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Energy and Climate Breakthroughs in the Real World – A Mixed Used Development in Ohio

The Marina District development on the banks of the Maumee River in Toledo, Ohio, is a new high density residential neighborhood combined with a destination-oriented entertainment district to be filled with a collection of clubs, restaurants, and entertainment options along the waterfront providing added appeal and access to Toledo's important boating community. It is a major factor in the revitalization of the city center. The housing is available for both rental and purchase targeted at moderate income residents. On the surface this is an attractive example of a "new urbanism" development becoming increasingly popular in the USA as an alternative to the anonymous suburbs that have dominated development for the past fifty years.

Beneath the surface, the Marina District is an example of energy and environmental excellence second to none. The developer, Larry Dillin, will explain how he saw the growing concerns over energy in the USA were becoming a major factor in customers' decisions in the coming years and could be a significant source of competitive advantage in a tough real-estate market. A team consisting of some of the world's leading experts in efficient construction and community energy services was invited to develop an energy concept for the site that would meet multiple goals. Among these were to substantially reduce the cost of energy for years to come, to ensure supply would be at least as reliable as traditional networks, and to create dramatically less greenhouse gases. At the same time, a project with hundreds of millions of dollars at stake in a risky real-estate market could not afford to experiment with approaches with unacceptable commercial risks. Recommended energy solutions must have minimal technical risk, and be acceptable in the eyes of relatively conservative potential clients. Finally, the impact on construction costs should be minimal to ensure the modest market rents and prices could be maintained.

An integrated energy plan was developed that viewed the entire development as a single energy object to optimize the efficiency not only of the individual buildings, but also of the various options for supplying heating, cooling and electricity to the entire site. The value of different measures, economically, technically and in terms of their potential to reduce market risk or create competitive advantage was balanced. Toledo has about 3,500 heating degree days and less than a third that for cooling. Significant focus was placed on reducing the total heat needed, and how it should be distributed and sourced.

The team drew on the expertise of cities in Europe with proven, highly efficient multi-utility systems such as Mannheim, Germany. They also drew on the expertise of Owens Corning in the USA to identify viable options for modifying construction to much higher levels of efficiency without the need to retrain local builders. Performance standards were benchmarked against those of the USA, Germany and Scandinavia.

The results were so attractive that the developer took the unusual and courageous decision to fully implement all recommendations of the integrated energy plan. Buildings would be 30% to 40 percent more efficient than the prevailing codes. Within the homes, heating and cooling distribution was separately optimized with a return to more effective and comfortable water-based heat distribution and maximizing the value of natural ventilation. The whole site is served by a highly efficient district heating system. This is the first of this size to be implemented in North America in the last 50 years. Heating and electricity is supplied from an energy center serving the entire site with a mix of optimally sized efficient boilers and cogeneration engines.

Residents will enjoy unsurpassed levels of comfort and competitive energy costs for decades to come. Total energy use is 40 percent less than normal. Greenhouse gases are over 70 percent less. By using proven approaches from both Germany and the USA the technical risks are low. Amazingly, the incremental construction costs are well within acceptable levels. On a final historical footnote, the precursor organization of the International District Energy Association was founded over a hundred years ago in….Toledo, Ohio. In some ways, the Marina District's energy solution is a case of "back to the future".