Sustainable Utopia

Linz (AT)

**GENERAL ASPECTS**

Linz, a city in northern Austria and capital of the province of Upper Austria, has a population of 185,000 inhabitants.

Linz is a green city that has the largest port on the Austrian Danube. Historically the world’s premier market for trading salt, today it is better known as a centre for trade, industry and education.

**BACKGROUND**

The idea for the solarCity Linz project arose in 1990 following the decision of the City of Linz to put low energy construction methods into practice in the field of public housing. About 12,000 people were looking for a home in the central Linz area. At the same time the construction and operation of buildings involved a high consumption of fossil energy which was a major contributor to the greenhouse effect. Both factors were decisive arguments in favour of a plan for a sustainable ecological urban district and so the idea for building a "solarCity" was born.

The district of Pichling to the south of the city was the only possible area available for potential expansion. The area is characterised by existing estates of single-family houses, smaller bathing lakes and, in the immediate proximity, lies the Traun-Danube riverside meadows, the largest continuous natural biotope structure in central Upper Austria. These conditions required a planning brief that would permit the sensitive insertion of a future residential area within the existing structures.

**ACTION UNDERTAKEN**

Preparing the plan for the new neighbourhood

In 1992, the renowned Austrian urban planner, Prof. Roland Rainer, was commissioned to prepare a comprehensive regional urban development plan, the master plan for the Linz-Pichling residential district. This master plan provides for a settlement potential of between 5,000 and 6,000 homes together with the entire infrastructure in this area.

One year later, in 1993, the Linz City Council commissioned an energy study for the homes in Pichling to serve as an example for the third millennium.
In 1994, the City of Linz, together with four of the most important non-profit-making housing associations in Linz confirmed their willingness to finance the planning and development of a model estate of 630 low energy homes in the district of Pichling. Furthermore eight non-profit-making building promoters joined in 1995, with the result that a total of 1,317 homes are to be built on an area of around 32 hectares. The homes are subsidised by the Province of Upper Austria. Construction of the housing commenced in 2001 and completion is expected in 2005. For the planning of the first 630 homes, the City of Linz succeeded in rousing the enthusiasm and obtaining the assistance of the world-class architects Norman Foster, and Richard Rogers from England and Thomas Herzog from Germany for the project. Together with the famous German energy technology planner Norbert Kaiser, these architects formed a working party under the name of the READ group - Renewable Energies in Architecture and Design - whose aim is to promote the breakthrough of low-energy construction methods at the international level. The EU General Directorate XII for Research and Development subsidised the planning work with a contribution of euro 600,000.

The City of Linz held an architectural competition in 1996 for the design of more homes. The winner of this competition, the Viennese architect Martin Treberspurg, a solar architecture specialist with experience in public residential construction, is now preparing the plans for the second stage. The planned school, kindergarten and community commercial centre are models of resource-saving solar architecture, with special provision for bio-climatic design to reduce expensive air conditioning.

**Eco-solar construction**

The name "solarCity" stands for the all-encompassing use of the energy of the sun. This concept ranges from the direct use of the sun to improve individual comfort and plant growth to the use of the sun as a source of energy. A compact construction method largely oriented towards the south, highly insulated facades, natural ventilation and lighting and the optimum storage of heat are characteristics of this solar construction. The buildings are built in a low-energy construction method (see artist's impression below). The heating energy requirements are limited by energy values laid down in the land purchase agreements. Solar collectors to heat water save fossil energy. A catalogue of construction elements has been prepared according to construction biology and construction ecology criteria, and is used by all the builders on the basis of agreements. This ensures that the building materials used minimise both the harm to the environment and the noxious effects on the persons living in the buildings.

**Energy supply**

The settlement is designed so that energy supply takes account of the principles of efficiency and should as far as possible be renewable. From a number of alternatives, the Düsseldorf engineering consultancy Kaiser Consult-, Bau- und Umweltpartnerschaft proposed the following solution:

Electricity and heat will be generated by a multiple-fuel-fired CHP station. This can be operated in cogeneration mode using biogas and/or vegetable oil. However it has not been possible to proceed with this project to date due to the high price for rape seed oil and the low prices for fossil energy. Hot water will be generated by thermal solar collectors (covering at least 34% of requirements). The remaining heating requirements will be covered by district heating (CHP using fossil fuels).
Waste disposal
In order to achieve an environmentally-friendly residential development, waste disposal has been included in the overall considerations:
Within the framework of a pilot project entitled a “waste-water free estate”, 106 homes and the school are to be fitted with urine separation with special toilets operated in the conventional manner. The urine is rich of nutrients and supplied as agricultural fertiliser. 
The solids are composted.
Grey water, i.e. the water from showers, dishwashers and washing machines, is cleaned locally in a sand bed filter with vegetation and fed into the nearest stream.
A rainwater management system with hollows, gullies and reservoirs ensures that rainwater soaks into the ground locally.
A closed-cycle system is to be installed, relieving the load on the environment to an extent far beyond the mere exploitation of regenerative (solar) energy, thereby increasing the extent of the ecological value of the overall energy concept.

Social engineering, landscape and the virtual community
In 1996, Wohnbund Salzburg was commissioned to prepare an overall socio-structural plan for the solarCity to ensure a viable social structure for the community. The final report recommended a balanced mix of legal forms of tenure (rent, purchase, purchase on mortgage etc.) and uses to encourage communities mixed in age and activities. It foresaw the integration of family needs in the design of new homes by the involvement of future users, including locating family groups in proximity, and provision of housing for immigrants. It proposed that neighbourhoods should be of manageable size, and should leave space for further development. In order to aid the process, The Ars Electronica Centre (AEC), Linz, the "museum of the future", has developed a computer programme to allow people to visualise the community in order to interactively involve all interested parties in the planning and implementation process.

The City of Linz negotiated with each of the 12 development companies to prepare quality agreements to ensure that the reality accorded with the plan.

A landscape plan for the area was prepared by Studio Dreiseitl following a competition in 1997. It considers existing and new elements of vegetation and water. The objective is the introduction of a multi-functional range of leisure activities, whilst creating and maintaining a variety of natural landscapes and habitats.
The small lake "Weikerlsee" is to be expanded, brooks are to be revitalised and the Traun-Danube marshes are to be listed as a nature reserve.

Project organisation
An interdisciplinary project group was established as the central co-ordinating body for the whole process. The project group works according to systemic principles formulating the objectives and is the driving force in implementing the project. They work with a project advisory board with leading representatives from politics, administration, associations and enterprises. Detailed responsibilities of these structures, the tasks, rules, standards and values, are defined in a project contract.

A separate corporate identity for the project has been identified to provide co-ordinated marketing. Communications and administration is carried out online. A wide ranging manual of results from the project is being prepared and will be published.

In Linz, which adopted the title “Sustainable City” in 1995, the local Agenda 21 forms a foundation for all decisions relating to the project. The project has enable Linz to obtain a Certificate of Distinction for 1997 in a competition held by DGXII and CEMR and to be included in the 100 Best Practices granted an International Award for Best Practice in improving the living environment in 1998 in Dubai.

Lessons learned
The project is under construction. All the intermediate objectives have been accomplished according to plan. The local development plan is largely complete and the details of the finished neighbourhoods have been negotiated.
The project represents an enormous planning and communications exercise and international response has been very positive. The project has altered the attitudes of those involved to energy supply and town
development, waste disposal and social engineering. Things are viewed and understood in perspective, leading to a step-by-step awareness of the project's good prospects. Where there is scope for new development clearly there is also scope to design it in a manner that reduces energy use. This is even more important in a liberalised world since the pressures to consider energy are reduced. But too much attention on attention grabbing new settlements could result in the demands of existing buildings, whose demand is responsible for the vast majority of energy use and where reductions in energy use are more difficult to introduce, being sidelined. In a sense, the conditions on new development which represents a net increase in energy consumption, need to be more stringent than on existing development if targets to reduce total overall consumption are ever to be met. This is because this increase in consumption has to be balanced by a stronger reduction in the consumption of existing development to meet overall targets for reduction of energy consumption. So in a sense even solarCity is extravagant!

**IMPLICATIONS FOR PUBLIC POLICY MAKERS**

In liberalised markets municipalities have a major influence on energy consumption in new build areas and can act sustainably providing that a suitable brief is given to those developing new build areas. It also needs commitment at the regulatory level from town planners and Government. However environmental communities will become more successful if all the partners have been actively involved from an early stage of planning, as in solarCity. Liberalised markets in fact imply more regulation if governments are to meet political targets, not less. However the transferability of utopian cities like solarCity is very culturally determined. This settlement gives the impression of being a very “socially organised” one and while well adapted to Northern Europe, may not suit a more individualistic society. Every one of the 1317 homes in this community is an apartment with no individual houses. So despite the objective of establishing a mixed community, the area risks suffering social segregation and may have limited transferability to other countries during an era dominated by the market when sprawling development of individual houses is the norm.

The neighbourhood intended to develop its own energy distribution network and power sources using renewables. In practice the competition from fossil fuel has made this impossible to justify economically and the competitive nature of an open market makes this difficult to overcome. The ability to invest in energy and emission saving technology is dependent on capital cost and ease of management. If central government really wishes to maintain momentum in improving energy efficiency in the residential sector, they will have to consider heavily subsidising the capital element in energy service systems using energy efficient or renewable technologies from public goods charges on energy supply.

**FURTHER INFORMATION**

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