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Energy INTRODUCTION

We shape our buildings and afterwards they shape us

— Winston Churchill

Across the country, growing numbers of citizens, community leaders, professionals in a variety of disciplines, and public policy makers are increasingly aware of the impact of environmental factors on the health of individuals and on communities. Citizens and professionals alike are taking active steps to address significant concerns about the environmental quality of our homes, our public buildings and spaces, our oceans, our food, and our drinking water and air. The condition of these factors is directly related to a person's health and quality of life, and directly affects the state of a community's level of livability.

The following paragraphs are taken from a document published by the United States Department of Energy.¹ People live the greater part of their lives in residential homes and other buildings. Throughout history, buildings have changed to address social needs, and this change is often advanced by innovative technologies. An example is the advent of the skyscraper a century ago, which allowed builders to take advantage of the transformative new steel-framing technology to overcome real-estate scarcity in crowded American cities by enabling extraordinary growth in a contained footprint. Today's building industry is entering another era of change, with a view toward minimizing a different kind of footprint—the energy, carbon, and environmental footprint of commercial and residential buildings. This time, change is being driven by a need to optimize and conserve resources — clean air, potable water, land ... and energy. And, once again, transformative technologies are holding the key to meeting the challenges in these areas.

As designers, developers, and owners search for ways to minimize the operating costs and the environmental impacts of buildings, while also increasing their functionality and appeal to occupants, “green building” trends have become increasingly observable in the marketplace. Energy-efficiency, energy conservation, and energy alternatives to fossil fuels are critical elements of green building. Across the country, both innovations and social needs are key drivers in green-energy trends in the construction of homes, commercial buildings, and civic facilities. For example, such trend-drivers include:

Energy consumption—

Energy consumption in buildings has been growing in aggregate over time. Today, the nation's 114 million households and more than 4.7 million commercial buildings account for nearly 40 per cent of total energy use in the United States, consuming

more energy than the transportation or industry sectors. The total utility bill for energy used by buildings topped \$369 billion in 2005.

Population growth—

Energy use is driven by population growth, and changes in population profiles. Growth in the number of people drives the number of homes, schools, and other community buildings that are developed; increases in the number of older people drives the development of specialized senior housing and assisted living facilities.

Economic growth—

Growth in Gross Domestic Product is a major factor in energy-use, driving the amount and size of new floor space in offices and retail buildings, in the size of new homes, service demands (lighting, space conditioning, electronics, process loads), and real energy prices.

Energy innovations in the building sector—

Improvements in technologies and practices over the past three decades (in lighting fixtures, windows, insulation, building controls, and appliances, as well as whole-building design and construction) have made it possible to significantly improve the efficiency with which energy service demands are met, delivering many building services with lower energy intensity.

Section IV.2 of the *Resource Manual* is devoted to "energy" as an aspect of environmental health, green building, and a livable community.

¹ Office of Energy Efficiency and Renewable Energy (October, 2008), *Energy Efficiency Trends in Residential and Commercial Buildings*. Washington, DC: U. S. Department of Energy.
http://apps1.eere.energy.gov/buildings/publications/pdfs/corporate/bt_stateindustry.pdf.