

*Tomáš Králík<sup>1</sup>*

## **INTERMITTENT RENEWABLE ENERGY SOURCES-CURRENT STATUS AND LIMITING FACTORS FOR THE FUTURE DEVELOPMENT**

<sup>1</sup> Czech Technical University in Prague, Czech Republic, +420 2 2435 3369, kralitom@fel.cvut.cz

### **OVERVIEW**

Based on the present global economic growth rates and prediction of the future energy demand, the human kind is approaching the time when the most of fossil fuels reserves are depleted. From that point of view is logical that there is an urgent need to find alternative energy sources that will be able to compensate the electricity production based on fossil fuels. Therefore the increased focus on renewable energy sources became evident after the energy crisis in seventies. Since that it is possible to observe a gradual increase of the renewable energy sources exploitation.

### **METHODS**

Intermittent renewable energy sources (namely wind and solar) can provide many advantages. They are widely available, their operating cost is extremely low (zero “fuel” cost) and they produce zero CO<sub>2</sub> emissions. Also the dependency on energy commodity import becomes a bigger issue in recent decades. From this point of view there is another argument for these renewable resources, namely their local character, respectively their availability in the place of consumption.

On the other hand these intermittent renewable energy sources have also number of disadvantages. The biggest problem is dependence on momentary conditions (speed of the wind, day, night, amount of solar radiation, etc.). Therefore the electricity generation is variable and random and the generation peaks rarely coincide with peak demand. This irregular and unpredictable electricity production consequently causes severe technical and economical problems. Another problem is the energy “density” that is contained in RES. Large area of land is required for gaining significant amount of energy.

Despite all disadvantages that are mentioned above, intermittent renewable energy sources (especially photovoltaic systems) are experiencing rapid development and exploitation in most of the developed counties around the world.

But to what extent can we expand and evolve intermittent renewable sources and what is their true potential? To answer that we need to know the current status of intermittent renewable energy sources, potential for future development and which factors (technical, economical, legislative, etc.) can limit this development.

### **RESULTS**

The work summarizes current status of the intermittent renewable energy sources, analyses their potential and identifies key limiting factors for future development. This work also demonstrate specific situation in the field of photovoltaics in the Czech Republic.

### **CONCLUSIONS**

The extensive development of the intermittent energy sources can cause both severe technical problems to the electrical grid and economical problems thanks to the rising additional costs. On the other hand those sources can provide mankind with a clean energy that is available at any place of the energy consumption.