

“Defining Energy Poverty in Developed Countries”

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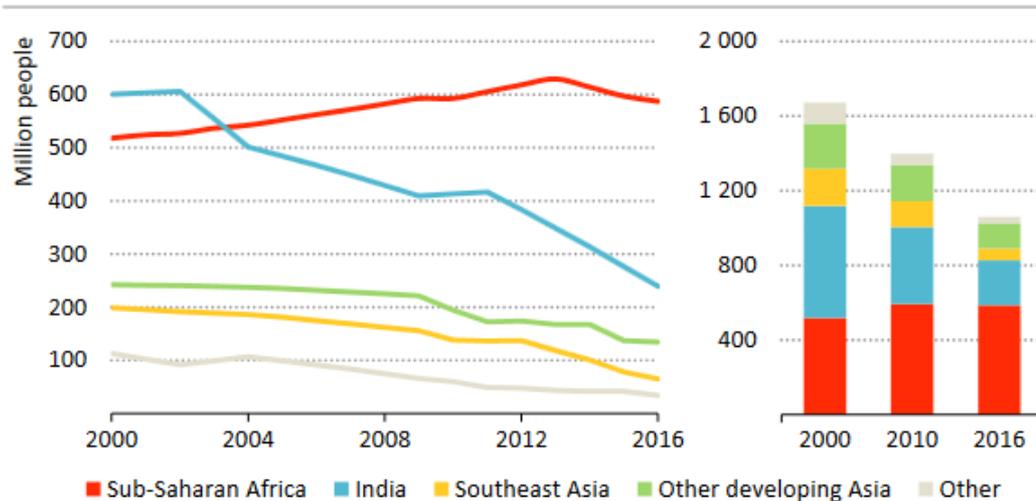
Institute of Energy for S.E. Europe (IENE), Athens

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Energy Poverty in Developing Countries

Population without access to electricity by region



Progress on electricity access is being made in all parts of the world, led by developing countries in Asia, in particular India

Note: Other includes Middle East, North Africa and Latin America.

- According to the International Energy Agency energy poverty is defined as the lack of access to basic energy services such as electricity, gas, heating, cooling, etc.
- The number of people without access to electricity fell to 1.1 billion in 2016 from 1.7 billion in 2000. It is on track to decline to 674 million by 2030, with India reaching universal access well before then.
- The IEA Analysis reveals that from 2000 to 2016 nearly all of those who gained access to electricity worldwide did so through new grid connections, mostly with power generation from fossil fuels.
- Over the last five years, however, renewables have started to gain ground, as have off-grid and mini-grid systems, and this shift is expected to accelerate.

Defining Energy Poverty in Europe (in OECD countries)

Households:

- Inability to keep home warm or cool
- Inability to pay utility bills
- Living in poor condition (energy-inefficient) houses
- Access to modern energy, both electricity and clean cooking solutions
- Degradation of Quality of life (in energy terms)

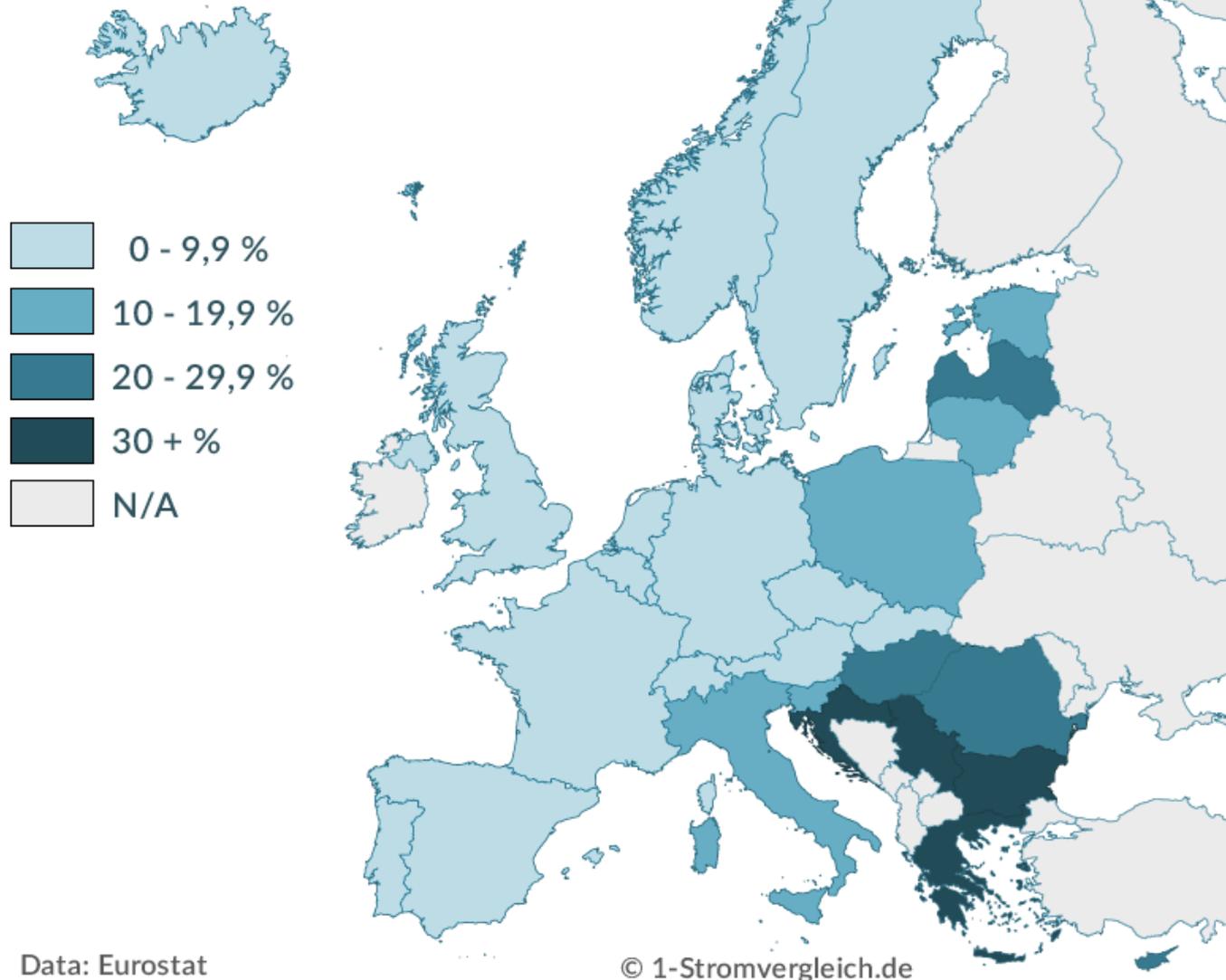
States:

- Inefficient and energy costly electricity production
- High levels of dependence on imported energy (natural gas, oil, electricity)
- Environmental degradation due to polluted energy forms
- Divergence among European regions in energy use and standards of living
- Energy Isolation
- Lack of technologies (smart grids) and combined-smart energy uses (e.g. HPP and irrigation systems, Co-generation, desalination, geothermal heating and cooling etc.)

According to the Buildings Performance Institute Europe (BPIE), the estimated number of energy-poor citizens in Europe is between 50 and 125 million people. Despite the severity of the problem, a common definition at European level is not yet in place, nor are there specific criteria for identifying those suffering from energy poverty.

ENERGY POVERTY IN EUROPE

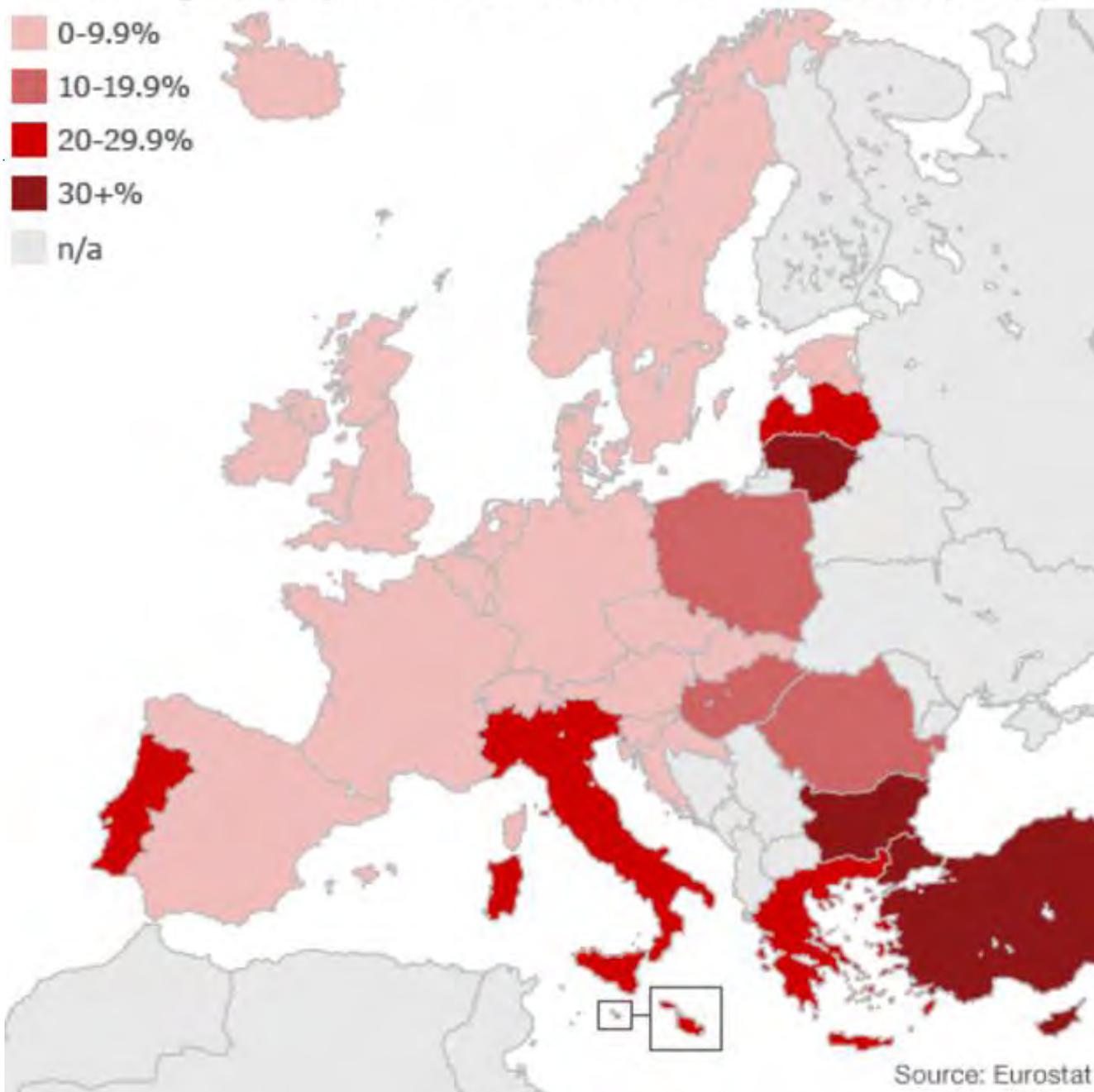
Percentage of population in arrears on their utility bills



Data: Eurostat

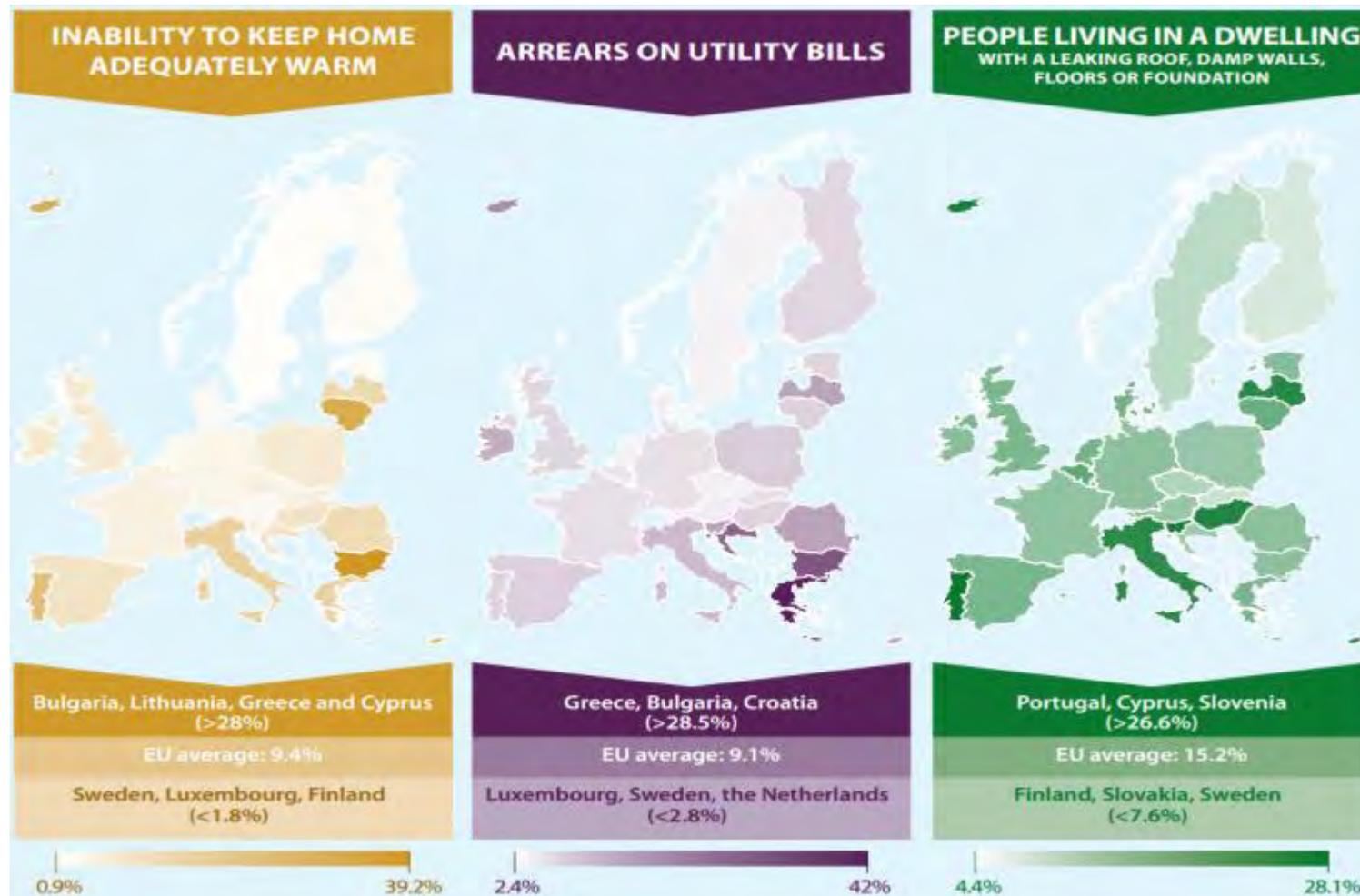
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Percentage of population unable to heat home adequately

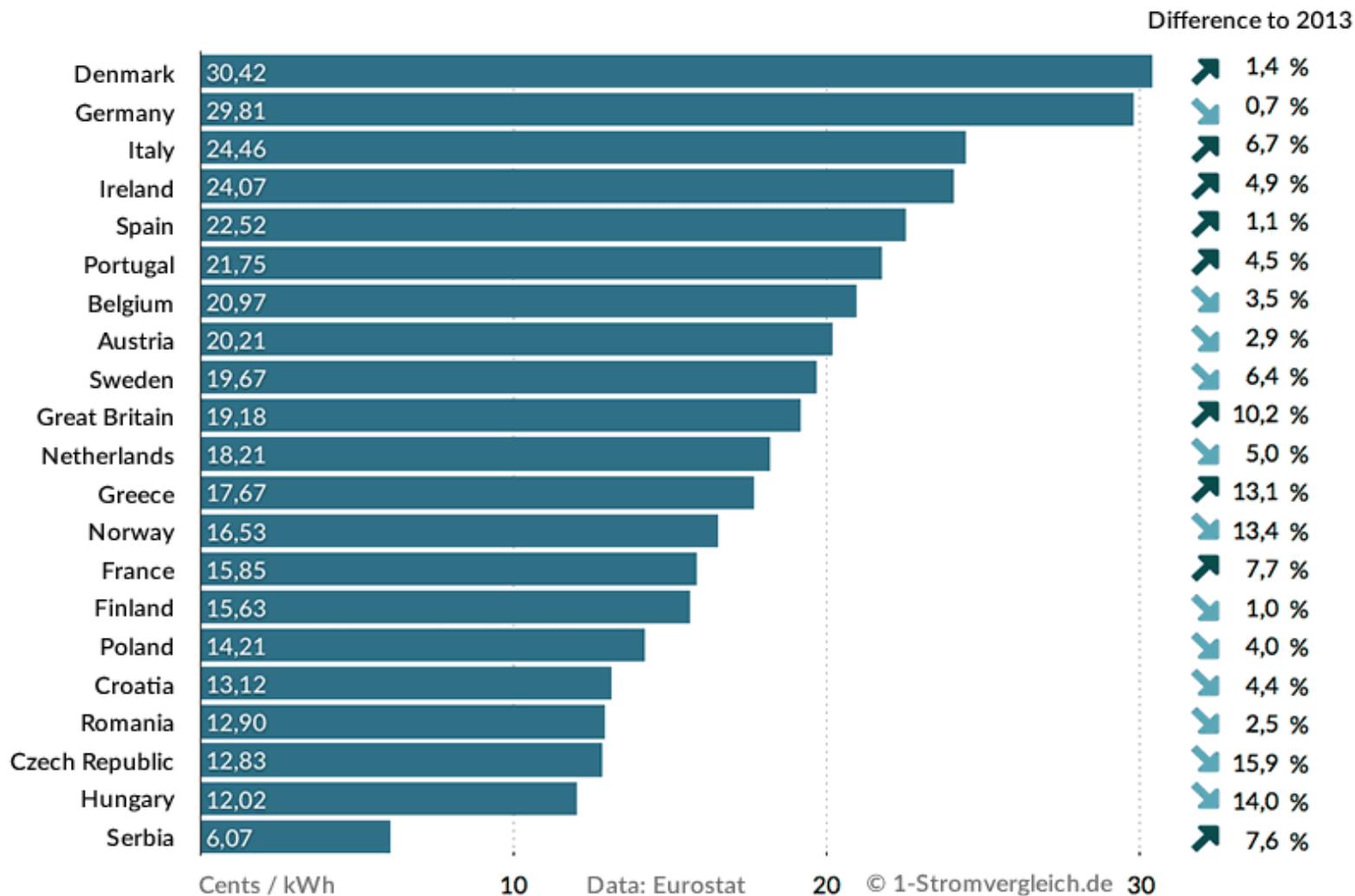


Source: Eurostat

Energy Poverty in Europe



ELECTRICITY PRICES EUROPE 2014



Energy Poverty in Greece

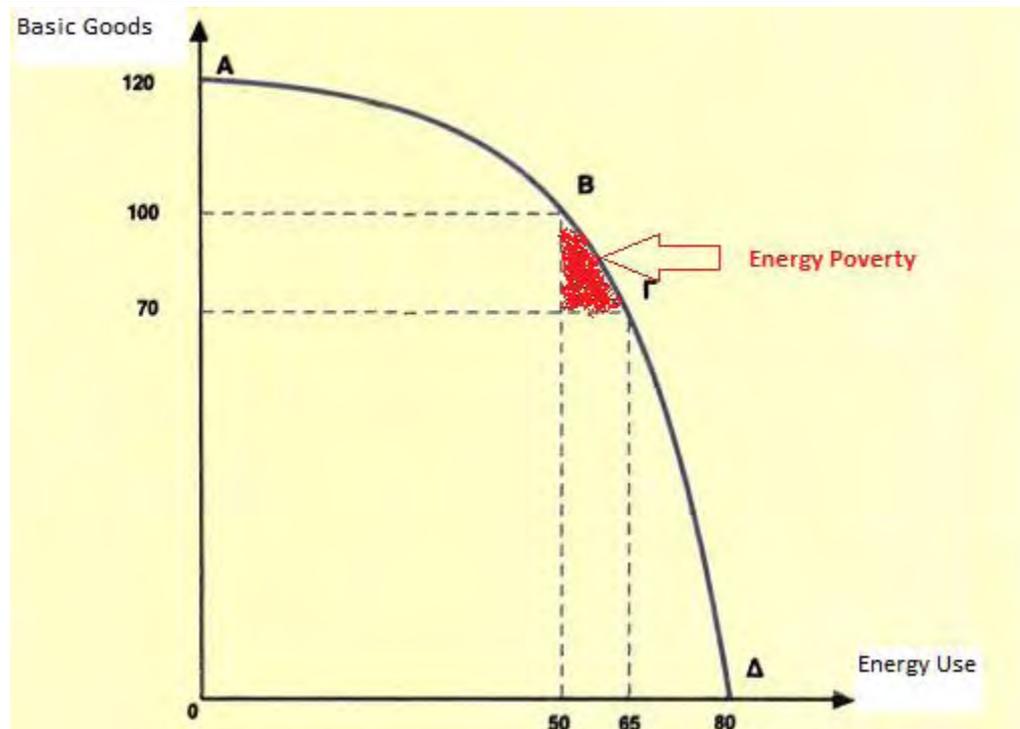
- In Greece there is neither a clear definition of energy poverty, nor specific indicators for monitoring the phenomenon.
- In general, a household is considered to be energy-poor if they spend more than 10% of their income on energy needs, combined with some other, usually social and geographical criteria for the allocation of benefits.
- Greece among the countries with the highest energy poverty in the EU
- In Greece, according to BPIE, 70% of the population is unable to maintain adequate heating in the dwellings, 50.7% delay payments of debts to utilities and 29.5% of people live in inadequate and inappropriate housing conditions. (European averages are 10.8%, 10% and 15.1% respectively)
- 500,000 bills of PPC are outstanding
- Energy poverty in Greece is largely the result of the economic recession and crisis of recent years

Energy Poverty in Islands

- Electricity is expensive to produce in autonomous island grids. Fuel costs are increased due to transportation and need for local storage.
- Opportunity to have low cost wind or solar generation is limited in autonomous grids unless energy storage is introduced.
- Island residents are not allowed to use photovoltaics the way mainland residents can.
- It is not easy to expand local production. New big consumers (industrial, tourism, desalination, etc.) are not easy to serve. Electricity generation expansion has to be planned.
- Energy poverty in islands affects every consumer if costs are subsidized.
- Power quality is lower in islands. There are power disruptions, not constant voltage, frequency, etc.
- Energy efficiency measures are more expensive to implement because lack of local expertise.

An Alternative Definition of Energy Poverty for Developed Countries

- The real cost of energy for a household referred to the goods that are sacrificed (opportunity cost) to secure it.
- Thus, energy poverty is defined as the increased number of the other goods required (sacrificed) to secure each additional unit of energy use.
- Energy poverty is therefore the rising cost of opportunity, as, to ensure an extra energy unit, inelastic coefficients (basic living standards) are detached from purchasing power, that are less and less able to provide additional and sufficient units of energy use.



Household Purchasing Curve

Conclusions

- Energy Poverty should be considered as a relative term and not as an absolute magnitude
- smart meters can play an extremely important role in gathering useful data and help smart grids
- The trends in the 21st century are the democratization of power generation with millions of power producers, instead of a number of large central power stations in the previous century
- RES will transform consumers to prosumers that will be able to operate their micro energy systems in order to generate, store and use energy
- Managing these energy micro-systems will required the achievement of higher energy efficiency which can be reached only through a radical integration of all energy services (digitalization)
- Technology and smart energy systems can transform the curve of increasing opportunity cost to a curve of stable opportunity cost and thus eliminating energy poverty



**Thank you for
your attention**

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