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Energy Supply Technical Work Group

Summary List of Recommended Priority Policy Options for Analysis

Option No.	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2008–2020 (Million $)[1]	Cost-Effectiveness ($/tCO_2e$)[1]	Level of Support
		2012	2020	Total 2008–2020			
ES-1	A thorough study of energy options for portfolio standards including renewables, energy efficiency, nuclear power, waste to energy, landfill gas, offshore wind, and hydro						Pending
ES-2	Technology Research and Development, including state funding						Pending
ES-3	Renewable Energy (full range) financing, tax incentives, loans						Pending
ES-4	Regulatory model to equalize utility returns on energy efficiency with returns on traditional power supply to allow investment in efficiency and renewables to be considered in parity with investment in new conventional capacity.						Pending
ES-5	New Nuclear Power, including reprocessing						Pending
ES-6	Green power purchases and marketing						Pending
ES-7	Attract renewable energy technology businesses to South Carolina						Pending
ES-8	Distributed renewable energy incentives and/or barrier removal (Including Interconnection Rules)						Pending
	Sector Total After Adjusting for Overlaps						
	Reductions From Recent Actions						
	Sector Total Plus Recent Actions						

* The numbering used to denote the above policy options is for reference purpose only; it does not reflect prioritization among these policy options.

[1]All costs are reported in 2005 US Dollars, net present value as of January 1, 2009.

General definition: For the purposes of the policies discussed here, and unless otherwise noted, “renewable energy” shall be defined as follows:

A renewable energy resource includes solar (including…); wind; small hydroelectric geothermal; ocean current or wave energy; biomass resource including agricultural waste, animal waste, wood waste, spent pulping liquors, combustible residues, combustible liquids, combustible gases, energy crops, or landfill methane; waste heat derived from a renewable energy resource and used to produce electricity; or hydrogen derived from a renewable energy resource.

ES-1. Energy Options for Portfolio Standards

Policy Description

A thorough study of energy options for portfolio standards including renewables, energy efficiency, nuclear power, waste to energy, landfill gas, offshore wind, and hydro.

Policy Design

Goals:

Analysis of this policy should include the following options:

1. Renewables only;
2. Renewables, municipal solid waste to energy conversion, nuclear energy and energy efficiency. A minimum of 75% of the goal must be met with renewable energy or energy efficiency.
3. Renewables and energy efficiency, with no more than 40% of the goal to be met with renewable energy;

Energy efficiency includes applications that provide measurable, verifiable, long-term savings to the retail customer compared with current technology in use, including but not limited to appliances, lighting, HVAC, building envelope and efficient motors.

See "Key Assumptions" for additional detail on interpretation of goals for analysis purposes.

Implementation Mechanisms

The portfolio standard will consider the following implementation parameters:

1. Ensure that the short term and long term demand for electricity in this State is met without causing undue economic harm to its citizens;
2. Protect and enhance the quality of the environment in South Carolina through increased use of renewables, energy efficiency, nuclear, and/or other low GHG-emitting sources;
3. Encourage the development, construction, and operation of clean energy resources at those sites in this state that have the greatest economic potential.

Related Policies/Programs in Place

SC Energy Efficiency Act, Title 48, Chapter 52.

Type(s) of GHG Reductions

TBD – [CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Reductions and Net Costs or Cost Savings

Data Sources:

Cost of Power Plants

GDS Associates, Inc. and La Capra Associates, Inc 2007. Analysis of Renewable Energy Potential in South Carolina, prepared for Central Electric Power Cooperative Inc.

LaCapra Associates, Inc. 2006, "Analysis Of A Renewable Portfolio Standard For The State of North Carolina," December 2006.

NREL 2007. Comparison of Cost-Based U.S. Operational Impact Studies. (Presents data on wind integration costs)

Stoddard, et. al. 2005. Economic, Energy and Environmental Benefits of Concentrating Solar Power in California, NREL, May 2005–April 2006, NREL/SR-550-39291.

US EIA 2007. Annual Energy Outlook 2007, Assumptions to the AEO, Electricity Market Module. Available at: http://www.eia.doe.gov/oiaf/aeo/assumption/index.html. (Source of capital cost, escalation assumptions)

Nuclear Energy Institute (source not found)

Wiser and Bolinger 2007. Report Summary, Annual Report on U.S. Windpower Installation, Cost and Performance Trends, 2006, US DOE, May 2007.

Wiser, et. al. 2006. Letting the Sun Shine on Solar Costs: An Empirical Investigation of Photovoltaic Cost Trends in California, LBL, LBNL-59282, January 2006.

Cost of Energy Efficiency Measures

GDS Associates, Inc. 2006. A Study of the Feasibility of Energy Efficiency as an Eligible Resource as Part of a Renewable Portfolio Standard for the State of North Carolina, Report for the North Carolina Utilities Commission, December 2006, available at http://www.ncuc.commerce.state.nc.us/reps/NCRPSEnergyEfficiencyReport12-06.pdf

GDS Associates, Inc. 2007. Electric Energy Efficiency Potential Study for Central Electric Power Cooperative, Inc.: Final Report. Updated September 21, 2007, available at www.ecsc.org/newsroom/EfficiencyStudy.ppt.

Forefront Economics Inc. et al. 2007. Duke Energy Carolinas DSM Action Plan: South Carolina Draft Report, prepared for Duke Energy Carolinas, July 24, 2007.

Experience in other states

ACEEE 2004. Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies, April 2004

Gene Fry, "Massachusetts Electric Utility Energy Efficiency Database", Massachusetts Department of Telecommunications and Energy, 2003 edition

Heschong Mahone Group, Inc. 2005. New York Energy $martSM Program Cost-Effectiveness Assessment, prepared for NYSERDA, June 2005

Bill Prindle 2007. "Energy Efficiency: The First Fuel in the Race for Clean and Secure Energy," Presentation at the NAPEE Southeast Energy Efficiency Workshop on September 28, 2007, available at http://www.epa.gov/solar/pdf/southeast_28sep07/prindle_new_napee_presentation_atlanta_9_28_07.pdf

Western Governor's Association (WGA) 2006. The Energy Efficiency Task Force Report to the Clean and Diversified Energy Advisory Committee of the Western Governors Association, January, 2006

Renewable Energy Potential

GDS Associates, Inc. and La Capra Associates, Inc 2007. Analysis of Renewable Energy Potential in South Carolina, prepared for Central Electric Power Cooperative Inc.

Biomass Energy Potential in South Carolina: A Conspectus of Relevant Information. South Carolina Energy Office. Available at: http://www.energy.sc.gov/publications/Biomass%20Conspectus%204-10-07.pdf

Harris, Robert A. etc. Final Report to the South Carolina Forestry Commission on Potential for Biomass Energy Development in South Carolina

Quantification Methods: The analysis estimates and compares the aggregated costs and benefits of four distinct scenarios on Energy Portfolio Standards. Specifically this analysis involves the following steps:

1. Determine the policy goals in terms of the percentage of Energy covered by Portfolio Standards each year through 2020.

2. Determine what type of conventional generation will be displaced or avoided by. this policy

3. Identify the type of resources that would most likely be developed to meet the Energy Portfolio Standard in each scenario and determine an appropriate resource mix among energy resources

4. Estimate the annualized costs and avoided emissions benefits of each scenario.

Key Assumptions: *Avoided cost*: avoided cost data for major utilities in South Carolina.

For purposes of analysis only:

- *Renewable requirements may only be met with in-state resources brought on line no earlier than January 2004.*

- *For nuclear options, assume two 1000-MW plants coming on line in 2017 and 2019, respectively (also must consider possibility of plants not being built on this schedule.)*
- *Energy Efficiency*
    - 5% or 10% by 2020 will be based on projected sales.
- *Solar set-aside: Analysis to be designed to accommodate solar set-aside should the CECAC decide to request same.*

Costs to be analyzed on a $/kWh basis as well as $/ton of CO_2e avoided.

Displaced Emissions: The introduction of new renewable generation under this policy option is assumed to displace generation from existing facilities in the short-term and postpone the construction of new conventional power plants in the long-term.

For the sake of analysis, we assume the mix of conventional energy resources that would be displaced by new resources is x% natural gas-fired power plants and (1-x)% coal-fired power plants.

Other assumptions (TBD with TWG):

- Discount Rate
- Renewable Energy Resource Mix
- Non-Renewable Energy Resource Mix

Cost of Power Plants
(including Capital and O&M cost of power plants and levelized cost of generation)

Renewable Technologies	Size (MW)	Capacity Factors	Average Installed Cost (2006$/kW)	High Installed Cost (2006$/kW)	Fixed O&M (2006 $/kW)	Variable O&M (2006$/ MWh)	Heat Rate (Btu/kWh)
Landfill Gas ICE (>5 MW)[1]	5-10	80%-85%	$1,750	$2,000	$100	$12	9,500
Landfill Gas ICE (<5 MW)[1]	1-5	80%-85%	$2,500	$3,000	$100	$12	9,500
Biomass (Co-fire Blending)[2,3,5]	5%	70%-75%	$75	$100	$12	$5	12,000
Biomass (Co-fire Retrofit)[2,4,5]	15%- 20%	70%-75%	$230	$300	$12	$5	12,000
Biomass (Stoker)5	25	80%-90%	$2,700	$2,970	$75	$10	13,000
Biomass (Fluidized Bed)[5]	25	80%-90%	$3,000	$3,300	$75	$10	13,800
Anaerobic Digester (Swine Waste)	0.1	70%-80%	$4,000	$6,000	$270	$0	14,000
Wind (On-Shore)	25-50	25%-28%	$1,800	$2,000	$45	$2	
Wind (Off-Shore)	50-400	30-35%	$2,800	$3,300	$80	$2	
Hydro Power (Conventional)	1-50	25%-35%	$2,000	$3,500	$12	$3	
Hydro Power (Small Hydro)	1-30*	25%-35%	$3,000	$4,000	$20	$5	
Hydro Power (Low Head)	<1*	20%-35%	$4,000	$5,000	$50	$10	
Solar PV (Utility Scale)	1-10	19%-21%	$4,000	$5,000	$15		
Solar PV (Commercial)	0.025-0.050	19%-21%	$6,000	$8,000	$30		
Solar PV (Residential)	0.002	19%-21%	$8,000	$10,000	$50		

Source: GDS Associates, Inc. and La Capra Associates, Inc 2007. Analysis of Renewable Energy Potential in South Carolina, prepared for Central Electric Power Cooperative Inc.

Cost of Energy Efficiency Measures or Saved Electricity

For Duke Energy (*Forefront Economics Inc. et al. 2007:*) 500 GWh of annual savings in the residential sector and about 300 GWh of annual savings in the non residential sector at a cost of about $0.03 per kWh of saved electricity. For scale, Duke's annual electricity sale is 5,440 GWh according to EIA.

For North Carolina (*Source: GDS Associates, Inc. 200)*:

	Present Value of Total Costs (2006$)	Value of Lifetime kWh Savings - Customer Meter Level	Levelized Cost per Lifetime kWh Saved
Residential Sector	$262,528,658	9,673,701,174	$0.027
Commercial Sector	$352,185,339	8,702,321,930	$0.040
Industrial Sector	$124,388,270	6,805,459,342	$0.018
Total - All Sectors	$739,102,267	25,181,482,446	$0.029

For other states:

State/Utility	CSE ($kWh)	Program Year	Source
Western utilities	0.025	1978-2004	WGA 2006.
Northwest Energy	0.02	2006	Montana PSC Docket No.: D2005.5.88 07/12/06
New York	0.03	2004	Heschong Mahone Group, Inc. 2005.
MA IOUs	0.038	2002	Gene Fry 2003
California	0.03	n/a	ACEEE 20004
Connecticut	0.023	n/a	ACEEE 20004
New Jersey	0.03	n/a	ACEEE 20004
Vermont	0.03	n/a	ACEEE 20004

Efficiency Measure Lifetime/Amortization Period: 13 years on average

Displaced Emissions: Energy efficiency measures are assumed to displace generation from existing facilities in the short-term and to contribute to postponing the construction of new conventional power plants in the long-term. For the sake of analysis for estimating GHG emissions reduction, we assume the mix of conventional power generation that would be displaced by new resources is xx % natural gas-fired power plants and X % coal-fired power plants and the emission factors would reflect this generation mix.

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until CECAC moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until CECAC Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the CECAC]

ES-2. Technology Research and Development

Technology Research and Development, including state funding

Policy Description

R&D funding can be targeted toward a particular technology or group of technologies as part of a state initiative to build or expand an industry or core technical competency around that technology in the state, and/or to set the stage for adoption of the technology for use in the state. (For example, part of the SC Hydrogen and Fuel Cell Alliance's mission is to help develop and deploy hydrogen technologies in the state). R&D funding can also be made available to any renewable or other advanced technology (including nuclear) through an open bidding procedure (i.e., driven by bids received rather than by a focused strategy to develop a particular technology). Funding can also be given for demonstration projects to help commercialize technologies that have already been developed, but which are not yet in widespread use. Finally, funding could be targeted to increase collaboration among existing institutions in the state for R&D.

A number of energy technology research and development (R&D) programs are already underway at organizations and academic facilities throughout South Carolina, as noted below.

Policy Design

- Establish an energy technology roadmap for South Carolina to focus on those efforts that have the greatest potential for achieving reduced GHGs, economic development opportunities, national security and energy independence for the state. Include Department of Commerce, economic development organizations, utilities, as well as state technology providers in the process.
- Support and provide funding opportunities/incentives for developing and implementing new technologies for GHG reduction that encourage collaborations between R&D, government, academic and commercial sectors.

Goals:

- Additional state funding of $20M for R&D initiatives in clean energy (Maybe 3-5 years?)
- Establish hydrogen infrastructures that are accessible to at least 80% of the population. (5 strategically-located stations)
- Complete a least one high visibility research and development demonstration to showcase alternative energies.

Timing: [TBD]

Parties Involved: [TBD]

Other: [As needed]

Implementation Mechanisms

1. H. 3146- The Hydrogen Infrastructure Act-potential $5M in 2008 (proposed $15M total over 5 years) for in-state projects *(this has passed but has not been funded.)*
2. H. 3649- South Carolina Renewable Energy Infrastructure Development Fund
3. Small Business Innovation Research /Tech Transfer Phase I Matching Grant Programs
4. SCRA's Launch Program- $200M per entity available for entrepreneur assistance
5. Research and Development Infrastructure and South Carolina Centers of Economic Excellence Endowed Professorship Program funded through SC state lottery

Related Policies/Programs in Place

1. University of South Carolina's National Science Foundation Center for Fuel Cells and Clean Coal Center of Excellence
2. Energy research conducted at the Savannah River National Laboratory and Center for Hydrogen Research
3. Clemson's University Restoration Institute's research in bio-energy and wind
4. International Center for Automotive Research (CU-ICAR) automotive system integration and material science program
5. The Greater Columbia Fuel Cell Challenge -creating a plan to make the region a center for fuel cell use.
6. South Carolina Research Authority's clean energy initiatives programs
7. Non-profit organizations that promote researchers, entrepreneurs, and businesses preparing for the emerging technologies in energy, as such as EngenuitySC, Concurrent Technologies, New Carolina, FuelCellSouth, etc.
8. State supported organizations that encourage R&D, such as SCBIO, South Carolina Hydrogen and Fuel Cell Alliance, South Carolina Biomass Council, South Carolina Institute for Energy Research, etc.

Type(s) of GHG Reductions

Non-quantifiable due to the uncertainty of selected research endeavors

Estimated GHG Reductions and Net Costs or Cost Savings

Non-quantifiable due to the uncertainty of selected research endeavors.

Data Sources:

Committee on Benefits of DOE R&D on Energy Efficiency and Fossil Energy, *Energy Research at DOE: Was It Worth It? Energy Efficiency and Fossil Energy Research 1978 to 2000*, National Academy Press, Washington D.C., 2001.

Quantification Methods:

This policy will not be analyzed quantitatively.

Key Assumptions: *Not Applicable*

Key Uncertainties

Not Applicable

Additional Benefits and Costs

- Job creation within South Carolina from utilizing enhanced R&D to build an energy industry is an additional benefit. The state is poised through its strength in hydrogen research to become a national leader in the hydrogen economy. By 2020, it is estimated hydrogen could have potential for >40,000 jobs in SC and $10 B in capital investments.
- With its strong nuclear industry, SC has the potential to capitalize on the emerging renaissance, by establishing itself as a hub for nuclear expertise and training. The state is also in a position to benefit from the research and development focus on nuclear production of hydrogen (as was recommended in the National Research Council's, *Review of DOE's Nuclear Energy Research and Development Program, October, 2007).*
- Additional benefits of reduced dependence on foreign oil and improved environmental conditions can be realized.

Feasibility Issues

TBD

Status of Group Approval

Pending – [until CECAC moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until CECAC Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the CECAC]

ES-3. Renewable Energy Financing

Renewable Energy (full range) financing, tax incentives, loans

Policy Description

This policy option concerns financial incentives to encourage investment in the full range of renewable energy resources.

The intent of these financial incentives will be to help overcome barriers for renewable energy development. Institutional and market barriers include price distortions, inadequate information, institutional barriers to grid interconnection, high transaction costs because of small projects, high financing costs because of lender unfamiliarity and perceived risk. These can be overcome through a suite of financial and regulatory redresses as well as through information and public education campaigns.

Financial obstacles can also be addressed through property tax exemptions, exclusions, and credits; personal income tax credits or deductions to cover the expense of purchasing and installing renewable energy equipment; loan programs to aid in financing the purchase of renewable energy equipment; and grant programs designed for research and development or to help a project achieve commercialization.

Policy Design

Goals: The initial evaluation should include several different types of financial incentives to represent the range of opportunities.

- remove legislative caps on current tax incentives for renewable fuel use
- tax credits or other incentives of $3,500 per kW-equivalent for small solar PV, solar and geothermal hot water systems, micro-hydro and small wind up to 50 kW grid-connected generation
- subsidy to renewable energy generators of 1 cent per kWh for electricity generated from a renewable resource on or directly connected to the South Carolina grid, unless that electricity is used to meet a federal, state or voluntary renewable energy standard
- feed-in tariffs for large-scale zero-pollution renewable generation projects, providing a guaranteed price for electricity or the market rate (if higher) by guaranteeing rate base recovery, as follows:
  - first 100 MW – 15 cents per kWh
  - second 100 MW – 14 cents per kWh
  - third 100 MW – 12 cents per kWh
  - fourth 100 MW – 10 cents per kWh
  - fifth 100 MW – 8 cents per kWh

- low-interest loans for feasible and desirable biomass generation that meets exemplary environmental performance standards with partial loan forgiveness for equipment that fails to perform to standard

Timing: Tax credits and subsidies are available from 2009 through 2025; feed-in tariffs are guaranteed for the lifetime of a project, up to 25 years, for projects brought online between 2009 and 2015; loans available for projects brought online between 2009 and 2015.

Parties Involved: All power producers operating qualifying facilities for incentives other than tax credits, which would be available to any grid-connected customer.

Other: TWG members were divided on whether or not this policy should apply to municipal solid waste to energy conversion.

Implementation Mechanisms

Incentives to be considered include:

1. direct subsidies for purchasing/selling renewable technologies;
2. tax credits or exemptions for purchasing renewable technologies;
3. feed-in tariffs, which provide direct payments to renewable generators for each kWh of electricity generated from a qualifying renewable facility;
4. government-sponsored or facilitated loan programs;
5. tax credits for each kWh generated from a qualifying renewable facility; and
6. regulatory policies that provide incentives and/or assurance of cost recovery for utilities that invest in central station renewable energy systems.

In all instances, financial incentives should be structured in such a way as to promote feasible and desirable renewable energy development and minimize distortions to any existing markets involving renewable energy, or renewable energy feedstocks (e.g. biomass).

Related Policies/Programs in Place

See list of current and pending legislation posted by the SC Energy Office, at http://www.energy.sc.gov/index.aspx?m=1&t=67. [TWG volunteers to identify legislation which applies.]

Type(s) of GHG Reductions

TBD – [CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Reductions and Net Costs or Cost Savings

Data Sources:

Renewable Energy Potential:

See ES-1

Cost of Renewable Energy

See ES-1

General DG Cost and Performance Data

Center for Sustainable Energy California 2007. "Statewide Self-Generation Incentive Program Data" (updated October 2007, 2.3 MB XLS), available at http://www.energycenter.org/ContentPage.asp?ContentID=279&SectionID=276&SectionTarget=35

GRI and NREL 2003, Gas-Fired Distributed Energy Resource Technology Characterizations—Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable, available at http://www.eea-inc.com/dgchp_reports/TechCharNREL.pdf.

Navigant Consulting 2006. "Energy Cost Savings Module for customer-sited DG" prepared for the Massachusetts DG Collaborative, available at http://masstech.org/renewableenergy/public_policy/DG/EnergyCostSavingsModule-Jan202006.zip (5.5 MB zip file)

Synapse 2005. Feasibility Study of Alternative Energy and Advanced Energy Efficiency Technologies for Low-Income Housing in Massachusetts, prepared for The Low-Income Energy Affordability Network, Action for Boston Community Development, and Action Inc.

Quantification Methods:

1. Establish targets (or assumptions) for the type and the amount of renewables installed through 2020 including the size of renewables (i.e., small systems up to 50 kW and larger systems).

2. Determine the potential biomass generation that meets environmental performance standards

3. Determine the type and amount of renewable energy imported to South Carolina from an area directly connected to the South Carolina grid

4. Estimate energy production from new renewable resources

5. Apply financial incentives, as noted above, to each renewable energy resource

6. Estimate the aggregate cost of renewable energy production & displaced emissions following ES-1.

Key Assumptions:

Avoided cost: See ES-1

Displaced Emissions: See ES-1

Cost of Renewable Energy Systems: See ES-1 for most of renewables.

Other state processes may provide a basis for establishing assumptions for analysis.

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

See comments below.

Status of Group Approval

Pending – [until CECAC moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until CECAC Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the CECAC]

ES-4:

Return on Investments in Energy Efficiency

Regulatory model to equalize utility earnings on energy efficiency with earnings on traditional power supply to allow investment in efficiency and renewables to be considered in parity with investment in new conventional capacity.

Policy Description

Utilities are responsible for meeting customer demand and they generate a predictable long-term earnings stream from investments in new supply resources that are needed to meet customer demand. Energy efficiency and distributed generation renewable energy not only reduce sales, but they reduce a predictable earnings stream that Wall Street expects for the future earnings of the utility. Alternative methods of meeting customer demand must provide the opportunity for an equivalent earnings stream to achieve investment parity.

Under traditional rate making, costs incurred by utilities, including a return on investment, are recovered through the sales of electricity. Because energy efficiency and distributed generation renewable energy sources can decrease the volume of electricity sales, traditional cost recovery mechanisms have created a financial disincentive to utility support for energy efficiency and renewables.

In the short run (between rate cases) lost sales due to energy efficiency programs reduce revenue by the full tariffed rate thereby undermining the utility's recovery of costs. When this net lost

revenue is taken into account, utilities may be unable to recover costs and face profit losses for energy efficiency and distributed generation measures.

The goal of this policy is to implement a regulatory model that equalizes the incentive for utilities to invest in cost-effective energy efficiency and distributed generation with the incentive to invest in new supply resources. By equalizing utility earnings on demand-side management and energy efficiency programs with earnings on traditional power supply, utilities will consider investment in energy efficiency in parity with investment in new conventional capacity.

This strategy is intended to be coupled with energy efficiency strategies being evaluated in the Residential, Commercial and Industrial Technical Workgroup to achieve actual reductions in energy demand and in greenhouse gas emissions.

Policy Design

Goals: The contemplated regulatory model would provide for the following:

- ***Timely recovery of costs.*** Utilities shall be provided timely recovery of all costs associated with the implementation of DSM and energy efficiency programs. Depending on each utility's proposed plan, this shall include the recovery of program costs and lost margins as well as any incentives. These costs would be recovered through an annual DSM/EE adjustment clause and rider.
- ***Recovery of Lost Revenues.*** Lost revenues experienced by the utility as a result of the implementation of DSM/EE programs shall be included in the costs recovered through the annual DSM/EE rider.
- ***Financial Incentives.*** Utilities shall be allowed to earn a financial incentive for the implementation of DSM/EE programs. Incentives may include sharing of savings achieved by the DSM/EE programs, or could be based on the capitalization of a percentage of avoided costs achieved by the programs.

Because parity in returns does not in itself guarantee any particular level of investment, equalization of revenues as a policy may be evaluated in a comparative framework. Assuming that all cost-effective energy efficiency is implemented, compare the cost and the level of energy efficiency achieved with and without equalization of utility revenues – the benefit of this policy will be its marginal contribution to the availability of cost-effective energy efficiency. If a method for estimating all cost-effective energy efficiency is not available, then the analysis may assume all energy efficiency up to 5 cents per kWh with and without the disincentive of net lost revenue as addressed through a mechanism that accomplishes the above goals.

- **Timing: Regulatory model** implemented in 2008 and fully available in 2009.
- **Parties Involved:** South Carolina Public Service Commission to implement rule, if necessary, affecting all investor-owned utilities.
- **Other:**

  Text proposed by EDH:

This proposal contains some elements that are consistent with the conventional notion of "decoupling", which is designed to remove utility disincentives for pursuing EE by assuring

recovery of utility costs regardless of the level of sales (i.e., utilities will not be penalized for effectively reducing their own sales.) However, the current proposal goes beyond the concept of decoupling by:

1. assuring that utilities' total *earnings* will not be adversely affected by pursuing energy efficiency instead of generation investments, and
2. Providing an incentive payment for utilities, based on avoided cost, to promote additional investment in energy efficiency and load reduction.

Implementation Mechanisms

In general, we contemplate that whatever state policies are selected to achieve energy efficiency, they should include a provision for timely recovery of costs and appropriate financial incentives. Furthermore, for large commercial and industrial customers that can have the internal capacity to finance and implement energy efficiency measures and can demonstrate that they have previously implemented conservation measures that are comparable to what the utility offers, there should be consideration of an opt-out provision.

The following elements are central to the current proposal:

(1) provide a financial structure that is comparable to new supply side generation for utilities who invest in energy supply and use end use technologies that are cost effective and reduce energy consumption or demand. This structure can include but is not limited to, decoupling, cost recovery, cost recovery capitalization, and lost revenues, and may also include utility incentives such as shared savings or a percentage of avoided cost of generation.

(2) require that the Public Service Commission establish rates and charges that ensure that the electric or gas utility's earnings, after implementation of cost effective demand side management and energy efficiency measures is at least as high as the earnings would have been if the demand side management and energy efficiency measures had not been implemented, without allowing for excessive, imprudent or unreasonable returns.

Related Policies/Programs in Place

TBD

Type(s) of GHG Reductions

TBD – [CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Reductions and Net Costs or Cost Savings

- **Data Sources:**
- **Quantification Methods:**
- **Key Assumptions:**

We will need the TWG's assistance to craft details on the following assumptions:

1. financial incentive mechanism

2. targets for electricity and natural gas savings. Decoupling (or a related policy) in and of itself will not decrease usage.

For each energy efficiency measure, energy savings will be assumed to continue until 2020 with no decay of program effects, because the study period is less than the average lifetime of energy efficiency measures. The annualized program costs (amortized over a period of 13 years or longer, consistent with the life of the asset) will be included in the analysis through 2020.

This policy analysis does not include costs and benefits of load management.

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until CECAC moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until CECAC Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the CECAC]

ES-5. New Nuclear Power

UTILITIES' PROPOSED CHANGES SHOWN

New Nuclear Power, including reprocessing

Policy Description

Nuclear power currently provides about 20% of U.S. electricity supply and accounts for approximately 50 % of the electricity produced in South Carolina. South Carolina currently has seven nuclear reactors, making it the state with the third highest total nuclear generating capacity. During operation, nuclear plants generate no greenhouse gases (GHGs), although there are GHG emissions associated with the mining, refining, and transport of nuclear fuel and the construction and decommissioning of plants. Nuclear power generation is the largest single source of non carbon emitting electric generation.

Electricity demand is [has been?] increasing each year in South Carolina. Estimates are that it would take approximately 10 years to design, permit, and construct a new nuclear plant, making rapid action in this area imperative if expanded nuclear power generation is to play a role in mitigating greenhouse gas emissions in the near future. Recently enacted federal energy legislation includes financial incentives for new nuclear plants in an effort to jump-start the nuclear power industry, providing cost savings in-state for new nuclear facilities.

Reprocessing spent nuclear fuel results in a significant reduction in the volume of high level radioactive waste. Through reprocessing, the recovered uranium and plutonium can be recycled into new fuel. Recycling involves the re-enrichment of the recovered uranium for use in light water reactor fuel assemblies and the conversion of the recovered plutonium into mixed oxide fuel assemblies, which also can be used in light water nuclear reactors. This approach offers the benefits of significantly reducing the inventories of commercial spent nuclear fuel and plutonium, as well as reducing the total volume of waste requiring geologic disposal.

~~Nuclear fuel reprocessing~~Recycling technologies have evolved significantly since the U.S. abandoned commercial recycling in the 1970s and ~~many believe that they~~ can now be deployed in a manner consistent with U.S. and international safety and nonproliferation standards.

The focus of this particular policy should be to recommend actions, e.g. state legislative and regulatory actions, that would support the construction of new nuclear power generating facilities in South Carolina, and to address the nuclear waste disposal issue by supporting the reprocessing and recycling of nuclear fuel.

Policy Design

Goals: The goals of this policy are:

(1)(a) To quantify the costs ~~(including the full cost of disposal and any taxpayer-assumed liabilities and risks)~~ and identify the benefits (to include avoidance of greenhouse gas emissions) associated with building new nuclear power plants in South Carolina;

(1)(b) To evaluate the economic, environmental, waste reduction, national energy security, and other implications of nuclear waste reprocessing-recycling in the state of South Carolina; and

(2) If new nuclear power is shown to be a viable option for new base load generation in South Carolina, expeditiously implement applicable regulatory and legislative actions to support the construction of new nuclear plants in South Carolina and to promote the reprocessing and recycling of spent nuclear fuel.

- **Timing** This policy would become effective immediately upon approval by the S.C. General Assembly.
- **Parties Involved:** Electric utilities, environmental advocacy groups, state legislators, county government and economic development leaders, manufacturer- business advocacy groups, and energy users/energy ratepayer advocacy groups.
- **Other:** [As needed]

Implementation Mechanisms

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Related Policies/Programs in Place

- SCE&G/Santee Cooper - new nuclear plant planned (plans are to apply for permits for two 1100 MW units.)
- Savannah River National Laboratory, which is partnered with the Economic Development Partnership of Aiken and Edgefield counties, and EnergySolutions will each receive a part of the $10 million in Global Nuclear Energy Partnership grants to allow for detailed studies of the proposed nuclear waste recycling plants.
- Savannah River National Lab is applying for the nuclear recycling program.
- Duke Energy – William S. Lee Nuclear Station (possibly two 1100 MW units) in Cherokee County

Type(s) of GHG Reductions

TBD – [CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Reductions and Net Costs or Cost Savings

- **Data Sources:**

Massachusetts Institute of Technology, *The Future of Nuclear Power: An Interdisciplinary MIT Study*, 2003, ISBN: 0-615-12420-8.

The Keystone Center, *Nuclear Power Joint Fact-Finding*, June 2007.

U.S. Energy Information Association, *Assumptions to the Annual Energy Outlook, 2007*, April 2007, Report #: DOE/EIA-0554(2007).

- **Quantification Methods:** [e.g. Life-cycle analysis on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

Additional new nuclear power plants in South Carolina, as well as a nuclear fuel reprocessing-recycling plant, would contribute substantially to the South Carolina economy. Statistics show that the average nuclear plant employs 1400 to 1800 employees during construction, employs 600 or more people long-term at salaries higher than the average salary in the local area, creates economic activity that generates 400 to 700 new jobs locally, and provides annual state and local tax revenue of more than $20 million, benefiting schools, roads, and other local and state infrastructure. ***(highlighted assertions require citations or should be generalized or deleted.)***

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until CECAC moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until CECAC Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the CECAC]

ES-6. Green power purchases and marketing

Policy Description

This policy would establish a voluntary green power program offering a green power option to consumers throughout the State. The green power purchases are comprised of a variety of consumer-driven strategies to increase the production and delivery of low-GHG power sources.

Palmetto Clean Energy (PaCE) is an independent, nonprofit organization established in August 2007. The organization consists of representatives from the SC Office of Regulatory Staff, SC Energy Office, Duke Energy Carolinas, Progress Energy Carolinas and SCE&G. PaCE is a renewable energy program designed to encourage the development of renewable energy resources that improve the environment through reduced greenhouse gas emissions. Consumers can elect to fund Green Power purchases by South Carolina investor-owned electrical utilities.

Contributions to the program help provide financial incentives for generators of electricity from renewable sources. To supplement the activities of voluntary green power programs in SC (PaCE and Santee Cooper Green Power), this policy provides support for marketing green power to consumers and for the developers of renewable generation through state funded green power initiatives coordinated by the SC Energy Office.

The relationship between this policy and a RPS needs to be determined by the CECAC.

Policy Design

Goal #1: Educate consumers about power (fuel) sources and emissions associated with the electricity they use.

Goal #2: Establish a Voluntary Green Power Utility Program

Timing: Operational by April 2008; 1-5% participation of retail customers by 2012.

Parties Involved: SC Office of Regulatory Staff, SC Energy Office, Duke Energy Carolinas, Progress Energy Carolinas, SCE&G, Santee Cooper, Lockhart Power Company and the Public Service Commission of SC.

Other: Definition of Green Power – A renewable energy resource includes solar (roofing materials with built-in solar photovoltaic cells, solar PV panels erected on roofs, solar water heating and solar space heating systems (*What about CSP?*)); wind; hydroelectric (less than 10 kW); geothermal; ocean current or wave energy; biomass resource including agricultural waste, animal waste, wood waste, spent pulping liquors, combustible residues, combustible liquids, combustible gases, energy crops, or landfill methane; waste heat derived from a renewable energy resource and used to produce electricity; or hydrogen derived from a renewable energy resource.

Goal #3: State Sponsored Green Power Initiatives

To supplement the activities of voluntary green power programs in SC (PaCE and Santee Cooper Green Power), this policy also provides marketing and renewable resource development assistance through state funded green power initiatives coordinated by the SC Energy Office.

Timing: Fully implemented by 2012.

Parties Involved: SC Energy Office, Duke Energy Carolinas, Progress Energy Carolinas, SCE&G Santee Cooper, Lockhart Power Company, the Public Service Commission of SC and PaCE.

Other: [As needed]

Implementation Mechanisms

Table 1. Demand- and supply-side recommendations

Demand-Side Recommendations	Supply-Side Recommendations
1. Provide consumer education programs and green power promotional materials.	1. Support for R&D on new and developing renewable energy technologies.
2. Provide incentives for new or expanding businesses to purchase power through voluntary green power programs.	2. Provide support for feasibility studies of various renewable energy technologies.
3. Provide tax credits for companies purchasing from power through voluntary green power programs.	3. Provide a mechanism for long-term contract guarantees for renewable energy producers.
4. Provide incentives for home builders to include one year of green energy through PaCE with the purchase of new homes.	4. Provide support for renewable energy development projects, thereby leading to more options and sales tools.
5. Provide assistance and participation in consumer and business marketing programs.	5. Provide low or no interest loans for qualified developers of renewable energy projects.
6. Provide Web-based technical assistance to consumers. (See Maine Public Utilities Commission program)	6. Provide incentive through reward and recognition for the top generators of green power.
7. Provide incentive through reward and recognition for Industry to purchase power through voluntary green power programs.	

Related Policies/Programs in Place

Green Power program through Santee Cooper (landfill methane – 5 sites,) expanding into solar. Eighteen electric co-ops also participate in the green power program through Santee Cooper.

Palmetto Clean Energy (PaCE)

Type(s) of GHG Reductions

TBD – [CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Reductions and Net Costs or Cost Savings

Data Sources:

Bird, L. and Marshall Kaiser. Trends in Utility Green Pricing Programs (2006). NREL, October 2007.

Bird, L. and Blair Swezey. Green Power Marketing in the United States: A Status Report (Ninth Edition). NREL, November 2006.

U.S. Department of Energy, "Can I Buy Green Power in My State?", http://www.eere.energy.gov/greenpower/buying/buying_power.shtml?state=SC&print (accessed December 6, 2007)

U.S. Department of Energy, "Green Power Policies: Maine: 10,000 Carbon Free Homes", http://www.eere.energy.gov/greenpower/markets/state_policies.shtml#me (accessed December 6, 2007).

GDS Associates, Inc. and La Capra Associates, Inc 2007. Analysis of Renewable Energy Potential in South Carolina, prepared for Central Electric Power Cooperative Inc.

LaCapra Associates, Inc. 2006, "Analysis Of A Renewable Portfolio Standard For The State of North Carolina," December 2006.

Stoddard, et. al. 2005. Economic, Energy and Environmental Benefits of Concentrating Solar Power in California, NREL, May 2005–April 2006, NREL/SR-550-39291.

US EIA 2007. Annual Energy Outlook 2007, Assumptions to the AEO, Electricity Market Module. Available at: http://www.eia.doe.gov/oiaf/aeo/assumption/index.html.

Wiser and Bolinger 2007. Report Summary, Annual Report on U.S. Windpower Installation, Cost and Performance Trends, 2006, US DOE, May 2007.

Wiser, et. al. 2006. Letting the Sun Shine on Solar Costs: An Empirical Investigation of Photovoltaic Cost Trends in California, LBL, LBNL-59282, January 2006.

Quantification Methods:

1. Identify a resource mix of renewable energy that will be developed under this policy option & costs.

2. Translate 1-5% participation goal into energy production from renewables.

3. Estimate costs of energy production from renewable energy sources following ES-1.

4. Estimate the marketing and administration costs associated with the green power program.

5. Estimate the greenhouse gas emission reductions associated with the green power program.

Key Assumptions:

Amount of green power purchased by each customer

- Average purchases of renewable energy per customer (kWh/year) from NREL's 2007 "Trends in Utility Green Pricing Programs" (page 10):

	2001	2002	2003	2004	2005	2006
All Customers	3,400	3,900	4,800	5,500	6,200	6,700

Customer Acquisition Costs per Customer

- Residential customer-acquisition costs by year from NREL's 2007 "Trends in Utility Green Pricing Programs" (page 22) for all utilities:

	2003	2004	2005	2006	2005 Top Performers	2006 Top Performers
Average	$36	$42	$43	$38	$31	$31
Median	$31	$30	$25	$30	$27	$28

- Residential customer-acquisition costs by year from NREL's 2007 "Trends in Utility Green Pricing Programs" (page 22) by utility size:

Size of Utility	2004			2005			2006		
Avg.	Median	Num. Resp	Avg.	Median	Num. Resp	Avg.	Median	Num. Resp	Avg.
1-99,999 Customers	$12	$4	12	$27	$14	21	$31	$19	18
100,000-499,999 Customers	$56	$35	13	$97	$41	9	$43	$37	9
500,000-999,999 Customers	$60	$55	9	$40	$28	7	$38	$29	5
1,000,000 Customers	$41	$36	9	$29	$30	8	$47	$33	10
All Utilities	**$42**	**$30**	**43**	**$43**	**$25**	**45**	**$38**	**$30**	**42**

Marketing & Administration Costs per Customer

- Marketing and administrative expenditures as a percentage of the green power premium from NREL's 2007 "Trends in Utility Green Pricing Programs" (page 20):

	2003	2004	2005	2006	Top Performing Utilities 2006
Average	17%	20%	15%	23%	24%

Median	5%	9%	2%	10%	28%

- Utility expenditures on marketing by utility size from NREL's 2007 "Trends in Utility Green Pricing Programs" (page 18):

Number of Utility Customers	Number of Responses									Total
	$0	$1 - $9,999	$10,000 - $49,999	$50,000- $99,999	$100,000- $199,999	$200,000- $299,999	$300,000- $399,999	$400,000- $499,999	$500,000 or more	
1-99,999	2	26	5	2	1	0	0	0	0	36
100,000-499,999	0	3	13	2	0	0	1	0	0	19
500,000-999,999	0	0	1	1	2	0	0	2	0	6
1,000,000+	0	3	0	0	2	1	4	1	1	12
Total Respondents	2	32	19	5	5	1	5	3	1	73
Top Performers/ % All Respondents	0/0%	5/16%	3/16%	0/0%	2/40%	1/100%	2/40%	3/100%	0/0%	

- Utility expenditures on program administration by utility size from NREL's 2007 "Trends in Utility Green Pricing Programs" (page 20):

Number of Utility Customers	Number of Responses									Total
	$0	$1 - $9,999	$10,000 - $49,999	$50,000- $99,999	$100,000- $199,999	$200,000- $299,999	$300,000- $399,999	$400,000- $499,999	$500,000 or more	
1-99,999	4	22	5	0	0	1	0	0	0	32
100,000-499,999	1	4	12	2	0	0	0	0	0	19
500,000-999,999	0	1	1	2	1	0	0	0	1	6
1,000,000+	0	2	2	2	3	1	1	0	1	12
Total Respondents	5	29	20	6	4	2	1	0	2	69
Top Performers/ % All Respondents	1/ 20%	5/17%	2/10%	2/33%	3/75%	1/50%	1/100%	0/0%	1/50%	16/ 23%

- Avoided costs (See ES-1).
- Costs of renewable energy generation: (See ES-1).
- Emissions associated with avoided fossil fuel generation and renewables (See ES-1).

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

- Would help to provide local employment and grow renewable energy use.

Feasibility Issues

- Interaction with other options to promote renewable energy needs to be taken into account.

Status of Group Approval

Pending – [until CECAC moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until CECAC Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the CECAC]

ES-7 Renewable Energy Technology Businesses

Attract renewable energy technology businesses to South Carolina

Policy Description

Renewable energy has recently developed into an immediate and long term growth industry. South Carolina can capitalize on this economic potential by working to attract companies that specialize in this industry. Incentives to attract renewable energy businesses should be designed to create South Carolina as a partner in the renewable energy world. The goal of this policy is to create a strong local market for renewables in South Carolina and for the state to become a vocal advocate of these energy solutions. Luring these types of businesses has become a primary economic target for many states and competition will be tough.

The CECAC accepted this policy priority for analysis in order to capture a comprehensive range of options for attracting renewable energy technology businesses to South Carolina.

Policy Design

Goals:

South Carolina has a internationally respected renewable energy business cluster making it an obvious destination point for company facilities.

South Carolina is a top-5 U.S. state (per capita) for new renewable energy installations per year.

South Carolina ranks as a leader in higher education and technical education for R&D and implementations of renewable technologies.

Timing:

January 2009: State legislators educated on magnitude of economic potential for renewable energies in South Carolina.

July 2009: Incentives in place for promoting widespread adoption of renewable energy in South Carolina.

December 2009: Plan in place for luring businesses to South Carolina. Info Packet, Materials, Policies, Marketing, etc.

October 2010: Programs in place at universities, colleges, and technical schools for renewable energy programs (R&D, Training, Education).

January 2010: Renewable Energy cluster in place with 2 to 5 businesses signed on.

2012: South Carolina cracks the top-5 list of states with new renewable energy installations.

2015:

Parties Involved: State and local governments, community and business leaders, citizens, education facilities, students, and visitors.

Implementation Mechanisms

Potential elements of this policy could include the following policies and incentives:

1. Incentives for business operations:
    a. Tax credits
    b. Low-cost financing
    c. Business energy tax credit
    d. Alternative Energy Product Manufacturers Tax Credit (as in New Mexico)
2. Policies for promoting locations in South Carolina
    a. Recruitment marketing plan (for developing a state renewable cluster)
    b. Infrastructure improvement assistance
    c. Work force and wage level availability
    d. Reliable and reasonably priced power
    e. Mothballed plants and analyzed or potential
    f. Railways, roadway, transportation hubs identified and targeted
    g. Trained workforce – quantify and develop
    h. Increased incentives for projects utilizing in-state manufactured equipment
    i. Cost of living – South Carolina positive – part of promotion
    j. International presence in South Carolina – positive attraction
    k. South Carolina is good location for manufacturing engineers
    l. Job training plan
    m. R&D plan
3. Market generating policies/incentives (overlap with other ES's)
    a. Renewable Energy feed-in production incentive
    b. Energy efficiency and renewable energy bond program
    c. Sales and tax abatement on capital equipment
    d. Statewide net metering
    e. Statewide interconnection standards
    f. RPS
    g. Tax credits
4. Other Policies and Incentives Include:
    a. Educating Legislators on potential of renewables (world/state economic potential analysis)
    b. Implementation of renewables on government owned facilities

Related Policies/Programs in Place

None identified.

Type(s) of GHG Reductions

TBD – [CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Reductions and Net Costs or Cost Savings

The costs and benefits associated with this policy will not be quantified

Data Sources: [TBD by CCS on TWG approval]

Quantification Methods: [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

Key Assumptions: [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until CECAC moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until CECAC Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the CECAC]

ES-8. Distributed renewable energy

Distributed renewable energy incentives and/or barrier removal (Including Interconnection Rules)

Policy Description

Distributed generation refers to the production of electricity at or near the sites of consumption. Distributed renewable energy[1] is energy specifically generated by naturally replenishing resources. The production of renewable energy results in few or no greenhouse gas emissions. Institutional and market barriers to distributed renewable energy include:

1. Inadequate information
2. Institutional barriers to grid interconnection
3. Community barriers (e.g. local covenants and restrictions)
4. Limited availability of qualified contractors
5. High transaction costs
6. High financing costs (e.g. due lender unfamiliarity and perceived risk).
7. Interconnection rules (e.g. standby fees, exit fees)
8. Ownership of Renewable Energy Credits (RECs)
9. Pricing of net generation
10. Failure of the market to value the public benefits of renewables and the social cost of fossil fuel technologies

These can be overcome through a suite of financial and regulatory redresses as well as through information and public education campaigns.

This policy should identify all renewable energy sources that could lead to possible distributed generation options for residences, commercial, and industrial facilities as well as the uncertainties and risks associated with greater adoption of these resources. In addition, this policy should identify and examine current and potential barriers impeding current and interested participants. Finally, it should identify and propose specific incentives or policies that would eliminate or limit barriers and expand distributed generation in South Carolina. It should also quantify the impact of distributed renewable energy goals.

[1] For the purpose of this policy description, please consider Solar Hot Water systems apart of distributed renewable energy.

Policy Design

Definition: Distributed renewables include solar PV and solar thermal; wind power; micro-hydropower (< 20MW); fuel cells using renewable fuels; biomass including non-woody energy crops, wood wastes and agricultural waste; methane from animal waste; and geothermal.

Goals:

- 3 MW per year of new distributed renewable generation (this numerical goal is for analysis purposes only and does not carry TWG's endorsement of the "best" number)

Timing: New distributed renewable generation beginning at __ MW in 2009 increasing to __ MW per year by 2014 and thereafter.

Parties Involved: Any industrial, commercial, or residential entity operating qualifying distributed renewable energy systems whether directly connected to the South Carolina grid or otherwise could participate.

Other:

Implementation Mechanisms

Potential elements of this policy could include the following policies and incentives:

1. Adoption of Interstate Renewable Energy Council Model Interconnection Standards and Procedures for Small Generator Facilities Statewide.
2. Adoption of Interstate Renewable Energy Council Model Net-Metering Rules Statewide
3. Uniform permitting standards for large/industrial distributed renewable generation.
4. State licensing and/or training for distributed renewable generation installers/contractors.
5. Consideration of adoption by state regulatory authorities of rate designs (possibly incorporating into the rate design a value for offset CO_2 emissions), coupled with the necessary metering technology, that promote reduction in GHG emissions by encouraging consumers to install renewable distributed generation systems.
6. Financial incentives including:
    a. Expand/Increase existing corporate tax credits to include all qualifying distributed renewable energy systems.
    b. Expand/Increase existing personal tax credits to include all qualifying distributed renewable energy systems.
    c. Expand state rebate program for solar thermal installations on EarthCraft homes to all qualifying distributed renewable energy systems and all homes.
    d. Institute a sales tax exemption for distributed renewable energy systems
    e. Institute a property tax exemption for distributed renewable energy systems.
    f. Set distributed renewable energy procurement standards for state government.
    g. Grants and incentive programs for schools and higher education institutions unable to benefit from state and federal tax incentives.

Related Policies/Programs in Place

None identified.

Type(s) of GHG Reductions

TBD – [CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Reductions and Net Costs or Cost Savings

Data Sources:

Renewable Energy Potential

GDS Associates, Inc. and La Capra Associates, Inc 2007. Analysis of Renewable Energy Potential in South Carolina, prepared for Central Electric Power Cooperative Inc.

Biomass Energy Potential in South Carolina: A Conspectus of Relevant Information. South Carolina Energy Office. Available at: http://www.energy.sc.gov/publications/Biomass%20Conspectus%204-10-07.pdf

Harris, Robert A. etc. Final Report to the South Carolina Forestry Commission on Potential for Biomass Energy Development in South Carolina

Renewable Energy Potential in the South Atlantic Division. Energy Information Administration (2005). Available at: http://www.eia.doe.gov/emeu/reps/rpmap/rp_so-atl.pdf

Joseph R.V. Flora, Ph.D., P.E. and Cyrus Riahi-Nezhad 2006. Availability of Poultry Manure as a Potential Bio-Fuel Feedstock for Energy Production, submitted to the South Carolina Energy Office, August 2006: Department of Civil and Environmental Engineering, University of South Carolina.

Cost of Renewable Energy

GDS Associates, Inc. and La Capra Associates, Inc 2007. Analysis of Renewable Energy Potential in South Carolina, prepared for Central Electric Power Cooperative Inc.

LaCapra Associates, Inc. 2006, "Analysis Of A Renewable Portfolio Standard For The State of North Carolina," December 2006.

Natural Resources Canada 2004. Microhydropower Systems: A Buyers Guide, Available at http://www.oregon.gov/ENERGY/RENEW/Hydro/docs/MicroHydroGuide.pdf

NREL 2007. Comparison of Cost-Based U.S. Operational Impact Studies.

US EIA 2007. Annual Energy Outlook 2007, Assumptions to the AEO, Electricity Market Module. Available at: http://www.eia.doe.gov/oiaf/aeo/assumption/index.html.

Wiser and Bolinger 2007. Report Summary, Annual Report on U.S. Windpower Installation, Cost and Performance Trends, 2006, US DOE, May 2007.

Wiser, et. al. 2006. Letting the Sun Shine on Solar Costs: An Empirical Investigation of Photovoltaic Cost Trends in California, LBL, LBNL-59282, January 2006

General DG Cost and Performance Data

Center for Sustainable Energy California 2007. "Statewide Self-Generation Incentive Program Data" (updated October 2007, 2.3 MB XLS), available at http://www.energycenter.org/ContentPage.asp?ContentID=279&SectionID=276&SectionTarget=35

GRI and NREL 2003, Gas-Fired Distributed Energy Resource Technology Characterizations—Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable, available at http://www.eea-inc.com/dgchp_reports/TechCharNREL.pdf.

Navigant Consulting 2006. "Energy Cost Savings Module for customer-sited DG" prepared for the Massachusetts DG Collaborative, available at http://masstech.org/renewableenergy/public_policy/DG/EnergyCostSavingsModule-Jan202006.zip (5.5 MB zip file)

Synapse 2005. Feasibility Study of Alternative Energy and Advanced Energy Efficiency Technologies for Low-Income Housing in Massachusetts, prepared for The Low-Income Energy Affordability Network, Action for Boston Community Development, and Action Inc.

Quantification Methods:

1. Identify distributed renewable energy potential in SC and define the resource mix
2. Project energy production from new renewable energy based DG development through 2020
3. Estimate the cost of energy production from the DG development
4. Estimate the benefits of the above as in the avoided costs of electricity
5. Estimate GHG emission reductions from the DG development

Key Assumptions:

Capital and O&M costs of renewable energy technologies (See ES-1)

Emission factors:

Discount rate:

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

Benefits of distributed renewable energy accrue to owners of the resource, the public, utilities, and the economy. In particular, for distributed renewable energy resource owners benefits could include:

1. Reduced utility costs
2. Revenue from net generation
3. Stabilized costs on portion of utility replaced renewably
4. Revenue from selling RECs

For the public benefits include:

1. Reduced air pollution
2. Increased renewable energy awareness
3. Increased energy security/reliability
4. Technological innovation
5. Reduction of exporting SC energy dollars

For utilities benefits include:

1. Reduced peak demand and associated expenses
2. Reduced system load (e.g. transmission)
3. Avoided cost of new transmission and generation
4. Reduced transmission and distribution losses
5. Expanded resource investment opportunities

For the economy benefits include:

Expansion of renewable energy markets (including Service Business Opportunities, SC Employment Opportunities, and Creating a marketplace where RE manufacturing businesses will want to locate.)

Greater disposable income for consumers

Reduction of exporting SC energy fuel dollars

Feasibility Issues

Uncertainties and risks associated with distributed renewable generation and their increased adoption also exist. Could increased adoption of distributed renewable generation lead to increased costs for utilities? How would owners of distributed generation resources interface with wholesale electricity markets? How reliable will distributed renewable resources be? What will the capital investment requirements be in the future? How long will federal and other incentives for distributed renewable generation last? How will grid-connected distributed renewable energy affect system reliability? Status of Group Approval

Pending – [until CECAC moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until CECAC Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the CECAC]