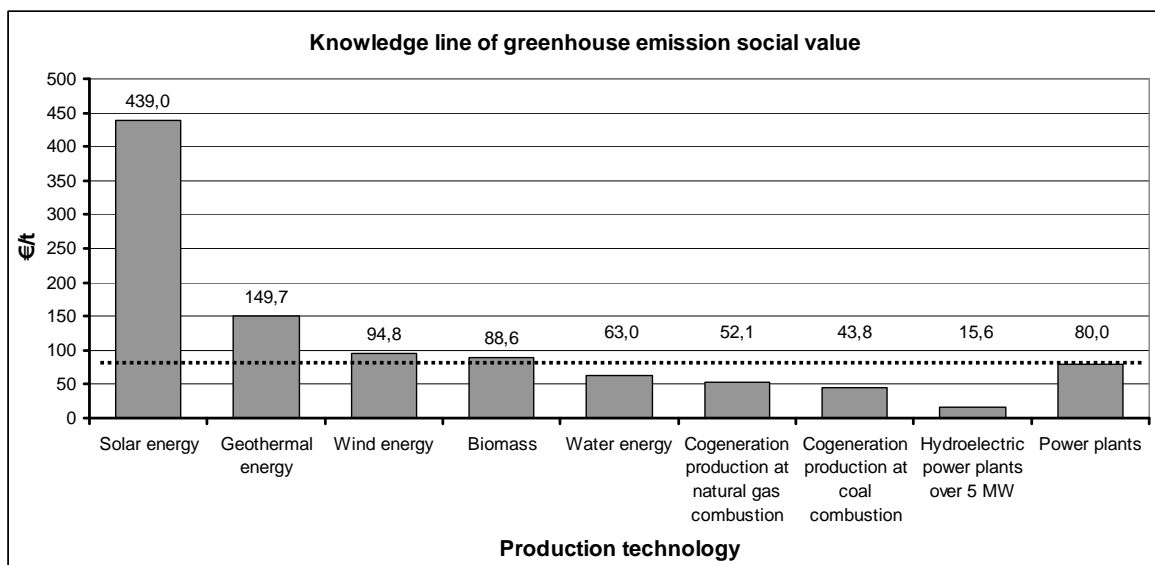


# Sustainable Energy Active Office Building in Košice

## Centre for Economy Study of Renewable Energies and Distribution Network Košice, Slovakia

Several analyses have shown that buildings are the largest energy consumers, reaching as much as 41% of all energy used. Directive 2010/31/EU defines nearly zero-energy building as the target for the year 2020. To achieve this, cost-effective economy-driven innovation principles are used to save as much fossil energy as possible. As a second step remaining fossil energy will be obtained from alternative renewable sources. In order to achieve a reasonable return on investment we have developed a special qualitative knowledge curve for carbon emissions, as shown in figure 1. This tool allows us to make a selection of the technologies which provide the most cost-effective investment criteria. Moreover, heat pump renewable energy systems and micro-capillary technology working together in synergy mode can provide energy performance factors - SPF - as high as 7 on an annual basis. These two technologies also allow us to enhance the quality of the services provided. During the summer season this allows us to cool the building in the most efficient way – cooling the building's



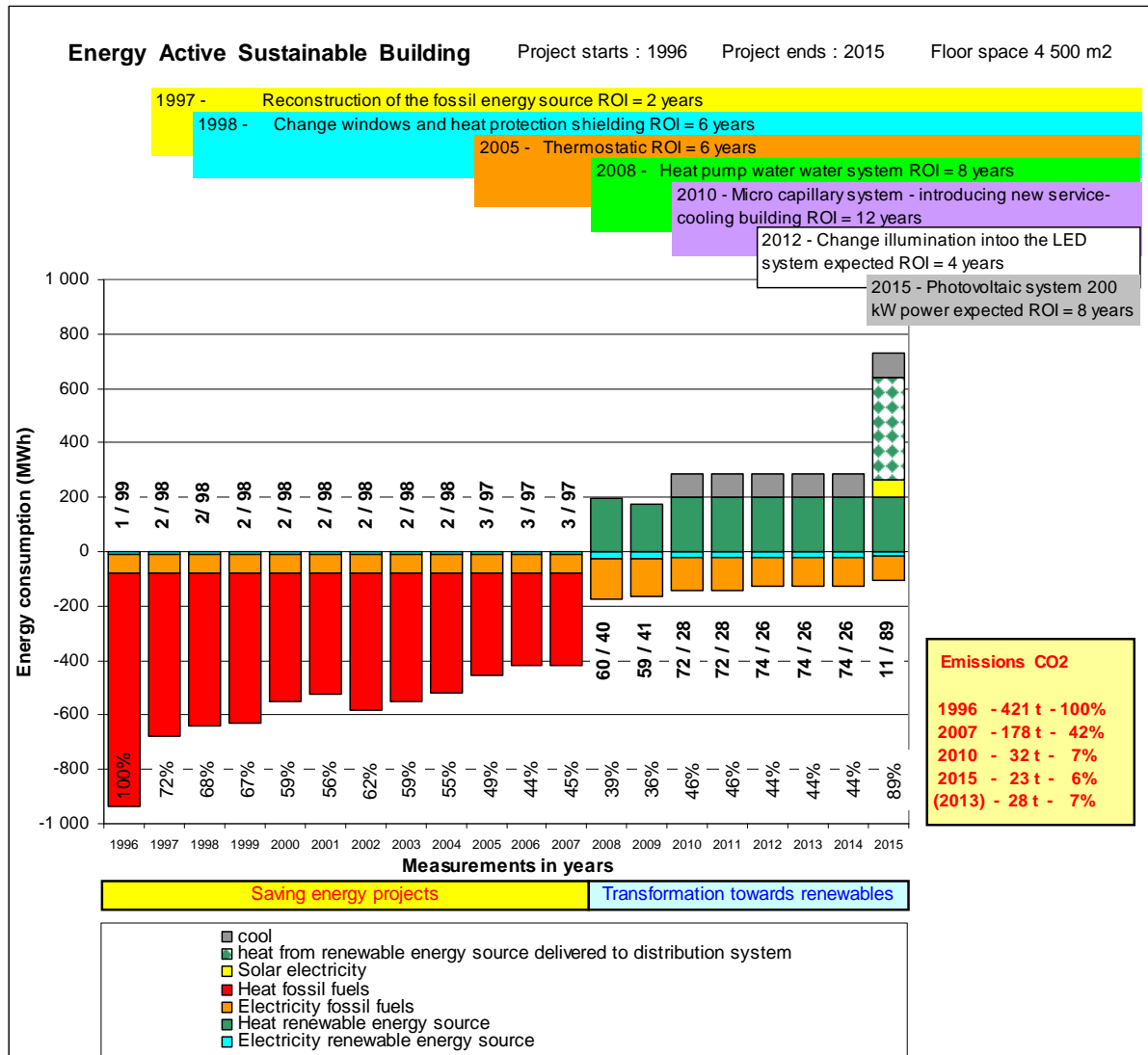
**Figure No1. Knowledge line for the evaluation of the social cost of carbon in Slovakian conditions**

internal environment through irradiation heat transport component. During the summer the resulting performance factor, SPF, can reach as high as 14, providing an extremely low-cost solution.

The project started in 1996 and is planned to be completed by 2015. The period from 1996 to 2007 involved the development of energy-saving technologies. In 2008 we started with projects to replace fossil energy by selected renewable technologies. In order to achieve economic performance and a return on investment period of between 4 to 12 years, a very precise timing is needed for the introduction of the selected technologies in practice. For example the experience curve for the most popular solar technologies tells us that it will not reach the cost level of traditional grid services until 2015. Similar immature technologies still have many unsolved technological problems. The need for cost-efficient energy storage systems required for wind and solar energy is just one example. We also expect that electric cars will appear and will provide new energy storage techniques which may also be suitable for solar and wind energy systems. The capacity of the renewable energy source for heating can also allow us to deliver excessive energy to other consumers outside the building itself. With the introduction of capillary system in the year 2010 building are reaching a virtual zero energy status. Enhanced energy delivery systems outside the building need the development of a common energy market for both fossil and renewable energy based on non-discriminating access to the energy source distribution networks. This will encourage the shift from less effective competing markets to much more effective cooperation between suppliers, and will drive the transformation of the energy systems

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towards distributed renewable energy sources in the most economic and effective way. We are defining new levels of the energy performance – the status of the sustainable energy building connected to a common non-discriminating energy market.



**Figure No 2. ActiveBuilding Innovation - Long term energy profile of the innovation towards sustainable energy active office buildings in Košice, Slovakia.**

Partnerships sought:

- research partners for developing the legal principles of the non-discriminating common energy markets for distributed renewable energy sources
- verification of the **ActiveBuilding** innovation in other types of facilities in the EU

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