Compressed Air Energy Storage

McINTOSH POWER PLANT • MCINTOSH, ALABAMA

PowerSouth
ENERGY COOPERATIVE
A Touchstone Energy® Cooperative
A RELIABLE, AFFORDABLE ENERGY SUPPLY

Electricity storage is impractical in most circumstances. That means every minute of every day, PowerSouth’s power supply must match power demands. Each generating facility plays an important role in PowerSouth’s mission to provide safe, reliable and cost-effective energy to our members.

PowerSouth operates generating facilities at three sites in Alabama. Collectively, this fleet is capable of generating more than 2,000 megawatts of electricity.

PowerSouth operates a diverse mix of plant technologies and fuel sources, including hydroelectric, coal, natural gas and compressed air energy storage. This fuel diversity enables us to minimize cost impacts from any one fuel source and ensures a reliable power supply.

The nation’s only CAES unit

Located in McIntosh, Ala., at the McIntosh Power Plant site, the 110-megawatt Compressed Air Energy Storage (CAES) Unit is PowerSouth’s most unique generating source.

The CAES unit was declared commercial in 1991. It is the only one of its kind in the U.S. and one of only two in the world. The other is in Huntorf, Germany.

CAES technology is an innovative electric power generation process. PowerSouth’s CAES unit provides an efficient solution to meeting peak requirements by taking advantage of lower-cost, off-peak energy to generate energy during peak demand periods.

Out of thin air

During off-peak hours, when energy is less expensive, air is pumped into the cavern in a process called “compression mode.” At full charge, air pressure in the cavern reaches nearly 1,100 pounds per square inch.

During periods of peak demand — times when the greatest demand for energy are made — the plant is put into “generation mode.” Air from the cavern is released, routed through more than 1,000 feet of pipe and fed into a heat exchanger called a recuperator. Here it is heated to approximately 600 degrees Fahrenheit.

The hot air then enters a high pressure combustion chamber, where natural gas is used to further heat the air to around 1,000 degrees before entering the high pressure expander.

The exhaust in the high-pressure expander is re-heated to 1,600 degrees before entering the low-pressure expander where it is fed back through the recuperator, providing an efficient source of heat for this stage of the process.

Excess heat is discharged into the atmosphere at a temperature of around 280 degrees.

Together, the high pressure and low pressure expanders rotate the generator to produce enough electricity to power nearly 110,000 homes for up to 26 hours.

Quicker, cleaner technology

The CAES generator is capable of producing up to 110 megawatts of electrical power within 14 minutes of startup during periods of peak demand — times when the greatest demand for energy are made. This provides PowerSouth the advantage of a cost-effective way to meet reserve requirements.

The CAES unit burns roughly one-third of the natural gas per kilowatt hour of output compared to a conventional combustion turbine, thus producing only about one-third the pollutants.

CAES is part of a larger, diverse generating mix utilized by PowerSouth that also includes natural gas, coal, water (hydro), wind, methane and long-term purchased power agreements with other utilities.

GENERATING ELECTRICITY

<table>
<thead>
<tr>
<th>Feature</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top of salt</td>
<td>410 feet</td>
</tr>
<tr>
<td>Cavern roof</td>
<td>1,506 feet</td>
</tr>
<tr>
<td>Maximum cavern diameter</td>
<td>238 feet</td>
</tr>
<tr>
<td>Maximum cavern height</td>
<td>753 feet</td>
</tr>
<tr>
<td>Cavern volume</td>
<td>19.8 million cubic feet</td>
</tr>
<tr>
<td>Total depth</td>
<td>2,650 feet</td>
</tr>
</tbody>
</table>

The CAES cavern is large enough to comfortably house an 80-story building.
PowerSouth’s positive energy is rooted in its commitment to its members, employees and neighbors in the communities it serves.

Safety is PowerSouth’s top priority and number-one corporate value. Through a comprehensive safety program, PowerSouth promotes the well-being of its employees, the general public and future generations.

The McIntosh Power Plant, which includes the CAES unit, has a positive effect on the economic vitality of Washington County and surrounding areas. Annually, Washington County receives more than $2 million in property tax from PowerSouth for the McIntosh Power Plant, the Charles R. Lowman Power Plant in Leroy, and other transmission facilities.

PowerSouth strives to be a responsible corporate citizen and ensure its operations have a minimal effect on the environment. Using advanced technology and proven methods, PowerSouth works to reduce emissions and preserve a healthy, clean environment for its neighbors.

TO FIND OUT MORE:
Visit www.powersouth.com for additional information about PowerSouth and the nation’s only compressed air energy storage unit.