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Editorial

Sustainable and Resource—Efficient Homes and Communities

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Throughout most of human history, societies have lived a self-sufficient existence. Their immediate environment was the place from which they harvested or collected their basic needs. They drew water from streams, grew food, used timber to keep warm, cook, and build shelters, and wool from domesticated animals to make garments. The inhabitants took from the land only what was required for their existence. In fact, the available natural resources often determined population size. It was a simple existence, where resources were consumed in measure and the needs of future generation was never at risk. This took place when most communities were rural and agrarian.

The industrial revolution changed all that. When people abandoned farms in search of employment, cities swelled. Those vastly expanded urban hubs could no longer rely on their surroundings to provide their daily supplies, which now had to come from afar. When electricity began to light up cities, the urban population grew dependent on it to power factories and dwellings on their many newly invented appliances. A system and an organization had to be put into place to meet the daily requirements of all the inhabitants—be they food, sanitation or energy. Gradually, homes were linked to utilities like fresh water supply and drainage. Food had to be trucked in from the hinterland and landfills needed to be set aside for the growing mountains of industrial and domestic waste generated. The dependence of humans on their surroundings grew to be utterly critical. Severing all supply links became impossible to imagine. Perhaps the greatest manifestation of this dependency was the post-Second World War North American suburb. Built away from the city center, a typical sub-division and its single-family detached dwellings consumed valuable resources during construction and after occupancy. Homes were built with disregard to the site's natural conditions and the chosen planning and construction practices had very little to do with vernacular paradigms. The community was dependent on external sources for its entire existence and function. Connection to a utility grid was unavoidable.

Things have changed since the mid-twentieth century. It takes, at times, cataclysmic events and ominous signs to remind us that human existence is at the mercy of nature. Phenomena like global warming and climate change, prolonged periods of drought in one part of the world and floods in another, the melting of the ice caps, the depletion of fossil fuel and the sharp rise in energy costs, the increase in the cost of food and the depletion of many natural resources and minerals that were once abundant are some of these aspects.

Socio-economic transformations have also brought to the forefront other issues: the widening gap between rich and poor nations, the ongoing global economic downturn, rapid population growth in some places and the aging of the population in others.

These natural and social phenomena have forced us to rethink how development should take place. We began reflecting on issues that were once considered marginal—making them of global concern. They have prompted a search for alternatives to the way we currently dwell ourselves.

The term sustainable development has become synonymous with a search for a new mindset. Its definition, put forward by a UN-commissioned report called "Our Common Future", regards the

needs of future generations as we conduct our present actions. In its simplest interpretation, the report calls on society to consume only what is needed, and minimize its environmental footprint.

But is this possible? Have we passed a tipping point beyond which we can no longer reverse a course of action that was charted several decades ago? This book argues that we can indeed detach our dwellings from a dependence on many external systems and resources and adopt other building practices. What is known as living off the grid is possible. It would be utopian, perhaps, to argue that all of our systems can be unplugged from already-built homes, but we can design and construct new dwellings where dependence on several systems can be substantially reduced and retrofit some aspects in existing dwellings.

This special issue outlines strategies and principles and offers examples to assist those who wish to familiarize themselves with dwellings that have reduced environmental footprints. It is also believed that adopting these ideas does not mean frugality or a reduction in personal comfort. What is cast here is a mindset that demonstrates that domesticity can be both enjoyable and cost effective, while still helping the planet.

If society is to attain a sustainable existence, one hopes that ideas that are manifested in a single dwelling will find their way into mainstream construction. This is, in fact, as history has demonstrated, the course of evolution. People—homeowners included—tend to follow a lead. The cost of products is reduced when more people consume them and educational institutions incorporate knowledge about them into their curricula. One needs to hope that the process will be swift.

This issue contains seven articles about sustainability in the residential environment. They are about: Thermal Ceramic Panels and Passive Systems in Mediterranean Housing: Energy Savings and Environmental Impacts [1], A Bamboo Treatment Procedure: Effects on the Durability and Mechanical Performance [2], The Convenience Benefits of the District Heating System over Individual Heating Systems in Korean Households [3], The Effect of Interior Design Elements and Lighting Layouts on Prospective Occupants' Perceptions of Amenity and Efficiency in Living Rooms [4], Taking the Time Characteristic into Account of Life Cycle Assessment: Method and Application for Buildings [5], Greenhouse Gas and Air Pollutant Emissions of China's Residential Sector: The Importance of Considering Energy Transition [6], Control of Thermally Activated Building System Considering Zone Load Characteristics [7] and The Small-Scale Hydropower Plants in Sites of Environmental Value: An Italian Case Study [8].

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