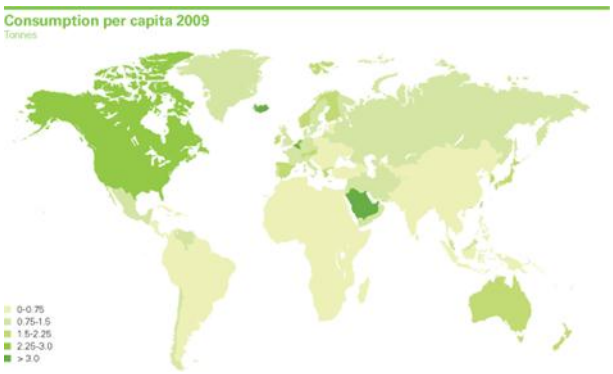
Fuel or energy poverty, possible causes, effects and remedies.

Anne-Grete Ellingsen, 2010

There is a close relation between economic growth, quality of life and energy demand. In most part of the world there is still a need to build out energy sources and infrastructure to secure sufficient and stable supply of electricity to the public and the industry.

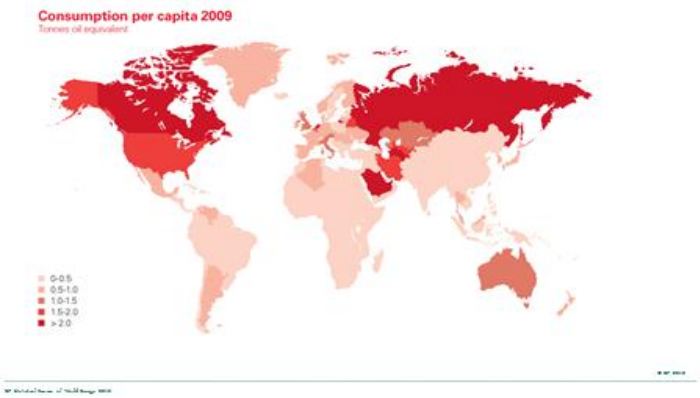
Figure 1: Energy consumption per capita 2009



Source: BP Statistical Review of World Energy 2010

As can be seen from figure 1 the energy consumption per capita is very unevenly distributed, with high consumption in North America and parts of the Middle East (Saudi Arabia, UAB, Oman and Qatar) and very low to nearly no consumption in Africa, South America and the Far East.

Figure 2: Gas consumption per capita

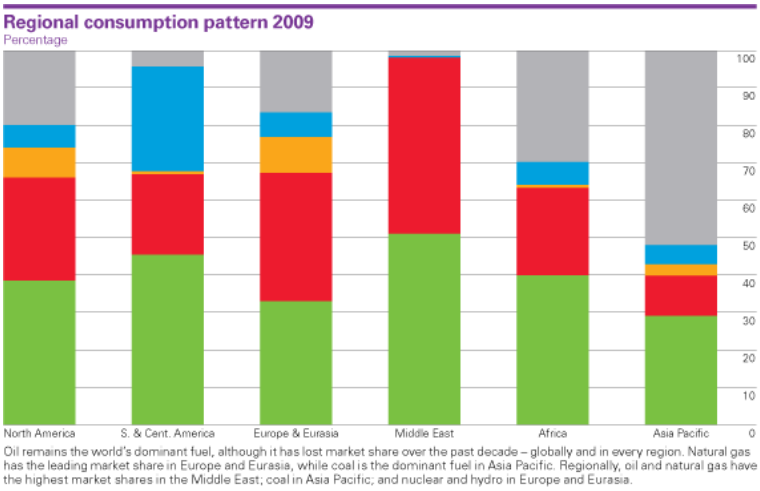


Source: BP Statistical Review of World Energy 2010

The consumption of gas shows the same pattern as consumption of oil; both the US and the Middle East are large consumers in addition to the former Soviet area.

Figure 3: Regional consumption patterns 2009

(Green=oil, red=natural gas, grey=coal, blue=hydropower, Yellow= wind power)



Oil is the leading energy commodity in the world, as shown in the figure 3. The figure also shows that the sources of electricity generation vary a great deal between the different regions.

From 1980 to 2002 world oil demand increased by 1-1, 5% per year and real prices were declining. The result was a steady growth in the world economy. This abundance of cheap energy led to little willingness to save and invest in energy saving technologies in the transportation sector or in buildings. (Noreng 2010)

From 2006 there was a sharp increase in oil prices leading to higher energy prices in oil importing countries using oil and gas as fuel for electricity production. By July 2008, crude oil prices reached $145 a barrel. The high price of oil combined with the bank financial crisis in 2008 led to an economic recession in the world. High import cost of energy led to cut backs in many countries due to the increase in the deficit of the trade balance. This hit the poorest country in the world hard.

In order to keep electricity prices at a reasonable level many governments subsidize the electricity prices to the end users. If the electricity production is based on oil this will be a heavy burden on the national budgets. Higher prices of electricity will also increase the number of people that cannot afford using energy for basic living needs like heating and cooking and thus increase fuel poverty and might cause social unrest.

Wikipedia defines **energy poverty** as the lack of access to electricity, heat, or other forms of power. Energy poverty exists when the required infrastructure is not in place for energy delivery, most often electricity.

Fuel poverty exists when people do not have the ability to pay for energy, most often heating materials.

Fuel poverty

There is not a common definition of fuel poverty. The department of Energy and Climate change in UK has defined fuel poverty as a household that needs to spend more than 10% of its income on fuel to maintain a satisfactory heating regime (usually 21 degrees for the main living area, and 18 degrees for other occupied rooms). The "Fuel poverty ratio" is defined as: Fuel poverty ratio = fuel costs (usage x price) ÷ income.

EU sponsor a project called European Fuel Poverty and Efficiency (EPEE). One of the goals is to find a common definition of fuel poverty.

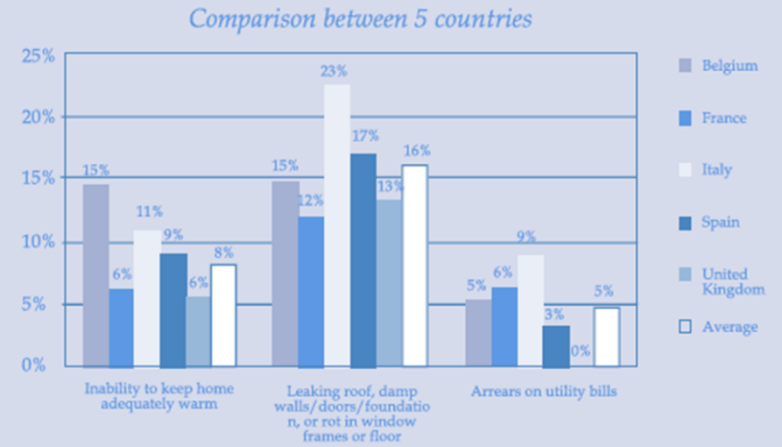
The main factors influencing the fuel poverty are identified as:

1. The energy efficiency status of the property (the energy required to heat and power the home)
2. The cost of energy
3. Household income

Item 1 is related to the quality of the building and the degree of energy saving used in the building structure, doors and windows.

Item 2 is related to the cost of electricity and the level of subsidizing from the government. If the basis for electricity is oil the prices increases with increasing oil prices. Especially in the high cost period of oil in 2008 this became a major problem in many households in Europe.

Figure 4: Comparison of 5 countries



Source: EPEE 2009

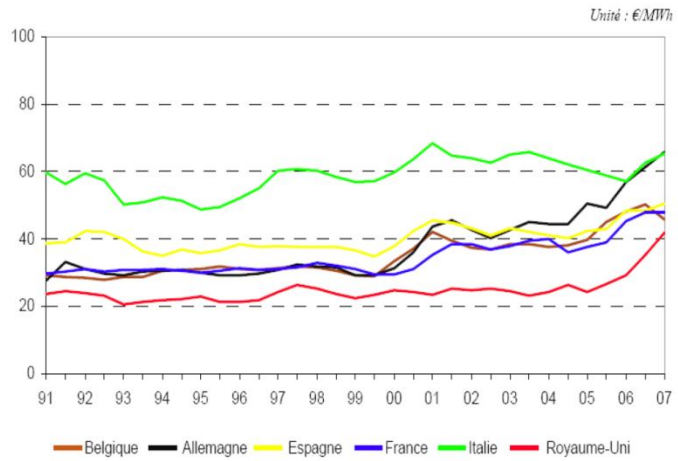
Figure 4 shows a comparison between 5 countries (Belgium, France, Italy, Spain and UK) with respect to the number of the households unable to keep the home warm enough (20 degrees), the quality of the buildings and the numbers of households that could not pay their energy bills. The survey is done by Intelligent Europe in the period from December 2006 to November 2009.

In her book "**Fixing Fuel Poverty**", **B**renda Boardman argues that the primary focus should be on practical brick-and-mortar solutions such as insulating the least energy-efficient homes

first. She argues that this type of capital expenditure is relative permanent and produces lasting benefits in several areas like comfort, the health and financial situation of occupants, which in turn produce other social benefits, and that the investments also will help to address the challenges of climate change and dependency on oil and gas. The measures she list are:

- Limiting energy prices impact
    - Role of social tariff
    - Winter fuel payment for low-income households
    - Prepayment meters
- Improving quality of housing
    - Funding to improve insulation of houses
    - Areas-based initiatives
    - Do It yourself retrofitting assisted by professional
    - Including energy criteria in decent homes standards
- Increasing revenues of households
    - Increased social benefits
    - Benefit entitlement checks (to assist household to maximize social income)

Figure 5: Energy prices (Euro/MWh) in different European countries.



Source: EPEE 2009

As can be seen the prices increases in all countries. The gas prices increased on average 18% and the electricity prices by 14 %. In Belgium there is a considerable degree of social support and consumer protection. France has a good and efficient infrastructure to tackle fuel poverty but lack policy to coordinate the response. In Italy there is rising social concern concerning fuel poverty.
Spain does not recognize fuel poverty as a social problem and hence and therefore no special action is taken. UK has, according to their definition of fuel poverty, 4,5 million households (17%) suffering from fuel poverty and is the only country in Europe that has a clear definition and an action plan to attack the problems connected to fuel poverty.(EPEE 2009)

The measures the EPEE identified to tackle the problem are very much the same Boardman describes in her book:

Energy cost: Social tariffs, debt assistance on energy bills, installation of meters in the homes to improve the day and night efficiency of energy use.

Energy efficiency of buildings: Programs for rehabilitation/upgrading of buildings, Social funds/grants to assist investments in energy efficiency, stricter building standards for news buildings and houses.

Energy poverty

According to IEA nearly 1.4 billion people lack access to electricity and 2.7 billion rely on the traditional use of biomass for cooking which is both time-consuming and unhealthy The World Economic Forum estimates that 3 billion people lacks access to sustainable and affordable modern energy. Most remain dependent on traditional fuels like wood which often leads to stresses on natural resources and undermining the sustainability of rural livelihoods in addition adding to global warming as green areas is declining.

According to the World Bank nearly 75 % of Sub-Saharan Africans, or 550 million people, do not have access to electricity. In South Asia, some 50 %, or 700 million people, lack access. About 90 % of those without access in South Asia live in rural areas.

The International Energy Agency (IEA) estimates that 1.4 billion people will still lack access to electricity in 2030 unless new approaches and policies are adopted

The World Bank supports the government of the developing countries to develop their energy sources and infrastructure through different investments schemes. These include:

- Rehabilitate and strengthen rural electricity distribution networks and support the corporate development of rural electricity supply companies
- Strengthen the capacity of regional and local governments to plan and manage electrification projects, including those that accompany other rural development activities
- Promote electrification investment opportunities to potential private investors
- Develop the legal framework and associated regulations to facilitate provision of capital cost subsidies to private sector providers
- Develop guidelines for electricity systems design and construction appropriate for rural areas, including operations norms
- Develop procedures for calculating rural tariffs and norms for rural service quality
- Develop appropriate policies and incentives for development of renewable energy and of public/private cost-sharing in renewable energy investment projects
- Develop and pilot sustainable financing strategies; support capable, local communities and stakeholders such as local governments, consumer associations, and village groups interested in operating and participating in the financing of small electricity concessions

Some of the barriers investors meet in the development of energy sources in developing countries are high investments cost. The energy sources are often in remote areas requiring investments in roads, transportation net, development of skilled labor etc. Due to this high cost of infrastructure connected to the projects, the energy generated need to be of a certain size to be able to give a profitable investments. The electricity produced is then often transported out of the area to more urban areas with a more constant demand for energy and

also higher purchase power. Few investors engage in the small rural projects unless there is a substantial support from the government or the financial institutions of the World Bank.

The high degree of corruption is also a barrier to investments in many developing countries. By enforcing a higher degree of transparency more investors might be willing to invest in energy projects in these countries.

Here the United Nations Global Compact initiative is welcomed by many investors as a tool to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labor, environment and anti-corruption.

Another initiative to deal with energy poverty is the Energy Poverty Action (EPA) partnership initiated at the World Economic Forum Annual Meeting in 2005 by British Columbia Hydro (Canada), Eskom (South Africa) and Vattenfall (Sweden). The World Energy Council and the Development Bank of Southern Africa joined as partners in 2007 and the World Business Council for Sustainable Development the following year.

The mission of EPA is to demonstrate market-based solutions to energy poverty which can work at scale. The aims is to combine the comparative advantages of international business with new market-based solutions to sustainable supply and 'smart' demand in areas that are remote from utility grids.

EPA aims is to contribute to solutions in three main areas:

- Development of commercially and environmentally sustainable business concepts for rural energy schemes, able to aggregate individually small projects into bankable packages.
- Access to significant private funding to underpin market establishment and development.
- Dislocations of knowledge and information, and creation of substantive partnerships for action.

The EPA partnership has reached three important milestones towards its mission:

- Establishment of a not-for-profit company that will jointly identify programs with host governments and development institutions, and provide professional services to assist program development and implementation.
- Implementation of a pilot electrification project in Lesotho and commencement of additional programs in southern Africa in collaboration with development partners.
- Definition of a private-public funding mechanism that can leverage public resources to mobilize significant private financing. (Source: World Economic Forum)

Also the developed countries can experience insufficient and unstable supply of energy. This can be due to insufficient capacity in period with very high demand or insufficient capacities in the transmission grid due to lack of maintenance, investments or necessary back up in case of fall outs due to severe weather conditions, sabotage or terrorist actions. Many countries in Europe have a high priority to develop both on- and offshore wind power. This type of energy has to be "consumed" when it is produced and the wind is blowing. Periods with high wind velocities will create disturbances in the transmission grid and might cause overload unless

the capacity in the grid is optimized for the maximum peak powers that the system might receive.

In Norway there has been a lack of investments in the transmission grid both on national and regional level for years resulting in weak infrastructure in many areas. A storm can result in black out of large areas for several days in worst case. In other areas the winter season 2009/2010 showed that certain areas had to be rationed with respect to supply due to too low capacity in the grid compared to need of the public and the industries in that area. A plan to improve the grid is now underway but the plan meet a lot of resistance in many areas of the country and the result might be delay in investments in new renewable energy (Norway's 20202 goals in the RES directive) and insecure supply to large urban areas for many years ahead.

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