Administration.

Local governments would be encouraged to aggregate their renewable energy purchases with those of the state in order to drive down the cost of the renewable energy they elect to purchase.

b. Public Policy Rationale: The reason to require government agencies to purchase renewable energy relates to the public good. Government should lead by example and set policy that is beneficial for the long-term health of the state or nation. Even though renewable energy costs more, this increment can be offset by reduced cost to restore the environment (air quality) and reduced cost of health care.

The federal government has a long-standing history of providing subsidies to desired energy sources. To date, development of the renewable energy industry has not received the same level of assistance as fossil fuels and nuclear power. Incentives for the use of renewable energy has the added benefit of helping to adjust the market for the societal costs associated with the continuing use of fossil fuels. These costs are not fully reflected in the price of electricity from fossil-fuel sources.

Because government agencies tend to be stable electricity consumers, government procurement policies could provide the renewable energy industry with sufficient assurance of a demand for their product to induce investment in capital-intensive renewable energy generating facilities. Additionally, because government is ubiquitous, demand would be spread throughout the Western Regional Air Partnership region. Having demand in every state may encourage development of local indigenous renewable energy resources. Another rationale for government procurement of electricity generation from renewable resources is that money spent by government to purchase renewable energy will benefit all citizens in the form of cleaner air, decreased reliance on imported fuels and often better utilization of local resources. Finally, the development of renewable energy can have a positive economic impact on the region.

c. Similar Policies: The only state in the WRAP region that has enacted a purchasing preference policy for renewable energy is Colorado. A gubernatorial executive order directed state agencies to purchase power produced from renewable energy resources "whenever cost-effective and practical." Although this order was never implemented, it was anticipated that the state energy office would have to work individually with state agencies to encourage them to purchase renewable energy.

On June 3, 1999, President Clinton issued Executive Order 13123, entitled "Greening the Government Through Efficient Energy Management." Under the Order, "each agency shall strive to expand the use of renewable energy within its facilities and in its activities by implementing renewable energy projects and by purchasing electricity from renewable energy sources...Where appropriate, agencies shall consider the life-cycle costs of combinations of projects, particularly to encourage bundling of energy efficiency projects with renewable energy projects...Agencies shall use off-grid generation systems, including solar hot water, solar electric, solar outdoor lighting, small wind turbines, fuel cells, and other off-grid alternatives, where such systems are life-cycle cost-effective and offer benefits including energy efficiency, pollution prevention, source energy reductions, avoided infrastructure costs, or expedited service."

Regarding federal agency purchases of electricity from renewable energy sources, the Executive Order states that "... each agency should adopt policies and pursue projects that increase the use of such electricity. Agencies should include provisions for the purchase of electricity from renewable energy sources as a component of their requests for bids whenever procuring electricity. Agencies may use savings from energy efficiency projects to pay additional incremental costs of electricity from renewable

energy sources. In evaluating opportunities to comply with this section, agencies should consider: ... EPA's guidelines on crediting renewable energy power in implementation of Clean Air Act standards."

Regarding the link between energy savings and renewable energy purchases, the Order states that "agencies granted statutory authority to retain a portion of savings generated from efficient energy and water management are encouraged to permit the retention of the savings at the facility or site where the savings occur to provide greater incentive for that facility and its site managers to undertake more energy management initiatives, invest in renewable energy systems, and purchase electricity from renewable energy sources...Agencies shall designate exemplary new and existing facilities with significant public access and exposure as showcase facilities to highlight energy or water efficiency and renewable energy improvements."

An example of the potential impact of government procurement policies comes from the recycled paper industry. The recycled paper industry has gone from a niche market industry to mainstream, in part due to government preference policies. Due to high landfill costs and shortages of landfill space, many states mandated that a percentage of municipal solid waste be recycled. To make recycling work, markets for the collected materials needed to be developed. Purchasing preferences were put in place whereby government would purchase paper with a recycled content if the price did not exceed a certain premium. This preference, along with technological improvement in the quality of recycled paper produced, increased the availability of recycled product, while at the same time driving down the price.

Government recycled paper purchasing preferences sent a signal to the market that if the paper industry could produce an acceptable product within the price premium, a market was assured. Additionally, limiting the cost of recycled paper to a specified premium provided a defined additional cost for those purchasing paper and indicated to the industry what premium was considered acceptable.

d. Political Feasibility: Instituting government procurement of electricity from renewable energy will require a top-down approach. The implementation and funding of a mandatory federal renewable purchase requirement could only be done through action by the President and probably Congress. The implementation of a purchase credit trading program among federal agencies could likely be done through cooperative action among agencies with the tacit agreement of the Office of Management and Budget and Congress.

Electricity from renewable energy can cost more and, in some cases, cost many times more than electricity from traditional power sources. Neither the President's Executive Order nor the Colorado Governor's Executive Order set specific goals for the purchase of renewable energy by government agencies. Funds to purchase renewable energy may be particularly problematic in states. State budgets tend to be tightly controlled, leaving little discretionary funds for purchasing non-essential goods and services.

In most cases, a mandate would need to have an accompanying funding source. States and the federal government could opt to set aside a certain amount of funds each year for electricity that could be spent on renewable energy purchases or could specify that a certain percent of all electricity be purchased from renewable energy.

To encourage activity in each state, renewable power marketing "drivers" need to be identified. In states with air quality concerns, renewable energy can be sold as a long-term aid to improve air quality. In states that have few indigenous fossil fuel resources, renewables can be sold based on fuel security. If states appreciate the externality costs of fossil fuel technology, then renewables may become favored. Additionally, states can argue that the development of renewable energy resources has an economic development benefit. The President's Executive Order suggests that greenhouse gas emissions are the significant driver for purchasing renewable energy.

To pay for the additional cost of renewable energy, states could utilize savings from existing demand-side management or conservation programs, as incorporated into the President's Executive Order. Changes in procurement of electricity related to restructuring of the electricity industry and retail competition offer additional opportunities.

The feasibility of each state adopting their own procurement policy will depend upon many factors including the current economy, concern for the environment, cost of electricity from renewables and other rationale that relates to the state's priorities. To encourage states to develop specific purchasing policies, the WRAP could recommend that the Western Governors' Association adopt a resolution to that effect. This may provide an additional push for state action.

e. Costs and Benefits: No comprehensive assessment of the impact of a state purchase requirement has been done. It is estimated that Arizona state government consumes 333,000 MWh annually and Utah state government consumes 400,000 MWh. If one extrapolates this data to the rest of the WRAP states based on the population of a state, then one could estimate that state governments in the GCVTC region consume 2,800,000 MWh annually. If 10 percent of that electricity was from renewable resources, there would be an additional demand for 280,000 MWh in the GCVTC region. The total cost of meeting a 10 percent purchase requirement for state governments in the GCVTC region would be $4.2 million, assuming this amount of power would be available at an incremental cost of 1.5 cents/kWh.[6]

[6] Arizona and Utah account for 13 percent of the population in the nine-state GCVTC region. The average state government consumption in Arizona and Utah is 367 million kWh annually. Extrapolating this consumption rate to other states in the WRAP region yields an estimated state government consumption of 2,800 million kWh. At an incremental cost of 1.5 cents/kWh it would cost state government in the nine-state region $4.2 million to purchase 10 percent of their electricity from renewable resources and $8.5 million to purchase 20 percent from renewable resources.

The federal government can play a significant role in expanding the use of renewables through government purchasing programs at federal facilities in the WRAP region. In the West federal facilities consume an estimated 17,601,123 MWh of electricity each year (see table below). This figure equals approximately three percent of the net electric generation consumed in the region.[7] Within the nine-state transport region, as defined in Section 51.309 of the Regional Haze Rule, federal facilities consume an estimated 14,629,559 MWh per year, which represents approximately 3.5 percent of the net electric generation consumed in the region. A federal Executive Order that establishes aggressive federal agency renewable energy purchasing policies could therefore create a small but significant market for renewable technologies in the West.

Federal Electricity Use by Each State Within the WRAP Region[8]

State	MSq Feet	KBtu/SF	Cum Mbtu	Elec MWh
AZ	46.4	138.06	6,405,401	1,175,459
CA	343.5	138.06	47,420,841	8,702,230
CO	51.3	138.06	7,080,546	1,299,356
ID	12.6	138.06	1,734,751	318,345
MT	9.0	138.06	1,238,380	227,256
ND	21.0	138.06	2,901,132	532,389
NM	47.5	138.06	6,563,556	1,204,483
NV	20.6	138.06	2,846,444	522,353
OR	12.3	138.06	1,702,744	312,472
UT	28.0	138.06	3,864,335	709,147
WA	87.3	138.06	12,053,352	2,211,919

[7] Net electric generation data provided by EIA Form 759 (1998 Data). Please see table in Section A of this report for a complete state-by-state breakdown of electric capacity and net electric generation in megawatt hours.

[8] Information in this table was provided by the U.S. Department of Energy's Denver Regional Office. The information on facility square footage was derived from DOE's FEMP web page (at http://www.eren.doe.gov/femp/financing/newfacr5.xls and http://www.eren.doe.gov/femp/financing/newfacr6.xls) The EUI (energy utilization index, in Btu per square foot) for federal facilities is collected by region and is not available by state. The overall EUI (based on Energy Information Administration 1998 CBECS data) for the western states was used to estimate state-by-state consumption. The MWh figures were similarly calculated by multiplying the square footage by the EUI for electricity from the CBECS data. The data in the table excludes process-related heavy industrial use.

State	MSq Feet	KBtu/SF	Cum Mbtu	Elec MWh
WY	15.2	138.06	2,101,864	385,714
Total	**694.7**	**138.06**	**95,913,348**	**17,601,122**

f. Procurement in a Competitive Market: As the electricity industry undergoes restructuring in different states, there is potential to adopt government procurement policies for renewables. Although they possess large, steady and sometimes diversified loads, governments rarely have had the opportunity to bid and negotiate for power. With retail competition, government has the opportunity to incorporate non-traditional services into power contracts. This may include performance contracts to upgrade facilities, utilizing savings from negotiated power contracts for renewable energy purchases, and incorporating renewable energy options into bundled contracts.

g. Interaction with Other Policies: Renewable portfolio standards would be complemented by government procurement efforts because government would create a demand for renewable energy required to be produced under the portfolio standards.

In Arizona, a penalty fund was contemplated that would receive funds from those not meeting the renewable portfolio standard. The fund was to be used to install photovoltiac systems on government buildings or to purchase electricity generated from photovoltaics.

System benefit charges could be structured to aid government procurement efforts if funds are earmarked for the purchase of renewable energy electricity. Green power marketing programs would be of benefit to government procurement policy by raising awareness in government of green power alternatives and by increasing consumer awareness and pressure for government to purchase cleaner power. An aggressive federal agency purchasing requirement would benefit from the establishment of a generation tracking system to ensure that renewable power is not sold twice.

h. Further Work: Since government is relatively inexperienced at bidding for power, it may be helpful to develop sample bid specifications for purchasing electricity generated from renewable energy. To more accurately determine the contribution state government could have on the use of electricity generated by renewable energy, data on each state government's electricity consumption needs to be collected and analyzed.

B) Actions to Improve Market Efficiency

Within Section “B” addressing actions to improve the efficiency of the market place, the Forum has identified the following potential options.

Section Outline:
1) Green Power Markets
2) Consistent and Accurate Power Labels and Generation Tracking
3) Transmission and Distribution System Policies
4) Cap-and-Trade Program
5) Renewable Energy Facility Siting Issues

1) Green Power Markets

a. Description: Market research has found that many consumers prefer cleaner energy sources and perceive that there is an added value to purchasing electricity generated from "green" renewable energy sources. In states that have restructured their electricity industry to provide for retail competition, many companies are marketing "green power" product options. In states where utilities continue to maintain exclusive service territories, some utilities are offering their customers an option to support renewable resources through a separate tariff, which is often referred to as "green pricing." Both competitive green power marketing and regulated utility green pricing programs offer a means by which customers can support environmentally preferable electric generation directly through their electricity purchases.

The difference between green marketing programs and green tariffs lies in who has the decision making authority and who is responsible for the green product. Green marketing lets the competitive market decide which "green" choices are made. Under green tariffs, the electric utility decides what choices the customer will have.

b. Public Policy Rationale: Greater use of renewable resources provides public benefits in the form of reduced emissions of air pollutants and conservation of non-renewable energy resources. Where green power purchase options are available, customers can exercise their personal preferences for cleaner energy sources in the marketplace, in addition to the other support for renewables that might be available as a matter of public policy. A robust green power market can generate additional public benefits with little or no additional expenditure of public funds.

c. Similar Policies: A wide variety of products are differentiated in the marketplace based on their environmental attributes, such as recycled paper, spray products using "ozone-friendly" propellants, organic foods, and electric automobiles. Initially, these products may command a premium to the standard product price but, over time, as market demand increases and production infrastructure improves, the price of these alternative products will fall. In some cases, policies have been used to support the development of these fledgling industries, such as government purchase preferences for recycled paper.

d. Political Feasibility: Green power marketing employs market mechanisms to support greater development of renewable energy resources and thus the political feasibility of this policy approach is very high. An important uncertainty relates to the effectiveness of competitive market structures; several studies have found that in states which have opened their electric market to competition, the established market rules are not fostering true competition. Pursuing green marketing strategies requires also pursuing policies to open the markets to customer choice and to ensure that there is meaningful competition for suppliers and a real choice for customers. Also, where markets remain regulated, some oversight will be required to ensure the quality of and corporate commitment to utility green pricing programs. Mandates may be necessary if utilities do not voluntarily make green power available to their customers. Finally, controversy can develop regarding the quality of green product offerings and the extent to which voluntary purchasing behavior should substitute for minimum public commitments to renewables development.

e. Costs and Benefits: The costs to the public of voluntary green power programs are negligible. Benefits accrue from the use of market mechanisms which more efficiently allocate resources and which increase reliance on renewable resources thereby avoiding generation from more polluting plants. The magnitude of the benefits depends on the extent of green power purchases and the resulting displacement of emissions-creating generation.

f. Effects on Competition: Green power marketing is consistent with the move toward competitive electricity markets. In fact, in today's restructured markets, providing green power is one of the only ways in which competitive marketers have been able to distinguish their products. However, the success of green power markets is highly contingent on how the market rules are structured.

In regulated markets, regulators must assure that customers have meaningful choices of quality products and that incumbent utilities do not retard the development of the green power market. There is an issue regarding the ability of new renewable energy providers being able to enter the market if the incumbent utility is still the decision maker and provider of the renewable energy product. This may have a long-term effect on competition and the formation of a viable renewable energy supplier industry. Care must be taken to assuure that green tariffs do not create future stranded costs on utility systems.

g. Interactions with Other Policies: The green power market is a subset of a larger market for electricity services. Green power marketing cannot be expected to succeed in the absence of a strong commitment to develop and market quality products or to introduce robust retail competition. Voluntary green power programs and public policies that provide support for renewable resources are complementary and not exclusive. The sale of green power to retail customers should be additive to the use of public policies, such as a renewables portfolio standard or system benefits charge, that establish a minimum public obligation to fund renewables development. In regulated markets, policies should be adopted that provide meaningful green power choices for captive customers.

Supporting policy mechanisms might include financial subsidies or tax incentives to renewable developers generating power for sale in the green market. California uses a public benefits fund to provide rebates to customers to encourage green power purchases. California has also established a publicly-funded, consumer-oriented green power education program to promote participation. In addition, states and other public entities can participate in the green market on their own behalf and purchase renewable power for their own loads. Finally, truth-in-advertising rules are also important to protect customers from fraud and build consumer confidence in the green power industry.

h. Further Work: There is widespread public confusion regarding the sources of electricity production and about electric industry restructuring in general. Educating consumers about competition and electricity choice will take a concerted effort. In addition, the willingness of consumers to contribute private funds to provide the public benefits of renewable resources is relatively untested, and additional experience with these markets is required. Because market competition is developing slowly, it appears unlikely that consumer demand for green power will result in large increases in the supply of electricity from renewable resources in the near term. However, the longer-term potential of this market suggests that efforts to educate the public about their energy choices should be expanded and public policies to remove market barriers be adopted.

2) Consistent and Accurate Power Labels and Generation Tracking

a. Description: Consumers in several western states are paying a premium for power generated from renewable resources, especially those with low environmental impacts. Such power is commonly referred to as “green” power or energy. With effective consumer protection, increased demand could lead to more of these resources being developed. Two key elements of effective consumer protection are tracking and labeling. Effective tracking means ensuring that desirable power is not double-sold. Effective labeling means clear and consistent labels throughout the West.

b. Public Policy Rationale: Effective tracking requires a system by the western states that assures desirable power generation is not sold twice. Absent such assurance, lowered consumer confidence may result, undermining development of a "green" market and the ability of desirable resources to attract a price premium. The California Energy Commission (CEC) is developing a generation certificate system. If this or another effective tracking system is adopted by all western states, it could prevent double-selling of desirable power in the West.

Effective labeling will result if the western states require clear and consistent labels. Consumer research and experience from states with retail competition show that consumer choice is strongly influenced by the price, resource mix, and environmental impacts of power. For markets to operate efficiently, consumers need basic information disclosed to them in a fashion that facilitates comparison shopping. Because many power brokers will likely be marketing in the western states, consistency of definitions and the format and content of disclosure labels improves consumer understanding and

reduces the cost of marketing. Therefore, to the extent possible, states should require consistent labels that accurately disclose price, resource mix and environmental impacts.

c. Similar Policies: A single tracking system has been developed and adopted by the six New England states. Maine and Rhode Island have adopted consistent power labels. Massachusetts requires more information on its label (e.g., union content), but also meets the requirements in Maine and Rhode Island so its label can qualify under the New England "label." Other New England states have not yet adopted label standards.

The Committee on Regional Electric Power Cooperation (CREPC) includes regulators and energy offices from the 11 western U.S. states and 3 Canadian provinces. On April 22, 1999, the CREPC passed a resolution supporting consistent tracking and a model disclosure rule.

Since then, Colorado PSC has required a label disclosing source and the Montana PSC is considering a rule to require a label that discloses price, source and environmental impact. Oregon law now requires a label that discloses price, source and environmental impact, and the PUC is beginning a rulemaking. California adopted label requirements before the CREPC resolution. The California, Colorado and proposed Montana labels are similar, but have different definitions of renewable resources.

d. Political Feasibility: The key policy issue is the consistency of the western states' requirements for tracking and disclosure. Only California has significant choice in residential and small commercial markets. Montana, Nevada, Arizona, New Mexico, and Oregon are implementing choice now. Many Colorado customers can buy wind energy. Western state utility regulators and energy offices have agreed to share data and consider the model rule.

It is likely the states will adopt some way to prevent double-selling. The California Energy Commission (CEC) optional certificate program can include data from other states. If it or a similarly effective system is adopted by the western states, double-selling will be quickly detected.

Absolute consistency of labels in the West is unlikely. The labels adopted or proposed in California, Colorado and Montana are similar in the areas covered and overall appearance, but are not identical. The concepts underlying the labels are consistent, except that several states have different definitions of renewable resources. Absolute consistency will likely require federal legislation. Communication among state regulators will aid the move towards consistency.

e. Costs and Benefits: The CEC has developed a tracking system. The additional CEC costs for all other states participating could be as low as one full-time annual staff person, when the system is operating. Participant costs would be those incurred for data reporting by owners of desirable power plants and state agencies. Any enforcement costs would be additional.

Establishing a disclosure rule will likely cost each state agency less than a full-time-equivalent staff person for the year of adoption. The fewer modifications to the model rule, the lower the costs.

Recurring costs to power marketers will be largely for the printing of labels. This cost will depend on the amount of desirable power sold, but should be a tiny fraction of normal marketing costs. Consistent label requirements can reduce the cost of marketing.

f. Effects on Competition: This proposal is completely consistent with a competitive market for electricity. Competitive markets require that consumers have good information and be protected against fraud. Care should be taken, however, to ensure that the reporting requirements imposed on electricity suppliers are not overly burdensome.

g. Interactions with Other Policies: If consumers perceive a significant risk of double-selling, it will quash consumer demand for desirable generation. Policies that depend on consumer demand, such as consumer renewable energy purchase credits, require an effective tracking mechanism. Clear and consistent labels will increase the demand for desirable resources. This will lower the level of subsidies or mandates needed to attain target levels of development.

h. Further Work: The Air Pollution Prevention Forum or other appropriate organization should monitor and assist the states in their efforts to develop an effective tracking system and clear and consistent labels. If the states falter, increased assistance to states or federal mandates should be considered.

3) <u>Transmission and Distribution System Policies</u>

a. Description: Access and pricing policies for the electric transmission system that are in place or being developed have a pronounced effect on the economics and, therefore, the ability of renewable generating technologies to compete in the markets to serve customers. The policies of concern fall into three general categories: interconnection standards, pricing for use of the transmission system, and protocols for the use of the transmission system. Prior to open access (FERC Order 888), vertically integrated utilities owned and controlled generation and transmission; Public Utility Regulatory Policies Act (PURPA) contracts governed interconnection requirements; and each utility's transmission system was priced using "postage stamp" rates—one price throughout that utility's system. Now the system is changing and these changes create opportunities, as well as potential barriers, to the development of renewable technologies. The three key areas of policy that need to be developed are interconnection standards, pricing regimes and transmission protocols that are favorable to renewable technologies.

- <u>Interconnection standards.</u> In spite of open access to the transmission system, utilities are using interconnection requirements to create barriers for new generation, either renewable or other

technologies, to serve customers. Also there are many different hardware specifications that industry has to comport with in order to integrate into the system. To prevent unfair interconnection practices and to create standardization of hardware, a set of national interconnection standards should be developed. These standards would include hardware specifications and standard terms and conditions of interconnection, including cost responsibilities of each party. These standards could either be developed and adopted administratively as part of the National Electric Safety Code or as part of Federal Energy Regulatory Commission (FERC) tariffs. Federal legislation should only specify that they be created, not what they are.

- Pricing. The transmission system is moving away from postage stamp rates and into pricing the transmission system so it reflects its true costs. This includes price signals that reflect when the system is congested and price signals for locating at the "right" place on the system. In addition, a system for eliminating pancaking of multiple systems' postage stamp rates is being developed to create efficient power markets. These policies are being developed by regional transmission organizations (RTOs) and ultimately will be approved by FERC as a part of transmission tariffs. Some pricing regimes are advantageous to renewable generation and some create disadvantages. The idea is to get FERC to approve RTO transmission pricing polices that do not disadvantage renewables. The policies are being developed at the RTO level, so that is where the predominance of policy effort should focus.
- Transmission Protocols. Aspects of the operation of the transmission system, such as scheduling flexibility, consequences of deviations from schedules or delivery imbalances, can negatively impact the economics of intermittent renewables, such as wind. These policies will become part of any RTO protocols.

b. Public Policy Rationale: The rationale for national interconnection standards is to create a "fair" opportunity for renewables to connect into the utility grid in a non-discriminatory way and minimize the costs of interconnection through standardization. Developing pricing regimes and transmission protocols that do not disadvantage renewables will remove barriers to the use of renewables on the system to serve loads. Protocols adopted by system operators therefore should be designed so that they do not unnecessarily penalize renewable resources. These policies are necessary, but not sufficient, to achieving the 10/20 goals.

c. Similar Policies: Standardized interconnection requirements are fairly common practice in electricity as well as other industries. The national electric safety code is a set of industry standards governing safety on the system. Generators have standards for interconnection, as do appliances, telephones and computers. The pricing policies are an emerging field without much precedent.

d. Political Feasibility: Industry is recognizing the need for standardizing interconnection requirements and Electric Power Research Institute and other national organizations are working to

develop a set of national standards. The Institute of Electrical and Electronics Engineers is also in the process of developing an interconnection standard through its Standards Coordinating Committee 21.

These actions make adoption of standardized interconnection requirements very feasible, unless the utility industry sees this as a tremendous threat. Pricing regimes are being developed and, to some extent, many of the features of these regimes will help all generation, including renewables, get to market. The question is going to be whether the promotion of a certain technology, like renewables, can be the driver for pricing the transmission system, or whether it will be the requirements of the system that drives pricing reform. FERC has been careful to be fuel-blind; and the needs of the transmission system will likely outweigh the needs of a particular technology. There are, however, areas where these two work together and these areas can create opportunities to get the right policies in place for renewables.

e. Costs and Benefits: The costs of these policies are fairly low. Developing interconnection standards and creating standardization for hardware is a low-cost effort that should generate tremendous benefits in terms of economies of scale in producing interconnection hardware. It will prevent discrimination and sometimes exorbitant interconnection costs, thus providing a fair opportunity for interconnection. This should promote renewable technologies, but to what extent is unknown at this time. The pricing regimes and appropriate RTO protocols should cost little to develop and implement. A more efficient transmission system will lower the cost of moving electricity from renewable sources to the marketplace, thereby keeping the costs of getting renewables to customers as low as possible. Failing to adopt these policies could severely constrain the generation of electricity from renewable resources and the ability to achieve the 10/20 policy goals.

f. Effects on Competition: These transmission policies are generally very consistent with a competitive market. Pricing regimes that advantage renewables at the expense of transmission system efficiency may have a negative effect on competition.

g. Interaction with Other Policies: These transmission policies tend to complement other policies and would be useful, but insufficient by themselves, in achieving the 10/20 goals. They do not undermine any other policies that are being proposed.

h. Further Work: Continued work will be needed to monitor the formation of RTOs in the Western Interconnection.

4) <u>SO_2 Cap-and-Trade Program</u>

a. Description: A regional sulfur dioxide (SO_2) cap-and-trade program would establish a declining cap on western SO_2 emissions. Each affected source would be allocated a fixed number of SO_2 emission credits, subject to the constraint that at any given time the total number of credits in the

region must not be greater than the level of the cap. To comply with its allocation, a source would be required either to reduce its emissions or to purchase credits from an over-complying source.

The WRAP's Market Trading Forum (MTF) is in the process of designing a stationary source SO_2 cap-and-trade program as part of the implementation of the GCVTC recommendations. The MTF has agreed that SO_2 emissions from stationary sources in the region will be limited to 540,000 tons by 2018, a 35% reduction from 1990 levels. Negotiations continue over the level of emission reductions that will be required by 2003, 2008 and 2013.

b. Public Policy Rationale: By limiting regional SO_2 emissions and creating a market in which emission credits can be bought and sold, a cap-and-trade program is designed to harness market mechanisms to achieve air quality goals at the least cost to society. By putting a monetary value on SO_2 emissions, a cap-and-trade program provides an economic incentive to engage in SO_2 reducing activities, including investing in the low- or zero-emission renewable energy technologies. The design of specific program elements, such as the credit allocation mechanism, can provide additional incentives to invest in renewables.

c. Similar Policies: The best known existing cap-and-trade program is EPA's Acid Rain Program. This program is national in scope and was created to limit SO_2 emissions from electric utilities to reduce the problem of acid rain. To date, the program has been successful in reducing emissions at costs significantly lower than expected. During the first half of 1999 the price of Acid Rain allowances averaged approximately \$200/ton of SO_2.

The Acid Rain program includes provisions for allocating up to 300,000 "bonus" allowances to energy efficiency and renewable energy projects. Projects are allocated 1 ton of SO_2 allowance for each 500 MWh of renewable energy production or energy efficiency savings. Projects installed after January 1, 1992 and prior to January 1, 2000 are eligible for allowances. As of June 1999, approximately 35,000 energy efficiency and renewable energy allowances had been awarded.

d. Political Feasibility: The consensus GCVTC recommendations demonstrated that there is broad political support, at least conceptually, for a western SO_2 cap-and-trade-program. Ultimately, however, the extent to which a cap-and-trade program is politically feasible will depend on the level at which the cap is set and the design of other program elements. For a cap-and-trade program to be politically feasible, stakeholders in the WRAP process will need to reach a consensus on the design of the overall program.

The political issues surrounding the inclusion of a renewable energy allocation mechanism within the broader cap-and-trade program center on the extent to which these resources will compete for credits with existing sources of SO_2 emissions. The more evidence that can be presented that demonstrates the emission reduction benefits of renewables, the greater will be the policy justification for

allocating allowances to these resources, and the more politically viable a renewable energy allocation mechanism will be.

e. Costs and Benefits: In a broad context there are both benefits and costs associated with reducing regional SO_2 emissions through a cap-and-trade program. A number of forums within the WRAP, including the Market Trading Forum, the Modeling Forum and the Econometrics Forum, are working to estimate these costs and benefits.

In the narrower context of a renewable energy credit allocation mechanism, the costs would be small, and would primarily be associated with verifying and tracking renewable energy production so that renewable energy projects could be allocated credits.

By putting a monetary value on SO_2 emissions, a cap-and-trade program will narrow the cost differential between non-emitting renewable technologies and fossil fuel-fired technologies that emit SO_2. A program that allocates emission credits to renewable resources will further reduce this cost differential. The more stringent the SO_2 cap, the greater would be the impact on renewable energy development. At the level of the cap being discussed within the MTF, the narrowing of the renewable/fossil cost differential is likely to be relatively small, probably in the neighborhood of 0.1 – 0.2¢/kWh. Given that even the most cost-effective renewable energy currently costs roughly 2¢/kWh more than conventional energy, a cap-and–trade program will not significantly narrow the cost gap. Thus, by itself a cap-and-trade program will make only a modest contribution to the 10/20 goal.

f. Effects on Competition: A cap-and-trade program is fully compatible with competitive electricity markets. In well-functioning, competitive electricity markets, power suppliers will seek to minimize costs across all aspects of their operations, including pollution control. A cap-and-trade program is designed to send price signals to firms regarding emission reduction opportunities and relies on the cost minimizing behavior of these firms to achieve the regional emission reductions at least cost.

g. Interactions with Other Policies: By narrowing the cost differential between renewable technologies and fossil fuel-fired technologies, a cap-and-trade program will allow polices that provide direct financial support to renewable energy (e.g. system benefits charges, renewable portfolio standards and green marketing programs) to yield greater amounts of renewable energy development for the same amount of money. For instance, the smaller cost differential means that every dollar raised through an SBC can support more renewable energy, and that each MWh required by an RPS can be achieved at a lower cost. Similarly, every dollar spent on a green marketing/green pricing program is capable of purchasing a greater amount of renewable energy.

h. Further Work: A more thorough analysis is needed to quantify the impacts of an SO_2 cap-and-trade program on regional renewable energy development. Similarly, a quantitative analysis of the

SO_2 emission reductions that would be achieved by meeting the 10/20 goals would be useful to see the extent to which meeting the goals will contribute to keeping the region under the cap.

5) <u>Renewable Energy Facility Siting Issues</u>

a. Description: Virtually all renewable energy generating projects are required to obtain permits or other approvals from one or more government agencies. Permitting authorities at the federal, state, tribal and local levels may have jurisdiction over a single development. The number of agencies and the level of government involvement will depend on a number of factors unique to each renewable energy generation project. These factors primarily include: the location of the renewable energy generating equipment and associated facilities or equipment, the need for transmission lines and access roads, the size of the development, the ownership of the project and the ownership of the land proposed for the development. Permits and other approvals are required to ensure the development is safe, environmentally benign, and an appropriate use for the land.

Renewable energy sources may or may not be transportable. Biomass fuels and landfill methane can be moved from the sites where they are produced to electric generating plants located elsewhere; solar, wind, falling water and geothermal energy sources must be converted to electricity where they are found. Whether a renewable energy source is transportable or not can have significant implications to development costs, environmental impacts and siting options for a project. Many renewable energy generation projects and their associated facilities cannot be relocated to address public or landowner concerns without destroying the profitability of the project.

In the western United States, a substantial proportion of land is owned by the federal government. A significant amount of the region's renewable resource base is located on these lands. Delays in getting authorizations from federal land managers to develop renewable resources found on these lands has frustrated a number of proposed projects. Presently, federal land managers are not required to act within specific timelines on proposals they may receive.

The permitting and approval process for renewable energy generating projects should reliably yield decisions that are timely, ensure compliance with all laws and regulations governing the development at reasonable costs, and reflect public input. The process must be credible to its participants to avoid court challenges. To be efficient and effective, permitting processes should conform to the following set of guidelines:

- *Significant public involvement.* Providing opportunities for early, meaningful public involvement is crucial to a successful process, but there is no one simple formula for achieving this.

- *Issue-oriented process*. Understanding the most important issues associated with each proposed renewable energy generation project and focusing the permitting process on resolving them helps agencies make more timely and defensible decisions.
- *Clear decision criteria*. Decision-making criteria should be clear and consistently applied, and all participants and interested parties should be aware of them from the outset of the process.
- *Coordinated permitting process*. Where more than one agency or type of government has jurisdiction over permitting, agencies are encouraged to coordinate with one another so that project review can proceed in unison while avoiding redundant, conflicting or inconsistent standards, requirements, and processes.
- *Reasonable time frames*. Unnecessary delays and associated uncertainties can be minimized if permitting agencies specify reasonable time frames for each of the major phases of the permitting process, and manage the process to stay within them.
- *Advanced planning*. Both the developers and agencies should know as much as possible about the project, the process, the interested public participants, and the issues tied to the project prior to commencing the formal permitting process. Developers and agencies should work with affected stakeholders to try to resolve their concerns before siting and/or permit applications are filed.
- *Efficient administrative and judicial review*. Following established procedures designed to systematically narrow and resolve the issues of concern and produce factually-based decisions can significantly limit appeals and allow them to proceed more efficiently if they do occur.
- *Active compliance monitoring*. Most agencies include specific conditions in their permits or approvals that must be met by resource developers during construction, operation and closure; these conditions should be clear, specific, measurable, agreed upon by all relevant parties, realistic, set within reasonable time frames, enforceable, and actually enforced.

A well conceived, properly-managed permitting process should be constructive for all of its participants. It can be assembled using innumerable combinations of interagency agreements, administrative policies and rules, and statutory requirements.

b. Public policy rationale: Siting and permitting of renewable energy generating facilities should safeguard public health and safety, protect personal, tribal and public property and shield the natural environment from the threats proposed developments may pose. They are also meant to involve the public meaningfully in government decisions that affect their lives. These regulations and processes are not designed to delay projects unduly or to burden them with insurmountable, unnecessary costs that might be associated with bureaucratic, vague, duplicative or inefficient requirements and/or processes.

c. Similar policies: Many government agencies already have agreements designed to help them coordinate their permitting and approval processes, e.g., various units of the National Forest Service have agreements to work with states on mine permitting. There are also protocols for getting

different agencies within the local, state and federal government to complete unified project reviews. Unfortunately, everyone is not familiar with them and agencies involved in the process invariably examine proposed projects from their narrow legal perspective. Local, state and federal agencies have not typically included tribal governments in their protocols for coordinated siting reviews. In many cases, basic jurisdictional questions must be resolved. Government agencies have also developed methods to involve the public in their decision-making, but the involvement is usually late in the process and often viewed as pro forma. A number of states have adopted energy facility siting acts. The Keystone Center, based in Keystone, Colorado, has developed a model transmission line siting statute. Also, this policy option is consistent with the Western Governors' Association Policy Resolution 99-013, "Principles for Environmental Management in the West." This resolution states that "successful environmental policy implementation is best accomplished through balanced, open and inclusive approaches at the ground level," and that "[c]ollaborative approaches often result in greater satisfaction with outcomes and broader public support, and can increase the chances of involved parties staying committed over time to the solution and its implementation."

d. Political feasibility: The management and administrative agreements and protocols needed to support coordinated permitting should be relatively easy to achieve. Any proposed statutory changes will, likely, attract widespread attention and will be difficult to enact because industry and public interest groups have become very cynical of one another and government. Even an innocuous, benign legislative proposal could be misunderstood or misrepresented and become a political lightning rod.

e. Costs and benefits: Better siting and permitting methods and procedures should lower compliance costs to developers and reduce the cost for others to participate in the process. The threats proposed projects may pose to people, public and private property and natural resources should be eliminated or mitigated without having to resort to lengthy and expensive court battles.

f. Effects on competition: Improved siting and permitting methods and procedures should yield more profitable, economically competitive renewable energy resource developments that conform to broad public, not just narrow, parochial values and interests.

g. Interaction with other policies: This policy should be consistent with all other existing energy and environmental policies and good government practices.

h. Further work: Training and technical assistance for government energy, land use, and environmental regulators could be improved. They should become familiar with the full range of requirements developers confront, not simply their own unique health, safety, and resource protection mandates. They should learn how to fit all the decisions and approvals needed by a project sponsor into a comprehensive, efficient project review strategy. Agencies should also eliminate ambiguous requirements and attempt to be specific about their permitting and approval standards. States, tribes, and local and federal governments should resolve any jurisdictional questions that could arise in siting

renewable energy generation units and associated facilities, such as substations and transmission lines, before specific projects are proposed to avoid making projects political symbols. Developers should be encouraged to begin working with agencies and the public earlier in the planning process so permitting and public concerns can be addressed as soon as possible.

IV. Recommendations

This section contains the renewable energy recommendations of the AP2 Forum. The recommendations are grouped into two major categories: recommendations to provide financial incentives for the production or consumption of electricity generated by renewable resources, and recommendations to improve the efficiency of the market place. The Forum also identified priorities among the recommendations for the various levels of government.

Barring major unanticipated changes in the economics of renewable and other generation options due to technological breakthroughs or major shifts in government policy (e.g., imposition of carbon limits or taxes), it will be difficult to achieve the 10/20 goals. However, major progress toward the 10/20 goals can be made by implementing the recommendations for financial incentives. The Forum believes that the recommendations for improving the efficiency of the market place are necessary, but not sufficient to meet the 10/20 goals.

The Forum also believes that, in selecting policies to promote the use of renewables, states should consider that such policies can be a means of increasing energy security and can help make state economies more robust. As an example, the state of Wisconsin, which imports about 98% of its energy from other states and regions, has long justified its renewable-friendly policies on the basis of economic benefits. In fact the Wisconsin Energy Bureau predicts that a 75% increase in the state's renewable energy use would create 62,000 new jobs, $1.2 billion in new wages and $4.6 billion in new sales for Wisconsin businesses.

Priorities Among the Recommendations

States

The Forum believes that the most significant progress towards meeting the 10/20 goals can be made through the adoption of aggressive state policies which provide financial incentives for renewable energy production and consumption. Most notably, the Forum believes that adoption of either an aggressive renewable portfolio standard (RPS) or a system benefits charge (SBC) are the most effective state policy options in encouraging the growth of renewables. The Forum recommends that every state should adopt at least one of these two "core" financial incentive policies to promote the use of renewable energy sources. A state may want to adopt both an RPS and a SBC depending on the relative costs and benefits of each policy choice.

For states choosing to adopt an RPS as the core financial incentive policy for renewables, the Forum recommends an RPS of 10% in 2005 and 20% in 2015. Such an RPS would assure the state of meeting its 10/20 goals, although the costs of imposing such a requirement could be substantial. To maximize the effectiveness of this program, the Forum recommends that states do not include sunset

requirements in adopting an RPS. The Forum also recommends that state implementation plans include provisions calling for the creation of a system for trading renewable energy credits among states in the WRAP region which have adopted an RPS.

For states choosing to adopt a SBC, it is important that the revenues allocated to the acquisition of renewables be identified because system benefits charges are typically used for a variety of purposes other than acquisition of renewable energy (e.g., low-income energy assistance, research and development, energy efficiency). The SBC revenues dedicated to renewable energy would be used to cover the above-market costs of acquiring renewable power.

With system benefits charges, the cost of the renewables program is known; however, the amount of renewables that will be acquired is not. With an RPS, the amount of renewables that will be acquired is known, but the cost is not. The unknown costs associated with an RPS makes enacting such a program difficult in many legislatures. One remedy for this deficiency with an RPS is to place a cap on the cost that will be paid for renewables. The cost cap could limit the ability to meet the RPS goals. For the purposes of analysis, the AP2 Forum has postulated cost caps on an RPS program of 1.5 cents, 3 cents and 4.5 cents.

The Forum strongly believes that, in addition to adopting at least one of the core financial incentive policies (an RPS or SBC), states should also adopt policies to ensure that every electricity consumer has the opportunity to choose to purchase renewable energy products through a viable green market or green pricing program. The Forum therefore recommends the adoption of programs which will: 1) establish consumer information disclosure rules and a power labeling program; 2) establish a regional generation tracking system; 3) implement consumer education programs on the sources of electricity available for purchase; and 4) adopt the consumer protection guidelines of the National Association of Attorneys General (See Appendix D for the NAAG guidelines).

In addition to the two primary recommendations above, the Forum recommends that state governments:

1) Establish renewable energy purchasing requirements for state operations.
2) Adopt an SO_2 cap-and-trade program under Section 51.309 of the Regional Haze Rule that includes emission allowances for renewable energy generation issued at the rate of 2.5 tons per megawatt of capacity. Such allowances would be allocated for renewable generation projects coming on-line after the year 2000 but before the triggering of the cap-and-trade program.
3) Work to eliminate barriers to the movement of renewable generation to customers through the electricity transmission and distribution systems.
4) Improve permitting processes for renewable energy generating facilities.
5) Adopt state tax incentives for renewable energy projects.

Federal Government

The Forum believes states should support complementary efforts by the federal government, including:

1) A national RPS that includes provisions for trading renewable energy credits among providers of electricity. Such a national RPS with an appropriate trading system would likely produce even greater benefits for renewables in the West than a western regional trading system because many of the low-cost renewable resource are located in the WRAP region.

2) Development and extension of tax credits for renewables, including an extension of the existing 1.5 cents/kWh federal production tax credit for wind and biomass through 2015 or until wind- and biomass-generated electricity become cost-competitive in the WRAP region, whichever comes first.

3) A mandatory federal agency renewable energy purchase requirement of 10 and 20 percent renewables (by 2005 and 2015, respectively) coupled with a tradeable purchase-credit program among agencies.

Complementary action by the federal government is needed to achieve the 10/20 goals because of the significant presence of the federal government in the WRAP region and the need to avoid inter-regional competition that would disadvantage those regions moving ahead with policies and incentives to expand the production and use of renewable energy.

Analysis of Impacts of Actions to Meet 10/20 Renewable Goals

As part of the process of developing recommendations to the states on strategies to meet the WRAP's renewable energy goals of 10% of electric demand in 2005 and 20% in 2015, the AP2 Forum felt it important to develop some rough estimates of the financial impacts of meeting the goals as well as estimates of contributions toward the goals various policy options could make. The financial impacts of actions to meet the renewable energy goals depend on projected demand in the WRAP region, current renewable energy production in the region, and the cost of adding sufficient renewable resources to meet the goals. Estimates of the contribution individual policies can make toward the overall goals require additional policy-specific assumptions. For example, in the case of green marketing, one needs to know the percentage of the customer base that is willing to purchase renewable energy at a premium and how much above conventional generation costs these customers are willing to pay. Uncertainty in future electric demand, the costs of adding renewable resources as well as other policy specific assumptions make estimates of the financial implications of the goals and the individual policy contributions necessarily approximate.

The Forum notes that the discussion of financial impacts here does not include a discussion of the environmental, economic and other potential benefits associated with meeting the renewable energy goals. The purpose of this analysis was not to weigh the costs and benefits of meeting the renewable energy goals, but simply to assist the Forum in prioritizing among various policy options. Future work by the Forum will focus on the benefits of the renewable energy goals.

Estimates of Future Electric Demand and Renewable Energy Targets

For the purposes of this discussion, future electrical demand in the WRAP region was estimated by growing historic 1998 electric demand levels at an annual rate of 1.9%, which is consistent with load growth projections made by the Western Systems Coordinating Council. The following table shows historic and projected total electric demand in the region as well as current renewable energy generation and the projected 2005 and 2015 renewable energy targets.[9]

Year	Electric Demand (TWh)	Renewable Gen (TWh)	Percentage
1998	577	27	4.7
2005	658	66	10
2015	794	159	20

Although the WRAP region is generally well endowed with renewable energy resources (see resource maps on pages I-10 and I-11), these resources may occur some distance from load centers, requiring the construction of major transmission facilities to connect renewable generators to loads. An analysis of the cost and availability of sufficient transmission capacity to meet the renewable goals is beyond the scope of the Forum's work. We therefore further assume that a concerted effort by state and federal governments could result in adequate transmission capacity.

Differential renewable energy costs used here represent the difference between the projected levelized cost of electricity from renewable resources minus the projected cost of competing conventional generation, assumed to be natural gas-fired combined cycle plants. The differential costs are therefore also sensitive to future costs of combined cycle plants, natural gas, and gas transmission facilities. We shall use conservatively high estimates of differential renewable costs to allow for the various uncertainties involved.

Supply adequacy and cost

A characterization of renewable energy resources in the region has recently been performed by NREL (see Appendix G for complete information on the NREL characterization). The results of the NREL

[9] For the purposes of this discussion, the WRAP region is defined to include the following states: AZ, CA, CO, ID, MT, OR, ND, NM, NV, UT, WA, WY. Nevada, although not an official member of the WRAP, is included because it was a member of the original GCVTC region. As this analysis was being prepared, South Dakota joined the WRAP. Data for South Dakota has not yet been incorporated into the AP2 Forum's analysis.

work indicate that known renewable resources would be adequate to meet the 10% goal, an increase of approximately 39,000 Gwh/year from 1998 levels, at a cost differential of less than 2 cents/Kwh. It should be noted that wind energy is the least cost resource as characterized by NREL. Geothermal energy may be cost-effective in some locations. Energy from landfill gas or other biomass resources was not characterized by NREL, but may also be cost-effective in some locations.[10]

An additional 92,000 Gwh/year of renewable generation would be required to meet the 20% goal in 2015. According to NREL, wind energy resources in the region are sufficient to meet this goal at relatively low cost. However, the intermittent nature of wind resources and reliability concerns may limit the amount of wind that can be developed in any subregion without back-up generation from other resources.

We conclude from the NREL study that the least-cost strategy to meet the 10/20 renewable goals is for the western states and federal government to undertake a major effort to develop the region's wind resources, together with additional cost-effective renewable resources such as geothermal and biomass that may be available locally. The levelized differential cost of this development is estimated to be 2.5 cents per kilowatt-hour, with an uncertainty of perhaps " 1 cent/kwh.

Distribution of Costs and Contribution of Various Polices toward the Goals

Assuming that the differential cost of renewable development is 2.5 cents per kilowatt-hour, meeting the 20% goal would result in an average increase in electricity prices of 5 mils/kWh. At this unit cost, the total annual differential cost of meeting the goal is of the order of $4 billion, a substantial sum equivalent to approximately 10% of current electric revenues in the WRAP states. A variety of policy mechanisms may be used to meet the goals and allocate these costs to electricity providers and their customers as discussed in Section III. More detailed information concerning the assumptions and calculations used to estimate the costs and contributions of the policy mechanisms that are discussed below can be found in the spreadsheet attachment in Appendix E.

Perhaps most attractive to policy makers would be programs through which end-use customers voluntarily choose to provide financial support to renewable generators. In states with competitive retail markets, such programs are known as "green marketing." In states without retail competition, voluntary programs offered by monopoly distribution companies are referred to as "green pricing" (see Section III, page 19). There is reason to hope that consumers will increasingly "vote with their electricity dollars" for environmentally preferable renewable generation through such programs.

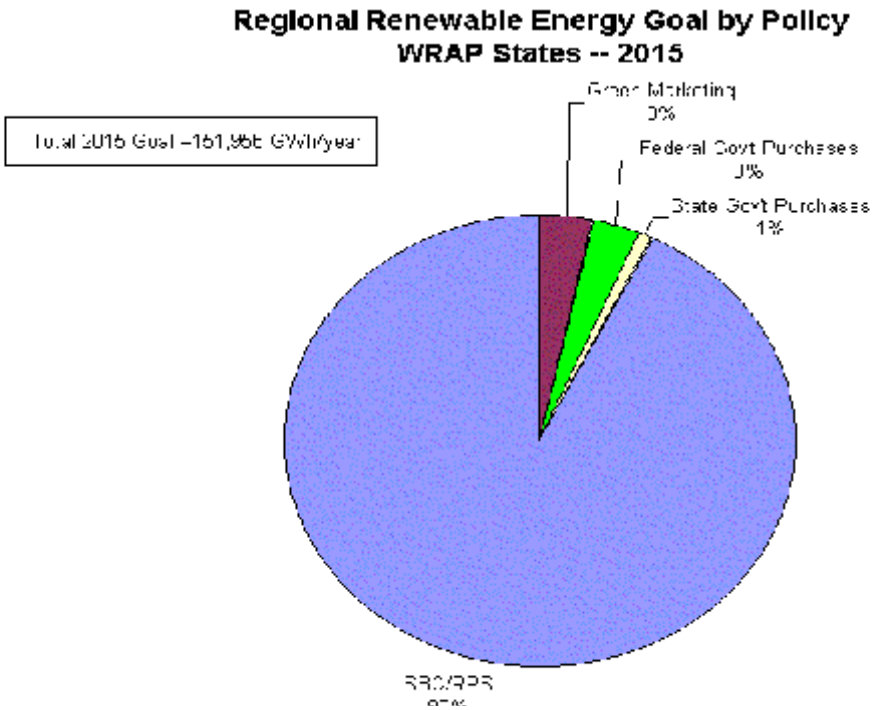
Unfortunately, these programs remain in their infancy, and it is impossible to forecast how much renewable capacity might be supported through voluntary private efforts. Based on early results, the Forum's

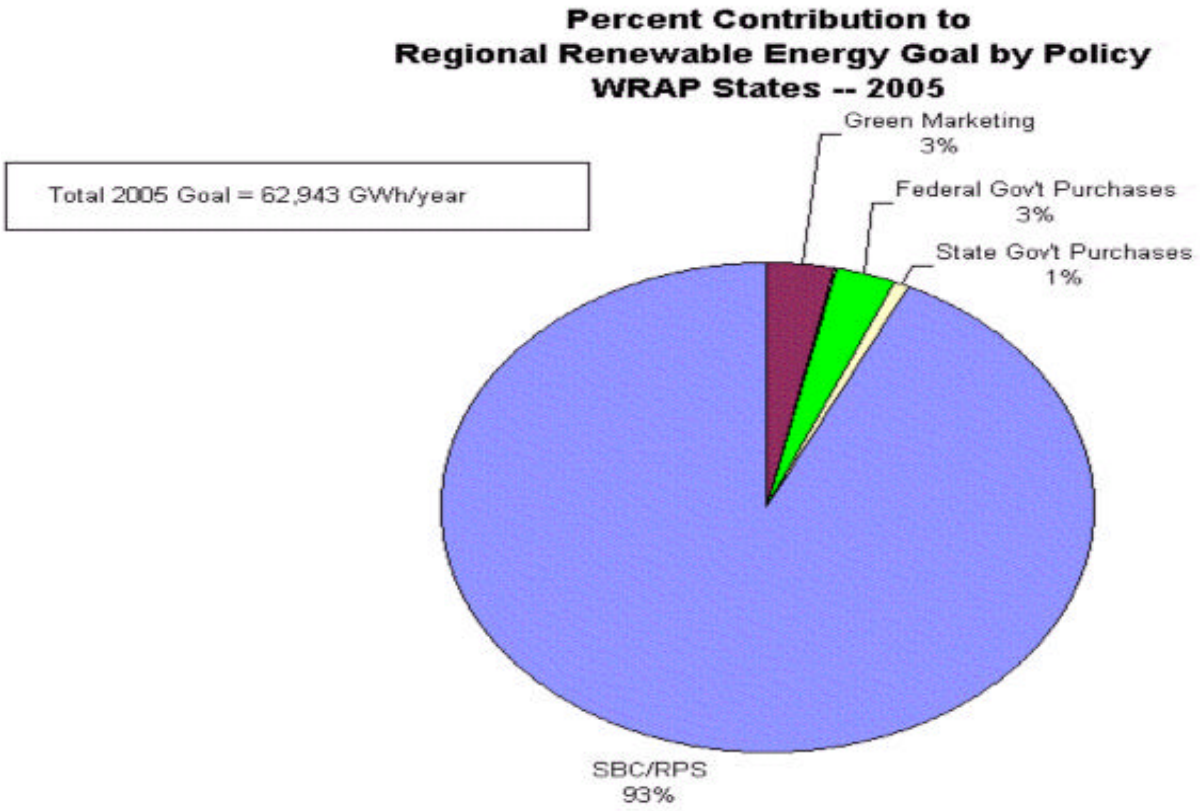
[10] It appears unlikely that sufficient renewable generation and associated transmission capacity will be financed, sited and constructed between the present time and the year 2005 to meet the first renewable goal. Nevertheless, there are adequate resources available to do so.

best guess is that perhaps 6% of residential customers may be participating by 2015, together with smaller participation from commercial and industrial customers. We estimate that altogether voluntary private purchases of renewable electricity may support approximately 5,000 Gwh/year by 2015, or only about 3% of the amount needed to meet the 20% goal. This result is perhaps to be expected, since the benefits of renewable energy are quintessentially *public* benefits, and it may be unreasonable to expect private individuals to expend private funds to provide them. We conclude that while voluntary private support should be encouraged by states and perhaps subsidized with public funds raised through so-called "system benefits charges,"states will not be able to rely on voluntary private efforts alone to meet the 20% goal.

Federal and state governments can provide financial support to renewable generators in much the same way that private citizens can. We estimate that in 2015, federal facilities in the WRAP region will use approximately 25,000 Gwh/year. If the federal government were to purchase 20% renewable power, they would contribute about 5,000 Gwh/year toward the goal or about 3% of the 20% goal. Data on electricity consumption by state government agencies is very sketchy. A very rough estimate of state government facility electric use in the WRAP region in 2015 is 7,500 Gwh. If state governments throughout the WRAP region were to purchase 20% renewable power, they would contribute about 1,500 GWh toward the goal, which would represent about 1% of the 20% goal. Thus, rough estimates suggest that federal and state government purchases together could meet about 4% of the 20% goal. The federal and state governments are encouraged to demonstrate their commitment to attaining the 20% renewable goal by committing to purchase 20% of their electric requirements from renewable resources by year 2015. However, this mechanism should also not be relied upon to make a major contribution to the overall goal of 20% of total generation.

Given the relatively small contributions expected from voluntary private and public purchases, we conclude that in the absence of dramatic and unexpected changes in the cost of electricity from renewable and/or conventional resources, policy mechanisms such as the RPS or SBC, as discussed in Section III, will be required to attain the 20% goal. As the tables below show, the Forum estimates that between 90-95 percent of the 10/20 goals will need to be met with one or the other of these two policy options.


Regional Renewable Energy Goal by Policy
WRAP States -- 2015
Total 2015 Goal =161,966 GWh/year
Federal Govt Purchases
1%
State Govt Purchases
1%


Percent Contribution to
Regional Renewable Energy Goal by Policy
WRAP States -- 2005
Total 2005 Goal = 62,943 GWh/year
Green Marketing
3%
Federal Gov't Purchases
3%
State Gov't Purchases
1%
SBC/RPS
93%

As discussed earlier, an RPS could be used to attain the goal, but the cost of such a program can only be estimated. On the other hand, the cost of a SBC can be quite accurately predicted, although the amount of renewable energy that can be obtained with these funds can only be estimated. However, most RPS systems include a cost cap or payment option in lieu of renewable energy purchases, with the funds being used in the same way as SBC funds. In practice, therefore, the difference between the two programs may not be clear cut. In either case, the differential cost of electricity from renewable generation will be born by electricity users.

Assuming that the differential cost of renewables is the same in either program, the region-wide cost of meeting 90-95 percent of the 2015 renewable energy target through either an RPS or SBC would be in the range of 3.5-3.7 billion dollars in 2015. The Forum estimates that these costs would increase average regional electricity prices by 4.5-4.75 mils/kWh.

Finally, we note that certain types of policies can act to narrow the cost differential between renewable energy and conventional fossil fuel-fired generation. In particular emission cap-and-trade programs, which place a monetary value on emissions, narrow the cost differential between those technologies that emit air pollutants and those, like renewables, that do not.

The WRAP is currently working to design a region-wide sulfur dioxide emissions cap-and-trade program. We estimate that such a program could act to narrow the cost differential between renewable resources and conventional fossil fuel resources by 1-3 mils/kWh. In 2015, this could lower the region wide cost of meeting the renewable energy goal somewhere in the range of $160-475 million per year, thus reducing the total estimated $4 billion cost of meeting the 20% WRAP target by 4-12%.

Summary of Recommendations

Black shaded policies are those which the Forum expects to have the greatest impact in achieving the 10/20 renewable energy goals. **Dark grey** shaded policies are those which the Forum expects will have a small to medium degree of impact in achieving the 10/20 goals. **Light grey** areas are expected to have a small impact on promoting renewables. **White** areas indicate that the policy option is not a priority.	State Government	Federal Government
A. Recommendations to provide financial incentives		
1.a. Adopt a Renewable Portfolio Standard		
1.b. Adopt system benefit charges to support renewables		
1.c. Establish a government purchase requirement		
1.d. Adopt/continue a production tax credit		
1.e. Adopt property tax incentives		
1.f. Adopt a sales tax exemption		
1.g. Adopt an income tax credit/deduction		
B. Recommendations to make the market more efficient		
2.a. Adopt consumer information disclosure rules and a power labeling program		
2.b. Establish a regional generation tracking system		
2.c. Adopt the NAAG guidelines on consumer protection		
2.d. Implement consumer education programs on the sources of electricity they purchase		
3.a. Eliminate pancaked transmission rates		
3.b. Adopt RTO policies that do not discriminate against renewables		
4.a. Implement IEEE interconnection standards		
4.b. Implement effective net metering programs		
5.a. Adopt/approve an SO2 cap-and-trade program under Sec.309		
5.b. Set emission allowances under a cap-and-trade program at 2.5 tons/MW		
5.c. Allow the earning of early credits for renewables		
6.a. Improve siting processes		

Black shaded policies are those which the Forum expects to have the greatest impact in achieving the 10/20 renewable energy goals. **Dark grey** shaded policies are those which the Forum expects will have a small to medium degree of impact in achieving the 10/20 goals. **Light grey** areas are expected to have a small impact on promoting renewables. **White** areas indicate that the policy option is not a priority.	State Government	Federal Government
A. Recommendations to provide financial incentives		
6.b. Share experiences among agencies in siting renewable projects		
6.c. Coordinate state/tribal siting processes		

Principles and Recommendations

Discussion of the recommendations is organized into those that provide financial incentives to renewables and those that generally improve the efficiency of the market place. The recommendations are further organized into "principles" and "actions to implement the principles." Following each recommendation or group of recommendations is a discussion of the recommendation's impact, priority, linkage to other recommendations, and implementation.

Impact of the recommendations on renewable energy generation and use. The assessment of the impact of a recommendation is based on a judgment of the economic efficiency or "bang for the buck" of the option in terms of megawatts/megawatt-hours of renewable generation per dollar spent. It is very difficult to quantify the impact of the recommended policy options because there is little experience with most of the options. "Back of the envelope" calculations of the potential impact of the recommendations are presented.

Priority of the Recommendation: The priority assigned to each recommendation is based on the AP2 Forum's judgment about the costs and benefits of the recommendation, the political feasibility of the recommendation being adopted, and how well the recommendation fits with the emerging competitive western electricity system.

Linkages among the Recommendations: Many of the recommendations are closely linked. That is, to successfully implement one recommendation it is necessary to implement other recommendations. These linkages are outlined.

Implementation of the Recommendations: Following each of the recommendations is a short description of the entities that may be able to implement the recommendation, the administrative difficulty in implementing the recommendation and potential unintended consequences.

An overarching issue which will be faced by states in implementing any of the recommendations below is how to assign responsibility/credit to individual states for solving a regional problem and how to coordinate state activities to meet the regional goal in the most efficient and effective way possible. The issue of developing regional solutions while maintaining individual state responsibility is presented in the Pollution Prevention section of the GCVTC component of EPA's Regional Haze Rule. Section 309(d)(8)(i) of the rule requires states to include in their regional haze state implementation plans their anticipated contribution to the regional renewable energy goals that 10% of regional power needs be met by renewable generation by 2005 and that 20% be met by 2015. In addition, Section 309(d)(8)(vi) requires a state to provide descriptions of the programs it is relying on to achieve its contribution toward the 10/20 goals. The rule, however, does not provide guidance on how to determine either a state's contribution or the extent to which programs adopted by a state are helping to meet its contribution.

As a general proposition, the Forum believes that each state's responsibility for contributing to

the 10/20 goals should be based on energy consumption. The Forum therefore recommends that *a state's contribution to the overall regional renewable energy goal should be calculated by multiplying the end-use electricity consumption in each state by the 10/20 percent regional renewable energy percentage targets.* This method bases a state's contribution on its share of overall regional electricity demand. Under such an approach, states with greater electricity use (presumably due to a larger population or greater economic activity) would make a larger contribution to the regional goals in terms of the MWh of renewable energy their renewable energy programs induce. However, when measured as a percentage of electricity use, all states would be contributing equally.

This approach is based on the following public policy rationale. The GCVTC renewable energy goals were recommended to help solve the problem of regional visibility degradation which is caused, in part, by conventional power production. If one agrees that electricity production is driven by the demand for electricity, then ultimately it is electricity consumption that causes the problem the renewable energy goals are seeking to address. If one also agrees that a fair way to assign a state's responsibility for the solution of a regional problem is based on a state's contribution to the problem, then determining a state's contribution to the renewable energy goals based on its share of regional electricity demand is a fair way to apportion the renewable energy goals across the states.

Once a state's required individual contribution to the regional goal is calculated, the next step is to ascertain the extent to which that state's renewable energy programs and policies are helping to meet its required contribution. To make this determination, it will first be necessary to have a region-wide generation tracking system in place in order to properly understand where electricity generated by renewable energy facilities is being consumed.

With a regional tracking system in place, the Forum recommends that, for the purpose of apportioning credit towards meeting the 10/20 goals, *the state where the renewable energy is consumed should receive one hundred percent of the credit, unless the state where the renewable energy is produced has adopted financial incentives which could be credited with reducing the cost of producing electricity from renewable facilities*.

> Example: Suppose the cost of producing renewable electricity is 2¢/kWh more than the cost of producing conventional electricity. Suppose that State A offers a 1¢/kWh production tax credit that narrows, but does not eliminate, the cost differential. Because of the tax credit, power suppliers in State B are able to offer their customers renewable energy from a State A production facility at a premium of 1¢/kWh rather than 2¢/kWh. In this case, both the State A production tax credit and the willingness of State B consumers to purchase renewable energy at a premium have combined to increase renewable energy production in the region. Because 50% of the renewable/conventional cost differential is made up by State A and 50% is made up by State B, 50% of the renewable energy production is counted toward State A's contribution to the regional renewable energy goals and 50% is counted toward State B's.

Such an arrangement would remove the difficulties associated with attempting to calculate the

contribution of policies such as consumer education and disclosure, which would be difficult to quantify. Instead, as demonstrated in the example above, a state which consumes no power generated by renewables but produces renewable power for consumption in other states would only receive credit for policies such as tax incentives or programs funded by system benefits charges which reduce the cost of producing renewable energy. The Forum also recommends that a regional entity, such as the Western Regional Air Partnership, should be utilized to construct a formula for apportioning credit towards meeting the 10/20 goals among states which produce and consume energy generated from renewable facilities.

A. Recommendations to Provide Financial Incentives for Renewable Energy Development and Use

With some exceptions in certain applications, new renewable electricity generation is more expensive than gas-fired generation, presently the low-cost option for new generation in the WRAP region. Renewable electricity generating costs have dropped significantly and are expected to continue to decline. The cost of different renewable generation technologies varies significantly. Some technologies, such as landfill gas and low-impact hydro are economic today in many circumstances. Wind, some biomass and geothermal resources are typically the next most economic resources. Except in certain circumstances, photovoltaics and solar thermal are further from being economic.

Financial incentives for the generation of electricity from renewable resources are necessary to meet the 10/20 goals. The form, size and duration of financial incentives should vary depending on the maturity of the technology.

PRINCIPLE 1: State and federal financial incentives are necessary to achieve the 10/20 goals. The bulk of financial incentives should be used to bring near-competitive resources into the market place. However, financial incentives should also be made available to less competitive technologies that may have the potential to make a major contribution to the 10/20 goals in the long term. Financial incentives: should be provided on a competitive basis; should be of sufficient duration to provide certainty to investors in renewable energy projects; and should not discriminate against out-of-state renewable generation.

To implement the above principle, the AP2 Forum recommends the following state government actions.

a. Adopt a state renewable portfolio standard (RPS) of 10 percent beginning in 2005 and 20 percent in 2015. A system for trading renewable energy *generation* credits among states in the WRAP region that adopt an RPS would be established. To help reduce the potentially high costs associated with implementing an aggressive RPS program, a "cost-cap" should be established whereby a seller of

electricity who fails to meet the RPS goal is required to make a 1.5 to 2.5 cents/kWh payment into a publicly-managed fund. The 2.5 cent maximum is based on the Forum's estimated cost differential for renewables. The proceeds of this fund should be used for any of the purposes listed below under recommendation 1.b. on system benefit charges.

Based on data provided by the Energy Information Administration in its *Annual Energy Outlook*, the Forum recommends that states not include sunset provisions in their RPS programs. According to EIA, which analyzed the 15-year sunset provision in the Clinton Administration's year 2000 electricity restructuring bill, "...the need to recover any above-market costs of new qualifying renewable plants before the RPS expires in 2015 appears likely to limit the impact of the proposed Comprehensive Electricity Competition Act's RPS on the development of new renewable electricity generating capacity."[11]

Impact: It is likely that, at least in the near-term, there would not be sufficient electricity from renewable resources available to meet the 10 percent RPS in 2005 and thus electricity suppliers would be contributing from 1.5 - 2.5 cents/kWh in lieu of offering renewable electric power.[12] The 2.5 cent maximum would again be based on the Forum's estimated cost differential for renewables. The Forum estimates that the region-wide cost of meeting 90-95 percent of the 2015 renewable energy target through either an RPS or SBC would be in the range of 3.5-3.7 billion dollars in 2015. The Forum estimates that these costs would increase average regional electricity prices by 4.5-4.75 mils/kWh.

Priority of the Recommendation: Recommendation 1.a. is the AP2 Forum's highest priority and represents the best opportunity to make significant progress toward achieving the 10/20 goals. The Forum recommends that every state adopt either an RPS, an SBC, or both as core policies in promoting the development and use of renewable energy sources.

Linkage Among Recommendations: A generation tracking system would be needed to verify claims that power being sold is from a renewable energy generator and that the power is not being sold more than once. The other recommendations to improve the efficiency of the market place (e.g, transmission and distribution reform, facility siting reform, cap-and-trade system) would be beneficial in

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[11] *Annual Energy Outlook 2000*, Energy Information Administration, December 17, 1999 ("Issues in Focus," page 20). Located at http://www.eia.doe.gov/oiaf/aeo/issues.html

[12] The Energy Information Administration's analysis of the Administration's proposed national 7.5 percent RPS with a 1.5 cents/kWh price cap estimated that the production of electricity from renewable resources in the U.S. portion of the Western Interconnection (which closely coincides with the WRAP region) would be 8.8 percent of total electricity production in the region in 2005 and 11.5 percent in 2015. It is assumed that to achieve these levels of productions in the Western Interconnection (which exceed the 7.5 percent requirement), power sellers outside the Western Interconnection are buying renewable energy production credits from generators within the Western Interconnection. (Source: The Comprehensive Electricity Competition Act: A Comparison of Model Results to Appendix A and B).

lowering the cost of complying with an RPS.

Implementation of the Recommendation: State legislation would be needed.

b. Adopt a non-bypassable system benefits charge dedicated to renewable resource acquisition. The charge should apply to all electricity sold to end-users and should be "non-bypassable" to ensure that all end-users pay the charge. Monies raised by the charge would be used to: make payments per kWh of electricity generation from renewable resources to developers who make winning bids; underwrite loan guarantees or low-interest loans to renewable energy developers; and/or make direct payments to retail customers who buy electricity generated by renewable resources.

Impact: The amount of additional renewable generation and consumption resulting from a system benefits charge can only be estimated. The Forum estimates that the region-wide cost of meeting 90-95 percent of the 2015 renewable energy target through either an RPS or SBC would be in the range of 3.5-3.7 billion dollars in 2015. The Forum estimates that these costs would increase average regional electricity prices by 4.5-4.75 mils/kWh.

Priority of the Recommendation: Recommendation 1.b. is also of the highest priority for the AP2 Forum. The Forum recommends that every state adopt either an RPS, an SBC, or both as core policies in promoting the development and use of renewable energy sources.

Linkage Among Recommendations: A generation tracking system would be needed if incentives funded by the system benefits charge are paid to generators based on their production or if payments are made to consumers who buy renewable power. Provisions for consumer information disclosure, consumer protection and consumer education on sources of electricity would also be important, particularly where the monies from the system benefits charge are used to reduce the purchase price of renewable power.

Implementation of the Recommendation: State legislation would be needed.

c. A state agency renewable energy purchase requirement of 10 and 20 percent renewables.

Impact: If 10 percent of the electricity purchased by state agencies in 2005 was from renewable resources, there would be an estimated additional demand for approximately 600,000 MWh in the WRAP region. The total cost of meeting a 10 percent purchase requirement for state governments in the WRAP region would be $15 million, assuming this amount of power would be available at an incremental cost of 2.5 cents/kWh. If state governments throughout the WRAP region were to purchase 20% renewable power by 2015, they would contribute an estimated 1,500,000 MWh toward the goal, which would represent about 1% of the 20% goal. The total cost of meeting this goal would be approximately $37.5 million, assuming the same 2.5 cents/kWh incremental cost. See the spreadsheets in Appendix E for more detailed information on the Forum's calculation estimates.

Priority of Recommendation: Implementation of a mandatory state government agency purchase requirement is a medium priority.

Linkage Among Recommendations: No significant linkages.

Implementation of the Recommendation: The implementation and funding of a mandatory state renewable purchase requirement could only be done through action by the governor and probably the state legislature. The implementation of a purchase credit trading program among agencies could likely be done through cooperative action among agencies. A mandatory purchase requirement should be coupled with: (1) a cap on the premium to be paid for renewable electricity; (2) an opportunity to use money from lower utility bills due to efficiency investments to purchase renewable power at rates above market cost; and (3) an option for local governments to aggregate their renewable purchases with the state's purchase. To satisfy the purchase requirement, agencies should not be prohibited from purchasing power from out-of-state generators.

d. Provide a state renewable generation production credit for new facilities.

Impact: A state production tax credit would have impacts slightly smaller than a comparable federal production tax credit because the state tax credit would be offset by increased federal tax liability for the company. Nevertheless, the Forum believes that a state production tax credit would provide an additional incentive to renewable energy producers that would complement a federal production tax credit.

Priority of Recommendation: Recommendation 1.d. is a low priority.

Linkage Among Recommendations: No significant linkages.

Implementation of the Recommendation: State legislation would be needed.

e. Provide property tax incentives for renewable energy facilities.

Impact: Depending on the tax structure in a state, property taxes can be a particularly significant cost for capital-intensive renewable energy production facilities. No assessment has been done of the impact of reduced property taxes on different renewable energy generating facilities in each of the WRAP states.

Priority of the recommendation: Recommendation 1.e. is a low priority, except possibly in states with higher property tax rates. Property tax incentives provide benefit to capital-intensive renewable generation projects but may not make a significant difference in renewable generation additions. Financial incentives, such as property tax breaks, reward investment in renewables rather

than production of electricity from renewables. In some locations, property tax incentives have been enacted and thus are believed to be politically feasible. The impact of property tax incentives on the emerging competitive western electricity system may be no greater than other financial incentives.

Linkage Among Recommendations: No significant linkages.

Implementation of the Recommendation: State legislation would be needed.

f. Provide a sales taxes incentive for the purchase of renewable energy equipment.

Impact: In the WRAP region, state sales tax rates range from zero (Montana, Oregon) to 7.25 percent (California). In many states there are additional sales tax add-ons for local government or special purpose districts. No assessment has been done of the impact of sales tax incentives on different renewable energy generating facilities in each of the WRAP states.

Priority of the Recommendation: Recommendation 1.f. is a low priority, except possibly in states with higher sales tax rates.

Linkage Among Recommendations: No significant linkages.

Implementation of the Recommendation: State legislation would be needed.

g. Provide a state income tax credit or deduction for investment in renewable energy production facilities.

Impact: In the WRAP region states, corporate income tax rates range from none (Nevada, Washington, Wyoming) to 10.5 percent (North Dakota). Because these rates are significantly lower than federal corporate income tax rates, state income tax deductions have a commensurately smaller impact than a comparable federal income tax deduction. A state income tax credit/deduction would also have a smaller impact than a comparable federal credit/deduction because the deduction of state income taxes from federal income tax liability is allowable. No assessment has been done of the impact of state income tax credits/deductions on the economics of renewable generating technologies in each of the WRAP states.

Priority of the Recommendation: Recommendation 1.g. is a low priority.

Linkage Among Recommendations: No significant linkages.

Implementation of the Recommendation: State legislation would be needed.

To aid in the implementation of Principle 1, the AP2 Forum also recommends that western states encourage complementary policy efforts <u>at the federal level</u> to encourage the use of renewables, including:

- <u>Adoption of a federal renewable portfolio standard (RPS)</u>: No analysis has been done of the impact of a 10 and 20 percent federal renewable portfolio standard on the WRAP region. However, the Energy Information Administration's analysis of the Administration's proposed 7.5 percent federal portfolio standard provides some insights. EIA estimates that under the Administration's proposal, 8.8 percent of the electricity generation in the Western Interconnection will come from renewable resources in 2005 and 11.5 percent in 2015. These percentages are much higher than the national percentages of 4.1 percent in 2005 and 5.8 percent in 2015. Presumably western production grows more than national production because it is cheaper to produce electricity from renewable resources in the West. Thus to meet the RPS requirement, sellers of power in the East will buy credits from renewable electricity generators in the West. EIA assumed a continuation of the existing wind and biomass production tax credit. Under the national portfolio standard, in the West wind makes the greatest gains compared to a baseline forecast without an RPS, increasing from 5 to 33 billion kWh in 2005 and from 5 to 59 billion kWh in 2015. Next to wind, biomass has the greatest increase in production on the national level, but shows little or no increase in the West. Presumably electricity from renewable resources would be used to meet both a state RPS and a federal RPS requirement.

- <u>Extension of the existing 1.5 cents/kWh federal production tax credit for wind and biomass through 2015</u> or until wind- and biomass-generated electricity become cost-competitive in the WRAP region, whichever comes first.

- <u>A mandatory federal agency renewable energy purchase requirement of 10 and 20 percent renewables coupled with a tradeable purchase-credit program among agencies</u>. If the renewable purchase credit program was limited to trading among facilities in the WRAP region, then the purchase requirement would create a market for approximately 2 million megawatt-hours at the 10 percent level (at an estimated cost of $50 million at the 2.5 cent/kWh differential cost level) and approximately 5 million megawatt-hours at the 20 percent level (at an estimated cost of $125 million at the 2.5 cent/kWh differential cost level). If the program for trading renewable energy purchase credits was extended nationwide, it is likely that the demand for renewable energy in the WRAP region would further increase because of the lower cost of renewables in the WRAP region than in other regions. See the spreadsheets in Appendix E for more detailed information on the Forum's calculations.

- <u>Provision of income tax credits/deductions for investment in renewable energy production facilities</u>.

B. Recommendations to Make the Market More Efficient

To maximize the impact of the recommended financial incentives and to create a long-term market for renewable energy, the AP2 Forum recommends that actions be taken to make the electricity marketplace more efficient. These recommendations are encompassed under Principles 2 through 6.

PRINCIPLE 2: States should ensure that every electricity consumer has the opportunity to choose renewable energy products.

To implement this principle, the AP2 Forum recommends that:

a. States should authorize retail electric competition *or*, for those states operating under a regulated retail electric power environment, utilities should be required to offer their customers the choice of purchasing electricity generated by renewable resources.

b. States should adopt information disclosure rules and power labels that provide consumers with information on the price, source of power and environmental impacts of their electricity use.

c. Acting in concert, states should establish a regional generation tracking system.

d. States should adopt the consumer protection guidelines of the National Association of Attorneys General. See Appendix D for the NAAG guidelines.

e. States should implement consumer education programs to inform users of the sources of the electricity they consume and associated environmental impacts.

Impact: There is limited but rapidly expanding experience with customer choice of electricity supply programs. These programs remain in their infancy, and it is impossible to forecast how much renewable capacity might be supported through voluntary private efforts. Based on early results, the Forum's best guess is that perhaps 6% of residential customers may be participating by 2015, together with smaller participation from commercial and industrial customers. It is estimated that altogether voluntary private purchases of renewable electricity may support approximately 5,000 Gwh/year by 2015, or only about 3% of the amount needed to meet the 20% goal.

Priority of the Recommendation: The Forum's primary recommendation is that every state should adopt either an RPS or SBC as its "core" policy in promoting the use of renewables. Recommendations 2.a. through 2.e. are the second highest priorities of the AP2 Forum, after implementation of one of the core policies.

Linkages Among Recommendations: 1. Consumer information disclosure rules and power labels need to be coupled with a regional generation tracking system to prevent double-selling of renewable power and provide consumers with information on the sources of electricity they are purchasing. An information program to assist consumers in understanding the power labels should be adopted to complement disclosure rules and power labels.

2. Implementation of the NAAG consumer protection guidelines should be linked to the implementation of disclosure rules and power labels and backed up by a regional generation tracking system.

3. Consumer education programs should be coupled with consumer choice and information disclosure programs in order that consumers can act based on the information they receive from education programs.

Implementation of the Recommendations: Generally, state public utility commissions have the authority to adopt consumer information disclosure requirements. Among the states (AZ, CA, MT, NV, NM, OR) in the GCVTC region that have authorized retail customer choice, California has adopted disclosure rules; and disclosure rules are included in pending rulemakings by the PUCs in Arizona, Oregon and Montana. In the GCVTC states that have not authorized retail customer choice (CO, ID, UT, WY), utility regulatory commissions have the authority to require jurisdictional utilities to provide consumers information on the sources of electricity being provided. The Colorado PUC has adopted disclosure rules.

A regional generation tracking system could be developed by any state. In the long run, a regional tracking system should be operated by the Western Interconnection grid management institution.

State PUCs and Attorneys General would implement the NAAG guidelines.

State PUCs may have the ability to implement limited consumer information programs. However, larger scale programs, similar to that implemented in California, may require action by the state legislature.

PRINCIPLE 3: Barriers to the movement of renewable generation to customers through transmission systems should be eliminated.

To implement this principle, the AP2 Forum recommends that:

a. Pancaked transmission rates should be eliminated.

b. The policies of Regional Transmission Organizations (RTOs) should not disadvantage renewables

i.The use of the transmission system should be priced to reflect the marginal costs imposed on the system. The Federal Energy Regulatory Commission (FERC) should

require load-based fees to cover the revenue requirements of the existing transmission system.
ii. Market-based mechanisms should be used to clear congestion on the transmission system.
iii. Without adversely affecting economic efficiency, transmission protocols governing scheduling flexibility for deviations from schedules or delivery imbalances should be adopted that do not disadvantage renewable generation. This includes real-time access to markets to balance actual and scheduled deliveries, as well as a real-time energy market for wind generators to sell into when wind resources are available.
iv. Renewable interests should have a role in developing the policies of RTOs.

Impact: No estimate is provided of the impact of eliminating barriers to transmission. Elimination of such barriers is a necessary condition to maximizing the impact of other recommendations (e.g., financial incentives).

Priority of the Recommendations: Recommendations 3.a. and 3.b. are low priorities. While the benefits of these recommendations exceed the costs, are politically feasible, and fit well with an emerging competitive western electricity system, they are a low priority relative to the need to implement an RPS or SBC.

Linkages Among Recommendations: Elimination of pancaked transmission rates and appropriate RTO policies are necessary to developing robust markets for renewable power but, absent other actions, are unlikely to spur major new renewable energy generation.

Implementation of the Recommendations: Transmission-owning utilities in the WRAP region should be encouraged to form Regional Transmission Organizations that adopt tariffs and protocols that eliminate pancaking of transmission rates, implement efficient transmission regimes based on the marginal cost of transactions, implement market-based systems to clear congestion on the transmission system, adopt protocols that do not disadvantage renewables and include the opportunity for renewable energy interests to participate in the development of RTO policies. FERC and state PUCs should grant necessary approvals of RTO proposals that meet these requirements.

PRINCIPLE 4: Barriers to the interconnection of distributed renewable generation technologies should be eliminated.

To implement this principle, the AP2 recommmends:

a. National interconnection standards such as those being developed by the Institute of Electrical and Electronics Engineers (IEEE) should be adopted and implemented by states and the Federal Energy Regulatory Commission.

b. Effective net metering programs should be in place in all states.

Impact: No estimate is provided of the impact of eliminating barriers to distributed generation. Elimination of such barriers is a necessary condition to maximizing the impact of other recommendations (e.g., financial incentives).

Priority of the Recommendations: Recommendations 4.a. and 4.b. are low priorities. While the benefits of the recommendations exceed their costs, are politically feasible, and fit well with an emerging competitive western electricity system, they are a low priority relative to the need to implement an RPS or SBC.

Linkages Among Recommendations: Effective net metering programs should be coupled with national interconnection standards.

Implementation of the Recommendations: The IEEE should be encouraged to expeditiously complete its efforts to set uniform interconnection standards. Utilities, state PUCs, and RTOs in the WRAP region, the Federal Energy Regulatory Commission, the North American Electric Reliability Council and the Western Systems Coordinating Council should adopt and/or enforce the standards.

Utah and Wyoming should be encouraged to adopt net metering programs. Other states in the WRAP region should evaluate the effectiveness of their net metering programs in promoting renewable energy generation.

PRINCIPLE 5: An emissions cap-and-trade program is an economically efficient method of achieving emissions reductions and helps narrow the cost gap between fossil fuel generation and renewable energy generation.

To implement this principle, the AP2 recommends:

a. Adoption of an SO2 emissions cap-and-trade program under the Regional Haze Rule.

b. The SO2 cap-and-trade program should include an allocation of emission allowances for new electricity generators, including renewables. Allowances for renewable energy generation should be issued at the rate of at least 2.5 tons per year per megawatt of capacity.

c. Emission credits should be allocated for renewable generation projects coming on-line after the year 2000 but before the triggering of the cap-and-trade.

Impact: Emission cap-and-trade programs, which place a monetary value on emissions, narrow the cost differential between those technologies that emit air pollutants and those, like renewables, that do not. The WRAP is currently working to design a region-wide sulfur dioxide emissions cap-and-trade

program. The Forum estimates that such a program could act to narrow the cost differential between renewable resources and conventional fossil fuel resources by 1-3 mils/kWh. In 2015, this could lower the region wide cost of meeting the renewable energy goal somewhere in the range of $160-475 million per year, thus reducing the total estimated $4 billion cost of meeting the 20% WRAP target by 4-12%.

Priority of the Recommendations: Recommendations 5.a., 5.b., and 5.c. are medium priorities. They are low-cost and may provide modest tangible incentives for additional renewable generation. They are politically feasible to implement and fit well with the emerging competitive western electricity system.

Linkage Among Recommendations: By narrowing the cost differential between renewable technologies and fossil fuel-fired technologies, a cap-and-trade program will allow polices that provide direct financial support to renewable energy (e.g., system benefits charges, renewable portfolio standards and green marketing programs) to yield greater amounts of renewable energy development for the same amount of money.

Implementation of the Recommendations: The Western Regional Air Partnership should approve a cap-and-trade proposal that contains the above provisions. Such a cap-and-trade program should be included in the October 2000 Annex to be filed with EPA under the Regional Haze Rule. EPA should approve such a cap-and-trade program and states should include the cap-and-trade system in their regional haze SIPs.

PRINCIPLE 6: Permitting processes for renewable energy generation facilities should provide for: significant public involvement; an issue-oriented process; clear decision criteria; coordinated permitting process; reasonable time frames; advanced planning; efficient administrative and judicial review; and active compliance monitoring.

To implement this principle, the AP2 recommends:

a. Improved siting processes that would include training and technical assistance programs for state, local, federal and tribal government energy, land use and environmental regulators and federal land managers to enable them to be familiar with the range of requirements developers confront, procedures by regulatory and land management agencies that fit all decisions and approvals into a comprehensive, efficient project review strategy, having permitting agencies eliminate ambiguous requirements and be specific about their permitting and approval standards, and urging developers to work with permitting agencies and affected parties early in the process so that public concerns regarding the project can be addressed.

b. Processes should be developed to enable governmental decision-makers in a jurisdiction which has

considered a renewable energy facility siting application to share their experiences and lessons learned with other jurisdictions which are considering applications for approval of similar projects.

c. States and tribes should coordinate their siting review processes, including resolution of jurisdictional issues, on projects that involve both state and tribal lands.

Impact: Not quantifiable. As the number of proposed renewable energy generating projects increase, efficient siting and permitting processes will become more important.

Priority of the recommendations: Recommendations 6.a., 6.b.,and 6.c. are low priorities. They are unlikely to spur significant new renewable generation in the near-term, but may be more important in the future when renewable generation is expected to be more cost-competitive.

Linkage Among Recommendations: The siting recommendations are closely linked with one another, but are only tangentially linked with other recommendations (e.g., RTO protocols on transmission facility expansion).

Implementation of the Recommendations: In the WRAP region state siting agencies, tribes, federal land management agencies and local government permitting agencies are responsible for issuing the major permits for renewable energy projects and thus are the appropriate parties to implement recommendations 6.a. and 6.b. A number of parties working with permitting agencies could implement recommendation 6.c.