

Energy and water shortages statistics

Memo prepared by FK (09-06-15)

Water scarcity

According to statistics from the **International Water Management Institute (IWMI)**, a **third of the world's population** is suffering from shortage of water, raising the prospect of water crises in countries such as China, India, and the U.S. About a **quarter of the world's population** lives in areas of 'physical water shortage', wherein natural phenomena over-use and poor agricultural practices have caused groundwater levels and rivers to dry up. A further **1 billion people** face 'economic water shortages' due to lack of necessary infrastructure to access water from rivers and aquifers. Scientists had initially forecasted that one in three would face water shortages by 2025, but that threshold has apparently already been crossed.

These statistics were released by the Comprehensive Assessment of Water Management in Agriculture at World Water Week in Stockholm. The Comprehensive Assessment was carried out by 700 experts from around the world over five years time and underlines the fact that access to reliable, safe and affordable water is a **key step** out of poverty for the world's **800 million rural poor**; many more people that are dependant on rivers, lakes and other wetlands risk falling into poverty because of declining groundwater supplies, loss of water rights and access, pollution, flooding, and drought.

Although holding some of the world's poorest people, typically relying on rain-fed agriculture, **Africa's savannahs** are singled out by the Assessment as having the greatest potential for increasing water productivity, increasing agricultural yields per unit water used.

The consequences of water scarcity are evident in a number of countries: **Egypt** imports more than half of its food due to lack of water to grow food domestically; **Australia** is facing major water shortage as a consequence of diverting large quantities of water for agricultural use; the **Aral Sea disaster** is another example where massive diversions of water to agriculture have caused widespread water scarcity, and one of the world's worst environmental disasters.

On a brighter note, the Assessment notes that while a third of the world's population faces water scarcity, this is not because there is not enough water but because of the choices people make – it is possible to reduce water shortages, feed people and address poverty, but the key trade-off is with the environment. Some tough choices will have to be made on how to allocate food and manage water, and not all situations will be win-win for the parties involved.¹

¹ Consultative Group on International Agricultural Research CGIAR, 2006, *A Third of the World Population Faces Water Scarcity Today* [online] Available at:

Severe challenges for policy makers

Research by the **International Food Policy Research Institution** (IFPRI) indicates that growing national, regional and seasonal water scarcities in much of the world pose severe challenges for national government, and international development and environmental communities, challenges heightened by increasing costs of developing new water, degradation of soil in irrigated areas, depletion of groundwater, water pollution, and wasteful use of water.

Water development is critical for food security in many regions of the world, and **irrigation** has played a very important part in helping to increase agricultural yields and outputs to feed the world's growing population; thus, irrigation has been vital to food security and sustainable livelihoods, foremost in developing countries. Population and income growth will boost demand for irrigation water to meet food production requirements and household and industrial water demand. By **2025**, the global population will increase to **7.9 billion**, of which more than **80 per cent** will live in developing countries and **58 per cent** in rapidly growing urban areas.

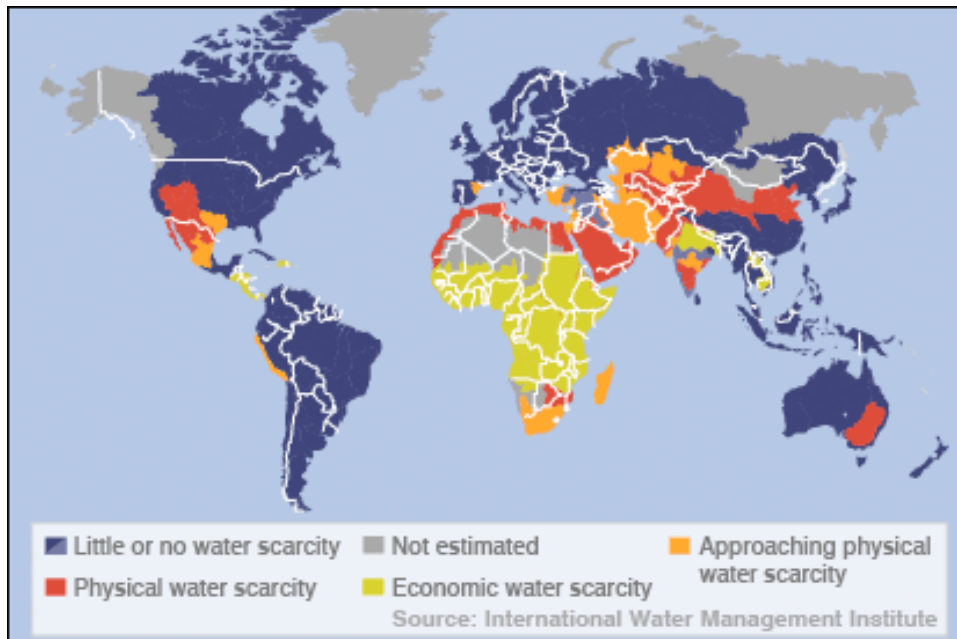
In the year **2000**, **1.1 billion people** lacked access to an improved water supply and **2.4 billion** had inadequate sanitation facilities; the majority of these people residing in developing countries, particularly in Africa and Asia. Water is no longer in abundance in many of these areas, and the high economic and environmental costs of developing new water resources impose limits on the supply expansion; new supplies may therefore not be sufficient to meet growing global demand. The situation has been made worse by sharply increasing food prices, and it remains a question of whether the water available for irrigation will provide the food needed to meet the growing demand and improve national and global food security.

While irrigation has largely been successful in ensuring food security and improving rural welfare, inappropriate management of irrigation has contributed to environmental problems including excessive water depletion, water quality reduction, and water logging. And, in addition to irrigation, water is essential for drinking and household uses, for industrial production, and for environmental and ecosystem services. Domestic and industrial demand for water has increased rapidly, putting further strain on the world's existing water supply. Should this growth continue at the same pace it will threaten the availability of irrigation water to meet growing food demands and, hence, global food security. ²

http://www.iwmi.cgiar.org/News_Room/Press_Releases/releases/CA%20Launch%20Press%20Release_Final.pdf
[Accessed on 15 June 2009]

² International Food Policy Research Institute IFPRI, 2002, *World Water and Food to 2025: Dealing with Scarcity* [online] Available at: <http://www.ifpri.org/pubs/books/water2025/water2025.pdf> [accessed on 15 June, 2009]

Global water scarcity³



Water: A source of future conflicts?

A recent World Bank report stated that water will become the natural resource most likely to cause armed conflict in the 21st century. Continual water shortages affect some **40 per cent** of the world's population in **80 countries** and, given the rapid expansion of the population and ever-increasing demand for water, the situation is expected to deteriorate further.

Whereas shortage of land once stood out as the main constraint on food production in the developing world, it is now water scarcity that will constitute the major challenge. Global demand for water is currently increasing at 2.3 per cent a year, doubling every 21 years, and supply can no longer keep up with the growth rate.

Lack of water is heavily detrimental to human health, but it can also instigate economic disaster, in terms of loss of agricultural exports and decreasing tourism as a result of e.g. cholera epidemics and natural disasters.

Stephen Lintner, an environmental specialist at the World Bank, said that the **Middle East** is the probable focal point for future wars over water. There is 'high potential for conflict of a military nature in the river basins of the Jordan, Tigris and Euphrates'. This, Mr. Lintner said,

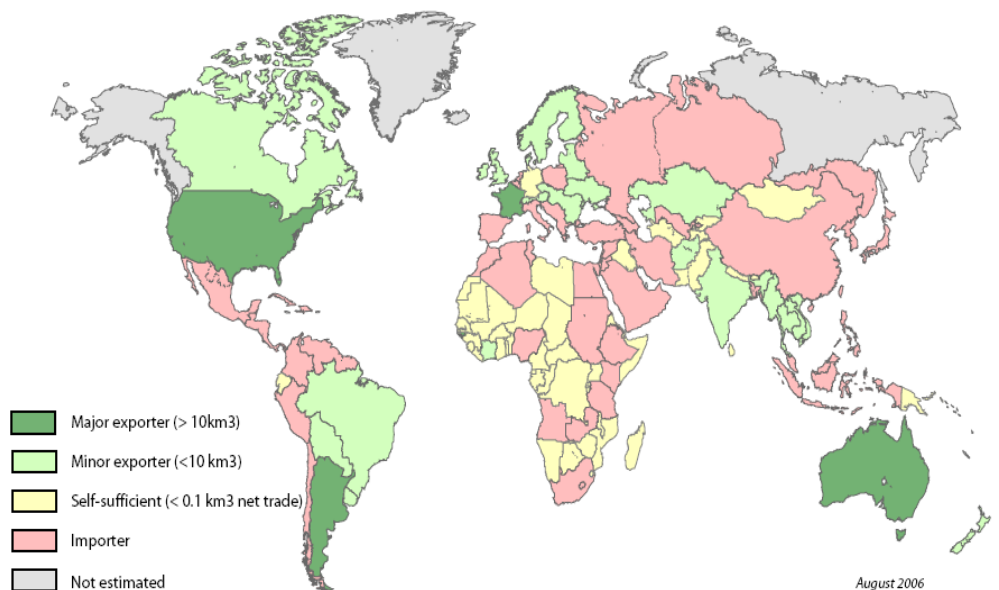
³ International Water Management Institute (IWMI), 2006, *Insights from the Comprehensive Assessment of Water Management in Agriculture* [online] Available at: http://news.bbc.co.uk/1/shared/bsp/hi/pdfs/21_08_06_world_water_week.pdf

requires 'sustained action' and the need to treat water as a 'valuable resource that should be wisely used'; much of the actual water shortage is down to bad management.⁴

UN Secretary-General, Ban Ki Moon, reiterated this view at an Asia-Pacific Water Summit in 2007, stating that a struggle by nations to secure sources of clean water will be 'potent fuel' for war. Mr. Ban condemned governments for not paying heed to the warning signs, saying that throughout the world, water resources continue to be spoiled, wasted and degraded...[t]he consequences for humanity are grave. Water scarcity threatens economic and social gains and is a potent fuel for wars and conflicts.' A few major trends are creating global water scarcity:

- Global population explosion, from 5.6 billion to 7.9 by 2025;
- Increasing levels of water pollution contaminating clean water supplies, effectively decreasing the amount of water available;
- New sources of water can cost between two and three times that of sources already tapped⁵

Global water movement (countries importing and exporting water)⁶



⁴ The Independent, *Water shortages to be new cause of wars* [online] Available at: <http://www.independent.co.uk/news/water-shortages-to-be-new-cause-of-wars-1595148.html> [accessed on 15 June 2009]

⁵ The Times, 2006, *Map details global water stress* [online] Available at: <http://news.bbc.co.uk/1/hi/sci/tech/5269296.stm> [accessed on 15 June 2009]

⁶ International Water Management Institute (IWMI), 2006, *Insights from the Comprehensive Assessment of Water Management in Agriculture* [online] Available at: http://news.bbc.co.uk/1/shared/bsp/hi/pdfs/21_08_06_world_water_week.pdf

According to the World Bank study, people in the MENA region will experience the worst problems, exposed to one of the most 'precarious water supplies in the world', as the population growth is overwhelming traditional water sources: From 1960 – 2025 renewable water supplies (per capita) in the MENA region will have decreased from 3,430 cubic metres to 667 cubic metres – an **80 per cent drop** within a generation.⁷

The energy crisis

The world is experiencing an energy crisis that is taking a huge toll on countries around the globe: **oil** prices are soaring and it is looking less and less likely to be a bubble; the price of **coal** has doubled; countries such as **South Africa** and **Tajikistan** are weighed down by power cuts; and several countries have experienced riots due to electricity disruptions. Rich states are increasingly becoming exposed to periodic blackouts and worry about the security of energy supplies. In the developing world, things are far worse: more than **1.6 billion people**, or around a quarter of the world population, have no access to electricity.

Global demand for energy is increasing rapidly as the population increases and as developing countries such as China and India are experiencing dramatic economic growth. The **International Energy Agency** (IEA) has said that the world's energy needs could be **50 per cent** higher in 2030 than today - the fossil fuels, however, are finite and a far cry from environment friendly. Policy makers increasingly express their concern and stress the need for coordinated political action on energy and related issues, such as climate change and poverty alleviation. The world lacks a global energy institution capable of convening countries and getting them to agree on joint solutions to the enormity of the challenges we face. The IEA, on its part, represents 27 **OECD** countries from the consumer's viewpoint; only 51 countries, almost all of them in Eurasia, have signed the **Energy Charter Treaty**; **OPEC** has only thirteen members and deals with oil only; and the UN's coordinating mechanism, **UN-Energy**, is only four years old, has twenty member agencies, and is fragmented.

Even the most pessimistic of experts believe the world has a few decades at least until the oil, on which prosperity hinges - starts to run out, and hence there is a need for joint action to develop long-term solutions to the energy crisis.⁸

⁷ The Independent, *Water shortages to be new cause of wars* [online] Available at: <http://www.independent.co.uk/news/water-shortages-to-be-new-cause-of-wars-1595148.html> [accessed on 15 June 2009]

⁸ International Atomic Energy Agency IAEA, 2009, *Tackling the Global Energy Crisis* [online] Available at: http://www.iaea.org/Publications/Magazines/Bulletin/Bull501/Energy_Crisis.html [accessed on 15 June 09]

The IEA is predicting markedly higher demand for oil, and argues that this must be met by 'radical' changes in countries energy policies. Due to the global economic crisis, investments in renewable energy and nuclear power are declining, however. The IEA has recommended governments to attain an energy mix with **50 per cent renewable sources** such as wind, hydro and solar, and a quarter from nuclear power; this will be difficult to achieve, despite all good intentions, and it is likely that we will see an increased dependency on oil.

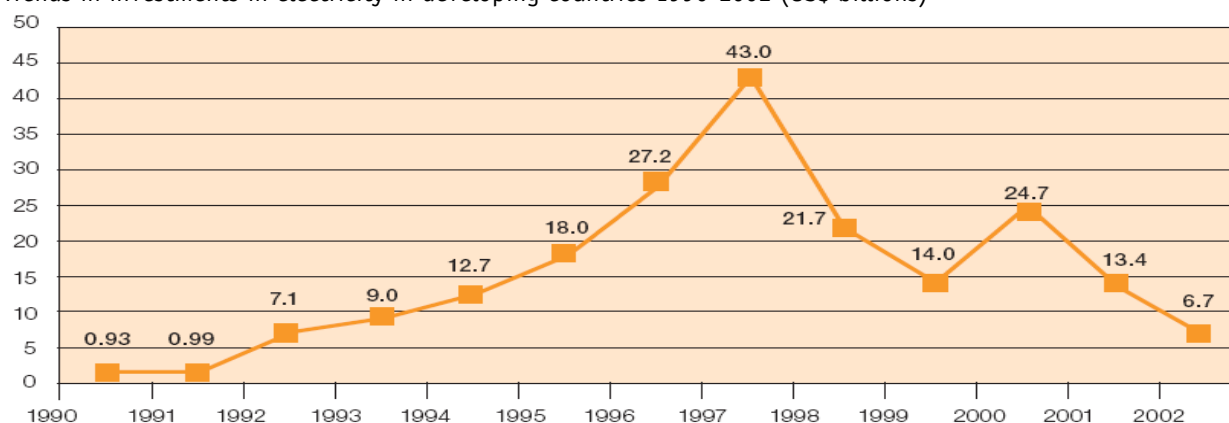
Current projections show that the Chinese, Indian and U.S. economies will pick up speed in 2010, with severe implications for the global oil supply and the price of oil, which could reach **\$200 a barrel**.⁹

Energy and the Millennium Development Goals

UN-Energy, the United Nation's energy agency, is advocating for energy to play a more prominent role in strategies to achieve the Millennium Development Goals (MDGs). Poor countries' consumption of modern energy services falls short of the need and potential; today's situation, a report from UN-Energy argues, 'entrenches poverty, constrains the delivery of social services, limits opportunities for women, and erodes environmental sustainability at the local, national and global levels.' Worldwide, **2.4 billion people** still rely on traditional biomass for cooking.

The **World Summit on Sustainable Development** (WSSD) recognised an explicit link between access to energy security and poverty reduction, and much work needs to be done improve access to reliable and affordable energy services for sustainable development; this amounts to serious challenges for governments, however.

Trends in investments in electricity in developing countries 1990-2002 (US\$ billions)¹⁰

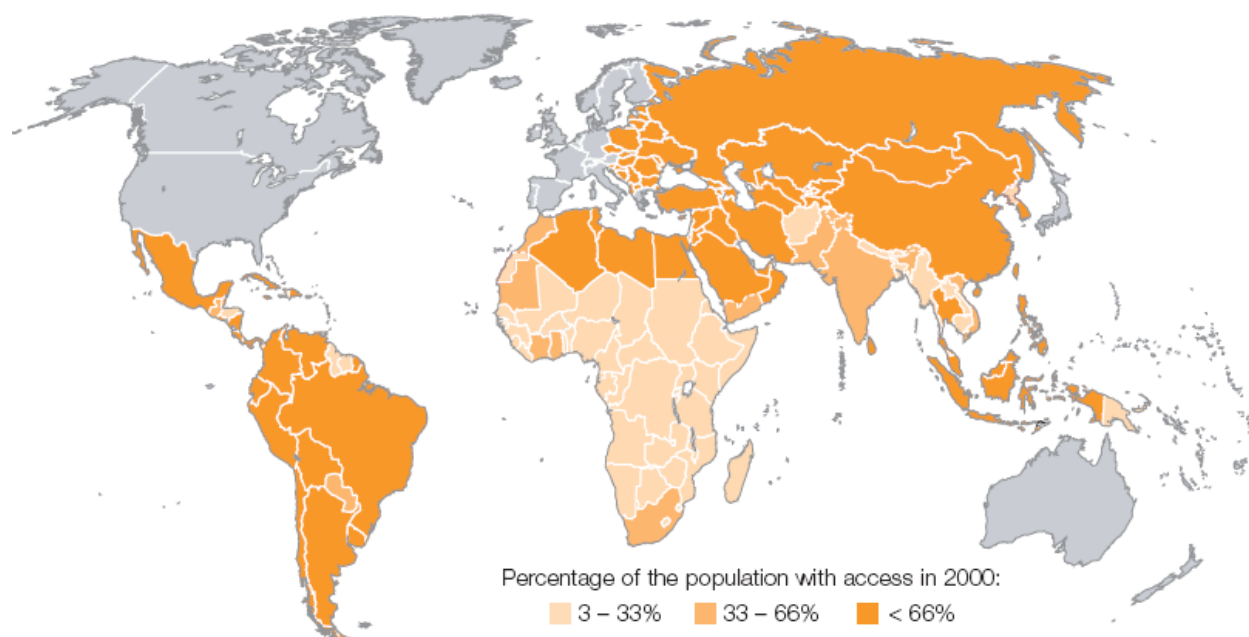


⁹ Energy Bulletin, 2009, *The IEA warns of shortages – “The next oil crisis is coming”* [online] Available at: <http://www.energybulletin.net/node/48582> [accessed on 15 June 2009]

¹⁰ UN-Energy, 2005, *Energy and the MDGs* [online] Available at: <http://esa.un.org/un-energy/pdf/UN-ENRG%20paper.pdf> [accessed on 15 June 2009]

The table above indicates a decline in developing countries' investments in electricity, investments needed to support economic growth that is central to poverty reduction, as well as to help to attain the MDGs. The IEA has estimated that developing and transitional countries face the following cumulative investment requirements in their energy sectors (oil, natural gas, coal, electricity): **US\$2.4 trillion** in the period 2001 to 2010; **US\$3.2 trillion** for 2011-2020; and **US\$4 trillion** in the period 2021 to 2030. Given that this demand is met, IEA estimates that access to electricity will be extended to around **2 billion people** in developing countries; the electrification rate will increase steadily from **64 per cent** in 2000 to **68 per cent** in 2030, accounting for a population increase from **5 billion** to **6.6 billion**. These extraordinary investments, which are doubtful to ever be realised, would still only decrease the number of people with access to electricity to **1.5 billion** in 2030.

Percentage of world population with access to electricity in 2000¹¹



Despite the fact that **1 billion people** gained access to electricity during the past 25 years, the situation remains bleak. Of the people without access to energy services, **four out of five live in rural areas of the developing world**, mainly in **Sub-Saharan Africa** and **Asia**. In Sub-Saharan Africa a mere **8 per cent** has access to electricity, compared with **51 per cent** of the urban population; in South Asia, only **30 per cent** the rural population has access compared to **68 per cent** of the urban population. The human and environmental costs, as well as the

¹¹ UN-Energy, 2005, *Energy and the MDGs* [online] Available at: <http://esa.un.org/un-energy/pdf/UN-ENRG%20paper.pdf> [accessed on 15 June 2009]

damaging effects on economic growth, mean that energy security is a pressing issue that requires urgent attention from policymakers in the developing and the developed world.¹²

The United Nations Development Programme (UNDP) argues that access to affordable and clean energy services is key to achieving the MDGs; that high and volatile energy prices are unaffordable for the poor and hinder development; and that, taken together, the task ahead is huge.¹³ Although there is no specific MDG relating to energy, **none of the MDGs can be achieved without affordable, accessible and reliable energy services** – access to modern fuels and electricity helps achieve the goals by increasing household incomes through economic development. Access to energy is also a precondition for modern **irrigation technologies** in order to improve agricultural output. UN-Energy has affirmed that sharp increases in energy services are needed in developing countries to improve the standards of living and have a positive impact on poverty eradication.¹⁴

¹² UN-Energy, 2005, *Energy and the MDGs* [online] Available at: <http://esa.un.org/un-energy/pdf/UN-ENRG%20paper.pdf> [accessed on 15 June 2009]

¹³ United Nations Development Programme UNDP, 2006, *Energy Security and its Implications for the Poor- from a Global Perspective* [online] Available at: <http://www.energyandenvironment.undp.org/undp/index.cfm?module=Library&page=Document&DocumentID=5764> [accessed on 15 June 2009]

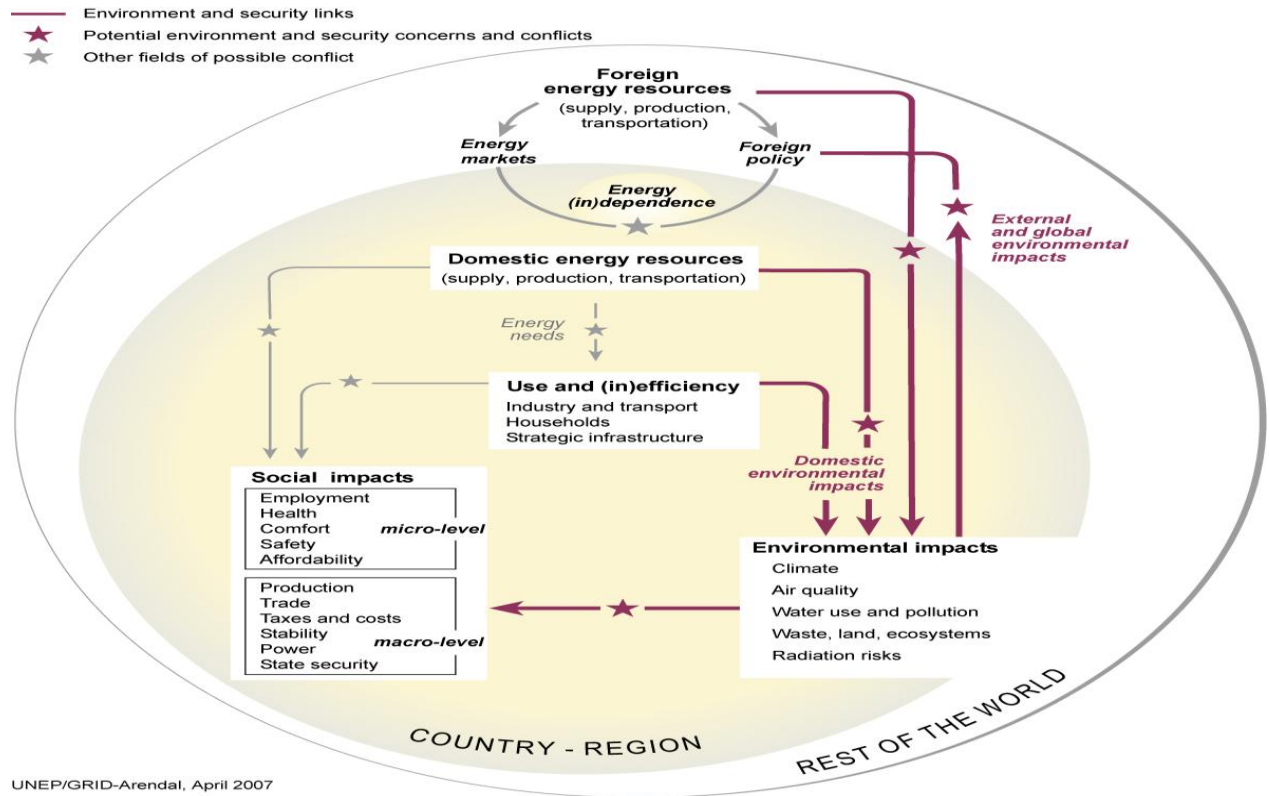
¹⁴ UN-Energy, 2005, *Energy and the MDGs* [online] Available at: <http://esa.un.org/un-energy/pdf/UN-ENRG%20paper.pdf> [accessed on 15 June 2009]

Appendix 1.

Below is a graph outlining the interrelated nature of energy, the environment and security interaction.

Graph of energy-environment-security interactions¹⁵

Energy - environment - security interactions



¹⁵ United Nations Environment Programme (UNEP), 2008, Maps and Graphics [online] Available at: <http://maps.grida.no/go/graphic/energy-environment-security-interactions>