



# Energy Supply

High Risk Sector



The generation and distribution of different forms of energy (electricity, gas, steam, hot water).

Related Sectors:

- Oil and Gas
- Water Supply



## Production Processes

Electrical energy is generated by utility companies using mainly coal, natural gas, water and oil as well as nuclear fission in some cases. In recent years, the use of solar, wind and tidal power has also become widespread.

A large proportion of electricity is generated from petroleum and coal as primary energy sources. Oil, natural gas, coal and petroleum are used for combustion and to produce heat, which in turn produces high temperatures and high-pressure steam. The steam is then transmitted to a turbine, which drives an electric generator.

Another key source of electrical energy in some regions is hydropower. This technology exploits the kinetic energy of moving water to convert it to electrical energy by a water turbine driving a generator. Hydropower belongs to the group of renewable energies of which other examples are wind and solar energy.

Electricity is supplied to consumers via transmission and distribution networks. High-tension power lines transport electricity over long distances. Before the electricity can be distributed to consumers via low-tension power lines, transformers modify voltage from high to low tension.

## Sustainability Issues

- Energy
- Water Use
- Emissions to Water
- Waste
- Emissions to Air
- Ecosystems
- Workplace Health & Safety
- Disaster Risk
- Site Contamination

### Sector Rating

- High risk issue
- Medium risk issue
- Low risk issue

## Risks & Opportunities

- Large quantities of water are used, mainly for cooling.**  
Water use in energy generation is an important issue, especially in areas where water is scarce. Conventional power plants use large amounts of water for the condensation part of the thermodynamic cycle. For coal plants, water is also used to clean and process fuel.
- Waste from fuel-based power plants must be disposed of appropriately.**  
Energy generation may produce large amounts of waste, such as ash and slag. The highest volume of waste is caused by lignite or coal-fired power plants. Waste must be disposed of appropriately. One potential way of disposal is use in the cement industry or for tarmac.
- Fuel-based power plants produce significant amounts of air pollutants.**  
Power plants based on fossil fuels (e.g. oil, coal, lignite) produce enormous amounts of emissions to air, depending on the type of fuel used, the combustion technology applied, and the treatment of the fumes. These air pollutants can cause health and environmental hazards.
- The contamination of property presents a risk to its value, to human health and to the environment.**  
Spills of fuels, leaks in tanks or pipes, and the disposal of liquid waste may contaminate buildings and the ground. This contamination may present a risk to groundwater resources, rivers and to human health. Clean-up costs may be considerable. The market value of contaminated property may be impaired.
- Energy-inefficient processes waste primary energy sources and pollute the environment.**  
The transformation of primary energy sources, such as coal, oil or gas, to electricity or heat involves large amounts of these energy sources. The efficiency of this process varies with the fuel used and the level of technology. This might also be an important cost factor.