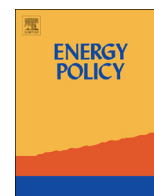




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Communication

Energy poor or fuel poor: What are the differences?

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HIGHLIGHTS

- Address energy poverty and fuel poverty simultaneously.
- Compare energy poverty and fuel poverty from 4 perspectives.
- Summarize the relationship between energy poverty and fuel poverty.
- Divide energy poor and fuel poor into three categories.

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ABSTRACT

Energy poverty and fuel poverty are descriptors of problems of households' energy consumption, they are both distinct problems and have been addressed by many researchers, organizations and governments. Cross use of the terms of energy poverty and fuel poverty in published papers is common. As an accurate descriptor is the presupposition of research and policy development, especially for those who just started to pay attention to this issue, this paper compares the definitions, research priorities, status quo, and problems of these two concepts, and summarizes the relationship between them. The paper suggests that only when the research targets are households who are living in a cold climate and have difficulty in getting access to electricity or modern cooking facilities, and in supplying indoor heating with appropriate cost, the concepts of energy poverty and fuel poverty have the chance to be broadened and mutually integrated.

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1. Introduction

Many papers confuse the terms energy poverty and fuel poverty, which both concern the problem of a residential households' access to domestic energy consumption. Pachauri et al. (2004) and Barnes et al. (2011) considered fuel poverty (using 10% of the income necessary to heat a home to acceptable temperatures), as one kind of energy poverty measure, Harrison and Popke (2011) used the term energy poverty to describe a situation known as fuel poverty, Foster et al. (2000) used the term fuel poverty to describe a situation known as energy poverty, Buzar (2007) believed energy poverty is synonymous with fuel poverty and that energy poverty is 'usually called fuel poverty in the UK and Ireland,' Bouzarovski et al. (2012) followed the opinion of Buzar and discussed the energy poverty policies in UK, which UK government called fuel poverty policies.

An accurate concept is needed for research and policy development, especially for those who just started to pay attention to this issue, this paper aims at comparing the definitions, research priorities, status quo, and problems of energy poverty and fuel poverty and finding the common points of them to discuss whether these two concepts are describe one problem and whether they could be cross-used or not.

2. Background

2.1. Definitions

Energy poverty has often been defined as a lack of access to modern energy services. In 2002 the IEA defined such energy services as household access to electricity and commercial energy (IEA, 2002), and as household access to electricity and clean cooking facilities in 2010 (IEA, 2010). Sovacool et al. (2012) recommended that mobility and mechanical power should be included in essential energy services, and Parajuli (2011) expanded the concept to 'an absence of sufficient choice in accessing

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adequate, affordable, reliable, quality, safe and environmentally benign energy services to support economic and human development'. The energy poor have also been defined as households who cannot meet their basic energy needs by estimating a minimum limit of energy consumption (Pereira et al., 2011). Most papers which focus on quantifiable energy poverty measures have used the IEA concept which was published in 2002 (Sagar, 2005; Birol, 2007; Barnes et al., 2011; Bhide and Rodriguez, 2011; Sesan, 2012; Kaygusuz, 2011). Here energy poverty could be measured by numerical indices. The IEA developed the Energy Development Index (EDI), which was composed of three or four indicators concerning physical access to energy, to compare the energy poverty situation of developing countries (IEA, 2002, 2004, 2007, 2010). Nussbaumer et al. (2012) further proposed the Multidimensional Energy Poverty Index (MEPI), which addressed the deprivation of access to modern energy services, to measure energy poverty.

Fuel poverty on the other hand has been the concern of some campaigners since the 1970s or earlier. In the early 1980s, fuel poverty became a serious political issue, and became the subject of formal government legislation in UK. Lewis (1982) first defined the concept as the inability to afford adequate warmth in the home; Boardman's (1991) definition that if a householder needed to spend more than 10% of their income on total household fuel costs to achieve a satisfactory indoor temperature regime then they were classed to be in fuel poverty. This definition was refined and then officially adopted by UK government in 2001 (DEFRA, 2001) with the minimum temperature thresholds being 21 °C in the living areas and 18 °C in other parts of the house; Boardman (2010) later defined fuel poverty when households could not 'afford adequate services ... clearly demonstrated when the home is cold or fuel debts accumulate.' In a 2013 review of fuel poverty in the UK Hills (2011) proposed a new definition of fuel poverty called the 'low income high cost' (LIHC) measure being those householders who would need to spend more on fuel costs than the median level and having done so the result would mean that their residual income would put them below the official poverty line. This new measure would be a relative measure as distinct from the earlier 10% measure which was absolute. The change would mean that the number of people in fuel poverty England would drop from around 3.2 million persons to around 2.6 million persons (DECC, 2013).

2.2. Research priorities

2.2.1. Energy poverty

Households who are living in developing countries are the main target groups for energy poverty. Some papers aimed at calling for a closer look at energy poverty, Birol (2007) has recognized that the energy-economics community has given far less attention to energy poverty among developing countries; Kaygusuz (2010) addressed the energy poverty situation of rural areas. Alleviating energy poverty is another main point, Sagar (2005) proposed an approach through creating a fund to help energy poor; Sesan (2012) examined the energy poverty alleviation efforts of Practical Action in West Kochieng, Kenya.

2.2.2. Fuel poverty

Most of fuel poverty researches took residents of England, Ireland, and Scotland as research targets. Proposing methodology for refinement of fuel poverty measure is one of aims of researches, Boardman and Hills argued about the details of the 10% measure and the low income high cost measure (Hills, 2011; Boardman, 2012); The subjective indicators was also used to measure fuel poor by Healy et al. (2004), Walker et al. (2012)

used GIS to integrate fuel poverty indicators. Health and social effects of fuel poverty is another major concern of fuel poverty research, Healy and Clinch (2002) addressed the effects of fuel poverty on household occupancy; Rudge and Gilchrist (2005), Liddell and Morris (2010), Dear et al. (2011) focused on the effects on the physical health, especially the higher rate of excess winter deaths. Carbon reduction and energy efficiency is also an important perspective of fuel poverty research, Jenkins (2010) explored the overlap between fuel poverty and carbon emission; Guertler (2011) examined the effects of carbon reduction strategy on fuel poverty.

2.3. The existing situation

2.3.1. Energy poverty

There are about 1.3 billion people in the world that lack access to electricity (IEA, 2012), with most of the electricity-deprived population living in the developing world, mainly in Africa, developing Asia and Latin America (see Fig. 1). The lowest levels of electrification rate of the world are currently in sub-Saharan Africa, where only 31% of the population has access to electricity. It has been estimated by the IEA that the number of the electricity-deprived population in the world will fall by only around 0.2 billion during the next 20 years, without any new policies to address this problem. Even then it will still account for around 15% of the world's population (IEA, 2010). Access to electricity is the result of policy-driven electrification projects in most cases, China's electricity industry experienced significant growth over the past three decades, because of the strong governmental intervention (Chen and He, 2013). Most of households in energy poverty, who rely on traditional use of biomass for cooking, are living in developing countries, with 32% of them in India, 24% in sub-Saharan Africa and 16% in China. The population using traditional devices of biomass of the world is estimated by the IEA to increase slightly from 2.7 billion in 2010 to 2.8 billion in 2030 (IEA, 2010).

Households who cannot get access to electricity rely mainly on traditional biomass to meet virtually all their energy needs, and many consume more primary energy than those who can get access to electricity. For instance taking Angola, Democratic Republic of Congo, Ethiopia, Kenya, Myanmar, Mozambique and Tanzania as examples and using 2009 data of, the highest electrification rate among these countries is about 12% but the

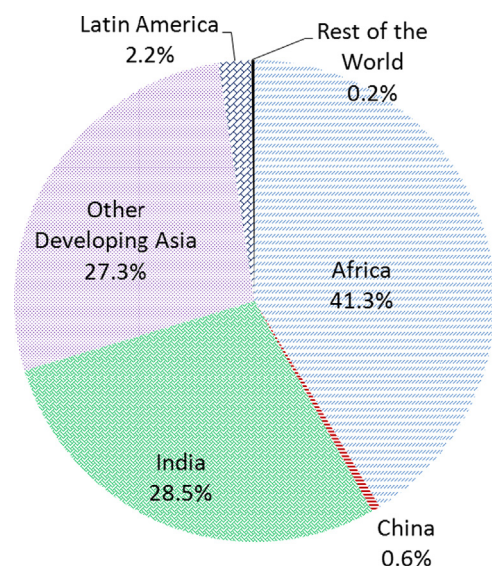


Fig. 1. Distribution of people without access to electricity, 2009. Sources: IEA, 2010.

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