

How can citizens influence companies to behave more eco-friendly way Innovation related issues

Composed 10

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1. Introduction, basic concepts

The main objective of the C4ET project is to develop tools to raise citizens' energy consumption awareness. It is obvious that we can consider the awareness of citizens to be of high level not only when we have increased their knowledge about the topic but when they are able to do actions based on this new knowledge.

Citizens' energy consumption consciousness is mainly based on practical and technical knowledge but in some cases organisation/organisational knowledge can be beneficial in implementation as a result of consciousness. All of this is based on innovation. This is why we have composed a concise e-book on the topic on innovation including the history and types of innovation.

Raising the awareness of citizens can be regarded as both technological and social innovation with more focus on social information in our case.

Innovation in details

Basic processes of innovation were born during the Industrial Revolution when a new product or technology was developed from an idea and then was sold on the market.

Next milestone in innovation is dated in the '80-ies, when a new term emerged in the field of technical development: innovation.

Innovation has not had an appropriate definition. At first it was considered as a technical process which:

- lasts from the idea to implementation, or
- lasts from Research and Development (R+D) to implementation.

Note that what both interpretations share is that innovation is always a process and a successful innovation process always results in implementation, adaptation, application and/or launching and marketizing. These two common points remained unchanged during the development of the term "innovation". Naturally, innovation processes are not always successful, which can have several reasons. For instance, during the implementation phase of the innovation process it can turn out that novelties are not viable, etc. This is what we call 'interrupted innovation.'

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Another important characteristics of innovation is the introduction of something new within the organisation. E.g. if a company starts to manufacture and launch a new product to the market - and something similar already exists -, it still is considered as innovation.

Later, research and development were separated from the innovation process and thus the process became a research and development and innovation (R+D+I) process.

Research has two types: basic research and applied research. The difference between the two is that basic research has no objective to achieve a technical result to be implemented in practice while applied research has. In the innovation process, research basically indicates applied research. Considering the fact, that steps of development and innovation are not separated in practice, they were merged and the Horizon 2020 program determined it as Research and Innovation (R+I). This term is the most accepted one today.



A modern definition of innovation

"Innovation is the implementation of a new or significantly developed product (goods or services), process, new marketing or organisational method in business practice, organisation, or outer/outside connections, partnerships."¹

This definition includes the four types of innovation: product, technological/process, marketing and organisational innovation.

We highlight that according to this definition, the term implementation refers to implementation and adaptation in business practice.

Apparently, raising awareness in energy consumption is not business-related. So this cannot be listed among the above mentioned innovation processes, as it has no direct economic effect. Although it has costs but it does not generate direct income or profit.

Although it is obvious that raising citizens' awareness in the field of energy consumption is basically not an economic innovation but has social orientation. Those activities that partly have an innovation process without economic benefits are called **social innovation**.

Social innovation has numerous definitions. We hereby present two of them.

Definition of social innovation I.

Social innovation has a lot of definitions indicating that it is a very complex term with more uncertainties. A study, requested by the European Commission (EC 2013), examined 17 researches about social innovation financed by the EU to find a definition of social innovation According to that social innovation has the next three dimensions:

- Social innovation, as social processes of innovation. In this sense innovation emerges with the participation of society and not in a traditional way (e.g. in research labs.)
- Social innovation as an innovative solution taking into consideration corporate social responsibility. In this case they make solutions considering the social values and norms trying to minimize social and environmental risks of innovation, going against profit maximizing business/innovation interest.
- Social innovation aims to renew the society by innovation processes to change attitu de and social structure. In this term social innovation gives answer only by changing social norms, values and relationships. These presented definitions differ from each other in the role they play in the society in the innovation process: creator of innova tion, aim of innovation, influencing dimensions of innovation solutions.

¹ CEN/TS 16555-1 "Innovációrányítási rendszer" Európai szabvány

The study above uses the term of social innovation in a broad sense. According to it "Every new approach, paradigm, connected products, processes, practices, networks which aim at solving social problems and need adding new values, attitudes, social connections and structures are called social innovation."²

Definition of social innovation II.

"Social innovations are socially oriented in their aims and assets. Social innovations are new ideas (products, services and models) that at the same time meet social needs (more efficiently than other methods) and create new social relationships and collaborations ."³

Raising citizens' energy consumption awareness is basically social innovation but in specific fields they influence each other with business-related innovation.



Closed and open innovation

At the spread of the term 'economic innovation' organisations used the knowledge, experience and creativity of their own co-workers, members and adapted their own earlier published knowledge portfolios. Today, this method is called closed innovation.

Later, they realised that not all the best knowledge can be found within the organisation and the creativity of co-workers and members may not be enough to implement an innovation process. It became obvious that in most cases they can find the best solutions outside the organisation. Therefore, innovative companies publish the problems and they await for solutions from outside. This form of innovation is called open innovation.

 $^{^2} www.researchgate.net/publication/283507926_TARSADALMI_INNOVACIO_ES_TARSADALMI_TANULAS_A_$

VIDEKFEJLESZTESBEN_-_SIKEREK_PROBLEMAK_DILEMMAK

³ TÁMOP pályázati útmutató: Forrás: Strengthening social innovation in Europe

Living lab

Living labs are practice-oriented organisations that make it possible to enhance collaborative open innovation in living environments or in fields where both open innovation and user-based innovation can be studied and new solutions can be developed.

Living labs operate as connections between citizens, research organisations, companies, towns and regions to create new products with common values, prototypes or methods for measuring innovation and business. Living labs have numerous common points but different implementations.

We can call a collaborative open innovation process or project as living lab. They can be acknowledged or certified by the European Network of Living Labs (www.enoll.org). The Network had about 400 certified members around the world at the end of 2015.



2 Innovation for raising citizens' awareness of energy consumption aiming the reduction of climate change

Today climate change is one of the biggest challenges to face and the biggest innovation task is to make it stop in a short time. It can only be solved globally but needs numerous significant integrated innovation processes both in social and technological innovation.



Innovation in this case can most easily be achieved in social innovation, which achieves the planned (and expected) results

by the cumulative activities of more innovators. The active innovators can be: governmental and regional organisations, companies, civil organisations, research labs, even citizens or groups of them, etc.

When reading this e-book, the part of the Erasmus plus C4ET project, you, as one of the citizens of the European Union, may wonder whether you can be part of this innovation process aiming the reduction of termination of climate change.

The answer is obvious: yes, you can! First of all, it is important to note that the reduction of climate change can be reached by reduction of energy consumption. This reduction for sure will decrease the emission of pollutants that contribute to climate change.

If you implement innovation in your own environment or lifestyle that saves energy and / or reduce the emission, you may contribute to the social innovation process. To better understand this issue, let us divide the actions into different groups:

- You only need to take care and be conscious about your actions. It has no costs but because of saving energy it saves money. E.g. you only use lights where you really need them or driving a car you pay attention to optimal con sumption of fuel, etc.
- You make developments to decrease your own energy demand. These improvements usually are expensive but the money is reimbursed with time. The best-known ways are e.g. renewal of your house to use less energy for heating/ cooling, acquisition of heating/cooling equipment, household appliances, fixtures with better performance to reduce energy consumption, purchase of cars with less fuel consumption, etc.

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Social innovation can be in close relationship with economic innovation as the limita-

tion of climate change needs a lot of new technology and equipment. These are made within the economic innovation process. An important element of the system is that while social innovation reduces climate change with costs, it has no measurable income. However, new technologies, equipment of economic innovation that are needed for the implementation of social innovation do have income and profit.

If citizens' awareness about energy consumption – as a result of C4ET project – is increased, (e. g. if they acquire new heating equipment with better performance by reducing pollutant emission in their house), they implement innovation. However, one person implementing innovation is not a social innovation. It has to be a bigger group of citizens implementing innovation solutions to call it social innovation.

3 Energy conscious innovation by connecting everyday life and work

3.1 Energy conscious innovation in work

You, as a citizen, are the same person at home and at your workplace. In spite of this, your thinking about energy consumption at your workplace can significantly differ, depending where you are. The cause of differentiation is the environment, the freedom in decisions and implementation, energy consumption and the opportunity of saving.

There can be more kinds of workplaces, e.g. manufacture, construction, office, services, etc. Nevertheless, workplaces have a lot of common points:

- e even in another way, but each of them use energy
- most of them aside from some places that don't use fossil fuel, or firm energy resource – contribute to climate change directly or indirectly.

Therefore, most of the organisations implement economic or social innovation which is based on:

- recently accumulated knowledge within the organisation
- the knowledge, experience and creativity of workers who are of course citizens
- the knowledge, experience and creativity of workers of other companies connected to the organisation

It helps the development of innovation if in a smaller organisation one person (even in part time), whereas in a bigger organisation at least a team is dedicated to innovation activities. To develop and operate innovation activities the following standard can be helpful: CEN/TS 16555-1 and CEN/TS-2-7 "The management of innovation"

Innovation aims of any organization can be very diverse and wide-ranging, but in general among innovation objectives of responsibly-led organizations saving energy and reducing negative effects of emissions can be found.

Your ideas aiming at energy saving and reducing pollution emission can be very useful for employers. Your knowledge, experiences and creativity can be part of the innovation potential of the organization.



The possibilities and tasks related to the innovation are, of course, highly dependent of the activity, size and location of your employer and your status in the hierarchy of the organization.

If you are a decision maker of an organization which has many levels of decision-making hierarchy, obviously you are expected to try to find innovative energy-saving and emission solutions and see if there are the right conditions to implement them. It is also expected that you and your colleagues in decision-making create the atmosphere or an organizational unit which helps the staff using their knowledge, experience and creativity to contribute to innovation objectives in relation of energy saving and reducing emissions. Innovation activity of the staff can be supported by rising knowledge (education), cash and other incentives to a great extent. It is important to evaluate ideas and suggestions of the employees in an objective way, receiving feedback within a relatively short period of time and to implement proposals bringing economic or other related advantages for the organization.

Various systems of tools can be designed to achieve the above mentioned objectives, today typically Kaisen philosophy is used by many institutions in practice.

"Kaizen is the practice of continuous development. To western public awareness it was raised by the book <u>Masaaki imai - Kaizen: The Key to Japan's Competitive Suc-</u> <u>cess.</u> Recently, Kaizen is seen as the basic pillar of long-term organizational strategy. Kaizen is <u>continuous development</u>, based on the following principles:

it was raised by the book Masaaki Imai - Kaizen: The Key to Japan's Competitive Success. Recently, Kaizen is seen as the strategic pillar of long-term organizational pillar. Kaizen continuous development, based on the following principles:

- Good processes bring good results
- To measure the current status, go and watch the processes
- Use data to speak control by facts
- Take steps to correct and keep away the roots of problems
- Work in a team
- Kaizen is our mutual duty

The most distinctive feature of kaizen is that it <u>brings great results for many small</u> <u>changes that accumulate over time</u>. However, often this is what is misunderstood in the context of kaizen. It is thought that kaizen is nothing more than just a small change. In fact, **kaizen means that everyone involved in the development**, **always and everywhere**. Those kaizen activities, which lead to the extension project as an introduction, or cross-functional teams implement as <u>kaizen events</u> might have the biggest impacts."⁴



However, there are organizations, mainly in production field which are developing new energy-consuming products or manufacturers (e.g. car factories) where the aim is not only to achieve direct but also indirect positive effects. For example, in the automotive industry this means that if the

vehicle weight is reduced, the power consumption (energy consumption), and hence a pollution emission are reduced.

In addition, cars consist of a very large number of components and parts are units that are produced by different suppliers. This means that weight reduction of individual parts may result in the weight reduction of the total vehicle which may conclude in a significant reduction of fuel consumption and exhaust emissions.

If you are planning to introduce innovative energy-savings and emission solutions, you should analyse the costs, investment expenses, and possible results of the costs saved. The analysis may have the following results:

- a.) implementing innovative steps will not cause any increase in costs, no investment needed, however the result will lead to cost savings in general (typically rationalization, organizational solutions),
- b.) Some investment is needed for implementing innovation, but this investment will
 - ba.) cause direct reduction in costs, and it will pay off in a certain period of time,
 - bb.) the cost reduction will not lead to the return of costs
 - bc.) because of the reduce of costs it will never pay off
- c.) Investment is needed for implementing innovative steps, and the operation of purchased tools results in increasing in operational costs (this may happen when we cannot reach decreasing of energy costs but implementation is needed for decreasing emission)

In case of the result showing a non-reasonable implementation from an economic point of view, it is not evidently to be disclosed from implementation, because for most organizations economic rationality is not the only decision-making criterium. These innovative steps usually fall within the scope of **social responsibility**.

⁴ Kaizen Institute hu.kaizen.com/rolunk/a-kaizen-jelentese.html

Social responsibility was stated by the "Green book" of the European Union. According to this:

"Most of the defined characteristics of social responsibility is stated as a concept in which companies voluntarily integrate social and environmental effects and interaction with their stakeholders into their operation.

Social responsibility does not only mean that companies will meet the compulsory legal requirements, but in addition that they perform better, invest more into intellectual capital, environmental issues and relationships with stakeholders. Responsible investment into compulsory environmental related issues may lead to the increasing of the competitiveness of the company as well. Changes in social field – e.g. training, working conditions, relationship between management and employees – may also lead to the increase of competitiveness. After all, this is an open door to changes that bring social development and improved competitiveness in line."⁵

If innovative steps in energy consumption or in emission control are taken in line with social responsibility issues, there is a chance for these steps to increase the profitability and competitiveness of the company directly.

As according to "Green book":

"In general, use of natural resources or reduction of emissions of waste can reduce environmental impacts. This can be useful for the company through reduction in energy and waste disposal bills and reduced tariffs. Some companies found that decrease in consumption will improve profitability and competitiveness."⁵

Although according to the above mentioned definitions, corporate social responsibility often results in increased competitiveness and profit, but they are not considered as the main objective, but the possible additional benefits gained on the way to achieve the main goals.

3.2 Energy consciousness at home and interaction of innovation at workplaces and home

Previously we presented energy related innovation possibilities with the involvement of employees. In fact, the majority of the employees are private people, citizens who have homes (houses or flats). However, power consumption, thus reducing energy consumption of a flat or house is insignificant compared with the energy consumption and savings of a bigger organization. However, the number of large organizations and their energy consumption are insignificant compared to the number of homes and their energy consumption.

⁵ http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52001DC0366&from=EN

It follows that the energy consumption of a large number of flats and houses represents a significant number compared to energy consumption of organizations.

In houses and flats most of the energy consumption is caused by heating, cooling, hot water, lightning and household, entertainment and of other electronic equipment. There is a big variety of flats and houses in terms of energy consumption which represents the decisions of the owner and the people living in. There are many types of houses, detached houses, block of flats and housing estates.

Citizens can freely choose which kind of lightning, household or entertainment equipment they use as well as how they use them. The decision is more complicated in case of heating and hot water production. These kinds of energy consumptions mostly depend on how the house is insulated, what the build-in materials are, and what energy carriers there are. Houses and flats are mainly built by different companies financed by the investor or the future owner. People generally own or hire these houses or flats. There is a consequence that people living in these flats and houses do not have a direct impact on technical solutions. They do have the right of the choice however, what kind of house or flat to choose for living which in the same time meets the requirement of their energy consumption. We must consider that the lifetime of a house or a flat can take for decades and during this time it will be amortized and the system needs to be renewed from time to time. Homeowners usually decide jointly about details of technical-economical solutions of the renovation when the apartments and houses are owned privately. In this case citizens have the right to decide according to their prin ciples and knowledge.

There are houses including one or two flats which were built by their owners from the basis. Naturally in these cases the owners are able to choose their ways of insulation, heating and hot water solutions.

If you as a citizen, is an employee of an organization having energy system which is relatively well developed and you are open-minded at your workplace, you may find several solutions which can be adapted to your private home life. It is only true for those energy-related issues where the decisions are yours. In addition, there are a lot of regulations at companies which are worth reading as you may gain some knowledge to be implemented at home, too. It is true for example when you buy an energy-using equipment where the most important aspects of decision is the specific energy consump tion. If you consider how energy can be saved at your workplace and you implement those steps, you may save a lot of money and in the same time contribute to the reduction of global warming. As a result you can be a part of a social innovation process mobilizing thousands of people in the same time.

Some suggestions on how to solve common project tasks

- Groups working for the same company can study this e-book in the framework of a project task by brainstorming and discussing opinions on the weak points in energy consumption of their workplaces and how to solve them. Find out what advantages the proposed steps could bring to the employer and reveal possible obstacles.
- Groups who study this e-book find out the weak points of energy transition in terms of buildings to live in. They try to find solutions to avoid those problems commonly. If they find obstacles during implementation of their actions they try to find solutions commonly.
- Today, a very important area of the using Internet is the "big data". The term "big data" often refers simply to the use of predictive analytics, user behaviour analytics, or certain other advanced data analytics methods that extract value from data, and seldom to a particular size of data set. If the group using the e-book works in the same workplace they can brainstorm on what kind of data or group of data could support the energy savings of the company by downloading it from a cloud.
- Today, a very important area of using Internet is "Internet of Thinks'. Simply, this term means those possibilities on the Internet which enable the work of different devices online. The collaborative group should collect those actions which enable decreasing of costs of flats they live in.