

# Energy Costs on the Rise

*Demand for electricity is also steadily increasing*

We have all seen noticeably higher costs for our energy needs. Certainly, prices have been rising at the gasoline pumps. Throughout the world, greater demand for energy in developing nations has been putting pressure on the availability and cost of all natural resources.

These pressures are reflected in electricity costs because of rising prices for the fuels used to generate power, as well as transportation costs for delivering fuel. South Mississippi Electric and its member cooperatives work hard every day to keep costs down by improving efficiency and planning for the future. That is especially important these days because we must find new ways to meet the growing demand of our consumers.

As Mississippi's economy and population grow over the next two decades, South Mississippi Electric and its suppliers, like many other American electric utilities, will be investing in new generation and transmission lines. The U.S. Department of Energy predicts the demand for electricity nationwide will increase by 40 percent by 2030.

New power plants will be required to keep up with that increasing demand, as will the need for transmission facilities to move large amounts of power to the areas where the energy is being used.

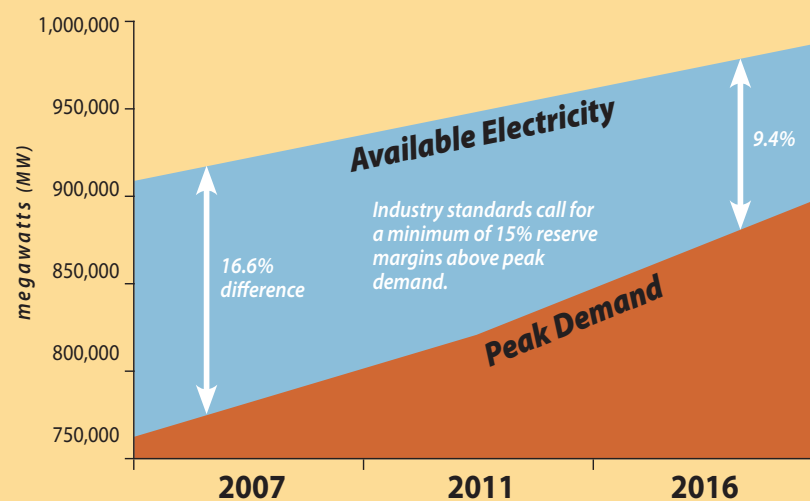
The consequences of not keeping up with demand would be serious, including more instances of major failures in some parts of the country, which could cause rolling blackouts.

The North American Electric Reliability Corporation (NERC), an independent non-profit organization charged with overseeing the growth and reliability of the industry, monitors the balance between the country's electric supply and demand. Because not all generating units operate all the time (which is not possible because of maintenance outages, fuel supply issues, low water levels for hydro-powered facilities, etc.), the industry maintains an extra 15 percent margin of supply above the highest (peak) customer demand.

The good news for those of us living in the Southeast is that our region's electric system is in better shape than in other parts of the country. Areas such as New England, Florida, California, Texas and the Midwest may face reliability issues sooner rather than later. But new plants and lines will have to be built throughout the country, and many existing generating facilities will have to be expanded or replaced, which will no doubt cause prices to continue to increase.

## Running Out of Power: Electricity supply is not keeping up with demand

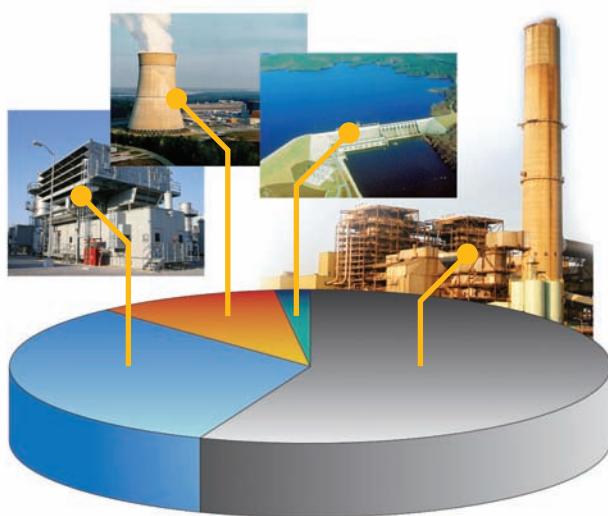
**Peak demand for electricity will increase by 17.7 percent in the U.S. over the next 10 years, while resources needed to meet that demand will grow only 8.4 percent.**



Source: North American Electric Reliability Corporation 10-year forecast, October 2007, pp 10-11

### South Mississippi Electric uses different fuel sources to keep its electric supply economical and reliable

- Coal 56%
- Gas 32%
- Nuclear 10%
- Hydropower 2%
- Fuel Oil 0%



### A Broad Strategy to Meet Customers' Needs

Most people don't realize how complicated our modern electric grid is. Operating a system of power plants and high voltage transmission lines to deliver wholesale electricity involves many considerations.

- Where is consumer demand and where should facilities be located to meet it?
- Where is demand growing and what plans must be made to meet the growth?
- Should new facilities be built or should power be purchased on the bulk market?
- What generating fuel is available and how is it delivered?
- How much does the fuel cost now and how much will the cost fluctuate over the life of a generating plant?
- What kind of transmission facilities will be needed to deliver the large amounts of electricity?

The best strategy is to have power plants that use a variety of fuel sources to best meet consumers' demand.

### News Co-op Members Need to Know

This is the third of a series of inserts to help members understand the many issues that affect their electric power supply. South Mississippi Electric produces and delivers the electricity that its eleven member-owner cooperatives provide to their consumers. Together, our responsibility is to deliver reliable, not-for-profit electric service to more than 400,000 homes and businesses in 56 counties. Every day—as a system—we work to demonstrate The Power of Twelve.

## The Power of 12



GROWING MISSISSIPPI

## Meeting Future Electric Demand Requires Finding the Right Mix

### Electric costs are primarily based on the expenses required to build generating facilities and then to purchase fuel to operate them year after year. Many of the nation's power plants – especially those that provide base load power – were built more than 30 years ago.

**CONSTRUCTION COSTS HAVE ESCALATED** for all types of plants, which will increase capital costs. Determining what fuel costs might do over the next 30-50 years is the most important part of deciding what kind of facility to build. In order to meet our growing demand for electricity, we will need all available energy options, from coal to nuclear to natural gas to renewables such as wind and solar.

Electricity is produced as base load, intermediate and peaking power. Base load power is the energy necessary to keep the electric grid energized and meet customers' constant demand. Intermediate and peaking power are used for those parts of a day when electricity usage and energy demand increases, and are usually much more expensive than base load.

Fuel sources for base load power include those that are economical and readily available, such as coal and nuclear. Intermediate and peaking fuel sources include natural gas, because of its escalating costs, and intermittent resources like solar and wind that produce electricity only when there's sufficient direct sunlight or sufficient sustained wind speed.

### Costs of New Generation by fuel type (Note: SMEPA's wholesale power costs are approximately \$0.075/kilowatt hour. Member consumers pay approximately \$0.11/kilowatt hour.)

Coal (base load)	
capacity (kilowatts)	600,000
cost to build (per kilowatt)	\$3,500
Total cost of construction	\$2.1 billion
Heat rate in Btu/kWh (efficiency of burning fuel)	9100
Capacity Factor (% of annual use)	85%
Expected hours of annual operation	7,446
fixed cost /kilowatt hour	\$0.07
cost of fuel/MMBtu	\$3.00
fuel cost/kilowatt hour	\$0.03
<b>Total cost/kilowatt hour</b>	<b>\$0.10</b>

### Coal

Coal is our most abundant, affordable fuel source for electricity. A quarter of all of the known coal in the entire world is here in America—in fact, America has more than 250 billion tons of recoverable coal reserves, the equivalent of 800 billion barrels of oil, or more than three times Saudi Arabia's proven oil reserves.

Large coal deposits can be found in 38 states. At the current rate of consumption, America is capable of meeting domestic demand for more than 250 years.

Currently, coal provides half of America's electricity generation and more than twice as much as the next-highest contributor, nuclear. Coal is used to power base load generating plants—those facilities that run throughout the day to provide the electric supply that is constantly required.

Given the huge role coal plays in meeting our electricity demands, it is important that we make sure it is a clean energy source. Over the last 30 years, America's coal-based electricity providers have invested over \$50 billion in technologies to reduce emissions. As a result of that commitment, today's coal-based generating fleet is 70% cleaner on the basis of regulated emissions per unit of energy produced.

Because coal is abundant in America and less expensive than other fuels used to generate electricity, the economics of using coal to generate electricity make sense. Without coal, America would be forced to rely more upon imported energy sources to meet our electricity needs.

Nuclear (base load)	
capacity (kilowatts)	1,000,000
cost to build (per kilowatt)	\$5,000
Total cost of construction	\$5 billion
Heat rate in Btu/kWh (efficiency of burning fuel)	10000
Capacity Factor (% of annual use)	90%
Expected hours of annual operation	7,884
fixed cost /kilowatt hour	\$0.10
cost of fuel/MMBtu	\$0.60
fuel cost/kilowatt hour	\$0.01
<b>Total cost/kilowatt hour</b>	<b>\$0.10</b>

### Nuclear

While nuclear plants account for about 20% of the electricity generated in the U.S., no new plants have been built in the country for the past 30 years—since the last units that were under construction at the time of the accident at Three Mile Island. Today nuclear plants have again become part of the discussion about how to meet our generation needs because they are emissions-free and operate from a virtually unlimited fuel source (of course, there are still questions about what to do with spent fuel). Such plants are extremely expensive to build, but their overall operating costs are low and they are excellent sources of base load power because they are normally able to run continuously.

Back in 1973, when Arab countries caused an oil shock by withholding oil supplies, France made the decision to use nuclear technology to reduce its dependence on foreign energy. Since then France has constructed 59 nuclear power plants. They now generate 78% of their overall electricity output from nuclear and enjoy some of the lowest rates in Europe.

In the United States, several major companies, including utilities and manufacturers, have been working for the past seven years with the federal government to develop a uniform permitting and design process. Their goal is to minimize the time and stabilize the costs involved in constructing new nuclear facilities. Even those efforts, however, would not bring a new plant on line before 2015 at the earliest, and Congress will need to show a greater commitment to a new generation of nuclear plants to achieve that date.

South Mississippi Electric owns a 10% share in Mississippi's only nuclear facility, Grand Gulf Nuclear Station, located at Port Gibson in Claiborne County.

**The current timeframe required for building a billion dollar-plus generating facility is longer than in the past. There are now many more issues involving such complex projects, including:**

- federal and state environmental permitting (2 years)
- securing land with necessary transportation options and natural resources (1 year)
- engineering studies & design, determining finance options, and ordering/manufacturing components (2-3 years)
- construction (2-6 years, depending on the availability of skilled labor)

Although many of these tasks overlap, the overall time from committing to build a power plant to when it actually produces electricity may be 8-10 years.

Natural Gas (peaking)		Natural Gas (intermediate)	
capacity (kilowatts)	75,000	300,000	
cost to build (per kilowatt)	\$750	\$1,400	
Total cost of construction	\$56 million	\$420 million	
Heat rate in Btu/kWh (efficiency of burning fuel)	12500	11500	
Capacity Factor (% of annual use)	3%	25%	
Expected hours of annual operation	263	2,190	
fixed cost /kilowatt hour	\$0.43	\$0.10	
cost of fuel/MMBtu	\$9.00 - 13.20	\$9.00 - 13.20	
fuel cost/kilowatt hour	\$0.11 - 0.17	\$0.10 - 0.15	
<b>Total cost/kilowatt hour</b>	<b>\$0.54 - 0.60</b>	<b>\$0.20 - 0.25</b>	

### Natural Gas

Over the past 10-15 years, numerous natural gas-fired generators have been built. (This was after a period in the 1970s when Congress had passed laws that prohibited natural gas from being used as fuel to generate electricity.) Although a fossil fuel like coal, natural gas burns cleaner, and the facilities required to convert natural gas to electricity are much less complex and expensive to build.

However, natural gas has also historically been used for other purposes, including heating homes. The supply of natural gas, and its resulting price, have been highly unstable over the past five years, making it very expensive to use now for generating electricity. Mississippi actually has a number of gas-fired facilities built during the past ten years that are infrequently used because they are not economical compared to other generation sources. Other states have rejected proposals for natural gas-fired plants because of price concerns.

Because affordability is one of the main concerns of the power industry, along with reliability and environmental considerations, balancing cost becomes one of our greatest challenges. The question about natural gas is what it will cost in the future as we build new generating plants. How much risk can we assume moving forward, knowing that rising natural gas costs will mean higher costs to consumers?

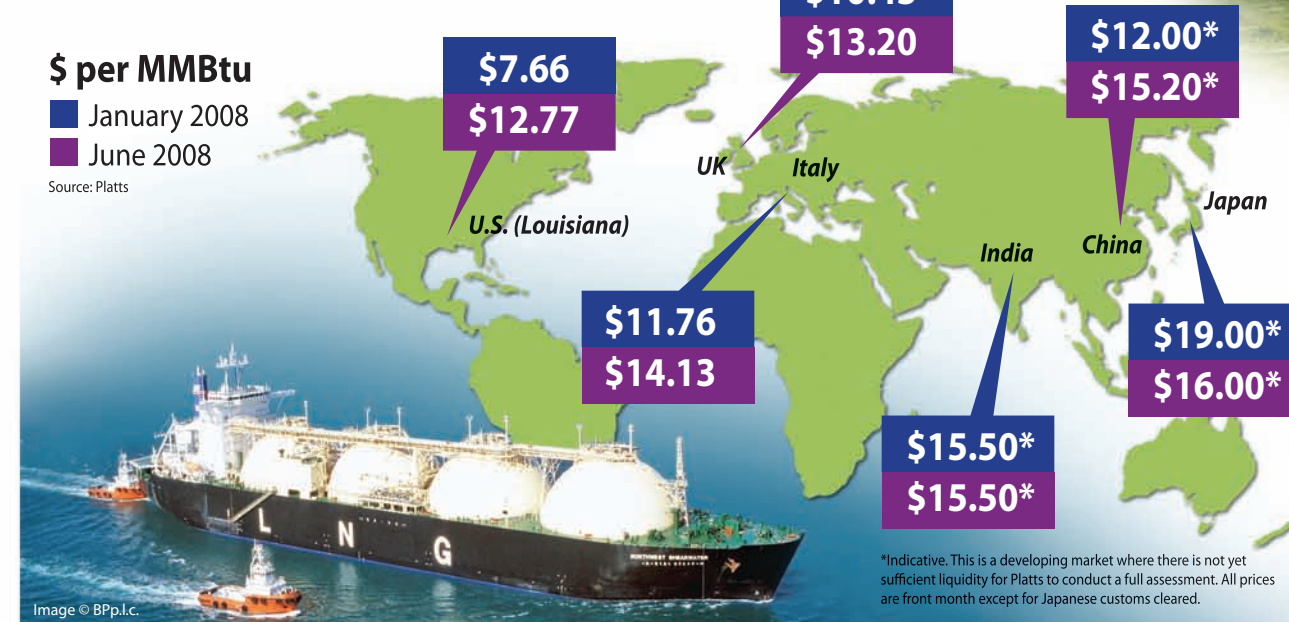
The availability of natural gas is also a concern. The U.S. Energy Information Administration estimates that if natural gas

consumption continues at current rates without an increase in imports, our domestic reserves will be tapped out in about 10 years. There have been renewed questions lately about whether we should begin more domestic drilling to provide additional gas production.

The United States currently imports liquefied natural gas (LNG) from Trinidad, the Caribbean, Egypt, Nigeria, and Algeria. LNG is essentially methane that has been cooled and liquefied for easier long-distance transport. Double-hulled tanker ships bring the resource to specially designed terminals dotting the U.S. coastline—six are currently receiving imports, from Freeport, Texas, to Everett, Maine. A terminal in Puerto Rico also serves North America. Several LNG terminals are in development in anticipation of the country's coming reliance on imported natural gas. Another 40 such projects are being discussed, according to the Federal Energy Regulatory Commission.

Unfortunately, gas markets around the world are trading at much higher prices than in North America, and with LNG, foreign sellers can divert a tanker at sea to higher-paying customers anywhere on the globe. Even if LNG supply grows enough to meet our needs, it is possible that Japan, India, China, and Europe will have first shot at the shipments because they are closer to the key sources in the world. If we are able to buy LNG, we will have to pay the world's market price.

### World Natural Gas Prices



### Renewables

At this point, wind and solar power sources are intermittent and expensive. For all the discussions about adding wind and solar power to the country's energy producing portfolio, the reality is that these sources cannot come close to taking the place of base load sources. They serve best as a supplement to existing generation sources, as they are not always available when demand exists. They are not viable options in the Southeast U.S. because of regular cloud cover and relatively weak, inconsistent wind patterns.

Wind generation makes up less than 2% of America's total electric output today. There have been calls by some members of Congress that wind should make up 20% of the country's output by 2030, but the Department of Energy suggests that such a scenario would require an investment of \$43 billion and an increase in wind sources of more than 1600%.

In those areas of the country where wind is promising, it is still inherently hard to capture and is widely dispersed. Wind turbines take up a lot of space. **The wind equivalent of a typical base load plant would require 300 square miles of turbines** as well as the construction of new transmission lines from wind producing areas, such as North Dakota, to where power is needed in more populated areas.

While the price of solar photovoltaic cells has been slowly dropping, solar-generated electricity is still four times more expensive than nuclear (and more than five times the cost of coal). **A solar facility equivalent to a 1,000-mega-watt base load plant would require about 60 square miles of panels alone** and would still be at the mercy of daylight, clouds and natural disasters.

Support for renewable power must be consistent with providing safe, reliable and affordable service to customers. Cooperatives will develop the renewable resources that make the most sense, geographically and economically.

SMEPA has joined with other cooperatives around the country to form the National Renewables Cooperative, which is dedicated to exploring new technologies and opportunities associated with renewables. As not-for-profit, consumer-owned organizations, co-ops will encourage elected officials to make sure that public policy is based on credible information and realistic expectations; makes the best use of technology as it develops; and does not impose a hardship on consumers.

## Our Energy Decisions Must Begin with a National Policy

By Jim Compton

### THE REGULATED ELECTRIC BUSINESS IS DIFFERENT FROM MOST OTHER BUSINESSES.

If you own a bakery and demand for your bread and desserts increases to the point that you are sold out every morning, you would have a choice to make. Do you expand your existing business, build a new facility, or just have some disappointed customers? When you evaluate that choice, you look at costs to expand or to move, including interest rates, construction costs, and adding employees. You may also evaluate how long you want to work and whether you want to assume the debt that goes with an expansion. Then you decide to either meet the increased customer demand or leave some customers disappointed.

In the electric industry we cannot leave customers disappointed due to electric energy not being available—unless there is a natural disaster, and then we must restore service as quickly as possible. When electrical demand increases, we have an obligation to build new plants or buy from other sources to meet that demand, even if construction and interest costs are high. In order to continue providing reliable service at the lowest possible cost, we evaluate the costs to build and operate generating units versus purchasing from the open market. We cannot discontinue or restrict service simply because fuel or purchased power costs are too high during certain times. The obligation to serve is part of the regulatory compact and is our foremost responsibility.

Thus, in order to meet increasing electrical demand with affordable rates, we need to plan for new generation resources. If the decision is to add new generating units, fuel cost is the most significant variable in deciding what type of units to build. A more expensive plant can actually save ratepayers if the fuel costs are lower. Consider this example: assume that two cars cost \$10,000 and \$100,000, respectively. The operating cost for the cheaper car is \$1 per mile, and 10¢ per mile for the more expensive car. If you drive 5,000 miles per month, the more expensive car is actually more economical overall to drive. But if you only drive 125 miles per month, the cheaper car is the obvious choice. You might also buy both if you have the right combination of short and long trips to take.

In the same sense, our needs will be for more base load plants that run almost continually—they are more expensive to build but have much lower fuel costs. To meet electrical demands that increase and decrease throughout the day, a mixture of baseload, intermediate, and peaking capacity is needed. Our generation studies at South Mississippi Electric indicate that we will need approximately 900 megawatts of new capacity in the next 12 years—nearly half of what we currently own and operate. Approximately 70% of the need is for base load generation, 25% for intermediate to run for several hours a day, and 5% for peak needs.

Solid fuel generation (coal or nuclear) is far less costly in the long run for base load generation, but long lead times are associated with constructing these options. Base load plants typically take eight to ten years to design, permit, and build. This is an increase from the previous timeframes of six to eight years, due to additional regulatory requirements and environmental challenges.

The bulk electric system is not an inexhaustible resource. We will need not only to meet new demand over the next few years but also to replace expiring contracts. We must have a fair opportunity to plan, study and build the right

### SMEPA at a Glance

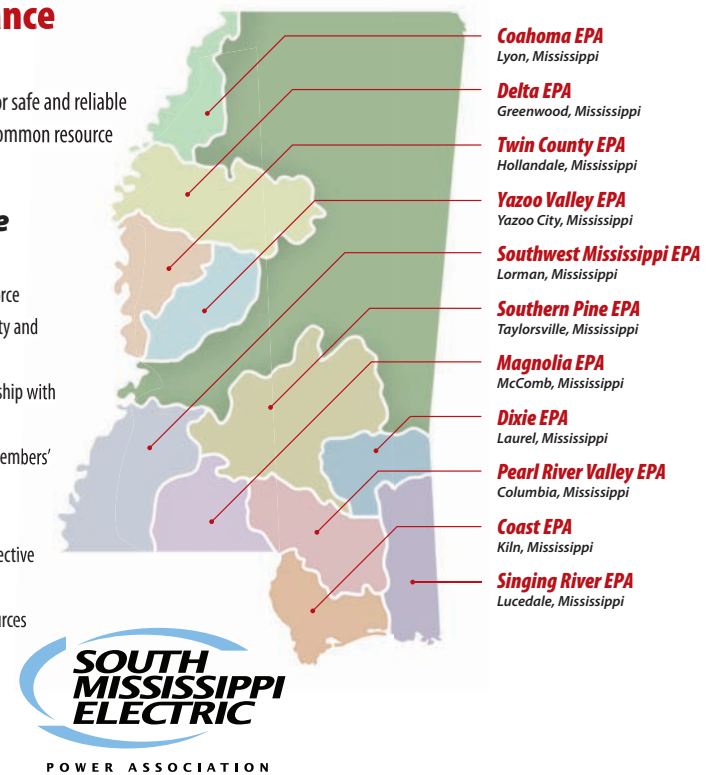
#### Our Mission

Deliver the South's best value for safe and reliable electric energy and serve as a common resource for our Member-owners.

#### Our Competitive Strengths

- An experienced, talented work force
- A commitment to employee safety and system reliability
- A long-term contractual relationship with our Member Systems
- Financial health, including our Members' Members' service territories
- Sustained load growth in our Members' service territories
- Long-range planning for cost-effective generation resources
- Fuel diversity in generation resources
- Environmental stewardship

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generation options to keep electric service reliable, affordable, and sustainable. If our decisions are made more difficult by regulatory uncertainty, we run the risk of being subjected to rising market prices, or worse, not having sufficient generation to meet our customers' needs.

Unfortunately, we find ourselves in the same position as electric utilities across the country. We are desperately hoping that Congress will turn its attention to the country's energy problems and develop an overall national energy policy. Today we are in a national energy price crisis, but in a few years, it will be a national energy availability crisis. As Dow Chemical Company Chairman and Chief Executive Andrew Liveris has stated:

"For years, Washington has failed to address the issue of rising energy costs and, as a result, the country now faces a true energy crisis, one that is causing serious harm to America's manufacturing sector and all consumers of energy. The government's failure to develop a comprehensive energy policy is causing U.S. industry to lose ground when it comes to global competitiveness, and our own domestic markets are now starting to see demand destruction throughout the U.S."

I totally agree. This energy policy failure will lead directly to higher energy prices for our members. South Mississippi Electric and other Electric Power Associations in Mississippi have developed a position paper on national energy policy. This information is included in Michael Callahan's article in this edition of *Today in Mississippi*. We have forwarded this paper to our Congressional delegation, urging our legislators to make national energy policy development a top priority. We believe that any proposed climate change legislation or energy independence legislation should be part of a broader national energy policy that will guide us into a reliable, affordable, and sustainable future. We hope you will support our efforts.

Jim Compton is General Manager and CEO of South Mississippi Electric Power Association

### South Mississippi Electric System Demand and Available Resources

