

Presentation of the Romanian Partner Oradea University

1. Human dimensions of a sustainable energy transition

First, we need to identify which behaviours need to be changed. A sustainable energy transition involves changes in a wide range of energy behaviours, including the adoption of sustainable energy sources and energy-efficient technology, investments in energy efficiency measures in buildings, and changes in direct and indirect energy use behaviour.

Second, we need to understand which factors underlie these different types of sustainable energy behaviours. We discuss three main factors that influence sustainable energy behaviours: knowledge, motivations, and contextual factors.

Third, we need to test the effects of interventions aimed to promote sustainable energy behaviours. Interventions can be aimed at changing the actual costs and benefits of behaviour, or at changing people's perceptions and evaluations of different costs and benefits of behavioural options.

Fourth, it is important to understand which factors affect the acceptability of energy policies and energy systems changes. We discuss important findings from psychological studies on these four topics, and propose a research agenda to further explore these topics. We emphasize the need of an integrated approach in studying the human dimensions of a sustainable energy transition that increases our understanding of which general factors affect a wide range of energy behaviors as well as the acceptability of different energy policies and energy system changes.

Key issues:

- (1) identification and measurement of energy behaviours to be changed,
- (2) examination of the main factors underlying energy behaviour, including the adoption of sustainable energy resources and energy-efficient technology, investments in energy efficiency measures in buildings, and user behaviour,
- (3) designing and testing interventions to change energy behaviour as to reduce CO₂ emissions by households, including information, financial incentives, regulations and technological changes,
- (4) studying factors underlying public acceptability of interventions and changes in energy systems.

Factors Underlying Energy Behaviour

Behavioural interventions aimed to encourage sustainable energy use will be more successful if they target important antecedents of behaviour, and remove significant barriers to change. Hence, it is important to examine which factors affect the likelihood that people engage in behaviours that promote a sustainable energy transition. People's perceptions of the energy use through their own behaviours is not always accurate. This implies that they may not accurately judge which behaviour changes are effective to reduce energy consumption and related CO₂ emissions. People tend to rely on a simple heuristic when assessing the energy use of household appliances, notably the size of appliances.

Motivations

Whether or not people engage in sustainable energy behaviour will depend on their motivation to do so. People will be more motivated to engage in sustainable energy behaviours when they evaluate the consequences of such behaviours more favorably, that is, when the behaviour has relatively more benefits and less costs. Individuals can base their decisions on the evaluation of individual as well collective consequences of behaviour, as we illustrate below.

People are more likely to engage in sustainable energy behaviour when they believe such behaviour has relative low individual costs and high individual benefits, resulting in overall positive evaluations of the relevant actions. This was found for both direct and indirect energy use.

The Psychological Effects of Unemployment

Conscientiousness

Conscientiousness, which represents a tendency for individuals to be goal focused and highly motivated bears links with achievements within the work environment. Hence, the experience of unemployment may curtail opportunities to express conscientious-type behaviour. Conscientiousness is also positively linked to one's economic situation, such as wealth accumulation or higher wages, and predicts fluctuations in life satisfaction following income changes. Unemployment, then, may cut off access to previously valued achievement goals, and this may act as a catalyst for personality change. Consistent with the theoretical expectation that unemployment will precipitate changes in conscientiousness, both retirement and first-time entry into employment have been associated with changes, negative and positive, respectively, in conscientiousness.

Agreeableness, Extraversion, and Openness

Work, like many normative life events, can have a crucial socialization influence. The ability to interact socially, convey ideas, and make compromises are typical aspects of day-to-day activities within the workplace. Hence, the experience of unemployment may thwart the expression of socially oriented personality traits. However, given that unemployment presents both new threats and new opportunities, it is not entirely clear how unemployment might influence traits like agreeableness, extraversion, and openness.

2. Case study - Osorhei Photovoltaic Power Plant (CEF Osorhei)

Realization of the Osorhei Photovoltaic Power Plant (CEF Osorhei) intended to use the renewable solar energy for producing green energy by achieving a power generation capacity of 0.6 MW on solar panels in Oşorhei.

Geographical location and climatic conditions of Romania provides the necessary context for producers of electricity using sunlight.

Areas of special interest for electric power applications of solar energy in Romania are: - the Romanian Plain, the West Plain, Banat and part of the highlands of Transylvania and Moldova.

These areas have streams of solar energy with an annual average between 1700 and 2050 hours of sunshine per year, and areas such as Dobrogea, Romanian coast of the Black Sea and the Danube Delta, presents special features, with an average annual solar flux extremely favorable reaching a number of over 2,200 hours of sunshine a year.

The Fughiu village is where the plant based on solar photovoltaic panels was carried out, with a production capacity of 0.6 MW of electricity. The solar energy potential that it offers the Bihor county is harnessed through the solar production of electricity, which is connected to the National Power Grid downstream of the point of separation (where users' installations are separated as property plant operator network). The land for this facility was chosen in Fughiu town because it has a large enough area for this project, and is positioned at a distance from any buildings, forests or other issues that may create shadows to the installation. The capture of solar radiation on the ground it take place under optimum conditions.

With reference to the favorable situation in terms of solar radiation of the areas where the solar system is located, this enables capturing the full potential of solar radiation in Bihor County, in a year, 5659.2 Wh / m².

In this way solar energy flows reach annual average between 1700 and 2050 hours of sunshine a year, which can generate a real electrical current production of 650,000 kWh / year for that installation of 0.6 MW.

The solar power photovoltaic thin film panels were chosen being the most viable for that production area, having a higher current than the system based on polycrystalline panels, because it works properly in days with low solar radiation. Basically a thin film PV system can be built to any size, taking into account the energy that you have to produce. Additionally it can be enlarged or moved, given the context.