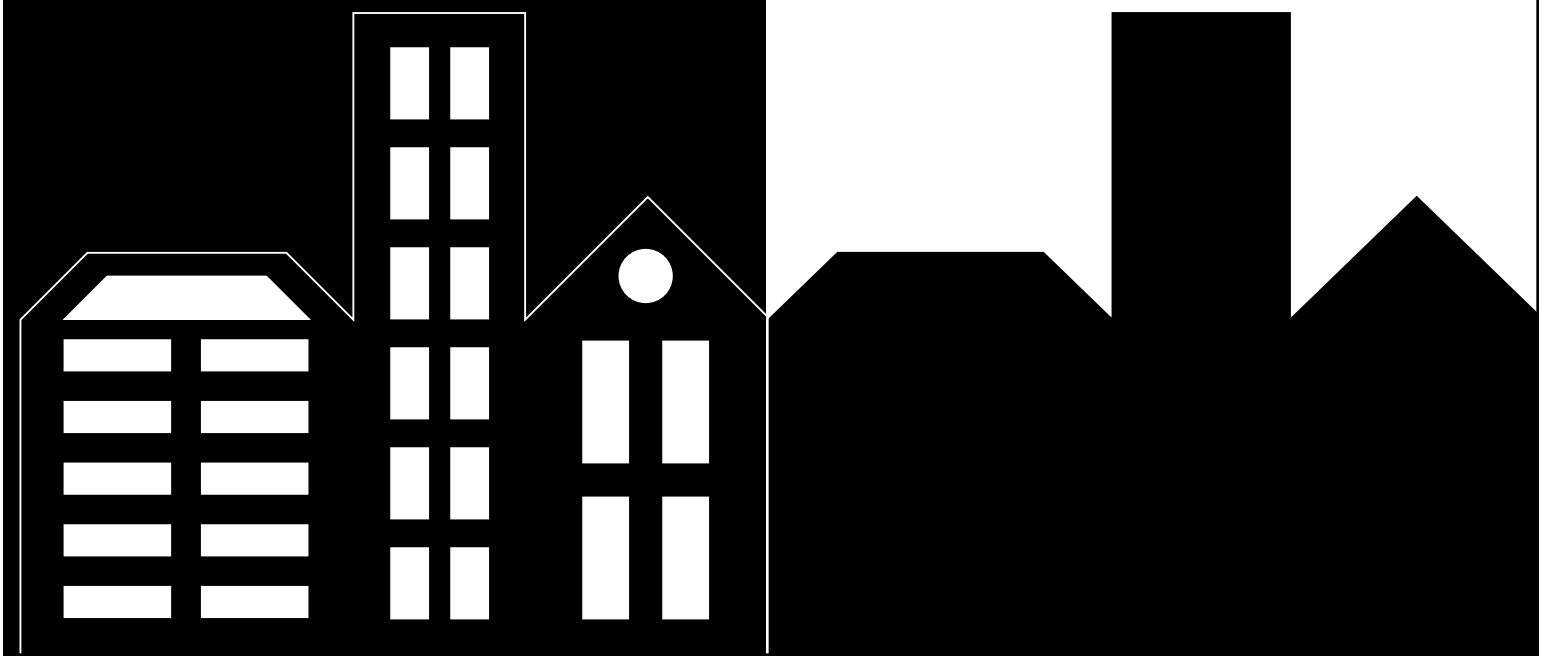
# STAYING cool

## How Energy-Efficient Air Conditioners Can Prevent Blackouts, Cut Pollution and Save Money

**Appliance Standards Awareness Project**

**July 2000**



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## About ASAP

The Appliance Standards Awareness Project is dedicated to increasing awareness of and support for appliance and equipment efficiency standards. Founded by the American Council for an Energy-Efficient Economy, the Alliance to Save Energy, and the Natural Resources Defense Council, ASAP is led by a steering committee that includes representatives from the environmental community, consumer groups, utilities, and state government. For more information, visit www.standardsASAP.org.

## Steering Committee

## Executive Summary

Record-breaking heat waves over the past few summers have been accompanied by power outages in many regions of the country. Policymakers, utility executives, and power system planners and regulators predict that outages and shortages will continue until actions are taken to improve the reliability of the nation's electric system. Effective solutions to our electric system reliability problems will consider the long-term economic costs and benefits as well as impacts on the environment and public health.

The summer months are particularly taxing on the electric system. Soaring temperatures lead to increased peak demand as consumers and businesses crank up their air conditioners to stay cool. The greatest demand for air conditioning generally occurs in the mid-afternoon hours, coinciding with the highest demand for other electricity uses. High temperatures also negatively impact the performance of electricity generation, transmission, and distribution equipment, reducing the availability of generation and transmission capacity and increasing the likelihood of distribution system failures. As a result, the electricity system is called on to meet the highest demand at the time when its components are most prone to problems.

A range of solutions has been proposed to address electric system reliability problems and reduce the likelihood of power outages, including constructing new power plants, expanding the transmission and distribution system, improving energy efficiency, and investing in distributed generation resources (e.g., renewables and combined heat and power). Building additional generation, transmission, and distribution capacity is very expensive, particularly when the power is only needed in the peak summer months. Furthermore, additional power generation imposes costs to the environment and public health — electricity generation is a leading source of the air pollution that contributes global warming and increases the incidence and severity of asthma and other respiratory and cardiopulmonary diseases. These environmental and health issues, along with concerns about the disappearance of open space and added noise, are driving community opposition to power plants and transmission line construction across the country. In contrast, energy efficiency and distributed power generation offer low-cost alternatives that reduce the need for additional central station generation and distribution capacity while reducing pollutant emissions and saving consumers and businesses billions of dollars.

Increased peak demand is at the heart of reliability problems, so efforts designed to reduce peak demand are an important part of any strategy to improve electric system reliability. Since air conditioning is a leading contributor to peak demand during times of system vulnerability, improved central air conditioning efficiency must be a key part of the solution to our reliability problems. Minimum efficiency standards are a proven method for cost-effectively reducing energy consumption and peak demand. As a result of current standards, the need for more than 20,000 MW of peak generating capacity has been eliminated in 2000 alone. Without these savings, the additional peak demand would be further intensifying the reliability problems the nation is experiencing today.

This report demonstrates the additional peak demand reductions possible from updated efficiency standards for residential and commercial central air conditioners. We provide estimates of the peak demand reductions, electricity savings, cost savings, and pollutant emissions reductions possible with adoption of new standards effective in 2006. Estimates are given for 2010 and 2020 at the national and regional level and for the four most populous states (i.e., California, Texas, New York, and Florida). In addition, we present four case studies illustrating the important role that standards can play in mid- and long-term efforts to reduce the likelihood of power outages and improve electric system reliability.

## Findings

- Our savings estimates are based on sensible improvements to the current standards based on the legally required criteria for upgrades. These improvements would require a 30% improvement in the residential central air conditioner standard as well as set a cap on peak demand and include technical advancements that minimize how much product efficiency deteriorates over time. For commercial equipment, a 20% improvement in the standard would lead to the greatest level of cost-effective savings.

- The use of central air conditioning in American homes has soared from 25% of households to more than 50% of households over the past twenty years. And central air conditioners have become practically a standard feature in new homes. As a result, air conditioning has had a growing impact on peak electricity demand and electric system reliability.

- Updated central air conditioning standards would eliminate the need for an estimated 23,850 megawatts (MW) of summer peak generating capacity in 2010 — the equivalent of the power produced by 48 large (i.e., 500 MW) fossil-fuel power plants. In 2020, peak capacity reductions grow to 77,700 MW — the equivalent of 155 large power plants and more than 10% of anticipated nationwide peak demand for the summer of 2000.

- Upgrading the standards to the level we propose would cut peak demand in every region of the country. The map on page 5 shows how many large power plants would be unneeded in each region if standards are upgraded. Peak reductions are largest in the hottest parts of the South and Midwest where demand for air conditioning is highest.

- Nationwide, estimated end-use electricity savings from updated standards would total more than 25 billion kWh in 2010, just four years after the standards take effect. Annual savings are projected to grow to 82 billion kWh in 2020, approximately 26% of projected residential and commercial electricity consumption for space cooling and 3% of overall residential and commercial energy consumption in 2020.

- Consumer electricity bill savings would be cut by an estimated $1.9 billion in 2010 and more than $6 billion in 2020.

**UPDATED CENTRAL AIR CONDITIONING STANDARDS WOULD:**

- **Reduce Peak Demand:** 77,700 MW in 2020
- **Reduce Carbon Emissions:** 15 MMT in 2020
- **Save Electricity:** 82 billion kWh in 2020
- **Reduce $NO_X$ Emissions:** 40,600 MT in 2020
- **Cut Electricity Bills:** $6 billion in 2020
- **Reduce $SO_2$ Emissions:** 208,500 MT in 2020
- **Save Money:** $16 billion net savings by 2020

Cumulative net savings from updated central air conditioning standards will exceed $7 billion for products purchased by 2010 and grow to more than $16 billion for products purchased by 2020. For every dollar of increased equipment purchase price, consumers will save more than two dollars on their electricity bills.

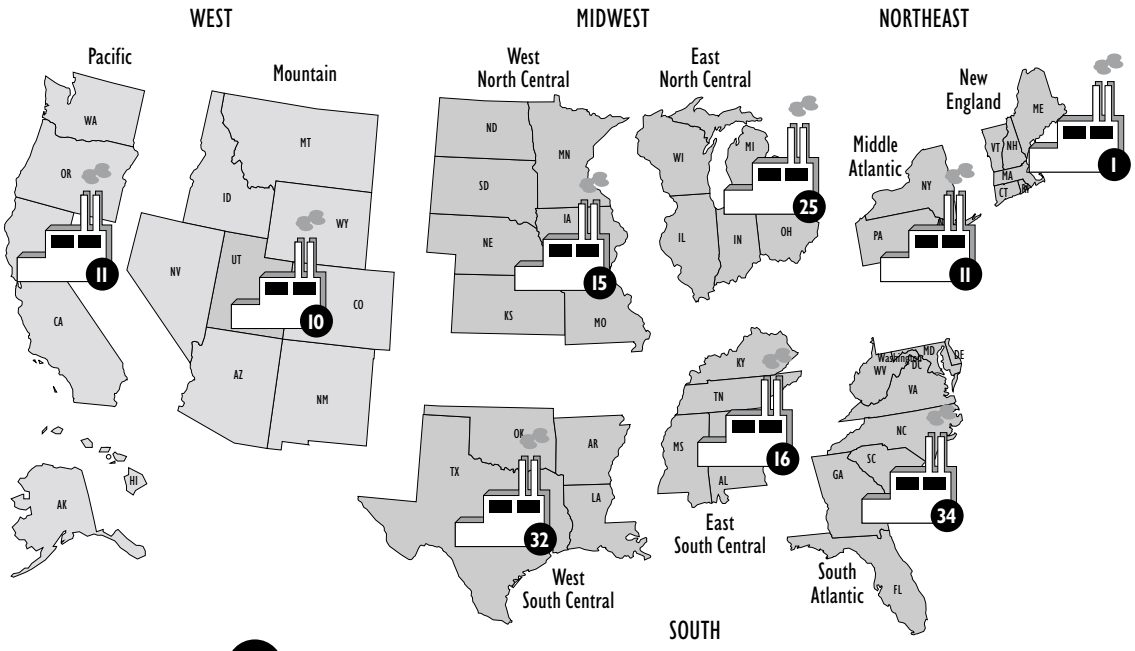
- Updated standards would reduce carbon emissions by more than 5 million metric tons (MMT) in 2010. In 2020, carbon reductions would approach 15 MMT. Carbon dioxide is the leading contributor to global warming. This is the equivalent of removing more than 4 million cars from the roads in 2010 and 12 million cars in 2020.

- Improved central air conditioning standards would reduce smog-forming nitrogen oxide emissions by 17,500 metric tons (MT) in 2010 and 40,600 MT in 2020. Sulfur dioxide emissions (the main component of acid rain) would be cut by approximately 77,500 MT in 2010 and 208,500 MT in 2020. Particulate (soot) emissions would be cut by more than 700 MT in 2010 and 2,100 MT in 2020. By reducing these pollutants, updated standards would help to alleviate public health problems and environmental degradation.

- Updated standards can play an important part in improving the reliability of the electric system. Had updated standards taken effect in 1990, outages experienced by customers in the Entergy service territory (i.e., Louisiana, Arkansas, Mississippi, and Texas) in 1999 could have been avoided, while the likelihood of outages in Long Island and Chicago could have been significantly reduced. In addition, updated standards could "supply" enough power to more than make up the shortages anticipated in California in 2000.

## LARGE POWER PLANTS AVOIDED IN 2020 BY REGION

***Improved air conditioner efficiency avoids the need for new power plants.***
***Large Power Plant = 500 MW***




***National Total = 155 power plants unneeded in 2020***