

## ČEPS's view of photovoltaics

### Frequently asked questions

#### **1. Why have you banned the connection of new environmentally-friendly power plants to the grid?**

ČEPS has not banned the connection of new environmentally-friendly power plants to the grid. ČEPS only asked distribution companies by means of a letter of 3 February 2010 to suspend the issuance of positive opinions on new applications for the connection of photovoltaic and wind power plants to the grid. It is expected that this initiative will provoke a discussion between distribution companies, the Energy Regulatory Office, the Czech Photovoltaic Industry Association and other institutions concerned.

#### **2. Why have distribution companies responded positively to your request?**

Under current legislation, ČEPS is responsible for the safe and reliable operation of the whole of the Czech power system. This means that ČEPS as the transmission system operator has to maintain the balance between electricity supply and demand at all times. The power system, however, does not comprise only high-voltage and extra-high voltage (220kV and 400kV) power lines operated by ČEPS; it comprises facilities for the performance of four basic functions: electricity generation, transmission, distribution and consumption. Consequently, when speaking about maintaining the safe and reliable operation of the Czech power system, we also speak about the distribution system.

Furthermore, distribution companies are well aware of those parts of their grids where the lack of available distribution capacity currently does not allow new electricity sources to be connected. Distribution companies act in accordance with current legislation which gives them the right to refuse an application for connection to the grid if the relevant capacity is not available or the connection might pose a risk to the reliable operation of the distribution system.

ČEPS is attempting to draw attention to the potential risk to the safety and reliability of the power system if projects already approved are realised and technical limits exceeded. Exceeding the technical limit for power system control means a situation in which existing electricity sources are not sufficient to provide reserve capacity in order to cover outages and, primarily, compensate for demand fluctuations and fluctuations in generation from photovoltaic and wind plants.

We would like to point out that in a situation in which the safety and reliability of the Czech power system is jeopardized (state of emergency) and all other control measures have been applied, the

ČEPS Control Centre can, according to the Energy Act, also reduce power output from photovoltaic and wind power plants.

### **3. Distribution companies responded to your letter very quickly. Do you have long-standing cooperation with distributors?**

Yes, ČEPS really enjoys long-standing cooperation with distribution companies. Moreover, the obligation for such cooperation is placed on ČEPS by the Energy Act (Act 458/2000). Without this cooperation, the reliable operation of the Czech power system would not be possible and electricity consumers throughout the whole country might be subject to blackout.

### **4. What further steps do you plan to take?**

The answer to this question should be provided from ongoing discussions between distribution companies, the Energy Regulatory Office, the Czech Photovoltaic Industry Association and other institutions concerned. Rules for the connection of new environmentally-friendly electricity sources to the grid, including a proposal for a solution to the issue of speculative applications for connection should also be subject to discussion.

What is the aim of this initiative? Primarily the following:

- to set rules for the sustainable development of photovoltaic and wind electricity sources;
- to prevent risk to investment in renewable energy sources (RES) – not only due to the limited capacity of the transmission system or the various distribution systems but also due to the limited capability of the market to absorb electricity generated from these sources, mainly because of the lack of power plants capable of compensating for generation fluctuations.

As mentioned in our Press Release of 10 February 2010, further information will be published in early March.

### **5. According to certain estimates made by environmental associations, the output of photovoltaic power plants will be lower than estimated by ČEPS; their estimates range from 1000MW to 1500MW. Aren't ČEPS's concerns about the safe operation of the power system somewhat exaggerated?**

These concerns are not exaggerated. We must have maximum certainty at all times that no outage or blackout (which would have immense social, economic and political impacts) occur. In today's

world, long-lasting system outages have in modern times a similar impact as natural disasters – and they enter into the public memory with similar intensity. ČEPS currently does not have at its disposal reliable information on to what extent investors in RES are speculating and to what extent they have really decided to invest in RES following the receipt of a positive opinion on the connection to the grid. This issue is also subject to ongoing discussions on new and comprehensible rules for the connection of electricity from RES sources to the grid.

## **6. Can new environmentally-friendly sources be connected directly to the transmission system?**

ČEPS allows RES sources to be connected directly to the transmission system provided that the output from these sources is at least 100MW. Sources of a lower output are connected to the relevant distribution system. Distribution companies may or may not consent to connection to the grid since current legislation entitles them to refuse if the necessary distribution capacity is not available or the connection might pose a risk to the reliable operation of the system.

## **7. You are calling attention to potential problems in the system. What problems do you have in mind?**

If the photovoltaic and wind power plant projects already approved are realised, it may cause problems not specifically in the transmission system or even the various distribution systems but in the Czech power system as a whole.

These problems would primarily concern the control of the whole of the power system while problems relating to transformation between the various distribution systems and the transmission system and problems concerning overall network capacity would be of only a limited nature. According to current information received from distribution system operators, positive opinions on the connection of photovoltaic sources to the grid issued by the end of January 2010 concern 6000MW of new installed capacity; the figure for wind farms amounts to 1700MW. This data does not include the capacity of plants already connected to the grid (500MW for photovoltaic sources and 180MW for wind plants).

Physical laws, notwithstanding efforts to adapt them to the wishes of various individuals, are insurmountable. The amount of electricity generated cannot exceed that consumed. We are not yet able to store electricity in an efficient way and in the sufficient amount.

**8. Why do you intend to switch off photovoltaic plants? The media have informed the general public that it will happen during the summer of 2011. Are you authorised to take such a measure?**

ČEPS has no intention of switching off, i.e. disconnecting photovoltaic plants from the grid unreasonably. We have a statutory obligation to maintain the safe and reliable operation of the Czech power system and the balance between electricity supply and demand at all times in order to make electricity available to all consumers. We would merely like to point out that if all the projects on which positive opinions have been issued are realised, in the event that the installed capacity of the sources involved is utilised in full we will be able to fulfil the statutory obligation only by applying rules for avoiding a state of emergency. Under these rules, specified in the Energy Act, ČEPS is authorised to restrict electricity output from photovoltaic and wind electricity sources, after having applied all other relevant measures.

Such an emergency measure may be applied only after all regulation power available at existing power stations has been utilised with the aim of maintaining the safe and reliable operation of the Czech power system.

**9. You say that regulation problems may occur. What does it mean?**

Let's imagine that you are driving a car which has neither an accelerator pedal nor a brake and the power of the engine cannot be controlled. Eventually an accident will occur or – if you are a responsible person – you will stop the car. ČEPS, which is obliged to manage the operation of power stations in order to meet real-time electricity demand throughout the country, is in a similar situation. Electricity demand is unstable and varies all the time. For this reason, sufficient regulation power must be available at any moment. Only conventional power stations are capable of delivering the required regulation power while the output of photovoltaic and wind plants depends on potentially changeable weather conditions and, consequently, cannot be used to meet real-time electricity demand. The output of a certain number of these electricity sources can be absorbed by the power system; however, a certain number of other sources capable of accommodating their output to the current needs of the power system must be available. The limit values of electricity output from RES thus vary according to the yearly and daily loads on the system.

In order to balance supply and demand, ČEPS has the appropriate tools at its disposal by means of which it can balance fluctuations caused by variations in electricity demand, equipment outages or variations in output from renewable energy sources and thus ensure the security and integrity of electricity supply to consumers. These tools are called ancillary services and involve so-called spinning reserve (power reserve at generating units which are in operation at the moment) and quick-start reserve (power reserve at generating units which can be quickly put into operation upon instruction from the ČEPS Control Centre).

Regulation power can currently be provided by conventional nuclear, coal-fired, gas-fired and hydro power stations. Nuclear and coal-fired power stations can provide these services only when in operation. At the same time, they must cover the power system base load.

The necessary number of units at conventional power stations must be in operation at any one time. For wind and photovoltaic power plants, i.e. electricity sources with unstable output, a certain limit value has been set – the so-called instantaneous output which can be absorbed by the power system. If this limit is exceeded, the safe and reliable operation of the power system cannot be guaranteed.

If such a situation occurs, output from conventional power stations will first be restricted up to the moment when the limit for the safe and reliable operation of the power system is attained. If these restrictions (i.e. the utilisation of demand-side ancillary services) prove insufficient and an “avoiding a state of emergency situation” occurs, output from wind and photovoltaic plants will have to be restricted. The extent of these restrictions will depend on the total installed capacity of wind and photovoltaic plants.

## **10. Why wouldn't you rather switch off coal-fired or nuclear power stations?**

If certain electricity sources need to be switched off, i.e. disconnected from the grid, in order to maintain the safe and reliable operation of the power system (to avoid or manage a state of emergency), we will act in accordance with current legislation, i.e. firstly restrict output from conventional power stations or disconnect (switch off) such power stations, if appropriate in terms of technology and safety, up to the technical limit for power system control. Only after all these measures have been applied, photovoltaic and wind power plants may be disconnected from the grid.

## **11. Isn't ČEPS behind the times in terms of the further development and upgrade of the transmission system?**

The configuration of the Czech transmission system is currently at the optimum level; a detailed investment plan for the period to 2022 has been prepared taking into account the requirements of all our customers-applicants for connection to the grid in order to supply output from their electricity sources to the grid or take electricity from the grid. As regards renewable energy sources, only three hydro power stations are currently connected directly to the transmission system and the connection of two wind farms is being negotiated.

The problem is not the transfer capacity of the transmission system but the potential lack of reserve capacity at power stations necessary for system control (so-called ancillary services). We have been attempting to draw attention to this problem for more than a year.

Given that the construction of new conventional electricity sources is motivated by market opportunities while the construction of photovoltaic sources is mostly motivated by guaranteed long-term support, the required capacity reserve to compensate for the fluctuations of photovoltaic plant output will not be available if appropriate agreement based on serious discussion is not reached.

The construction of power stations which would provide ancillary services (capacity reserve for the compensation of fluctuations both in electricity supply and demand) as well as their connection to the transmission or distribution system take much more time (primarily because of the lengthy licensing procedure) than the construction of photovoltaic or wind power plants. Furthermore, the obligation of constructing power stations to provide ancillary services cannot be imposed on anybody and ČEPS, under current legislation, does not hold a licence for power plant construction.

## **12. You are calling attention to the potential worsening of conditions for a return on investment with regard to RES. What does it mean?**

Similar to the efforts to distort the laws of physics already mentioned, the law of supply and demand is being distorted in this case. Generating more electricity than can be consumed is nonsense. If supply exceeds demand, the price (usually) falls.

Any power system, and that of the Czech Republic is no exception, is capable of absorbing only a limited amount of electricity generated by photovoltaic sources. This electricity has certain specific features, e.g. its generation is more dependent on the forces of nature than on human decisions.

If the output of these sources exceeds the limit set for a given day or hour, the surplus must be regulated or, in a state of emergency or in a state of emergency avoidance situation, disconnected from the grid. This fact has a direct impact on the effectiveness of the investment concerned: the more the supply exceeds this limit, the worse the return on investment will be.

## **13. Why don't you export excess electricity?**

Exporting electricity from photovoltaic power plants is possible and might contribute towards solving the problem. However, there must be a trader capable of realising such a transaction. Photovoltaic plants are owned by hundreds of individuals who are not able to organise such exports. Instead, they prefer to take advantage of the statutory obligation of distribution companies to purchase their electricity. Distribution companies, however, are not authorised by law to trade in electricity. That's why we are attempting to promote a new purchase model which would facilitate trading in this type of electricity.

#### **14. Aren't you worried about possible legal proceedings or investigation?**

ČEPS prefers dialogue, negotiation and searching for a solution to the current situation. Law suits may well be filed against our Company; however, this is not the way to solve the problem.

#### **15. You are calling attention to the current state of affairs in which the Czech Republic has become a “photovoltaic paradise” which is attracting foreign investors. Can you estimate the percentage of photovoltaic plant installed capacity in the hands of foreign investors?**

We are not able to answer this question since we don't have the relevant information at our disposal. Only absolute figures are available either those received from distribution companies or those extracted from reviews prepared by the Energy Regulatory Office (ERÚ). Specific investors and their share of capacity are known only to relevant applicants for connection to the grid. This information is not available to distribution companies which issue opinions on connection to the grid or to the ERÚ which grants the licences.

#### **16. Connection of electricity output from renewable energy sources to the grid poses no problems in other European countries. Why is it a problem in the Czech Republic?**

The opposite is true. In Germany, especially on her north coast for example, huge problems with the further connection of wind farms have occurred, however, they are not widely publicised. The main problem there is not the connection of a wind farm to the nearest substation but the transfer of electricity generated by wind farms to the major electricity consumption centres in central Germany. Output from wind plants in northern Germany causes overloading on power lines in the neighbouring transmission systems of Poland, Slovakia, the Czech Republic, the Netherlands, Belgium and Switzerland.

A noteworthy consequence of wind plant electricity trading in markets in Germany or Denmark, where electricity is traded on a day-ahead basis, is the concept of a negative electricity price which is offered because some traders are willing to pay for the supply of their electricity to the grid since this contracted electricity is generated by power stations which cannot be shut down. System control capability rather than transmission system capacity is the limiting factor.

In Spain, which is often mentioned as a good example, the mix of generating plant is very different from that in the Czech Republic, as is system control capability. In comparatively large power systems, with a much higher proportion of hydro, gas-fired and oil-fired power plants, the transmission system operator can allow electricity sources with unstable output (wind and

photovoltaic plants) to assume a higher share in the mix of generating plant while maintaining the same guaranteed level of operational security.

**17. The share of electricity from RES in the gross final consumption within the European Union by 2020 has been set at 20%; an individual value has been fixed for each country, based on its specific conditions. The target for the Czech Republic is a 13% share. How successful are we in our efforts to meet this target?**

With the conservative estimate of the installed capacity of photovoltaic and wind power plant projects already licensed, an output of roughly 3500GWh can be expected from these plants by 2012. In addition, electricity will be generated from biomass and other renewable energy sources.

Based on these assumptions, we can expect that the Czech Republic will meet its obligation by 2020 and the target set will most probably be exceeded.

**18. Why didn't ČEPS react earlier to the development of photovoltaics?**

Nobody expected such a dramatic development in photovoltaic sources. Even in the most recent report on the state of the fulfilment of the indicative target for electricity generation from renewable energy sources (for 2008), the Ministry of Industry and Trade, the Ministry of the Environment and the Energy Regulatory Office expect an increase of 131MW in installed capacity at photovoltaic sources by 2010. Moreover, considering the share of small-scale sources connected to the various distribution systems, the contribution of photovoltaic sources to the enhancement of system operation security is seen positively.

**19. You say that the Czech power system is capable of absorbing only a limited amount of electricity generated by photovoltaic sources. What does it mean?**

The term "power system" is often misinterpreted as being made up only of the transmission system or the distribution system. However, the Czech power system comprises facilities for electricity generation, transmission and distribution. These three functions, together with electricity consumption, are the necessary elements of the electricity supply chain. Which of these elements are of key importance to the sustainable development of photovoltaic and wind power plants? Without doubt consumption and generation.

### **Demand-side (consumption-side) constraints:**

Demand-side constraints are easy to explain. No consumer can be compelled to consume and pay for more electricity than he/she needs. Electricity generation is dependent on the demand for it.

### **Supply-side (generation-side) constraints:**

The explanation here is not so easy. The principle is as follows:

A sufficient amount of disposable reserve capacity (so-called ancillary services) must be available at any moment to cover equipment outages and compensate for demand fluctuations and fluctuations in generation from photovoltaic and wind plants. The reserve power is partly provided by quick-start sources (gas-fired and hydro power stations) and mostly by coal-fired and nuclear power stations. These sources must be in operation at all times to be able to provide the required reserve power. Output from photovoltaic and wind power plants at any given moment must be in a certain proportion to output from conventional power stations. In other words, the output from photovoltaic and wind power plants has a certain physical upper limit; if this limit is exceeded, the safe and reliable operation of the power system cannot be guaranteed. The share of photovoltaic and wind power plants in the electricity supply chain is limited. Consequently, the power system's capability to absorb output from these power plants primarily depends on:

- real-time electricity consumption (i.e. consumer demand);
- the capacity of power stations which can deliver reserve power, i.e. provide ancillary services to compensate for fluctuations in supply and demand (a problem of the mix of generating plant within the Czech power system).

## **20. Why has ČEPS repeatedly changed information on the number of positive opinions on the connection of photovoltaic and wind power plants to the grid? You have changed information on the capacity of these plants from 3500MW to 7700MW during one week. How many positive opinions have distribution companies issued?**

ČEPS always strives to use the most up-to-date figures. Figures which were at our disposal from official sources (the ERÚ) in December 2009 showed the installed capacity of photovoltaic power plants for 2010 at being approximately 250MW. Later, on 12 January 2010, the ERÚ stated in its presentation to the Parliamentary Economic Committee that licences for the construction of photovoltaic power plants with total installed capacity of 2500MW had been issued and a number of further licences were under consideration. According to data from the EGÚ, licences for the construction of photovoltaic power plants with a total installed capacity of 3500MW were issued by 31 December 2009. ČEPS then asked distribution companies for relevant data; according to their information, positive opinions on the connection of photovoltaic power plants to the grid with a total installed capacity of more than 6500MW had been issued by January 2010. Photovoltaic power

plants already connected to the grid (500MW) are not included in these figures. The figures are being continually refined. Accurate figures together with information on the current stage of the processing procedure for applications for which positive opinions have been issued will be published jointly by ČEPS and distribution companies in early March.