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**Applicability of sustainable housing techniques in Estonia based on  
the example of sustainable housing area Lebens(t)raum Johannistal**

Essay

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Energy security has been a topic of very lively discussion in Estonia ever since joining the EU in 2004, however very little attempt to achieve it has been done on the individuals' level. It would seem to many people as a phenomena, that can only be achieved on the state level, because the energy security as such is very closely associated with gas supplies from Russia on the one side and the operation of Narva power plant near Russian border on the other. It is often overlooked that energy security on an individual and group level depends as much on energy production as energy consumption. Although an individual can to a very little extent affect the energy production side, it is very much possible to adjust and alter consumption. One way to decrease individual demand for energy and thus dependence on external sources is to use eco-friendly means of transportation and more efficient appliances in our households. However in the moderate climate areas the heating question remains. It would appear to be the greatest obstacle to achieving the needed decrease in fuel consumption. Besides heating, lighting and cooking can be named as energy-intensive aspects of the consumption side, and least, but not last, the construction of housing itself has a significant effect on energy requirements as well as on surrounding environment. During the last decades several attempts have been made around the globe to build housing with increased energy efficiency and smaller ecological footprint. However, until now such practices have been rather scant in Estonia, mainly due to only recent availability of needed technologies and also lack of proper mindsets in the framework of rapid economic development. The current paper will focus on describing the sustainable housing techniques on the example of Johannistal sustainable community in Berlin and assess the applicability of them in more northern and newly independent parts of Europe, such as Estonia.

The Johannistal sustainable community project includes several innovative solutions from the point of view of energy production, energy conservation and energy efficiency in general. Also the organization of the village fosters economies of scale to achieve further decrease in energy consumption. First and foremost the construction aspect of the project must be mentioned. The construction techniques used in Johannistal project include utilizing natural and eco-friendly materials such as timber for the main structure of buildings and clay and straw for insulation. Using such materials decreases the overall ecological footprint of the housing area and improves natural ventilation of the buildings. Also the circular orientation of the houses next to each other enables interconnections between them, which is efficient from the space occupation perspective and is a prerequisite for achieving economies of scale in heating service distribution.

Secondly, great effort has been put into developing localized energy production and energy conservation. The village is using three types of energy – imported electricity from the central network, solar heat and electricity and locally produced pellets based heat. From sustainability point of view, the second and third one are significant. Solar energy is available mainly during summer and requires very good weather conditions. For this reason, during most of the year external source is needed. However using solar energy for heating water and creating electricity provides certain independence in summer and helps decrease CO<sub>2</sub> emissions caused by the village. The heating system is organized centrally and is based on burning industrial leftovers, i.e. pellets made by wood producers. The entire village relies on a single boiler system from which heat is distributed to every house. A lot of attention has been given to using proper insulation for pipes, as well as utilizing the excess heat from smoke. Although great advancements have been made to decrease heat-loss from the heating process, it is nonetheless important to mention, that further improvements can be implemented in energy conservation. For example, the warm water

from showers ends up in the sewage, thus heating the surrounding environment. This heat could instead be collected and utilized. Also the ventilation techniques allow warm air to escape into the atmosphere, resulting in a greater heat signature of the buildings.

Last but not least, the topic of mindsets of the inhabitants must be elaborated. Practices such as car-sharing and communally owned means of transportation are only few of the initiatives used in Johannistal in order to achieve increased efficiency. The fact is that cars are normally parking most of the time and only used on very rare occasions. This means wasting valuable space and increasing overall ecological footprint due to a greater number of cars produced per inhabitant. To avoid such inefficiencies, cars and also bicycles are shared by the community members. Also, shopping is arranged on group level, so that fewer trips need to be made. Besides this, bicycles are often used instead of cars for shorter distances to decrease fuel consumption. Purchasing electric cars is however still a plan for the future. While speaking of economies of scale, it should also be mentioned that several facilities, such as childrens' playgrounds are also constructed from a common budget and as a team effort.

Although energy efficient housing has become a popular topic and the first so called „passive houses“ have already been constructed in Estonia, large scale experiments such as Johannistal are yet to be attempted. Based on the above description, it can be summarized that the innovativeness of the concept originates mainly from combining the already existing technologies in new and efficient ways and adding a community based structure to organizing the use of utilities and transportation, as well as common activities. Deriving from the concept used in Johannistal, it can be assumed that a similar concept may be implemented in a country such as Estonia. In the second part of this paper some counter-arguments to this thesis will be presented and possible solutions will be proposed.

The first counter-argument a sceptic would present is probably the lack of solar light in Estonia due to the geographical position. It is of course true that Johannistal is much further south and thus better placed from this point of view. It is also a fact that there are less sunny days in Estonia. However, this may not be the ultimate obstacle to using renewable energy sources in Estonia on the local level. First of all, solar panel technology is constantly being improved, which is why a suitable solution will no doubt be available for such a project in form of a more universal solar panel. Secondly, there is already a successful example of solar panel installation present in Tallinn, with the capacity to provide hot water during 9 months a year. To go even further, the solar energy must not be the only type of renewable energy that could be used. Innovative generators such as vertical turbines can be installed to further increase power output. All in all, geographical location cannot be considered a serious counterargument, similar projects have after all been started even further north, e.g. in Norway or Sweden. This is why another aspect of the project must be evaluated, namely the proper mind-set.

Surely there are cultural differences between Germany and Estonia, especially in the sense that Estonia has only recently become a part of the capitalistic Europe. It can be argued, that because of this, Estonian people are not yet ready to lead a community based life. Furthermore, Estonia has had its bad experience with the communal life during the soviet times, which is why certain reluctance towards such ideas would be logical to expect. Although much of this is probably true for the majority of Estonian population, there are still many opposite examples, mostly represented by the younger generations, which have not been affected by the soviet heritage. Communal life is in fact nothing rare or exceptional in Estonia – almost half of the students in Tartu live in dormitories and the other half is either sharing a flat or in rare cases indeed living alone. The same applies to constructing new facilities and making investments from the

communal budget. It is no longer a new concept to form cooperatives in blocks of flats and this practice has paid off during the current decade.

Owning a proper house and a modern car have become certain symbols of status during recent years, mainly due to the newly opened opportunities. Car sharing can therefore be an idea hard to accept by many. Even though adjusting to this concept requires a lot of time and change of mindsets, it seems that the rising oil prices and increasing number of traffic jams will create incentives to share means of transportation in the future. Many Estonians already prefer public transportation to private cars for these exact reasons, which is why mindsets are not likely to be an obstacle. Not only that, but also sorting garbage, preferring recycled materials and several ways of conserving energy are gaining popularity.

It has often been argued that installing solar panels and retrofitting the old buildings with new insulation require huge investment and will therefore never pay off. In fact, such arguments are short-sighted and cannot be taken seriously. It is of course true that such investments need to be planned in advance due to their high cost, but nevertheless in 7-8 years perspective, most of the investments will have paid off depending on the circumstances. Even though making such an investment is usually an economical decision, the environmental costs must also be considered, which means that the investment does not only pay off, but also results in an immediate impact on the surrounding environment. This in turn may affect the inhabitants health in a positive way.

Based on the above discussion, it can be concluded that it should not be a question of whether to implement the concept of sustainable housing in Estonia, but rather which solutions should be implemented in the framework of such a project. This leads to the topic of available resources, current technologies and last but not least the legislative aspects.

In order for a similar project to be sustainable in Estonia, several resources are required. When speaking of renewable and eco-friendly construction materials, there is an abundant supply of wood readily available in Estonia, as most of the country is covered by forests. Clay and straw can also be supplied in sufficient amounts. Furthermore, experiments have been attempted to develop better insulation materials from renewable sources. Surely, the insulation quality requirements are higher in Estonia due to colder climate. For heating purposes, pellets can be used and will be available from local sources. A wood products manufacturer Stora Enso has lately announced that a pellet production line will be opened in Central Estonia, which will probably reduce the price for local consumers. All in all, resources are available and there is a lot of potential to improve the currently used materials.

As already mentioned, the geographical location of Estonia may create certain complications on the renewable energy production side. Although solar panels are not produced in Estonia on large scale, they are likely to become more available and also less expensive due to overall economic development. First of all, global demand for solar panels will create incentive to produce more, this in turn will assure economies of scale in production and thus lower the price. Secondly, technological advancements in the renewable energy sector will put downwards pressure to the prices of current technologies. Provided that a proper mindset exists to implement the renewable energy production, the technology will no doubt be available. The question of mindset exists not only on individual level, but also on state level in the form of legislation. Such a project would probably find more initiators if sustainability was coded into the state legislation. It must be said, that several steps have already been taken to achieve this. For example, limits have been set to selling traditional, low-efficiency light bulbs.

The main aim of this paper was to assess whether the sustainable housing concept can be applied in Estonia. First of all, the materials and most of the needed technologies are already available on the local market. Secondly, there are reasons to conclude that the project will pay off in the long run and is thus profitable. Lastly, the fundamental willingness to innovate is already present in Estonia to a considerable extent. Although several arguments have been presented to support the applicability thesis of the concept, it must be mentioned that there are also downsides. First of all, there is still a need to change the mindsets of the general population in order to achieve wider support. Secondly, economic incentives must be in place to insure that the project is profitable. Although there are already technologies available, much room for improvement exists, which is giving incentives to wait with large scale investments until cheaper or more efficient solutions become available on the market. Even though there are a few counterarguments, it seems that there are no major obstacles to applying the general concept of sustainable housing in Estonia. It is true, that the concept should be adjusted to local requirements and some modifications must be made, such as introduction and implementation of higher technical standards, better means of insulation and further adjusting to community based ways of living. Energy efficiency in housing is an important element in the state level energy security and cannot be neglected from the overall discussion on the subject. It is evident that the sustainable housing concept will increase the independence of households in their energy consumption and thus provide higher security, bringing Estonia a step closer to becoming a developed western country which fosters innovation and sustainability.