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LECTURE VIENNA 3. NOVEMBER 2011 - Mr. Arch. Werner Nussmüller

1. Owner of Nussmüller Architekten ZT GmbH
   - office for architecture and cityplanning in Graz and Rottenmann
   - in Partnership with my wife Ingeborg and my son Stefan Nussmüller
   - at the moment 12 co-workers

2. Managing director of Seewood (Styrian Engineering for Ecology and Wood)
   - together with Hohensinn Architecture and the structural engineers Koppelhuber and Riebenbauer with the task to promote modern Styrian wood architecture in connection with new wood materials made in Austria (cross laminated timber plates)

3. Guest professor in Maribor/Slovenia on housing.

First I have to thank you for the invitation to talk about energy efficient architecture in front
of such a highly knowledgeable and experienced audience. Considering the short time I have for my input, i will lay my focus on housing.

I will split my lecture in 4 parts.
- A general reflection on the concept of energy efficiency
- political tendencies expressed in laws and normative regulations
- architectural answers to actually demands
- summary and an attempt for an outlook to the next years

1. GENERAL

Highly sustainable
is a church, existing since 800 years, built of stones from the surrounding with handicraft of local workers, never heated and cooled.

Highly energy efficient
Is housing after the first world war in Austria, where the average housing requirement was 6 square meters per person (about the same as in Beijing nowadays)

So if we talk about energy efficiency, we must first talk about standards:

- an average Austrian citizen is living on 44 square meters
- 1000 citizens own 530 cars , 60% goes with their private car to work
- the energy requirement raised from 1999 to 2009 by 29%

If we talk about energy, we have to talk about the problem of an missing political understanding for regional planning:
You can wrap an stand-alone one family house far way from infrastructure with 1m of insulation,- it will not hold an general economy reflection. - Because you cannot look at the house in isolation, the house and the people living in it are part of a system. If for every aspect of their daily life, they need to consume energy to move to these places, one can question if the perfectly insolated house is still energy efficient.

So you would have to increase the insulation every 5 years.- but we know in the mean time, that the economic usefull thickness of insulation ends with 20cm.

2. WISHES, HOPES AND REGULATION

Energy efficiency, sustainability or acting responsible having in mind the lives of our children are hard themes to think about, when your job demands to fly every week to Brussels or New York, or the best job is 50 miles away- and there is no public transport system.

Because nobody wants to imagine the consequences of a reduced/simpler life style, maybe even with negative tendencies, which means „negative growth", nor do we reflect on the real consequences of climate change. In contrast, we are continuing our wishes for comfort. And to cope with the challenges, we take the easy way in increasing the technical demands for insulation and energy efficient equipments.

Regulations for lowest energy, passive -zero- and plus energy houses (or NZEB – net zero energy buildings - regarding the net), regulations putting an end to the classical light bulb, limits for Co2 emissions and all sorts of environmentally harmful pollutions are easier, than a discussion about life style.

I do not want to say, that these regulations might not be leading to a good outcome. Indeed, if these regulations manage to revise our common and daily habits and lead to a reflection about the life style, the goal is reached!
But, if these regulations tempt us to consume more energy, to demand even more square meters of living area and longer distances of driving, all these efforts will lead to no or even a negative impact on the environment.

3. ARCHITECTURAL ANSWERS

In our understanding of architecture, the architect is still the "generalist", he has to fulfil the task of the client under the urban, social and economic conditions in the best possible way, while complying with sustainability criteria.

Now to some personally statements and examples about energy efficiency in architecture with focus on housing:

- Energy efficient is housing, which is used in flexible way for generations. So: -one of the sustainability criteria is the lasting functionality and beauty of a building.

- The sustainability criteria for constructing new residential houses in Austria are already so high, that I believe there is no further need of action.

The standard of 20-25kwh/m2a is sufficient, and in my opinion the aim to reach passive house standards in social housing is a mistake. There are limits to what makes sense, if you take into consideration how people live.
(Passive house standard is only possible with controlled ventilation. A friend of mine, Prof. Gamerith, former professor of physiks at the Techn. University of Graz wrote articles about the human right of fresh air by opening windows)

Let me tell you why I think so:
First – the building costs are sky rocking if you tighten the obligations for more insolation. Concretely, the building costs increase about 8 percent from 20 to 10kwh/m2a (about 120 €/m2)
Second - the customer behavior in social housing vary up to 200% by opening windows as they like, lights are left on, water is let running and electrical instruments in the household are used extensively.

- The real demand in energy sufficiency lays in redevelopment of our residential homes from the fifties up to the nineties.
  Most of these buildings consume more than 150kwh/m2a. With simple insulation of the roof, the ceiling to the cellar and changing or improving the windows you can easily achieve results in about 50kwh/m2a. So you save 100kwh/m2a with a minimal amount of building costs.

  We are currently showing, how this can be done! As member of an international study project NZEB (Net Zero Energy Building), and a research project by HDZ (Federal Ministry for Transport, Innovation and Technology, Department of Energy and Environmental Technologies) we are just involved in such projects in Graz.

4. CONSLUSIO

- I see a big discrepancy between the wishes of the politicians, laid down in regulations and laws, and the meaningfulness when it comes to realisation.
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- Excessive energy standards can lead to an reduced architectural design, caused by focusing on the thermal insulation only.
- There needs to be a thorough assessment, what outputs can be achieved by which means. A simple cost-effectiveness analysis would advise us to renovate roofs, ceilings and cellars for the start and the result would be great energy savings.
- Requirements on energy efficient buildings alone will not achieve the expected results if we still build housing far away from basic infrastructure. One measure (saving energy for heating in the house) will be outweighed by the energy you need to go from A to B.
- It is more important to simplify our thoughts and constructions than to join every

madness due to new building regulations and norms.

- We have to consider the overall impact and not put too much focus on details. We need a new life style, not new building norms.

Our personal approach to this theme is to reduce design of one family houses and to increase working with wood, the most sustainable material. That's one of the goals of "Nussmüller Architects"