

## INDUSTRY TRENDS AND OPPORTUNITIES

# SUSTAINABLE SYSTEMS

Sarasota County is poised to lead the region by taking advantage of emerging business opportunities in sustainable systems.

The Sarasota County Five-Year Economic Development Strategic Plan, April 2009, identified “sustainable systems” as one of its three key platforms—a promising potential initiative that could be leading edge, first of its kind, and generate significant economic benefit for Sarasota County and the region.<sup>4</sup>

Nationwide, sustainability and green jobs are now a major part of most economic development conversations. For Sarasota County, that niche is clearly in the area of water, supported by assets including Mote Marine Laboratory and a growing number of specialized practitioners in the related fields of water and soil management and low-impact development.<sup>4</sup>

This paper further highlights the Sustainable Systems Opportunity for Sarasota County, including providing some key facts for emerging industries, so that our community partners might develop a deeper understanding of sustainable systems and help the County achieve its goals.



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### What Is Sustainability?

The modern sense of the word entered the lexicon in 1987 with the publication of *Our Common Future*, by the United Nations World Commission on Environment and Development, also known as the Brundtland commission after its chair, Norwegian diplomat Gro Harlem Brundtland. That report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”<sup>3</sup>

With ever increasing global population size, urbanization and consumer demands for both basic needs and modern conveniences, there is an urgent need to reconsider the ways in which human needs are met.<sup>5</sup>

The notion of sustainability is, in essence, living with minimal impact on the environment and natural resources, with a view to maintaining environmental and natural systems for future use and enjoyment. In practice, sustainability involves finding ways of minimizing pollution, waste production and chemical use, as well as maximizing the efficiency of resource use and reducing dependence on finite resources.<sup>5</sup>

Although there’s a fair amount of overlap between the terms sustainability and “green,” “green” usually suggests a preference for the natural over the artificial. With some six billion people on the planet today, and another three billion expected by the middle of the century, society cannot hope to give them a comfortable standard of living without a heavy dependence on technology.

### Sustainability and Our World

The United Nations projects that the planet will have to sustain another 2.6 billion people by 2050. But even at the current population level of 6.5 billion, we’re using up resources at an unsustainable rate.<sup>3</sup>

To secure a quality life for current and future generations, sufficient land, water, and energy must be available.

## Sustainability and Our Nation

Americans constitute 5% of the world's population but consume 24% of the world's energy.<sup>1</sup> In our country, we control about 25% of the world's wealth, and produce 25-30% of the world's pollution. Clearly, we are dependent on the stability and productivity of nations all over the world to maintain our level of affluence: the time has long passed when we could act on our own, and rely on our own resources to maintain our standard of living.<sup>2</sup>

## Sustainability and Our Community

With sustainable development and green jobs at the top of every community's economic development strategy, Sarasota County needs to focus on areas where it can build a competitive advantage and stand out from other regions. The county is best suited as a location for applied research or demonstration projects and initiatives that illustrate the integration of multiple sustainable development practices or clean technologies.<sup>4</sup>

Employment growth in environmental and other technical consulting services has more than tripled over the five year period from 2002 to 2007.<sup>4</sup>

## Key Industries

Sustainable systems industries like aquaculture, water management and renewable energy are emerging business opportunities for Sarasota County. For example, Mote Marine Laboratory's aquaculture demonstration work incorporates sustainability elements (water re-use and solar power) to minimize environmental impact.

Such sustainable systems have potential applications in agricultural, commercial and residential settings. Additionally, the region's growing expertise in water resource management can be integrated with local food production, energy conservation, low-impact development, and environmental resource management. Opportunities related to renewable energy—including solar—also offer possibilities.<sup>4</sup>

## Aquaculture

The broad term "aquaculture" refers to the breeding, rearing, and harvesting of plants and animals in all types of water environments, including ponds, rivers, lakes, and the ocean. Similar to agriculture, aquaculture can take place in the natural environment or in a manmade environment. Using aquaculture techniques and technologies, researchers and the aquaculture industry are "growing," "producing," "culturing," and "farming" all types of freshwater and marine species.<sup>6</sup>

Aquaculture is the fastest growing form of food production in the world. It is also a significant source of protein for people in many countries, including the United States. Globally, nearly half the fish consumed by humans is produced by fish farms. This worldwide trend toward aquaculture production is expected to continue. At the same time, demand for safe, healthy seafood is also expected to grow.<sup>6</sup>

If the current estimates for world per capita consumption of seafood are accurate, the projected demand for seafood will not be met without growth and technological advancement in aquaculture to supplement the harvest of wild stocks.<sup>7</sup>

In its 2006 report, "State of World Aquaculture," the U.N. Food and Agriculture Organization (FAO) reported that nearly half of the fish consumed as food worldwide are raised on fish farms (compared to 9% in 1980) and estimated that worldwide aquaculture production would have to increase from 45.5 million mt in 2004 to 80 million mt in 2050 to just maintain current per capita consumption levels.<sup>9</sup>

Aquaculture is not a new industry—the National Oceanic and Atmospheric Association (NOAA) and its predecessor agencies have been involved with commercial marine aquaculture and enhancement of wild finfish and shellfish stocks since the late 1800s—it has grown to be a \$1 billion industry (farm gate sales) in the United States.<sup>9</sup>

A \$3 million increase was included in the President's FY 2008 Budget for NOAA to establish the regulatory framework for environmentally sustainable commercial aquaculture opportunities

In the global market for seafood, the United States, which had been a pioneer in sustainable aquaculture, has fallen alarmingly behind. In fact, US aquaculture is less than 2 percent of the \$70 billion worldwide industry, with China accounting for 70% of global production.<sup>9</sup>

Many other countries are investing more heavily in aquaculture than the United States. According to the United Nations Food and Agriculture Organization, the US ranked 10th in total aquaculture production in 2004, behind China, India, Vietnam, Thailand, Indonesia, Bangladesh, Japan, Chile, and Norway.<sup>12</sup>

The United Nations is projecting a 40 million ton global seafood shortage in 23 years (by 2030).<sup>10</sup>

Aquaculture shows significant economic potential and good prospects for success in the United States, according to a new report commissioned by NOAA.<sup>11</sup>

The largest single sector of the US marine aquaculture industry is molluscan shellfish culture (oysters, clams, mussels), which accounts for about two-thirds of total US marine aquaculture production, followed by salmon (about 25%) and shrimp (about 10%). Current production takes place mainly on land, in ponds, and in coastal waters under state jurisdiction.

There is significant potential to increase commercial aquaculture production in the US using today's technology. Preliminary production estimates by NOAA indicate that domestic aquaculture production of all species could increase from about 0.5 million tons annually to 1.5 million tons per year by 2025. The additional production could include 760,000 tons from finfish aquaculture, 47,000 tons from crustacean production, and 245,000 tons from mollusk production. Of the 760,000 tons of finfish aquaculture, 590,000 tons could come from marine finfish aquaculture.<sup>11</sup>

Mote Marine Laboratory is developing water reuse technologies and processes with applications in the growing field of sustainable aquaculture, in Sarasota County.

The county has a role in supporting/expanding this leading-edge work. Assistance in forging industry collaborations and partnerships, in particular, could create a national or even worldwide reputation for Mote in the applied sciences and help promote the development of a new technology-intensive industry in the region.<sup>4</sup>

### Water Management

Water tables are diminishing on every part of the world. Water quality and availability affect environmental quality for life support. Groundwater aquifers are more polluted. Water tables are falling on all continents, while human demand for water increases. Over 1 billion people lack safe drinking water. Almost half of the world population does not have adequate sanitation. Most diseases in the developing world are water-related. If current trends continue, half the world could face water shortages by 2032.<sup>18</sup>

The World Water Council says the world will be 17% short of the water necessary to feed global population by 2020 based on current water consumption patterns.<sup>16</sup>

### Water and Wastewater Market

In 2002, the worldwide market for water and wastewater totaled more than €250 billion, and analysts foresee an overall growth rate of up to 60% by 2010. The World Bank has ongoing commitments of about €17 billion in water projects.<sup>15</sup> Ninety percent of the worldwide market is serviced by companies with less than \$50 million in revenues.<sup>16</sup>

The domestic water treatment market is growing at 6% per annum in average from 2004 to 2015. The total market volume in 2007 was \$5 billion. It is projected to reach \$6 billion by 2010 and more than \$10 billion by 2015.<sup>16</sup>

Emerging technologies to meet demand for water include more efficient water usage; greater reliance on recycling and reuse, membrane based filtration technologies (desalination), automatic metering to promote conservation and efficient usage, replacement of chlorine and other treatment chemicals by oxidation, UV and other emerging technologies; agriculture: more efficient/less water intensive water drip irrigation systems and new information technologies to improve the measurement, monitoring and utilization of water resources.<sup>16</sup>

Population projections forecast that more than 6 million people will live in the Southwest Florida Water Management District, which includes Sarasota County, by the year 2025. This represents a 51% increase from 2000 and creates new demands for water on an already stressed supply.<sup>14</sup>

### Desalination

Desalination, a process that removes dissolved minerals, usually salts, from sea, brackish and wastewater, is one of the most viable solutions to the decreasing supply and increasing demand for fresh water. Driven by the increasing world population and the diminishing freshwater sources, a result of global warming, desertation and environment destruction, many countries in the world have constructed or are constructing water desalination plants for water supply. The market for water desalination has witnessed a significant upturn during the last years<sup>15</sup>

About 15,000 desalination plants generate 3% of the global water supply and could be more than 5% by 2015.<sup>16</sup> Desalination is a \$5 billion global market, growing more than 10% a year.<sup>16</sup> The market worldwide is to reach nearly \$30 billion up to 2015. Dramatic increase is expected in Asia mainly China, in new technologies and small systems applications.<sup>17</sup>

Divided by regions, Middle East still takes over 50% of the market share, followed by Asia-Pacific, where economic boom, urbanization, population growth and environment deterioration make the municipalities and industrials eager to search for new water sources. These two regions are going to remain the leading forces for the global markets.<sup>17</sup>

America and Europe share about 10% of the market respectively. The construction in these areas is mainly for the purpose of reducing the use of groundwater or adding alternative water sources.<sup>17</sup>

The traditional dominating technology Multiple Stage Flash (MSF) is continuing to lose its share to Reverse Osmosis (RO) and Multi-effect Distillation (MED), due to the improvement of membrane technologies and the cost advantage.<sup>17</sup>

It is anticipated that by 2020, about 400 million gallons of additional water may be necessary each day to supplement current water resources to meet the projected water demand of all the current and future water users within the Southwest Florida Water Management District.<sup>13</sup>

### Renewable Energy

Renewable energy is energy generated from natural resources—such as sunlight, wind, rain, tides, and geothermal heat—which are naturally replenished. In 2006, about 18% of global final energy consumption came from renewables, with 13% coming from traditional biomass, such as wood-burning. Hydroelectricity was the next largest renewable source, providing 3% of global energy consumption and 15% of global electricity generation.<sup>19</sup>

Each of these renewable sources is now at or near a tipping point, the crucial stage when investment and innovation, as well as market access, could enable these attractive but generally marginal providers to become major contributors to regional and global energy supplies. At the same time, aggressive policies designed to open markets for renewables are taking hold at city, state and federal levels around the world.<sup>20</sup>

Governments have adopted these policies for a wide variety of reasons: to promote market diversity or energy security, to bolster industries and jobs, and to protect the environment on both the local and global scales. In the US more than 20 states have adopted standards setting a minimum for the fraction of electricity that must be supplied with renewable sources.<sup>20</sup>

The use of renewable fuels is projected to grow

strongly, particularly in the liquid fuels and electricity markets. Overall consumption of marketed renewable fuels—including wood, municipal waste, and biomass in the end-use sectors; hydroelectricity, geothermal, municipal waste, biomass, solar, and wind for electric power generation; ethanol for gasoline blending; and biomass-based diesel—grows by 3.3% per year, much faster than the 0.5% annual growth in total energy use.<sup>22</sup>

Over the past five years, annual installations of wind farms have doubled, while annual installations of solar power systems have increased six-fold. Total installed capacities of both technologies have grown at an average annual rate of 20–30% over the past decade, closer to the high growth rates seen in computers and mobile phones than to the single-digit growth rates common in today's fossil-fuel markets.<sup>21</sup>

### Solar

Solar photovoltaics use semiconductor materials to convert sunlight into electric current. They now provide just a tiny slice of the world's electricity: their global generating capacity of 5,000 megawatts (MW) is only 0.15% of the total generating capacity from all sources. Yet sunlight could potentially supply 5,000 times as much energy as the world currently consumes. And thanks to technology improvements, cost declines and favorable policies in many states and nations, the annual production of photovoltaics has increased by more than 25% a year between 1996-2006 and by a remarkable 45% in 2005.<sup>20</sup>

The Sustainable Systems Opportunity holds great promise for Sarasota County to achieve its economic development goal of reaching a target of 15,000 jobs and 2,500 new firms in five years. Reaching this goal means a more strategic focus of our resources around sustainable systems, supported by clear outcomes and strategies, and shared accountability.<sup>4</sup>

### Conclusion

Sarasota County has a small but growing core of progressive architecture, environmental services and related companies, along with a strong community interest in and orientation toward concepts of sustainability.<sup>5</sup> With help from our community partners to grow existing businesses and attract new ones that develop products and provide professional and technical services in sustainable markets, Sarasota County will achieve its economic development goals while leading the region in sustainability.<sup>19</sup>

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