# Chapter 5
# Energy Supply

## Overview of GHG Emissions

GHG emissions from the Energy Supply (ES) sector in New Mexico include emissions from electricity generation and the fossil fuel industry (i.e., oil, natural gas, and coal) and comprise a substantial majority of the State's overall GHG emissions (approximately 64% of gross emissions in 2000). New Mexico GHG emissions are proportionally greater than many states because New Mexico is an energy exporter, of both electric and fossil fuel energy. Roughly two-thirds of the State's fossil fuel emissions are associated with exports. Slightly less than half of New Mexico's electric generation emissions are associated with exports, though this is expected to decline to less than one-third by 2020 based on the CCAG reference case forecast. Overall, by 2020 ES emissions are expected to increase from 1990 levels by 32% on a production basis with the fossil fuel industry somewhat outpacing electric generation in increased GHG emissions due to increasing demand for natural gas. Due to continued growth in the State, emissions reflecting energy consumed in New Mexico (rather than exported to other states) are anticipated to rise 63% over 1990 levels by 2020, with electricity emissions increasing more than fossil fuel emissions.

**Figure 5-1 Historical and Projected GHG Emissions from the Electric Sector, New Mexico, 1990 to 2020 (Consumption Basis)**

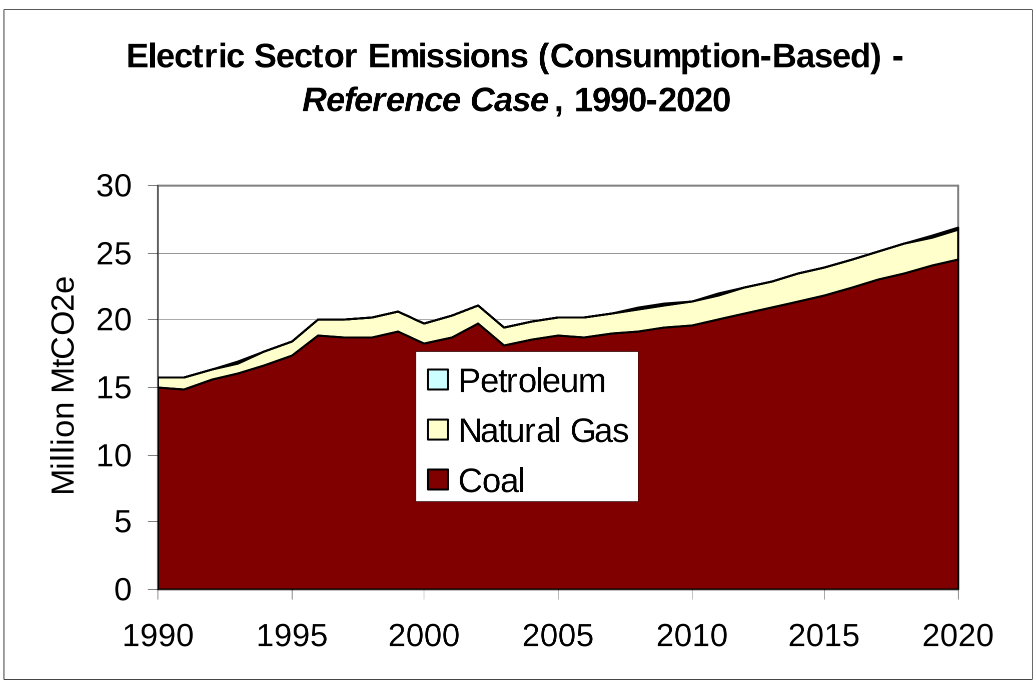
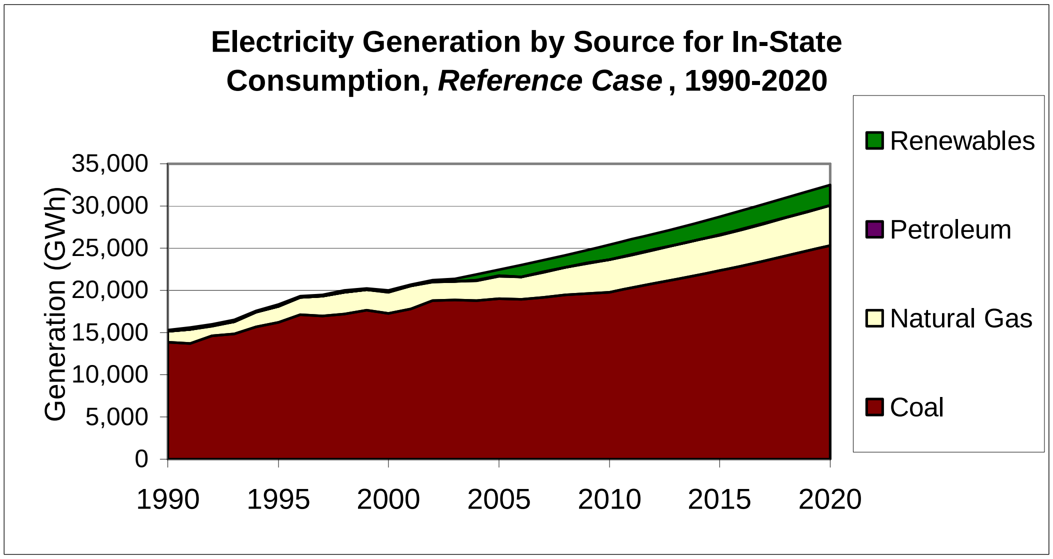


**Figure 5-2 Historical and Projected Electricity Generation, New Mexico, 1990 to 2020 (Consumption Basis)**




## Key Challenges and Opportunities

There are two primary challenges in addressing GHG emissions from New Mexico's ES sector: continued growth within the State and ever-higher demand from other states for New Mexico's energy products. These challenges are compounded by significant uncertainties, including whether natural gas production in the State will remain relatively flat through 2020 due to intensified exploration efforts and unconventional recovery techniques, or whether it will decline as natural gas fields in the State are tapped out. A second key uncertainty is associated with increasing electricity consumption: Will New Mexico simply reduce power exports in order to meet its growing domestic need, or will it retain its presence as a major energy exporter by bringing new electric generating facilities on line? New Mexico may face an additional challenge in reducing GHG emissions from the power sector because generating facilities in the State are subject to substantially different oversight regimes depending on whether they are regulated by the Public Regulation Commission (e.g., PNM), overseen by their own elected board (e.g., rural electric cooperatives), or are located on tribal lands (e.g., the Four Corners Power Plant). This disparity may make broad adoption of some of the CCAG's recommendations more difficult.

Fortunately, there are significant opportunities to reduce GHG emissions growth attributable to energy production and supply, including diminishing the carbon intensity of electrical generation through greater use of renewable energy options and recapture of waste energy through combined heat and power and other technologies. Advanced coal technologies like integrated gasification combined cycle (IGCC) with carbon capture and storage are not yet fully commercial yet, but are expected to be widely available in the 2012-2015 timeframe. Natural gas producers and processors benefit from the fact that steps which reduce methane venting, leaks, or combustion – of which there are many – enable more product to come to the market, producing a genuine win-win situation. On the consumption side, the CCAG has identified several demand reduction, energy efficiency, and conservation measures in the Residential, Commercial, and Industrial Sector; these are detailed in Chapter 4.

New Mexico has plentiful renewable resources in the form solar and wind energy, and due to the State's long history as an energy pioneer, unusual human resources to capitalize on these resources. This offers the State a significant leadership opportunity in the commercialization of associated technologies. Solar photovoltaic (PV) is commercial in some applications (e.g., peak shaving, off-grid applications), but will need cost-effective storage technology to provide baseload power. Concentrating solar power (CSP) is an emerging technology approaching commercialization. Some CSP technologies can dispatch electricity for six or more hours after sundown, providing power for all but the lowest demand hours. New Mexico also has untapped wind resources, albeit not necessarily well located to meet domestic demand. Wind's intermittency inhibits its value for baseload capacity, but its baseload capability can be enhanced by carefully planning wind facilities at multiple sites, and coupling them with backup combustion turbines and/or storage technologies as the latter emerge.

## Overview of Policy Recommendations and Estimated Impacts

The CCAG recommends a set of 16 policy options for the Energy Supply sector that offer the potential for significant emission reductions and economic benefits. As summarized in Figure 5-3, coupled with RCI policy options that reduce electricity demand, these policy recommendations could lead to GHG emissions reductions from reference case projections of 13 $MMtCO_2e$ per year by 2020, cumulative reductions of almost 85 $MMtCO_2e$ from 2007 through 2020, at a net cost of only $17 million through the year 2020 on a net present value basis (NPV).[1] The weighted average cost of saved carbon from the policy options for which quantitative estimates of both costs and savings were prepared was less than $7 per metric ton of $CO_2$ equivalent (after eliminating potentially overlapping options). When coupled with RCI demand reduction measures and their associated cost savings, the 85 $MMtCO_2e$ cost only $0.21 per $MtCO_2e$.

[1] The net cost savings are based on fuel expenditures, operations, maintenance, and administrative costs, and amortized, incremental equipment costs. All NPV analyses here use a 5% real discount rate.

**Figure 5-3 Impact of Policy Recommendations on Energy Supply Emissions**

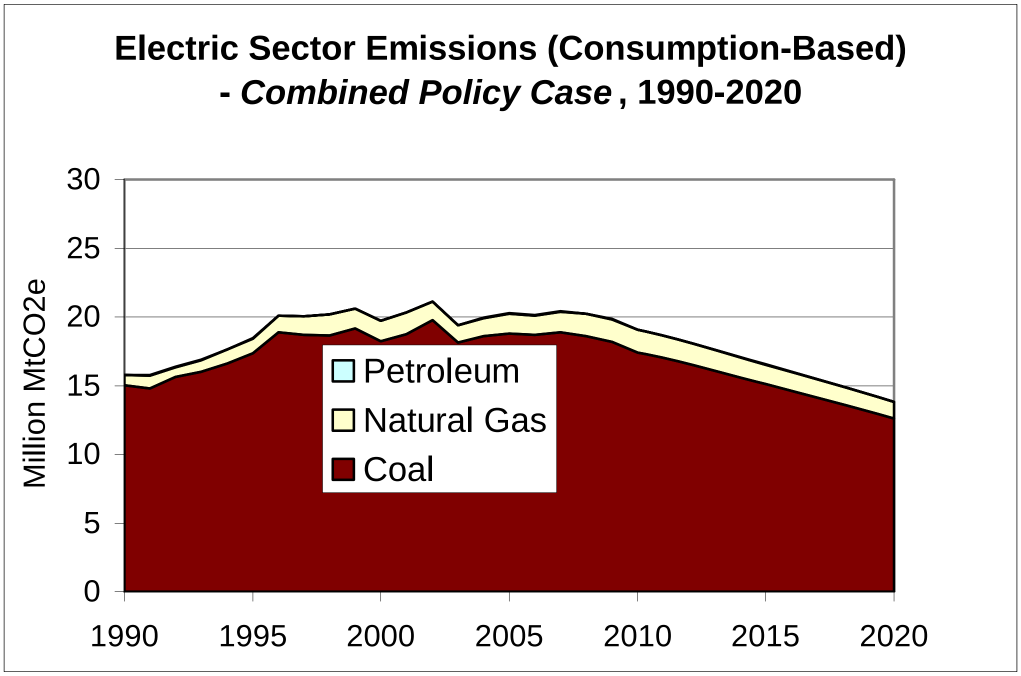
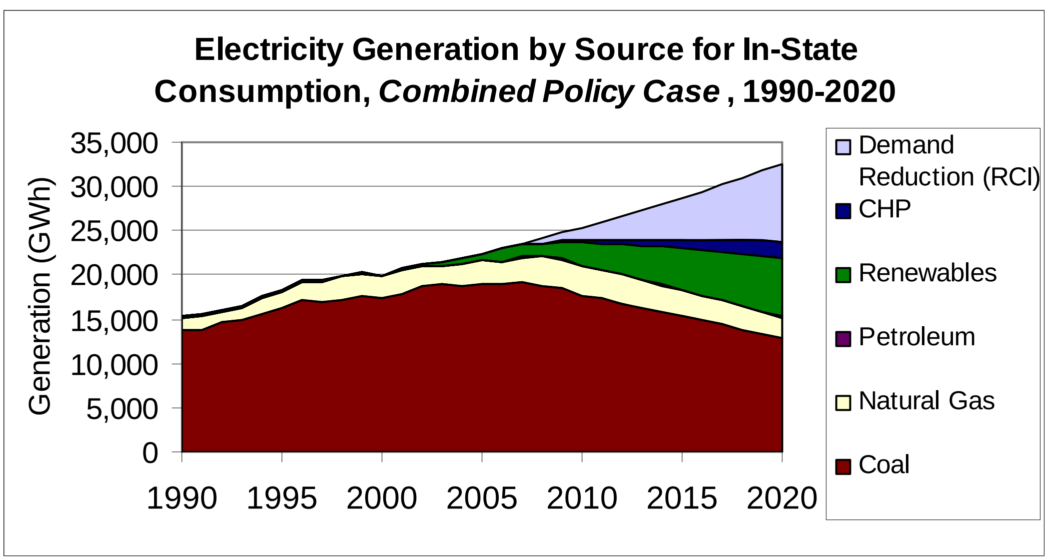



**Figure 5-4 Impact of Policy Recommendations on Energy Supply Emissions**




The estimated impacts of the recommended Energy Supply policies are shown in Table 5-1. The CCAG policy recommendations described briefly here (and in more detail in Appendix XX to this Report) result not only in significant emissions savings, but offer significant additional benefits as well. A substantial expansion of renewable energy in New Mexico, for instance, would be accompanied by a corresponding increase in related jobs in New Mexico as energy investment shifts from fixed assets to labor on a relative basis. Leadership in commercializing renewable technologies would also contribute to the growth and influence of New Mexico-based companies serving markets elsewhere. Energy reliability and security would be enhanced by greater penetration of distributed and renewable energy resources, as would public health and visibility as a function of reduced fossil fuel-fired emissions.

**Table 5-1 CCAG Recommended Policy Options and Results for the Energy Supply Sector**

| Energy Supply Sector Summary of Results | | | | | | |
|---|---|---|---|---|---|---|
| **Option Number** | Policy Name | **Estimated 2012 GHG Reduction ($MMtCO_2e$)** | **Estimated 2020 GHG Reduction ($MMtCO_2e$)** | **Cumulative 2007-2020 GHG Reduction ($MMtCO_2e$)** | **Estimated Cost or Cost Saving ($\$/tCO_2e$)** | **Level of CCAG Support** |
| **ES-1** | **Mandate(s) for Renewable Energy (RPS, etc.)** | | | | | *Pending* |
| | ES-1a: 10% in 2011, 0.5% increase/year to 2021 | 1.0 | 1.7 | 13.2 | $4 | |
| | ES-1b: 10% in 2011, 1% increase/year to 2021 | 1.1 | 2.6 | 17.8 | $6 | |
| | ES-1c: 10% in 2011, 2% increase/year to 2021 | *See ES-4 below* | | | | |
| **ES-2** | **Financial Incentives for Distributed Renewables** | | | | | *Pending* |
| | ES-2b: Payback 25 years; PV, wind & biomass; all utilities | 0.02 | 0.4 | 1.6 | $105 | |
| **ES-3** | **Renewable Energy Transmission and Storage** | *Not quantified* | | | | *Pending* |
| **ES-4** | **RPS to 30% by 2021 with Financial Incentives for Centralized Renewables** | 1.2 | 4.2 | 26.0 | $8 | *Pending* |

| | | | | | | |
|---|---|---|---|---|---|---|
| **ES-5** | **R&D including Energy Storage** | *Not Quantified* | | | | *Pending* |
| **ES-6** | **Advanced Coal/Fossil Technologies (e.g., IGCC with carbon capture)** | | | | | *Pending* |
| | ES-6a: All new coal plants would be IGCC with 60% capture | *Not Quantified (lack of data)* | | | | |
| | ES-6b: All new coal plants would be IGCC with 90% capture | 0.8 | 4.3 | 22.7 | $29 | |
| **ES-7** | **Nuclear Power** | *Not Quantified* | | | | *Pending* |
| **ES-8** | **Incentives & Barrier Reductions for Combined Heat & Power (CHP)** | 0.3 | 0.9 | 6.1 | $4 | *Pending* |
| **ES-9** | **Demand-Side Management, Energy Efficiency, and Integrated Resource Planning (IRP)** | *0.2* | *1.0* | *5.5* | *-$18* | *Unanimous Consent*<br>*(Quantified as RCI-1)* |
| **ES-10** | **Transmission Capacity and Corridors** | *Not Quantified* | | | | *Pending* |
| **ES-11** | **CO2 Capture & Storage or Reuse (CCSR) in Oil and Gas Operations (A & B)** | 1.6 | 3.0 | 25.1 | *Not Estimated* | *Pending* |
| **ES-12** | **Methane Reduction in Oil and Gas Operations: BMPs and PROs** | 2.7 | 3.4 | 35.3 | *Not Estimated* | *Pending* |
| **ES-13** | **CO2 Reduction from Fuel Combustion in Oil and Gas Operations (A & B)** | 0.6 | 1.4 | 10.6 | *Not Estimated* | *Pending* |
| **ES-14** | **GHG Cap and Trade** | *Quantifications below are for illustration only.* | | | | *Pending* |
| | National/NEMS: 2.4%–2.8% Carbon Intensity (CI) improvement per year, with a $6.16–$9.86 safety valve | -0.1 | 1.0 | 3.6 | $7 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | National/NEMS: 2.6%–3.0% CI, $8.83–$14.13 safety valve | 0.1 | 1.0 | 4.2 | $10 | |
| | National/NEMS: 2.8%–3.5% CI, $22.09–$35.34 safety valve | -0.1 | 8.1 | 31.3 | $17 | |
| | National/NEMS: 3.0%–4.0% CI, $30.92–$49.47 safety valve | 0.1 | 9.1 | 43.5 | $19 | |
| | Rose: 11-State Economy-wide C&T; 5% costless | 6.7[2] | 10.9[3] | 90.6[4] | $3 | |
| | Rose: 11-State Economy-wide C&T; 15% costless | 10.3[5] | 14.9[6] | 132.0 | -$4 | |
| | Rose: 11-State Power-Sector C&T; 5% costless | 2.97 | 5.48 | 42.5 | $8 | |
| | Rose: 4-State Economy-wide C&T; 5% costless | 5.79 | 9.410 | 78.1 | $5 | |
| **ES-15** | **Generation Performance Standard** | 1.2 | 3.8 | 24.3 | $21 | *Pending* |
| **ES-16** | **Regulatory Reform for Electric Cooperatives** | *Non-quantified enabling policy* | | | | *Pending* |
| **Net Total All Options (Accounting for Overlap Among Other ES Options and RCI Options)** | | 6.6 | 14.2 | 109.5 | $7 | |
| **Additional Emissions Savings from Recent Actions (not included in forecast or in policy options above)** | | | | | | |
| **Net Total All Options Plus Recent Actions** | | | | | | |

[2] See Adam Rose spreadsheet "S_5% Case NPV1" – "Emission Reduction" Table
[3] See Adam Rose spreadsheet "S_5% Case NPV1" – "Emission Reduction" Table
[4] Per Adam Rose's 8/6/06 email of S/5%/2020 with 2006 NPV. See spreadsheet "S_5% Case NPV1"
[5] TABLE AS/15%/2012, page 7.
[6] TABLE BS/15%/2020, page 9.
7 TABLE AP/5%/2012, page 11.
8 TABLE BP/5%/2020, page 12.
9 TABLE A'S/5%/2012, page 13.
10 TABLE B'S/5%/2020, page 14.

# Energy Supply Sector
# CCAG Policy Descriptions

The Energy Supply sector includes emissions mitigation opportunities related electricity generation and oil and gas production. Electrical energy options include mitigation activities associated with the generation, transmission, and distribution of electricity, whether generated through the combustion of fossil fuels or by renewable energy sources, and whether generated in a centralized power station supplying the grid or by distributed generation facilities. Oil and gas mitigation options include mitigation activities associated with the extraction, transportation, and processing of oil and natural gas. Sequestration options can apply to both electrical generation and oil and gas production, but are considered primarily with respect to the latter, because carbon dioxide is already being injected underground for purposes of enhanced oil recovery.

## ES-1 Mandate(s) for Renewable Energy (RPS, etc.)

A renewable portfolio standard (RPS) is a requirement that utilities acquire a certain percentage of electricity from renewable energy sources. Utilities can meet this requirement by purchasing or generating renewable-based electricity or by purchasing renewable energy credits (RECs).

The CCAG recommends that New Mexico reduce the carbon intensity of its electricity generation by increasing its existing 10% Renewable Portfolio Standard (RPS) by 1% annually over the period 2011-2021, applicable to all load serving entities. As a stand-alone policy, this measure would reduce New Mexico's GHG emissions relative to reference case levels by approximately 2.6 MMTCO2e by 2020.

## ES-2 Financial Incentives for Distributed Renewables

Financial incentives to encourage investment in distributed renewables could include: (1) direct subsidies for purchasing/selling distributed renewable technologies given to the buyer/seller; (2) tax credits or exemptions for purchasing/selling distributed renewable technologies given to the buyer/seller; (3) tax credits or exemptions for operating distributed renewable energy facilities; (4) feed-in tariffs, which provide direct payments to distributed renewable generators for each kWh of electricity generated from a qualifying renewable facility; (5) tax credits for each kWh generated from a qualifying renewable facility; (6) R&D funding to support development of distributed renewable technologies; (7) net metering; and (8) a clean energy grants program. New Mexico has been trying to implement capital buy downs and production incentives such that there is full payback over 25-30 years to those who install distributed renewable options.

The CCAG recommends that New Mexico offer concrete incentives for distributed solar photovoltaic (PV) technologies in order to reduce their payback period to 25 years or less.[11] Very-low-carbon PV generation would displace generation from fossil fuels and correspondingly lower carbon emissions more than otherwise would be the case. In addition, New Mexico stands to gain economically through leadership in commercializing technologies in the emerging renewables marketplace.

### ES-3 Renewable Energy Transmission and Storage

Renewable energy from wind and solar is intermittent by nature, while fossil fuel technologies can be called upon to meet demand as needed. A renewable energy transmission authority (RETA) could be created to assist in the development of energy storage technologies and to foster the development of transmission capacity necessary to take advantage of renewable resources.

The CCAG recommends that New Mexico legislatively establish a Renewable Energy Transmission Authority (RETA) charged with overcoming limitations on renewable energy by fostering (a) the development of renewable energy storage technologies to address intermittency, and (b) the development of transmission capacity necessary to take advantage of available renewable resources. Creation of a RETA as recommended in this non-quantified enabling policy would assure greater penetration of renewable energy resources and the success of other CCAG-recommended policies. A first step has already been taken in this direction via the introduction of HB111 in the New Mexico Legislature in 2006.

### ES-4 Financial Incentives for Centralized Renewables

As with distributed renewables, financial incentives for centralized renewables could include: (1) direct subsidies for purchasing/selling centralized renewable technologies given to the buyer/seller;[12] (2) tax credits or exemptions for purchasing/selling centralized renewable technologies given to the buyer/seller; (3) tax credits or exemptions for operating centralized renewable energy facilities; (4) feed-in tariff, which is a direct payment to centralized renewable generators for each kWh of electricity generated from a qualifying renewable facility; (5) tax credits for each kWh generated from a qualifying renewable facility; (6) R&D funding to support development of centralized renewable technologies. This policy could also be linked with other carbon policies in order to make them more effective. For example, financial incentives could be provided in conjunction with an RPS in order to (a) provide long-term financial support for renewable developers, (b) help ensure that aggressive levels of renewable generation can be achieved in practice, and (c) provide financial support for certain renewable technologies that would not otherwise be developed.

The CCAG recommends that New Mexico implement production tax incentives for centralized renewable energy of 4¢/kWh for solar, 2¢/kWh for biomass, and 1¢/kWh for wind. As modeled, these incentives would be provided in conjunction with an RPS that increases the existing New Mexico RPS targets by 2% per year from 2010 to 2020. (In other words, for modeling purposes these financial incentives are combined with the 2% RPS case mentioned in option ES-1c above.) The State should also eliminate the existing 2 million MWH/year overall cap on this

[11] Any direct subsidies or incentives would need to be cleared through the New Mexico Attorney General's Office to ensure that they comport with the anti-donation clause of the New Mexico Constitution.

[12] Any direct subsidies or incentives would need to be cleared through the New Mexico Attorney General's Office to ensure that they comport with the anti-donation clause of the New Mexico Constitution.

incentive; lower the facility size threshold from 10 MW to 1 MW, and extend the tax credit to apply to personal income taxes as well as corporate income taxes.

## ES-5 Research & Development (R&D)

R&D funding can be targeted toward a particular technology or group of technologies as part of a state program to build an industry around those technologies in the state and/or to set the stage for adoption of those technologies in the state. Funding can also be given for demonstration projects to help commercialize technologies that have already been developed but are not yet in widespread use.

The CCAG recommends that New Mexico establish an R&D program tasked with the development and deployment of concentrating solar energy technologies, hydrogen-based energy storage technologies, and other energy storage technologies such as compressed air storage, molten salt storage, and cavern storage. This is a non-quantified enabling policy to assist in the achievement of GHG emission reductions though other CCAG-recommended policy options.

## ES-6 Advanced Coal/Fossil Technologies (e.g., IGCC with carbon capture)

Advanced fossil technologies such as integrated gasification combined cycle (IGCC) may offer greater efficiency than conventional fossil technologies, and can therefore have lower CO2 emission rates. IGCC is expected to be fully commercialized well before 2020. Advanced fossil technologies combined with carbon capture and sequestration or reuse (CCSR) could enable significantly lower CO2 emissions. Policies to promote advanced fossil technologies for new coal plants may include mandates, incentives, or a combination of the two.

The CCAG recommends that the State encourage all new coal plants in New Mexico, or serving customers in New Mexico, to be built as IGCC with CCSR. Because development of an IGCC plant involves risks and uncertainties that have inhibited rapid commercialization, the CCAG recommends an incentive-based approach rather than a mandate. Accordingly, the CCAG recommends that the state develop an incentive package to encourage utilities to develop IGCC with CCSR. The CCAG also recommends that New Mexico task a state agency (e.g., OCD, which has this regulatory authority) to provide technical resources for carbon sequestration, including an evaluation of suitable storage sites, and possibly the administration of incentives.

## ES-7 Nuclear Power

The production of electric power in nuclear fission reactors creates little direct GHG emissions. In states with existing nuclear facilities, relicensing can extend their productive life, and uprating can enable more power to be generated, typically by improvements to the steam side of the operation. New Mexico has no existing commercial nuclear power plants to relicense or uprate, however, so its nuclear options are limited to whether or not new nuclear generation capacity should be built.

In evaluating nuclear power options, it is important to consider costs beyond the direct costs for generation, operation, waste storage, and decommissioning. The costs of the unusual risks associated with nuclear power, including taxpayer assumption of reinsurance liability under the Price-Anderson Act and new security costs, should also be considered. At the same time, in the interest of completeness, it is important to include new nuclear capacity as an option. To do otherwise could suggest that the CCAG was inadequately comprehensive in its consideration of available electricity supply alternatives.

The CCAG recommends that New Mexico consider whether new nuclear generation capacity is advisable for the State, following a qualitative but comprehensive review of all direct and indirect benefits and costs associated with nuclear power. The CCAG decided not to quantify this policy option, lacking a basis to do so until such a comprehensive review is completed.

## ES-8 Incentives and Barrier Reductions for Combined Heat & Power (CHP)

Financial incentives for combined heat & power (CHP) could include: (1) direct subsidies for purchasing/selling CHP systems given to the buyer/seller; [13] (2) tax credits or exemptions for purchasing/selling CHP systems given to the buyer/seller; (3) tax credits or exemptions for operating CHP systems; (4) feed-in tariff, which is a direct payment to CHP owners for each kWh of electricity or BTU of heat generated from a qualifying CHP system; and (5) tax credits for each kWh or BTU generated from a qualifying CHP system. There are also numerous barriers to greater penetration of combined heat and power (CHP), including inadequate information, institutional barriers, high transaction costs because of small projects, high financing costs because of lender unfamiliarity and perceived risk, "split incentives" between building owners and tenants, and utility-related policies like interconnection requirement, high standby rates, exit fees, etc. The lack of standard offer or long-term contracts, payment at avoided cost levels, prohibitions on running private wires, and lack of recognition for emissions reduction value provided also creates obstacles.

The CCAG recommends that New Mexico undertake a concerted effort to revise its policies in order to remove or reduce barriers to CHP and the recovery and use of currently wasted energy.[14] This policy option assumes that 2-3% of the estimated CHP potential in New Mexico can be realized each year from 2008 onward. The potential for these energy sources is estimated to be ~650 MW.

## ES-9 Demand-Side Management, Energy Efficiency, and Integrated Resource Planning

This policy option involves increasing the efficiency of electricity use in New Mexico through programs, funds, and/or requirements focusing on demand-side management (DSM) activities. This option is designed to work in tandem with other strategies that the CCAG has recommended that also encourage efficiency gains. Many different policy configurations are possible,[15] including various combinations of energy savings targets, utility spending targets, public benefit charges,[16] tariff riders or enabling legislation (recently enacted in NM), and incorporation of energy efficiency in integrated resource planning (IRP) processes, among others.

The CCAG recommends that New Mexico's DSM, energy efficiency, and IRP policies go beyond what is currently cost-effective to include measures that would be cost-effective when an appropriate value for carbon dioxide emissions is included (i.e., a "carbon adder"), which should

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[13] Any direct subsidies or incentives would need to be cleared through the New Mexico Attorney General's Office to ensure that they comport with the anti-donation clause of the New Mexico Constitution.

[14] New Mexico may wish to review similar policy changes recently enacted in Connecticut, Vermont, Pennsylvania, Nevada, and Rhode Island.

[15] For an overview of activity in other states, see USDOE/DSIRE summary tables http://www.dsireusa.org/summarytables/

[16] Public benefit charge funds are in place in about 15 states, typically adopted as part of electricity restructuring policy/legislation. These funds are collected as surcharge on utility bills, and are typically directed to a mix of energy efficiency, renewable energy, and low-income programs.

lead to larger GHG emission reductions. *This policy option echoes and is quantified under option RCI-1, Demand-Side Management and Energy Efficiency Programs.*

## ES-10 Transmission Capacity and Corridors

Satisfying the long-term demand for electricity requires not only new generating capacity, along with demand-side measures, but also measures to improve transmission in order to reduce line losses, diminish bottlenecks, and enhance throughput. Advanced composite conductor technologies, capacitance technologies, grid management software, and other technologies may soon become available to increase transmission line carrying capacity as much as threefold. Entirely new transmission lines may also be necessary, although siting new transmission lines can be difficult due to their cost and their actual or perceived impact on health, environment, and the use, enjoyment, and value of property.

The CCAG recommends that when new construction, repairs and upgrades of existing transmission and distribution infrastructure in New Mexico are undertaken, transmission-owing entities should evaluate the cost-effectiveness of incorporating advanced composite conductor technologies, capacitance technologies, grid management software, and other technologies to increase throughput capacity on the grid. The CCAG further recommends that the analysis also take into account reductions in GHG emissions that would result from energy saved due to lower line losses.

## ES-11 CO2 Capture and Storage or Reuse (CCSR)

Carbon capture and storage or reuse (CCSR) involves capturing carbon and either (1) sequestering it in a geologically sound reservoir or (2) reusing the carbon to aid in natural gas extraction or as a feedstock for industrial processes, and perhaps someday as a feedstock that when combined with water could be reformed into liquid fuels. Carbon can be (and sometimes is being) captured in natural gas extraction. CO2 in commercial natural gas is capped at 2.5%, and some gas fields have a much higher concentration. Excess CO2 is removed through processing and currently emitted to the atmosphere. Carbon can also be captured in the process of gasifying coal to liquid fuels. This process is well established in the chemical industry and forms the basis for IGCC electric generating plants. Potentially, carbon could also be captured directly from the atmosphere.

The CCAG recommends that New Mexico task a state agency (e.g., NMOCD, which has this regulatory authority) to provide technical resources for carbon sequestration, including an evaluation of suitable storage sites, evaluating the technical and economic feasibility of capture and storage, and possibly the administration of financial incentives. Implementation could include financial incentives; mandatory measures – coupled with technical feasibility and cost and investment recovery mechanisms, if appropriate; or both.

The CCAG also recommends further evaluation to identify regulatory, technical, and economic factors affecting the use of acid gas injection (i.e., acid gas streams containing both H2S and CO2) in New Mexico. The CCAG suggests focusing on capturing the CO2 currently being vented at natural gas processing plants, and on acid gas injection at sour gas processing plants. It is the intent of the CCAG to require further study and analysis of CCSR by the NMOCD and other appropriate agencies, and that from this study and analysis, changes in goals and determinations regarding the economic and technical feasibility of CCSR may result. This study should consider sour gas processing facilities (i.e., facilities with sulfur recovery units (SRUs)) separately from natural gas processing facilities.

**ES-12 Methane Reduction in Oil and Gas Operations (BMPs & PROs)**

There are a number of ways in which methane emissions in the oil and gas industry can be reduced. Natural gas consists primarily of methane, so any leaks during production, processing, and transportation/distribution should be addressed. In addition to reducing potent GHG emissions (methane has 21 times the global warming potential of CO2), eliminating leaks and venting is economically beneficial because it prevents the waste of valuable product. The EPA Natural Gas STAR program offers numerous methods of preventing leaks. These methods, called Best Management Practices (BMPs) and Partnership Reduction Opportunities (PROs) include opportunities to reduce leaks in venting in the production, processing, and transportation/distribution of natural gas.[17]

The CCAG recommends that (a) New Mexico implement, on a voluntary basis, all BMPs, PROs, and available technologies starting in 2007 to reduce overall CO2e emissions by ~20% by 2020; (b) New Mexico actively promote participation by oil and gas operators in EPA's Natural Gas Star program and New Mexico's San Juan VISTAS program; and (c) as voluntary measures are implemented, if the State determines that oil and gas operators are not on track to achieve the above goal, the State should implement mandatory approaches where appropriate.

**ES-13 CO2 Reduction from Fuel Combustion in Oil and Gas Operations**

There are a number of ways in which CO2 emissions in the oil and gas industry can be reduced, including (1) installing new efficient compressors, (2) replacing compressor driver engines, (3) optimizing gas flow to improve compressor efficiency, (4) improving performance of compressor cylinder ends, (5) capturing compressor waste heat, and (6) utilizing waste heat recovery boilers. Policies to encourage these practices can include education and information exchange, financial incentives, and mandates or standards that require certain practices.

The CCAG recommends that New Mexico focus attention on reducing GHG emissions from fuel combustion in the oil and gas industry through education, financial incentives, or mandates or standards – coupled with cost and investment recovery mechanisms, if appropriate – to: (1) improve the efficiency of compressors; (2) boost waste heat recovery for compressors and boilers including the deployment of CHP systems that could sell excess power back to the grid; and to a lesser extent, (3) replace gas-driven compressors with electrical compressors when doing so reduces CO2 emissions. It is the intent of the CCAG to require further study and analysis of these approaches by the NMED and other appropriate agencies, and that from this study and analysis, changes in goals and determinations regarding the economic and technical feasibility of these approaches may result.

**ES-14 GHG Cap and Trade**

A cap and trade system is a market mechanism in which GHG emissions are limited or capped at a specified level, and those participating in the system can trade permits (a permit is an allowance to emit one ton of CO2). By allowing trading, participants with lower costs of compliance can over comply and sell their additional reductions to participants for whom compliance costs are higher. In this fashion, overall costs of compliance are lower than they

[17] For a complete list, see http://www.epa.gov/gasstar/techprac.htm#tabnav

would otherwise be.[18] Among the important considerations for New Mexico with respect to a power sector GHG cap and trade program are the sources and sectors to which it would apply, the level of the cap, how allocations would be distributed, what offsets would be allowed, over what region the program would be implemented (e.g., nationally, regionally, etc.), and whether tribally-operated facilities and rural electrical cooperative facilities would be included.

The CCAG recommends that any cap and trade program applicable to New Mexico sources be preferentially implemented on a national or regional (i.e., multi-state) basis. The CCAG further recommends that the State of New Mexico should lead or participate in a regional collaborative to investigate market-based mechanisms, such as cap and trade and other state policies, that would limit and reduce greenhouse gas emissions in the West and in the Nation. This will be valuable for the region and inform and help shape national legislation to regulate GHG emissions.

Economic modeling was conducted within the CCAG process, however, to consider potential GHG reductions and cost ramifications for New Mexico relative to other states under several regional scenarios. This modeling was conducted for the purpose of understanding the potential impacts upon New Mexico of a cap and trade program, not to define the details of a prospective cap and trade regulatory program. Using the Governor's GHG reduction targets as the cap, the CCAG considered scenarios reflecting a national power sector GHG cap and trade program; a regional cap and trade program over the Western Electric Coordinating Council (WECC) states (subject to minor variations as needed to facilitate analysis); and a program over a sub-region of the WECC states selected so as to minimize "leakage" (i.e., sales into the region from unregulated sources outside the region). The CCAG also considered alternative program scenarios covering reflecting all sectors (i.e., an economy-wide approach) as opposed to the power sector alone. Modeling results indicate costs ranging from -$4/ton CO2e to $19/ton CO2e and GHG reductions of 4-132 MMTCO2e depending on the regions and assumptions used. More detailed results can be found in Appendix **XX**.

## ES-15 Generation Performance Standard

A generation performance standard (GPS) requires electricity utilities or load serving entities (LSEs) to acquire electricity with an average emission rate below a specified mandatory standard. Utilities must take action to ensure that their generation mix meets this standard.

The CCAG recommends that New Mexico develop a GPS applicable only to new generation (both to meet demand growth as well as to replace retiring generation capacity). The GPS level would be equivalent to GHG emissions from a new natural gas combined cycle plant.

## ES-16 Regulatory Reform for Electric Cooperatives

As member-owned entities, rural electric cooperatives are often not bound by the same regulatory conditions as investor-owned utilities (IOUs). The latter enjoy monopoly status in the marketplace along with a guaranteed rate of return in exchange for close regulatory oversight to protect customers from undue market power. Electric cooperatives are not seen as requiring similar regulatory oversight because their customers (coop members) are also owners and thus have alternative oversight mechanisms available (e.g., elections of Boards of Directors).

[18] The State of California's Climate Action Team recently assembled a good discussion of cap and trade design issues. It can be referenced at: http://www.climatechange.ca.gov/climate_action_team/reports/2005-12-08_CAP+TRADE_REPORT.PDF

As a result of this key regulatory difference, electric cooperatives are often not subject to the same regulations as IOUs, including state environmental regulations. (They are subject to federal environmental regulations.) Accordingly, the CCAG believes that it is worth considering limited reform of state regulatory provisions so that electric cooperatives face equivalent GHG reduction requirements as IOUs.

Unless otherwise indicated, the analysis of all ES policy options addresses generation statewide, and thus includes electricity generated at tribally owned or operated facilities and at electric cooperatives. While the CCAG remains cognizant that final implementation of ES policy options is likely to vary among IOUs, tribal facilities, and cooperatives, this approach allows policy options to be considered equitably across the board. Accordingly, the CCAG recommends this policy option as a non-quantified enabling policy for the electric cooperative-related GHG emission reductions and costs that are already quantified in the ES policy options. To include GHG reductions and costs under specific ES policy options as well as under this generic enabling policy would double-count the associated GHG reductions and costs.