

Sustainable investments in Poland

– The need, the profit or the luxury?

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1. INTRODUCTION

In modern global economy it is **investment** (in the meaning of allocation of capital) that develops sustainability or causes insustainability. Sustainability can be introduced by special means of country's or regional policies, which may have different form such as legal, organisational, financial, fiscal, educational, or other. All of them are finally focusing on creation of willingness to pay (WTP) for sustainable investment. The WTP as seen by economy is interpreted in cost and profit language where the discount rate is a main factor for taking the investment decision. It is reported, [1] in relation to energy conservation investment, that WTP depends on market value of available rates and it accepts lower than market rate with increase of investor financial wealth's. The neoliberal economists say that political intervention into economy causes market failures. Market forces are believed to take into account and enforce the need for sustainable environment themselves, if we do not disturb the supply–demand interaction. This could be a general truth, provided that the value of products on a market (as opposed to market value) reflects all of related environmental costs. Due to the competition most of the producers do not count these costs into the final product's price, because quality of environment is still considered as a limitless good for individual entrepreneur, even if it is not true for global balance.

This article discusses some aspects of WTP based on experiences of two different ways of introducing the sustainability to Polish market. The first one comes from legal category, where the adequate act of law has been accepted to support WTP for modernisation of existing buildings, and the second one is an international demo project which used subsidizing for backing up the GHG reduction investments. So far, both of them did not develop enough to bring predicted results. Both of them failed to propose enough to create expected WTP of investors. The opposite experience is reported from summaries of EU RTD Vth Framework programme, where the WTP has been triggered by 1/3 of the support given to the investors. The explanation and analysis of this fact could be very comprehensive, in here we try to find a simple correlation between WTP and an overall Environmental Sustainability Index as it is defined by An Initiative of the Global Leaders for tomorrow Environment Task Force, World Economic Forum. [2].

For better understanding of presented here programmes recently developed in Poland it would be helpful to present the overall situation of Polish building sector.

2. BACKGROUND - BASIC INFORMATION ABOUT HOUSING IN POLAND.

According to 2001 data Poland has approx. 12 million housing units with the total usable space of approx. 710 million m².

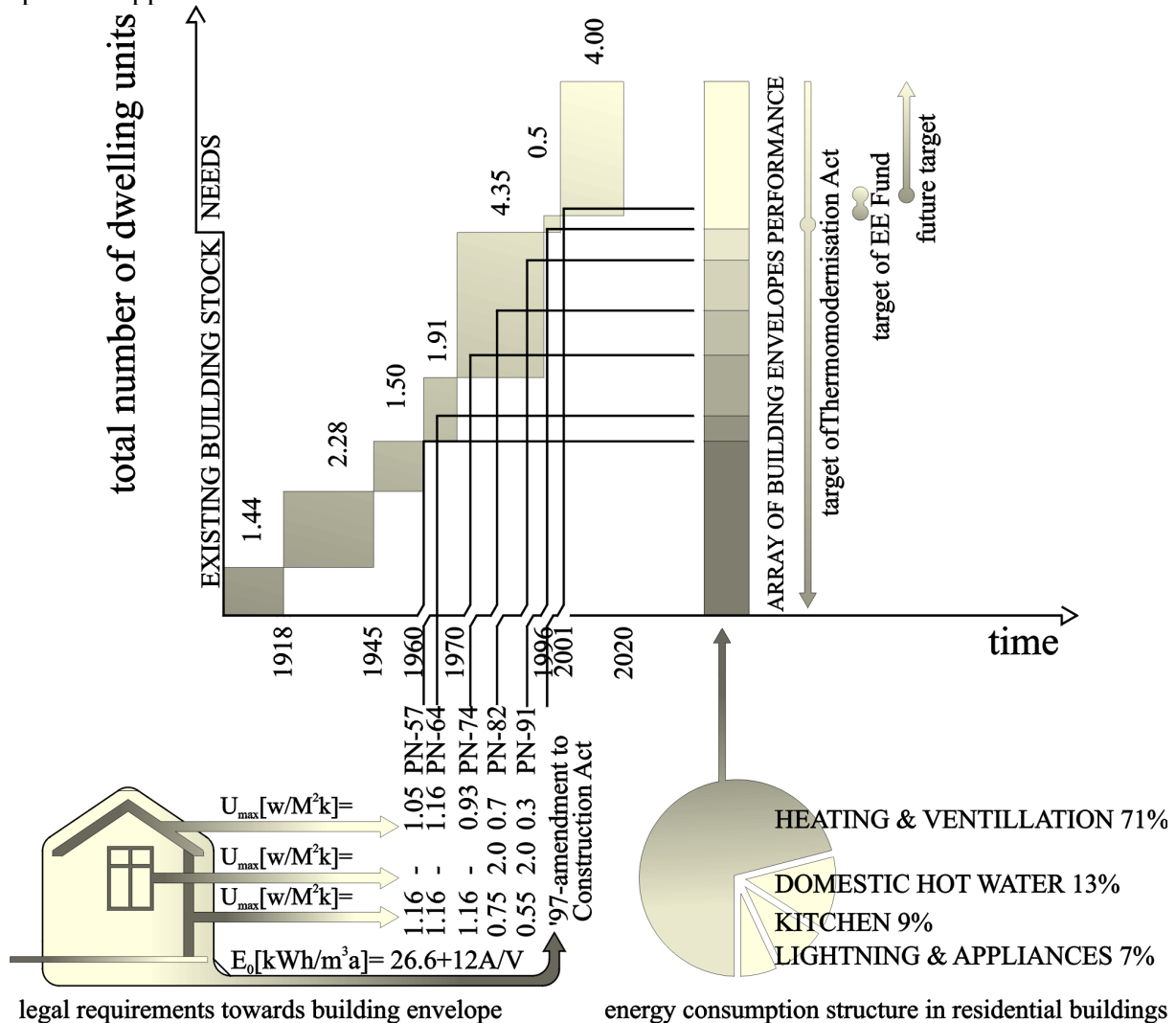


Figure1. Importance of energy saving measures on the background of existing and predicted numbers of dwelling units in Poland.

The scale of recent construction in Poland is far below the needs and reaches approx.80 thousand units per year. In order to achieve by the year 2020 average European 400 units per 1000 inhabitants, 200 000 apartments should be constructed per year. There is a strong need for new housing in Poland (there are approx.300 dwelling units per 1000 people), so it should be expected that sooner or later it will result in intense construction activity. Considering the data shown in Figure 1 it is obvious that thermal modernisation of existing buildings and modernisation of their systems to reduce energy and water consumption is most urgent. On the other hand, there is a chance to balance housing deficiency with new, sustainable buildings.

To help to overcome problems of modernisation of building stock, Polish government introduced special financial mechanism to improve the investors' ability to undertake the investment in energy saving measures.

3. THE THERMOMODERNISATION ACT

Thermomodernisation Act established by Parliament on December 1998, with latter amendments in July 2001, called into being the Thermomodernisation Fund. The Fund is an institution financing – in form of thermal modernisation bonus – the projects aimed at the improvement of buildings envelope, internal technical systems, local energy sources and distribution networks. After fulfilling terms of the Act, the investor using bank credit for thermomodernisation is granted a bonus. The bonus may reach up to 25% of the credit raised for the investment, and is paid by the Fund to the bank servicing the credit after completion of construction. (Previous version of Act, set up the bonus release after repayment of 75% of the credit with the regular interest rate). It is significant decrease of the cost of investment. The premium is paid only for measures which fulfil condition concerning level of profits, the type of modernisation activities and its economic result. The bonus may be granted both to the owners or administrators of buildings, and operators of local heating networks and central (town) heating plants.

The programme to support thermomodernisation showed moderate investor's interest and its development has been criticised by different groups. Financial resources dedicated every year for the Fund remained not spent. This can be explained by different barriers related to thermomodernisation, one of them is poor attractiveness of offered support from investor's point of view. This results in investors' hesitation to undertake the investment. However, in other countries programmes less supportive are gaining higher interest. This interest is connected with WTP (willingness to pay), and in case of Poland it shows different priorities of investors. These priorities are related to economical, social, environmental and educational situation of the country, partly explained by the correlation of elements of ESI – environmental sustainability index.

The programme of thermomodernisation is dealing with existing buildings, whereas the improvement of building standards over the ones in power is a scope of the project undertaken by Global Environmental Facility and related to the new construction..

4. GLOBAL ENVIRONMENTAL FACILITY PROJECT

In a five-year period (1997-2002) over 10 new-built housing projects in Poland underwent the process arranged by Global Environmental Facility (GEF) demonstration project - the Energy Efficiency in Buildings component [4]. GEF project was tailored to specific needs of Polish housing construction given the name of Energy Efficiency Fund for New Residential Buildings. Main resulting arrangements were as follows:

- EE Fund would grant-finance 100% of incremental energy efficiency and conservation measures, i.e.: extra improvement above the current Polish building code.
- EE Fund would be provided to applicants who have secured construction financing
- one of the strict requirements to be met by granted projects was cost-effectiveness of extra features. That means, the cost per unit of conserved energy had to be lower than cost per unit of electric energy on the market. Given that, several extra features were successfully applied in new designs. The most efficient of them are:
 - an additional insulation of walls, roof and basement floor, above that required by Polish regulations combined with high thermal efficient windows and doors
 - mechanical ventilation system with waste heat recovery
 - passive energy collecting features incl. solar energy and recovery of waste heat from technical systems
- detailed energy audits revealed very promising energy savings (up to 90%+ for the combined systems) and reasonable incremental cost efficiency.

Investors applying for the EE grant were to undergo complicated and time-consuming process of auditing construction projects, accepting applications by GEF Project office, co-operating with auditors and supervisors. What's more, it was the investor's financial risk, since it was the investor who was to secure all the construction costs including incremental cost of energy-conserving extra features before grant was paid after successful completion of recommended measures.

Considering GEF Project through **PPP** (place-product-price) principles of marketing we can identify some of its barriers. The product here is the environmental performance of building successfully achieved in over 10 realised projects, so we take this variable as constant value while the other two – place and price are subject to further manipulation.

Price needs some comment. As it was said before, the grant was paid after the completion of construction. For that reason no cost of money was considered in the cost-effectiveness of the energy measures. This is an important factor in face of economical facts in Poland, where the interest rates oscillated at figure of 25% at that time. The cost of money was paid by investors, but it was paid along with energy audit, and both should be somehow additionally included in the grant e.g. as a part of incremental costs.

“Place” is most controversial. It seems that programme could be better disseminated. As a result of the lack of information many potential investors were unable to undergo the procedures required by GEF Project Office in a time, even if they were able to provide extra money for incremental initial cost. The predicted high interest of investors caused that the programme designers had not reserved resources to market the programme.

Table1: Costs and Benefits of the 2 Groups of Energy efficiency Strategies

Unit type	Energy savings	Incremental construction cost	Cost of Conserved Energy	Simple Payback (1)	GEF Cost -effectiveness
	%	zł/m ²	cce (2)	Years	USD/tonCO ₂
<i>Group 1: Improved insulation and windows:</i>					
Townhouse	27-34	14-31	0.054-0.083	2.2-3.3	19-26
Multi-unit	21-32	17.1-23.1	0.136	1.6-5.4	15-81
<i>Group2: Mechanical ventilation, waste heat recovery and control, plus improved insulation and windows:</i>					
Townhouse	68-75	148	0.158	6.3-7.7	42-45
Multi-unit	63-77	75.9-98	0.1-0.144	4.6-6.7	76-130

$$\text{Simple Payback} = (\text{Average Cost of Energy Consumption} - \text{Given Cost of Energy consumption}) / \text{Incremental Construction Cost} \tag{1}$$

- using the national cost of electricity as the base (0.18 – 0.2088 zł/kWh – depending on year of analysis).

$$\text{CCE} = (\Delta \text{ Cost} / \Delta \text{ Energy}) * (\text{discount rate} / (1 - (1 + \text{discount rate})^{-n})) \tag{2}$$

- discount rate = 0.12, and n = 50 years.

We can measure success of main goals of the project by two indicators of achievement: the quality of experience and the scale of it. The quality of experience means effectiveness of dissemination of technical and organisational solutions, while the scale of the programme means recorded repeatability of implemented ways of development countrywide. Taking this definition as a basis we can conclude that the EE project did not perform in a predicted way. The programme did not attempt directly to help investors to overcome the barrier of higher

initial cost, but their willingness to pay (WTP) was enforced by expected refunding despite the risk that they would not comply with final requirements of detailed procedure due in time and sophisticated technology.

5. THE FIFTH FRAMEWORK

Described above, two financial mechanisms have failed to fulfil their objectives in extent. Thermomodernisation Fund and GEF did not attract expected interest of investors despite the predicted financial attractiveness. Within a Fifth Framework RTD European programme financial mechanism which facilitated implementation of demonstration projects of new technologies, approaches and solutions under the thematic programmes existed. This mechanism rule was that up to 35% of incremental costs could have been refunded. A number of projects underwent this procedure, and according to reports summarizing Vth Framework the proposed mechanisms has been widely accepted and used among the European Communities member countries. This means that remaining 65% of money invested by the applicants came from other private or governmental sources. The overall tendency is the increasing direct financial participation of investors. This could lead into the conclusion that the WTP of investors from countries of European Communities is at least as much as 65% of marginal costs for new technologies, even if the market value of the investment in energy saving measures is far below the interest rates.

6. CONCLUSIONS

The WTP is a complex factor and depends on level of income (GDP per capita), education of society, traditions, externalities (meant as the characteristic of local environment), health, and many other social and technical aspects. The WTP reflects an ability of society to participate in environmental sustainability development. For the purpose of this article differences of WTP of individual investors were analysed on the socio-economic backgrounds. It is clear that the performance of economy expressed by WTP of individuals is a key factor predicting success of sustainable development in the market economy. WTP reflects adequacy of particular mean to support sustainability. Adequate means result then in broader response of individual investors, and the final success is measured by the scale of undertaken investment in sustainability. The differences in WTP of investors in less or more developed countries seem to be easily explained with the rule of hierarchy of needs – the more basic needs are first to be fulfilled.

This correlation is at some degree revealed in “Environmental Sustainability Index” [2]. ESI is a measure of overall progress towards environmental sustainability developed for 122 countries. A high ESI rank indicates that a country has achieved a higher level of environmental sustainability, a low ESI rank signals that a country is facing substantial problems in achieving environmental sustainability along multiple dimensions. Poland’s ESI score is much lower than these of EEC countries. Attraction of investor interest in case of countries with lower ESI requires more favourable conditions than for the countries better rated. This conclusion can provide some guidelines for designers of terms of Sixth Framework to distinguish co-financing of demo project in relation to ESI, if the same rule will be attained.

ESI reveals that there is a relationship between income and environmental sustainability. The 35% of refunding marginal costs of demo projects in Fifth Framework proved to be adequate subsidy to trigger the WTP in European Communities. At the same time much more attractive programmes established in Poland did not get significant interest – they did not generate

expected WTP of investors. It is clear, that greater WTP will occur if we create greater individual demand e.g. by:

- having bigger per capita income
- promoting individual awareness of importance of energy savings
- proposing individual financial benefits
- pointing out benefits for individual health and comfort
- dissemination of opportunities and means

Statistical data proved there is no straightforward correlation between the need for high quality environment and investment decisions. Construction sector in Poland encounters problems originating from economy transition from central management to free market. Because of deficiency of flats, the demand for housing is coloured by the strong need for more space for people to live in. The initial cost of investment is then vital, because it is the total amount of usable area what is demanded at first. Primarily it is usable area and location but not the cost efficiency of energy consumption that calculates NPV value of a flat. People do need a high quality environment, but it is a false assumption that they would be therefore interested in investment in environmental performance of technical systems. If they want better environment they choose more comfortable location.

There is a lesson gained from financial incentives introduced in Poland, that it is not always adequate to generate sustainable development by enforcing investors' WTP for energy saving solutions. Economists would probably argue that this is because such incentives were not aligned with market forces. Authors of this article share that point of view. It proved that market forces are not capable to resolve global energy deficiency in forseen future [1]. This is because the individual demand for high quality environment is not necessarily associated with energy efficient investment - the comfort of an individual is limited to his own living space. In the market economy there is inequity of distribution of high quality environment. We can see that logic in Polish experience if we profile the investors that yielded WTP required by GEF programme. Sustainable development is possible under condition that energy saving will be the rule for all, not a luxury for the chosen. Financial incentives aiming to trigger WTP of individuals in the poor market sector, like construction of new houses in Poland must be ineffective due to their inadequacy to the people's needs. The failure of GEF and Fifth Framework in Poland comes from unrecognised conflict of individual and public interests.

Individual investors would respond for financial incentives if they were aware of and share the social need for sustainability and have their other needs satisfied. So the final conclusion is that we shall cure the causes of unsustainability like low environmental end economical awareness and low institutional capacity along with market interventions.

Literature:

- [1]. R.J.Sutherland, "No Cost" Efforts to Reduce Carbon Emissions in the U.S.: An Economic Perspective, The Energy Journal, Vol 21, No.3 2000
- [2]. An Initiative of the Global Leaders for tomorrow Environment Task Force, World Economic Forum, Annual Meeting 2001, Davos, Switzerland, <http://www.ciesin.columbia.edu/indicators/ESI>
- [3]. Monitoring of Housing Sector in 2001, Institute of Housing Management, Warsaw, Poland
- [4]. R. Benmessaoud, J. Deringer, G. Dyduch, A. Panek, Sustainable Housing in Poland, World Bank Seminar of GEF project, Washington 2000.