

DESERTEC: security of energy supplies¹

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There are many reasons why the DESERTEC proposals would provide good security of energy supplies:

- **The big picture:**

- In the scenario for Europe up to 2050 described in the TRANS-CSP report from the German Aerospace Centre,² there would be an overall *reduction* in imported sources of energy and an *increase* in the diversity of sources of energy, with CSP imports providing up to 15% of Europe's electricity. In this scenario, *the entire renewable energy supply system will be highly resilient and resistant to any kind of catastrophic interruption.*
- The DESERTEC proposals provide a good answer to worries about a “global grab for energy.” Because the resource is so large, the world market may be flooded with cheap energy. This would mean increased energy security for everyone.³
- In themselves, CSP imports would help to increase the diversity of sources of energy. Without CSP imports, there would probably be a need for increased imports of other less secure (and more polluting) sources of energy such as gas.
- Bush/Blair policies, driven by the perceived need to protect oil supplies, have made the world more dangerous, not less. A much better option is to break down mutual distrust and build international understandings by collaboration on projects that are a win-win benefit for everyone, as envisaged by the Union for the Mediterranean.⁴ The DESERTEC-inspired “Mediterranean Solar Plan” of the UfM is just such a project.

- **A solar cartel?**

- Because the resource is so large, there would be a buyers' market for clean power from deserts. It would be very difficult to set up some kind of solar cartel (like OPEC).
- Deserts and other areas with high levels of direct sunlight are very widely distributed in the world—which means that no country need be overly dependent on a few sources. Torsten Jeworrek of the DII consortium has said “It's not just one country that will be home to solar thermal power plants, but many. Therefore, the plants will be widely spread geographically and we don't perceive any additional risk from politics or

¹ An electronic copy of this document, with live links, may be downloaded from <http://www.trec-uk.org.uk/resources.htm#PDFdocs>. See also <http://www.trec-uk.org.uk/csp/security.htm>.

² Which may be downloaded from <http://www.trec-uk.org.uk/reports.htm>.

³ See also http://www.trec-uk.org.uk/csp/bonuses.htm#global_security.

⁴ It appears that the UfM was at least partly inspired by the way that, after the second world war, the European Coal and Steel Community helped to break down distrust amongst countries in Europe by engaging them in collaborative projects that were of mutual benefit—leading to the founding of the European Union.

terror, that's not any different from Europe" (Wall Street Journal, 2009-10-30).

- If a solar cartel was created, it is likely that it would be self-defeating because it would simply encourage further development of the many alternative sources of renewable energy.⁵ According to a report from the European Environment Agency, wind power could provide all of Europe's electricity needs, and more.⁶ Another report from the US National Academy of Sciences reaches similar conclusions for the world.⁷
- When OPEC raised oil prices in the 1970s, it damaged investments by OPEC countries in western economies. Even if there was a solar cartel, there would be similar reasons for it to avoid excessive price rises or disruption of supplies.
- CSP plants can provide major benefits for host countries⁸ so there is little incentive to disrupt their operation. Any such disruption would reduce earnings from the export of solar electricity.
- Europe already imports substantial amounts of gas and oil from countries like Algeria and Libya and there is no sign of these supplies being suddenly cut off.
- It is normal practice to provide 25% reserve capacity in power transmission networks for emergencies. Thus, even if all the solar power plants and HVDC transmission lines were cut off simultaneously—which is highly unlikely—there would still be enough power.
- **Nationalisation?** In some countries, there may, for investors, be a risk that their investments could be nationalised. However:
 - That risk would be largely for the investors, not for consumers. It is likely that exports of solar electricity would continue and, since there would be a buyers' market for solar electricity, it is unlikely that the price could be increased.
 - Regarding the possibility that exports of solar electricity might be cut off, much the same can be said as for a possible solar cartel (see above).
 - Naturally, investors are likely to channel their investments into countries where the risk of nationalisation is small.
 - Investors may, if they wish, take out insurance against the risk of nationalisation.
- **The supergrid:**
 - The supergrid can increase the security of supplies for everyone because a shortfall in any one area can almost always be met by supplies from one or more other areas.⁹
 - The UK can benefit from solar imports without it being necessary for electrons to travel all the way from the Middle East or North Africa to the UK.¹⁰ The UK would not be dependent on the integrity of long-distance transmission.

⁵ See <http://www.mng.org.uk/gh/energy.htm>.

⁶ See http://www.mng.org.uk/gh/scenarios.htm#eea_wind.

⁷ See http://www.mng.org.uk/gh/scenarios.htm#us_academy_wind.

⁸ See <http://www.trec-uk.org.uk/csp/bonuses.htm>.

⁹ See http://www.trec-uk.org.uk/elec_eng/grid.htm.

¹⁰ In many ways, a transmission grid is like a lake. Water (electricity) may be added at one end and the same amount may be taken out at the other end without it being necessary for the water (electricity) to

- The transmission grid can be designed to accommodate damage in very much the same way that the internet was designed to be resilient in the face of military attack. Rather than rely on a few large transmission lines, electricity may be transmitted over an interconnected grid of smaller transmission lines. In that case, *electricity would normally be able to bypass any part or parts of the network that may be damaged.*
- If necessary, HVDC transmission lines may be buried underground or laid under water where they would be difficult to attack. A supergrid of this type has been proposed for Europe, composed entirely of submarine cables.¹¹ According to ABB, underground or submarine HVDC lines cost about 10% to 20% more than overhead lines for distances above 500 km.
- **Alternative vectors:**
 - *It is not necessary to rely exclusively on transmission lines for the import of solar energy.* Although efficiencies would be lower, there can be good reasons to transport energy from CSP plants as hydrogen or as finely powdered metal or boron.¹²
 - Apart from providing an alternative route for transmitting solar energy, these *energy 'vectors' can be stored in large quantities as backup supplies of energy if direct transmission is interrupted.*
- **Other reasons:**
 - Knocking out a CSP plant with a bomb would not be easy and the damage would be easily repaired—and, in any case, it would be necessary to knock out hundreds or thousands of them simultaneously to have much impact.
 - From a UK perspective, discussions of whether or not it is wise to import solar electricity from North Africa and the Middle East may turn out to be “academic”. It is very likely that the rest of Europe will import solar electricity from MENA and, since the UK will be part of the single European market for electricity that is taking shape now, it will be participating in those solar imports. Unless the UK makes the unwise and improbable move of cutting its power connections with the continent and setting itself up as a self-contained power fortress, UK businesses and consumers will welcome the opportunity to buy clean power from deserts.

To put possible security concerns in perspective, it should not be forgotten that many countries now depend on supplies of fossil fuels that come from relatively few sources and are quite vulnerable to interruption. It has become accepted that gas, for example, may be transported over long distances through a single pipeline that may be attacked by terrorists at any point along its length. Nuclear power plants depend on imported fuels (they are not a ‘home grown’ source of energy) and are themselves vulnerable to terrorist attack. Nuclear fuel or nuclear waste may easily be hijacked as it is transported around the world in trucks, trains or ships. And nuclear power facilitates the proliferation of nuclear weapons around the world with implications for all aspects of security.

travel from one end to the other (see http://www.trec-uk.org.uk/elec_eng/cascade.html and http://www.trec-uk.org.uk/elec_eng/kickstart.html).

¹¹ See http://www.trec-uk.org.uk/elec_eng/grid.htm.

¹² See <http://www.trec-uk.org.uk/csp/synthesis.htm>.

Again, to put security concerns in perspective, there is now an urgent need to cut emissions of CO₂ and the DESERTEC proposals are probably the single most effective means of doing it. Without that urgent action, including the vigorous development of “clean power from deserts”, the disruptive effect of climate change will dwarf any possible worries about security of energy supplies.