

# Tools for State Energy Planning

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## State Climate Action Plans

**GHG Inventories:** 39 states have inventories of total Greenhouse Gas (GHG) emissions. This information provides a baseline for planning and for future pollution trading systems.

**Benefits:** Climate Action Plans help states identify cost-effective opportunities to reduce GHG in ways appropriate for the state. North Carolina, for example, has a legislative Global Climate Change committee that identifies the potential threats to the state, determines the costs/benefits of different strategies, and assesses the economic opportunities for the state in the emission target market.

**Climate Action Plans:** States provide the highest certainty of significant emission reduction when they combine a comprehensive climate plan combined with enforceable GHG emission targets. 29 states have climate action plans but only 14 have established targets. *TN does not have an active climate plan nor an active legislative commission or executive branch advisory group.*

**Cap and Trade Systems** allow GHG sources to trade emission allowance within a system with established capped levels of GHG emissions. The level of capped emissions is reduced incrementally over time. Industries and utilities earn credits for reductions achieved outside the electricity sector: energy efficiency or renewables. *TN does not participate in a cap and trade system, nor has it set GHG emission targets.*

**CA Model:** California's Global Warming Solutions Act caps the state's GHG emission at 1990 levels by 2020 and includes major industries. The act has penalties for noncompliance and provides for statewide reporting of GHG monitoring and compliance with cap and trade systems.

## Regional Initiatives

**Regional Initiatives** are multi-state agreements to reduce GHG which:

- Set regional emission targets.
- Establish market-based cap and trade system to aid in meeting the target.
- Set up an emission registry and tracking system across states.

### Advantages Over State Plans:

- Cover a broader geographic area and more GHG sources.
- Eliminate duplication of effort.
- Help business by bringing greater uniformity and predictability to state rules and regulations.

## States Lead by Example

**Need:** Energy costs of public buildings on the average are 10% of a state's annual budget. State buildings account for 28% of US publicly owned floor space and 5% of nonresidential floor space.

**Benefits:** State leadership provides a model in energy efficiency. Energy savings of up to 30% are possible, freeing up public funds for other programs. This kind of leadership increases the public visibility of energy efficiency.

**State Buildings:** States leading by example adhere to energy efficiency performance criteria, such as Energy Star or LEED. The Energy Star certification program rates buildings on a scale of 1-100 based on energy use and building characteristic. LEED is a green building rating system. TVA already uses the Energy Star Certification program in its encouragement of energy efficient home construction. The energy intensity metric for buildings is energy / square feet. *TN does not have energy standards for state public buildings.*

**Local Public Buildings:** The Tennessee Local Government Loan Program, started in 1991, offers 3% interest rate

loans

to local government agencies including public school systems for energy-efficiency improvements. The endowment is provided by the Petroleum Violation Escrow fund. Loans up to \$500,000 are offered. The maximum payback period for eligible programs is seven years.

**Effective Programs:** The most effective state programs establish an overall percent savings target in energy savings per square foot.

**Energy Efficient Products:** Leading states specify that purchased equipment meet energy efficiency standards such as Energy Star which has standards for electronics, office equipment, HVAC, lighting, and fleets. The benefits are savings and market stimulation. *TN does not require state purchase of energy efficient products.*

**State Funded R&D:** Several states have funded energy efficiency research.

**State Fleet:** (See transportation.)

**Barriers to States Leading by Example:**

- Limited knowledge. State policy makers need to learn what other states are doing.
- Insufficient funding for higher front end costs. State can use innovative funding mechanisms.
- Limited support and staff availability. States need a “champion” and a reward and recognition program.

### **Building Efficiency Codes**

**Need:** Buildings consume 40% of US energy and 65% of its electricity and account for 40% of its GHG. The average age of the US building stock is 46 years. As buildings have a long life time and are not easily retrofitted, it is crucial to target building efficiency measures prior to construction.

**Obstacles:** When a building does not incorporate energy efficiency, it is a lost opportunity.

- Building construction has a split incentive: the builder bears the higher front-end cost of energy efficiency requirements while the occupant reaps the long-term benefits.
- The construction industry is both large and fragmented with more than 150,000 home building companies. This highly fragmented industry is not designed to work as a system and has difficulty in processing new information.

**Mandatory Building Energy Codes:** 39 states have mandatory building energy codes requiring a minimum level of energy efficiency for residential and commercial buildings.

**TN Building Energy Code:** While TN does have a residential building energy code (1992 Model Energy Code), it is out of date and only applies to those local governments requiring building permits. It precedes the 1998 International Energy Construction Code (IECC) and does not meet the federal Energy and Production Act required codes. The state’s commercial standard is voluntary (ASHRAE 90A-1980 and 90B-1975.)

Most states have adopted the 2006 MED/IECC codes require a minimum level of energy efficiency in new residential construction. ASHRAE has newer building energy codes for commercial buildings that are performance-based with prescriptive provisions.

**Voluntary Building Energy Codes:** TVA offers rebates to encourage voluntary use of EPA/s Energy Star Homes which guarantee a 15% savings relative to current energy codes. DOE’s Building American Program has a 50% energy savings.

**Tennessee Small Business Energy Loan Program,** founded in 1988, offers 3% interest rate loans to small businesses (less than 300 employees or less than 3.5 million dollars in annual gross sales or receipts) for energy-efficiency upgrades in their buildings, plants and manufacturing processes. The endowment is provided by the Petroleum Violation Escrow fund. Loans up to \$100,000 are offered. The maximum payback period for eligible programs is seven years.

## Appliance Efficiency Standards

### Federal Legislation:

- **1987 - National Appliances Energy Conservation Act.** Set standards for refrigerators, freezers, AC, furnaces, boilers, dishwashers, clothes washers and dryers. DOE completed required updates for new technologies standards in 1997, 2000, and 2001. It has since missed deadlines for 20 other updates.
- **1992 - Energy Policy Act.** Required standards for lamps, electric motors, commercial HVAC, and plumbing fittings.
- **2005 - Energy Policy Act.** Set new efficiency standards for 16 products and ordered DOE to set standards for five additional products. DOE in January 2006 set a timetable for addressing the backlogged appliance standards, further delaying the process.

**Energy Star:** The US DOE has minimum efficiency standards for approximately 20 types of residential and commercial appliances.

**State Standards:** 11 states have passed legislation and/or regulations setting appliance efficiency standards since 2002. The state leaders are CA and RI which have their own research labs. CA first developed appliance standards in 1974. *TN has no energy efficient appliance standards.*

### Barriers to Appliance Efficiency:

- Split Incentive. The home builder wants the least expensive bottom line while the occupant has to pay the bills.
- Panic Purchase. The cheapest, most available product is used for immediate replacement.
- Information - Cost. Consumers have limited information about efficient products.
- Bundling. Bundling of high efficiency products with additional high cost features make it difficult for consumers to know what is economically optimal.

## Transportation

**Need:** Transportation accounts for 28% of total US energy use and 70% of the oil consumed. The transportation sector emits one-third of the US GHG.

**Reduce GHG:** While Congress mandates the fuel efficiency of vehicles, states can regulate tailpipe emissions standards, another way to achieve greater fuel efficiency and reduce fuel carbon-intensity. The Supreme Court recently ruled that GHG is a Clean Air Act pollutant and can be regulated by states. Emission standards have the greatest energy savings potential in the near to midterm.

California is the leader in its emission standards, but other states can adopt the CA standards. 12 states have done so. *TN (SB486) says that when 40% of the US population has adopted CA standards, TN will also.*

**Increase Fuel Efficiency:** The average US fuel economy has decreased from 22.1 mpg in 1987 to 20.5 mpg in 2004. The most energy efficient vehicles today are the electric hybrids. States can encourage consumers to purchase them through tax breaks.

**Reduce Vehicle Miles Traveled (VMT) - Land Use Policies:** Between 1993-2003, VMT increased 26%, twice the population growth. Sprawl growth is largely responsible for this increase. 80% of commuters drive alone. Strategies to reduce VMT depend upon local and regional planning for Smart Growth. The most needed Smart Growth policies are those that promote transit-oriented development, higher residential density, high quality transit service, and location of activity centers near residential developments. States have an important role in Smart Growth through incentives and technical assistance.

The 1998 Growth Policy Law required counties and metropolitan areas to develop growth boundaries and land preservation plans. While the counties and cities dutifully filed their growth development plans, implementation of the growth plans has been largely ignored as the law depends upon voluntary compliance.

**State Fleet:** States can mandate a certain percent reduction in energy consumption by its fleet. Numerous states require that a percentage of their fleets run on ethanol or natural gas or meet a fuel efficiency standard.

**Public Transportation:** 10 states use state tax dollars for public transit. In 2003, TN ranked 22<sup>nd</sup> in state per capita

funding of public transportation (using federal dollars): \$5.10 per capita.

**TN Leadership:** A May 2006 law allows single occupant drivers of fuel-efficient vehicles to use high occupancy vehicles lanes. *This is TN's only energy efficient transportation initiative.*

### Agriculture

**Need:** Agriculture-related activities account for two-thirds of nitrous oxide emissions, one-third of methane emissions, and 7% of GHG.

**State Programs:** Five states are studying ways that agriculture can sequester carbon as a possible revenue source in a cap and trade system. Several states, including TN, have jumped into ethanol even though it consumes more energy in its production than it delivers at the pump. States have been promoting No-Till agriculture for many years as a way to reduce soil erosion and now as a method to reduce energy consumption, although it does rely heavily on herbicides.

### Tax Incentives

**Benefits of Tax Incentives:**

- Lowers net cost of energy efficient products and services, reducing higher costs relative to standard models.
- Increases consumer awareness of eligible products.
- Encourages manufacturers and retailers to actively market products.
- Lowers price as sales increase.

**Need for Tax Incentives** to overcome market barriers limiting private investment:

- First cost issue - higher front-end cost even though life-cycle cost lower.
- Risk aversion - few consumers are early adopters because of perceived risks.
- Low visibility in the market - low consumer awareness.
- Energy efficiency is a low priority for many consumers.

**Tax Incentives Lessons Learned**

- Target only the high efficiency technology.
- Incentive large enough to affect decision-making

**Incentives for Energy Efficiency:** States and utilities give incentives for home weatherization, new building construction that meets standardized building energy codes, and purchase of energy efficient equipment. Grants are primarily made for research and development or for commercialization.

**TN Status:** Because TN does not have an income tax, it cannot use personal or corporate income tax deductions as an incentive. It has the following incentives:

- A law passed in May 2006 reduces the sales tax rate on certain fuel-efficient vehicles to 3.5%.
- TN Local Government Loan Program (1991) offers 3% interest rate loans to local government agencies for energy-efficiency improvements, up to \$500,000 with a 7-year payback.
- TN Small Business Energy Loan Program (1988) offers 3% interest rate loans to small businesses for energy efficient upgrades in their facilities and processes, up to \$100,000.

### Financial Incentives for Renewable Energy

Form of Incentive	TN	TVA	No. of Other States	Other Utilities
Sales tax deductions	No		20	
Property tax deduction	Yes		40	
Rebates	No		17	126
Grants	Yes		14	3
Loans - no, low interest	Yes		22	41

<b>Industry Recruitment</b>	No		9	
<b>Bonds</b>	No		3	
<b>Production Incentive*</b>	No	Yes	7	18

\* Net metering.

### Financial Incentives for Energy Efficiency

Form of Incentive	TN	TVA Programs	No. of Other States	Other Utilities
<b>Sales tax deductions</b>	No		1	
<b>Property tax deduction</b>	No		3	
<b>Number of Rebates</b>	No	21	11	480
<b>Grants</b>	No		13	29
<b>Loans</b>	Yes	23	29	155
<b>Bonds</b>	No		2	

### Required Utility Strategies

**TN Lack of Oversight of Electric Utilities:** The State of TN has no oversight over TVA because it is a federal agency. TVA, in essence, provides its own oversight. In other states with state utility commissions, a number of utility strategies described below have been mandated.

### Renewable Energy Portfolio Standards (RPS)

**Purpose:** RPS includes both energy efficiency and renewables to meet a clean energy target.

**Requirements:** A RPS requires a percent of capacity to come from renewable sources by a given date and mandate specific levels of energy savings. They are generally administered by a state utility commission. Targets are met through documented direct program energy efficiency savings and for purchasing energy efficiency credits.

**Track Record:** 5 states have an implemented RPS. Another five states remain in the planning stage or without binding targets. *TN does not require TVA to have a RPS. TVA does not have a RPS.*

**Primary Motivators:** Job creation; energy security; improved air quality; reduced GHG.

### GHG Reduction - Low Carbon Electricity Policies

**Need:** Electricity generation accounts for 30% of US GHG emissions and 38% of CO2 emissions.

**Existing Plants:** MA and NH require GHG reduction from existing plants. CA is developing a cap on GHG from utilities.

**New Plant CO2 Offsets:** Two states require new power plants to offset a certain portion of their anticipated GHG by undertaking either emission reduction or mitigation projects or pay a specified fee to designated organizations that will select and fund offset projects.

**Incentives for Carbon Capture:** Two coal-rich states (WV and OH) provide incentives for developing technology that will store CO2 in geologic formations.

### Distributed Generation

**Distributed Generation** is any technology that produces power off the electric grid. It normally refers to net metering and

Combined Heat and Power cogeneration (CHP.)

**Net Metering:** Customers sell electricity back to the grid. 41 states have a utility that offers net metering. 18 states have it statewide. *TVA offers net metering through its Generation Partners program.*

**CHP Need:** Power plants average a 33% efficiency in thermal conversion. CHP heat-recovery technologies can increase efficiency to 85% and also reduce the 7% utility line loss.

**CHP Potential:** Large industries and institutional facilities such as paper mills and universities have the highest CHP potential. Presently, most of these operations use natural gas but several are using biomass and methane from landfills and municipal waste.

**CHP Utility Barriers:**

- Utility standby rates and tariffs.
- Complex application process, but new interconnection rules have eased this barrier.
- Utilities do not view CHP as a resource.

**Other CHP Barriers**

- Spark-spread: The rising cost of natural gas has made these CHP sources less economical.
- Tax treatment for smaller facilities (less than 25 MW.)
- Customer readiness - high upfront costs.
- Emission standards.

**Progressive CHP Policies:**

- Of major importance is streamlined interconnection rules for distributed generation.
- Financial incentives (grants, tax incentives, rebates, loans) *(TN is one of 23 states with one or more of these incentives.)*
- RPS that include CHP as an eligible technology. (Only six states)
- Output based regulation of emission standards and output-based allocation of emission allowances within a cap and trade system.
- Utility leadership in collaboration with industry and institutions.

## Green Pricing

**Green Pricing:** The customer is given the option of paying a premium on their electric bill to have a portion of their power bill from designated renewable sources. *TVA offers the Green Power Switch program.*

## Public Benefit Funds

**PBF:** Public Benefit Funds mandate a specific level of utility funding for programs to encourage customers to reduce energy bills through weatherization, energy efficiency and renewable energy projects. It is collected through a small charge on power utility bills.

**State Leadership:** 23 states have PBFs. Fourteen of these coordinate their funds' investments in renewable energy through the publicly managed Clean Energy States Alliance. *TN has no public benefit funds for energy efficiency programs.*

**Resources:** Database of State Incentives for Renewables and Efficiency (NC Solar Center); Select State Actions to Address Climate Change: Compiled by the National Caucus of Environmental Legislators (NCEL), 3/20/07. State Energy Efficiency Index: Alliance to Save Energy; The State Energy Efficiency Scorecard for 2006: American Council for an Energy-Efficient Economy (6/07); State and Regional Programs to Address Global Warming: National Wildlife Federation; Climate Change 101: Pew Center on Global Climate Change.