



Catalog of State Actions Energy Supply Technical Working Group

A catalog of state-level, GHG-reducing actions and policy options based on actions undertaken or considered by state, local and private actors.

Key to Future Rankings of Options in the Tables that Follow:

Potential GHG Emission Reductions <u>1/</u>	Potential Cost or Cost Savings <u>1/ 2/</u>
High (H): At least 1.0 million metric tons (MMt) carbon dioxide equivalent (CO ₂ e) per year by 2020	High (H): \$50 per metric ton CO ₂ e (tCO ₂ e) or above
Medium (M): From 0.1 to 1.0 MMtCO ₂ e per year by 2020	Medium (M): \$5-50/tCO ₂ e
Low (L): Less than 0.1 MMtCO ₂ e per year by 2020, or 1 MMtCO ₂ e by 2050	Low (L): Less than \$5/tCO ₂ e
Uncertain (U): Not able to estimate at this time	Negative (Neg): Net cost savings
	Uncertain (U): Not able to estimate at this time
<p><u>1/</u> Several measures may overlap in terms of emissions reductions and/or cost impacts. Estimates assume measures would be implemented independently from other measures.</p> <p><u>2/</u> Costs are denoted by a positive number. Cost savings (i.e., “negative costs”) are denoted by a negative number.</p>	

In preparation for Call #3, the TWG facilitators have proposed notional rankings based on the above table. These are presented for TWG consideration as a starting point for our conversation, and should be considered preliminary and subject to modification during our meeting.

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Externalities/ Feasibility issues	Notes / Related Actions in SC
ES-1	EMISSIONS POLICIES AND OVERARCHING ITEMS				
1.1	Regional GHG cap and trade	M	U	Allocation of permits a crucial issue	Could be interpreted as support for a federal C&T approach
1.2	Carbon (GHG) tax	Impact depends on level of the tax	U	<ul style="list-style-type: none"> • Impact on low-income ratepayers • What happens if/when fed tax comes in? 	
1.3	Generation performance standards and/or mitigation requirements for electricity	M	M		
1.4	Integrated resource planning (IRP)	H	L/Neg		SC requires the SC Public Service Authority and electric utilities regulated by the Public Service Commission to submit IRPs every three years, with annual updates. An electric cooperative or municipally owned electric utility must submit an IRP to the State Energy Office (EO) if it plans to acquire generation capacity >12 MW; the EO evaluates the environmental and economic consequences of the IRP but does not have regulatory authority related to IRPs.
1.5	Voluntary GHG commitments including mandatory disclosure	L	L		
1.6	Technology Research & Development	U	U		Bio-diesel research at Clemson and U

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					<p>Hydrogen research at Savannah River National Laboratory</p> <p>SRNL CO2 monitoring</p> <p>The National Science Foundation Center for Fuel Cells – USC</p> <p>hydrogen production and storage and automotive system integration- International Center for Automotive Research (CU-ICAR).</p> <p>FuelCellSouth - fuel cell researchers, entrepreneurs, and businesses preparing for the emerging hydrogen economy.</p> <p>The Greater Columbia Fuel Cell Challenge - creating a plan to make the region a center for fuel cell use.</p> <p>EngenuitySC - leadership council designed to coordinate technology initiatives in Columbia.</p> <p>Policy may include biomass research, fuel cells, storage research, CCSR R&D + incentives, Blake Ridge research, research on other carbon removal technologies.</p>
1.7	Technology transfer - bringing R&D into	U	U		

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	commercial operation				
1.8	Address plant-wide efficiency	M	Neg/L		
1.9	Join or start regional climate association	U	U		pewclimate.org references many states being in regional agreements with other states and explains the benefits of such associations. However, the Southeastern states have no regional associations related to climate. Can we include an action for SC to be included in or starting or promoting regional activity? Reference page 3 of http://www.pewclimate.org/docUploads/States%20Brief%20Template%20_March%202007_jgph.pdf
ES-2	RENEWABLE ENERGY AND ENERGY EFFICIENCY				
2.1	Renewable Portfolio Standard (RPS)	H	M		This may include energy efficiency but not nuclear or CCS with sequestration. The latter are included in 2.13, "Environmental Portfolio Standards".
2.2	Grid-based renewable energy incentives and/or barrier removal	H	U		Zoning and siting (formerly 2.7) should be considered as a barrier.
2.3	Distributed renewable energy incentives and/or barrier removal (Including Interconnection Rules)	L	H		SC Alternative Energy bills establish tax incentives for residential/business purchase of solar heating and cooling systems – tax credit of 25% of installation cost - \$3,500 annual tax credit limit (amounts over the cap can be rolled over to subsequent years) Under consideration: <ul style="list-style-type: none"> • Tax credit for purchase and installation of equipment for creating energy from biomass

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					<ul style="list-style-type: none"> Renewable energy revolving grant and loan programs <p>In addition, the Public Service Commission, Santee Cooper and the electric cooperatives are considering net metering. Zoning and siting (formerly 2.7) should be considered as a barrier.</p>
2.4	Green power purchases and marketing	L	M		<p>Green Power program through Santee Cooper (landfill methane – 5 sites,) expanding into solar, biomass, geothermal, and wind. Eighteen electric co-ops also participate in the green power program through Santee Cooper (e.g., Palmetto Green Power).</p> <p>Possible overlap with RCI</p>
2.5	Combined Heat and Power (CHP) standards, incentives and/or barrier removal	H	L/M		Possible overlap with RCI
2.6	Pricing strategies to promote renewable energy and/or CHP (e.g. net metering, interconnection standards)	L	M		Possible overlap with RCI Includes 2.10d
2.7	Renewable energy development issues (zoning, siting, etc.)	U	U		Public perception issue with siting ethanol plant in Batesburg-Leesville
2.8	Technology focused initiatives (biomass co-firing, energy storage, fuel cells, etc.)	U	U		Bio-diesel research at Clemson and U
2.9	Decoupling of energy sales and revenues to	U	U		

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	allow investment in efficiency and renewables to be considered in parity with investment in new conventional capacity				
2.10	SC Biomass Council recommendations	H	U		Legislature is currently considering items on generation of power from biomass
2.10	Renewable Energy Financing (i) Increase and improve renewable energy grants and loans program. (ii) increase and improve RE production cents/kWh incentive payment program. (iii) increase and improve tax incentives for RE production and use.	H	U		Includes: GRANTS AND LOANS 1. Small-Scale Alternative Energy Revolving Loan Program 2. Provide critical information (to support biomass energy and products development in South Carolina) 3. Biomass Energy Application and Bioproducts Grant Program PRODUCTION INCENTIVES 4. Biomass energy production incentive PROPERTY, SALES, AND FRANCHISE TAX EXEMPTIONS 5. Energy Conversion Facilities Tax Exemption TAX CREDITS 6. Jobs Creation Tax Credit <u>Recent actions in biomass financing:</u> <u>The Energy Freedom and Rural Development Act Provides for:</u>

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					<ul style="list-style-type: none"> • <u>incentive payments for electricity produced from biomass or methane gas fuel from biomass.</u> • <u>Income tax credit for purchase and installation of equipment to produce heat, power, steam, electricity or other energy for commercial use from at least 90% biomass.</u> <p><u>The Renewable Energy Grants and Loans Program provides for:</u></p> <ul style="list-style-type: none"> • <u>SC Renewable Energy Revolving Loan Program - loans for biomass and other renewable energy production facility</u> • <u>SC Renewable Energy Grant Program provides grants to assist entities in attaining federal and other grants for renewable energy research and other projects. Planning grants, R&D and demonstration grants up to \$200,000.</u>
2.10b	Biomass — exemption from air regulations				
2.10c	State Mandates — State Government Renewable Energy Use				
2.10d	Net Metering				
2.10e	Federal Clean Renewable Energy Bonds				
2.10f	Establish funding for the South Carolina Energy Office and the South Carolina Institute for Energy Studies				
2.10g	Joint Energy Policy Working Group				
2.11	Reducing additional requirements put on	L	Neg		

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	hydro during relicensing				
2.12	Existing hydro modernization	U	Neg/L		
2.13	Clean Energy/Environmental Portfolio Standard, including renewables, energy efficiency, nuclear power, waste to energy, landfill gas, and hydro	H	U (from EE to nuclear)		
2.14	Regulatory model to equalize utility returns on energy efficiency with returns on traditional power supply	U	U		Positive incentive, whereas 2.9 is removal of a negative one. Includes rider on the bill based on avoided costs to cover lost revenues.
2.15	Attract renewable energy technology businesses to South Carolina	L	U		We mention technology R&D and we talked about feasibility studies, etc. But should we not also propose policy to entice businesses that currently manufacture wind turbines, or tidal turbines, or solar PV, etc. to set up shop in SC? Where SC may not propose its own RPS or Cap & Trade, it sounds like it may happen at the national level, in which case positioning our state to better address the availability and promotion of renewable energy technologies within our borders would benefit the general population in more ways than one
2.16	Offshore Wind development	U	H?		NOT Considered by CECAC
ES-3	FOSSIL FUEL AND NUCLEAR ELECTRICITY				
3.1	Advanced fossil fuel technology (e.g. IGCC, CCSR) incentives, support	U	H		A supercritical coal plant is planned. Includes former 3.1a.
3.1a	IGCC-specific incentives, support, or requirements	L	H		

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3.2	New Nuclear Power	H	H	What is the specific role of the state in this area?	<p>SCE&G/Santee Cooper - new nuclear plant planned (2 1000 Megawatt units.)</p> <p>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.</p> <p>Savannah River National Lab is applying for the nuclear recycling program.</p> <p>Duke Energy - new nuclear plants at the old Cherokee site. (2 1000 Megawatt units)</p>
3.3	Relicensing/Upgrading Existing Nuclear Power	M? Low hanging fruit already picked	L/Neg		<p>All operating Nuclear Plants in the state have received 20 year license renewals. Still potential for upgrading? H.B. Robinson 1.7% on 11/05/2002</p>
3.4	Efficiency improvements and repowering existing plants	M?	L		Make sure highest efficiency resources are used.
3.5	Technology focused initiatives	U	U		Tax incentive for fuel cell development.
3.6	Expanded training to provide utility workforce	U	U		
	Recycle nuclear fuel	U	H	Federal issue?	NOT Considered by CECAC

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ES-4	FUEL PRODUCTION, PROCESSING AND DELIVERY				
4.1	Oil and gas production: GHG emission reduction incentives, support, or requirements	U	U		
4.2	Natural gas transmission and distribution	L	L		
4.3	Oil Refining: GHG emission reduction incentives, support, or requirements	??	??		
4.4	Coal Production: GHG emission reduction incentives, support, or requirements	??	??		
4.5	Coal-to-liquids Production: GHG emission reduction incentives, support, or requirements	??	??		
4.6	Low GHG Hydrogen production incentives and support	L	H		
ES-5	CARBON CAPTURE AND STORAGE OR REUSE				
5.1	CCSR incentives, requirements and/or enabling policies (administration, regulation, liability, incentives)	H	M		
5.2	R&D for CCSR	U	U		
5.3	State study into pumping CO ₂ into Blake Ridge for enhanced gas recovery	U	U		
5.4	State study into new technologies for carbon removal	U	U		

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ES-6	OTHER ENERGY SUPPLY OPTIONS				
6.1	Transmission system upgrading	U	U		
6.2	Reduction of transmission and distribution line losses	L	L/M		
6.3	General distributed generation support (interconnection rules, net metering, etc.)	M	M		
6.4	Environmental (GHG emissions) disclosure	U	L		
6.5	Landfill Gas Recovery (see also Waste)	??	??	(Taken care of in 2.10, 2.13)	SC has six existing landfill methane-to-energy facilities. One facility provides power directly for manufacturing processes. More are in the pipeline. Facilities in Eastover and Charleston.
6.6	Waste to Energy (see also Waste)	H	M	(Taken care of in 2.10, 2.13)	Under consideration Barnwell and Aiken counties nuclear recycling facilities. Nitrous Oxide, a minor component of total NOx emissions from fossil fuel combustion, is one the most powerful GHG's. Each ton of N ₂ O represents > 250 tons CO ₂ e. Recent/planned SCR installations at SCE&G-Cope, Wateree and Williams impact NOx emissions from units totaling ~17,500 mmBtu/Hr. What component of total NOx reductions comprises N ₂ O reductions? Will need to conduct further study for better assessment.
6.7	N ₂ O reduction co-benefit	U	U		