



VISION OF THE PROJECT DESERTEC

Marek Pavlík, Ján Zbojovský, Martin German-Sobek, Marián Hrinko

ABSTRACT

This article deals with a very interesting project Desertec. Desertec project is currently highly discussed project. The main aim of the article is to inform about the project, which is not so known. An important fact is that Desertec project should provide 15% of European electricity consumption. Desertec project is a big challenge, because this would contribute to independence from fossil fuels and nuclear energy.

1. INTRODUCTION

The Desertec Concept was developed by a network of politicians, scientists and economists from around the Mediterranean, from which arose the Desertec Foundation.

The Desertec Foundation is a global civil society initiative aiming to shape a sustainable future. It was established on 20 January 2009 as a non-profit foundation that grew out of a network of scientists, politicians and economists from around the Mediterranean, who together developed the Desertec Concept. Founding members of Desertec Foundation are the German Association of the Club of Rome, members of the international network as well as committed private individuals. [1]

Desertec project is primarily focused on electricity production from renewable energy sources in a manner that protects the environment.

According to availability and resource efficiency will be used:

- Wind energy – the northwest coast of Africa, the western coast of Europe, the Baltics, Iceland
- Solar energy – Sahara, Southern Mediterranean, Middle East
- Photovoltaic panels – selected sites in Europe with sufficient intensity of incident solar radiation
- Hydropower – everywhere in the mountainous area in favorable conditions in the watercourses
- Biomass energy – in areas of surplus agricultural production
- Geothermal energy – in areas suited to the Earth's heat

It is proposed that solar and wind resources lost to the Sahara area 17.000 km². The generated electricity will be transported by high-voltage DC cables.

2. ENERGY USED IN THE DESERTEC CONCEPTION

2.1. Wind energy

Wind power is the conversion of wind energy into a useful form of energy. A large wind farm may consist of several hundred individual wind turbines which are connected to the electric power transmission network. Offshore wind farms can harness more frequent and powerful winds than are available to land-based installations and have less visual impact on the landscape but construction costs are considerably higher. Small onshore wind facilities are used to provide electricity to

isolated locations and utility companies increasingly buy back surplus electricity produced by small domestic wind turbines.[2]

Wind power, as an alternative to fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation and uses little land.[3] Any effects on the environment are generally less problematic than those from other power sources. As of 2010 wind energy production was over 2.5% of worldwide power, growing at more than 25% per annum. The overall cost per unit of energy produced is similar to the cost for new coal and natural gas installations.

2.2. Solar energy

Solar energy, radiant light and heat from the sun, has been harnessed by humans since ancient times using a range of ever-evolving technologies. Solar energy technologies include solar heating, solar photovoltaics, solar thermal electricity and solar architecture, which can make considerable contributions to solving some of the most urgent problems the world now faces.

Solar technologies are broadly characterized as either passive solar or active solar depending on the way they capture, convert and distribute solar energy. Active solar techniques include the use of photovoltaic panels and solar thermal collectors to harness the energy. Passive solar techniques include orienting a building to the Sun, selecting materials with favorable thermal mass or light dispersing properties, and designing spaces that naturally circulate air.[4]

2.3. Photovoltaic panels

Photovoltaic panel is a packaged, connected assembly of photovoltaic cells. The solar panel can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Each panel is rated by its DC output power under standard test conditions, and typically ranges from 100 to 450 watts. The efficiency of a panel determines the area of a panel given the same rated output - an 8% efficient 230 watt panel will have twice the area of a 16% efficient 230 watt panel.

2.4. Hydropower

Hydropower is energy that comes from the force of moving water. The fall and movement of water is part of a continuous natural cycle called the water cycle. Hydropower dams can cause several environmental problems, even though they burn no fuel. Damming rivers may permanently alter river systems and wildlife habitats. Fish, for one, may no longer be able to swim upstream. Hydro plant operations may also affect water quality by churning up dissolved metals that may have been deposited by industry long ago. Hydropower operations may increase silting, change water temperatures, and lower the levels of dissolved oxygen. Some of these problems can be managed by constructing fish ladders, dredging the silt, and carefully regulating plant operations. [5]

2.5. Biomass energy

Biomass, as a renewable energy source, is biological material from living, or recently living organisms. As an energy source, biomass can either be used directly, or converted into other energy products such as biofuel.

Biomass can be converted to other usable forms of energy like methane gas or transportation fuels like ethanol and biodiesel. Rotting garbage, and agricultural and human waste, all release methane gas also called "landfill gas" or "biogas." Crops such as corn and sugar cane can be fermented to produce the transportation fuel, ethanol. Biodiesel, another transportation fuel, can be produced from left-over food products like vegetable oils and animal fats.[6] Also, Biomass to liquids (BTLs) and cellulosic ethanol are still under research.

2.6. Geothermal energy

Geothermal energy is thermal energy generated and stored in the Earth. Thermal energy is the energy that determines the temperature of matter. Earth's geothermal energy originates from the original formation of the planet (20%) and from radioactive decay of minerals (80%).[7] The

geothermal gradient, which is the difference in temperature between the core of the planet and its surface, drives a continuous conduction of thermal energy in the form of heat from the core to the surface.

At the core of the Earth, thermal energy is created by radioactive decay and temperatures may reach over 5000 degrees Celsius (9,000 degrees Fahrenheit). Heat conducts from the core to surrounding cooler rock. The high temperature and pressure cause some rock to melt, creating magma convection upward since it is lighter than the solid rock. The magma heats rock and water in the crust, sometimes up to 370 degrees Celsius (700 degrees Fahrenheit).

3. VISION OF DESERTEC CONCEPTION

By far the largest, technically accessible source of energy on the planet is to be found in the deserts around the equatorial regions of the earth.

The DESERTEC Concept is designed to bring deserts and existing technology into service to improve global security of energy, water and the climate. To this end we propose Europe, the Middle East and North Africa (EU-MENA) begin to cooperate in the production of electricity and desalinated water using concentrating solar thermal power and wind turbines in the MENA deserts. These technologies can meet the growing demands for power production and seawater desalination in the MENA region, and produce clean electrical power that will be transmitted by High Voltage Direct Current (HVDC) transmission lines with relatively little transmission loss to Europe (10-15%). From a political point of view, implementing DESERTEC in countries like Australia. The overall allocation of sources of the concept Desertec is shown in Fig.1



Figure 1 – Location of sources of Desertec Conception [8]

4. CONCLUSIONS

The project Desertec is one of the largest energy projects. It should be noted, that provide 15 percent of European electricity consumption. But it is also responsible its price. Price includes himself in the fact that electricity will be produced only from renewable energy sources and thus it will be clean energy. The project will begin in Morocco and gradually expands to form shown in Fig 1.

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Authors:

Ing. Marek Pavlík
Technical University of Košice
Faculty of Electrical Engineering and Informatics
Mäsiarska 74
041 20 Košice, Slovakia
E-mail: marek.pavlik@tuke.sk
Tel: +421 55 602 3562

Ing. Ján Zbojovský
Technical University of Košice
Faculty of Electrical Engineering and Informatics
Mäsiarska 74
041 20 Košice, Slovakia
E-mail: jan.zbojovsky@tuke.sk
Tel: +421 55 602 3562

Ing. Martin German-Sobek
Technical University of Košice
Faculty of Electrical Engineering and Informatics
Mäsiarska 74
041 20 Košice, Slovakia
E-mail: martin.german-sobek@tuke.sk
Tel: +421 55 602 3560

Ing. Marián Hrinko
Technical University of Košice
Faculty of Electrical Engineering and Informatics
Mäsiarska 74
041 20 Košice, Slovakia
E-mail: marian.hrinko@tuke.sk
Tel: +421 55 602 3560