

# Virtual Power Station Heuersdorf

## Background

After national reunification in 1990, the electrical power industry in eastern Germany underwent major reconstruction. Air pollution control equipment has now been installed on modernized power stations, while large cities have constructed gas turbine plants for municipal electrical and district heating services.

A major commitment has likewise been made by the German federal government to erect a new generation of 800 Megawatt power stations employing domestic lignite. Immense quantities of this low-quality, but abundant "brown coal" will be extracted from open cast mines, necessitating the devastation of natural landscapes and human settlements.

## Growing Skepticism

According to present mining plans, the medieval village of Heuersdorf near Leipzig is to be excavated to provide one-tenth of the lignite required by the Lippendorf power station. The residents are to be resettled with only partial indemnification provided for the loss of their traditional homesteads.

The villagers are willing to accept personal sacrifice in the interest of regional development, but only if the economic need for additional power generation can be demonstrated. The refusal of government officials to provide the appropriate confirmation makes the lignite power station appear unjustified in light of the deregulated European power market. Under this circumstance, financial burdens and communal disruptions have been decisively rejected by the citizens of Heuersdorf.

Lignite power likewise remains controversial owing to the lost options for landscape development, and because of extremely high emissions of carbon dioxide (CO<sub>2</sub>) that impair fulfilment of international commitments on climate protection. Efficient mining and power plant technologies have diminished the importance of lignite for local employment.

## A Time of Decision

Independent energy researchers have shown that some electrical power stations could be downscaled or even eliminated using advanced techniques of energy conservation. The federal parliamentary ("enquete") commission on climate protection has already pointed to energy savings capable of reducing CO<sub>2</sub> emissions in Germany by 30 percent.

The appropriate conservation strategies have not been widely implemented, however, since energy sales are the mainstay of the power industry. The commercial incentives of the European electricity market may mean the ultimate failure of climate protection policies.

The modernized power industry in eastern Germany has not significantly enhanced local productive capabilities. On the contrary, irreplaceable domestic resources are being expended to generate an energy surplus for a diminished industrial base.

## Regaining a Technological Initiative

The rapid development of information technologies has remained widely neglected as a possibility for effective energy conservation. More than 50 years ago, the mathematician Norbert Wiener (the "father" of cybernetics) already showed that increased information could enable a reduction of entropy and thus of energy use.

At that time, however, electronic computers weighing several tons were less powerful than today's pocket calculators. Only recently has it become possible to influence the energy consumption of an entire society using communication technologies.

The prerequisites for mounting this initiative are especially favorable in eastern Germany:

- \* the telecommunications infrastructure has been fully modernized since national reunification

- \* extensive data has been collected on cost effective energy conservation techniques.

## Generating Virtual Power

Within a few years, it will be possible to operate any family television set like a home computer. Special adapter boxes are already being sold for connecting a conventional TV to the Internet. Many professional computers are likewise equipped with networking capabilities.

As a result, it is already possible for information to be exchanged via Internet regarding energy use (as well as water and sewage services, garbage collection, transportation etc.) on a voluntary basis. New studies have revealed surprising differences in resource use - varying as much as 4:1 - in identical customer categories (sometimes even in the same building).

When the appropriate information is provided on a computer or television, individuals may be warned of excessive energy or resource consumption. Corrective action can be taken using the practical advice appearing on the screen. A check list contains technical information for reducing consumption.

With this system, excessive energy levels are always signaled to users. Corrective actions may be performed either manually (such as by switching off unused lights) or automatically (turning down the heat in rooms not illuminated). Either way, energy consumption will drop because of the additional information supplied (just as Prof. Wiener predicted).

Thus, a fictional or "virtual" power has been generated by substituting superfluous energy consumption by the feedback of information on the amount of energy actually needed. By consequently applying this technique, resources may be saved and the village of Heuersdorf thereby preserved.

## The Virtual Power Station Project in Heuersdorf

Many practical experiments are required to determine how much energy can be saved by the virtual power technique. Since electricity, gas, and oil are still relatively inexpensive, however, many consumers are not interested in cutting their resource budget. Therefore, a special group of people is needed.

The citizens of Heuersdorf are particularly motivated to participate in the project, because they will lose their homes without programs of energy conservation.

There are two basic factors to be determined:

1. The technical potential for saving energy.

The current energy consumption must be measured and compared with the amount of energy that could be saved using all affordable means of conservation.

2. The role of human responses in energy conservation.

The reaction of people to communicated information must be determined. Under favorable conditions, the technical potential could be achieved by integrating information into normal living contexts.

The appropriate investigations have been begun in Heuersdorf by a team of consulting engineers, who are also designing the computer programs required for information exchanges.

The energy reduction achieved will determine the capacity of the "virtual power station" in the village.

## How Much Energy Can be Saved?

By engaging additional communities to pursue the same strategy, the substitution of entire power plants appears a realistic perspective. The conservation of resources by means of enhanced information will save money, increase the transparency of decisions, and ultimately strengthen democratic processes.

## Fulfilling the Objective

The community administration of Heuersdorf is consulting with German and international companies on implementing the project. The prerequisites for a European communal initiative are likewise being developed.

The availability of communications technologies makes virtual substitution a viable method of resource conservation. Enhanced information will enable mankind to protect irreplaceable natural and cultural values.

For Further Information

For information on how to participate in the virtual power station project, address your inquiries to the community administration:

Village of Heuersdorf, Dorfstr. 25, D-04754 Heuersdorf, Germany

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[www.heuersdorf.de/English1.html](http://www.heuersdorf.de/English1.html)