

TEN THEMES OF SUSTAINABILITY

The Biosphere Eco-City (BEC) model divides sustainability into ten broad Themes to increase involvement and action. People and organizations can relate to the Themes because they reflect their own areas of work and interest. For those new to the ideas of sustainability, the concrete nature of the Themes makes them easy to understand. As well, each theme is a natural area for discussion, and can bring together people and organizations of different backgrounds who share a common interest.

When the [Biosphere Eco-City Model](#) was being developed, research found repeated reference to what are now called the first nine BEC Themes in many books and articles on urban sustainability. There was frequent reference to the tenth – Sense of Place – as well, but sometime with different names.

The Ottawa Biosphere Eco-City Initiative has communicated the ten Themes in over three years of operation (from 2009). This has included 22 presentations and a larger number of private meetings and discussions. In every case, the people learning about the Themes found them to be a useful tool for addressing sustainability.

Any Biosphere Eco-Cities develop, they can provide more insight into the Themes of Sustainability. Meanwhile, the following is offered as guidance:

1. *TRANSPORTATION* (movement of goods and people)

This theme focuses on the movement of goods and people. Projects may address such issues as travel distance and time, energy savings, safety, and convenience. Because transportation is a dynamic system, projects are build on previous results. For example, an activity to develop a public transit system might follow a more fundamental study of transportation questions, such as the relationship of travel to employment and health.

2. *ENERGY* (for buildings, transportation, manufacturing, and agriculture)

Heating/cooling, transportation, manufacturing, and agriculture are all major energy consumers, and are therefore potential areas for conservation. Projects could focus on such things as: energy sources, energy storage, natural sheltering, alternative energy vehicles, etc. A Biosphere Eco-City might also promote manufacturing processes that save energy or provide energy for other uses (e.g. district heating systems). In rural areas, agricultural projects might focus on conservation (e.g. low energy cropping systems) or supply (e.g. generation of bio-gas).

3. *DESIGN* (built environment - especially buildings and roads)

The design of the urban area has a significant impact on sustainable development and quality of life. For example, a compact city design makes mass transit more viable, encourages walking and (by reducing automobile use) makes neighbourhoods safer. Also, the use of natural materials (e.g. stone and wood) for buildings may save energy and reduce pollution (produced in the manufacture of materials).

4. *HABITAT* (urban green spaces, water areas, and rural environment)

The creation of parks and wild lands within a city will provide habitat for a number of species, while providing health and enjoyment for residents. If urban green spaces are connected with rural natural areas, these corridors can reduce genetic isolation among plants and animals. In rural areas, efforts to increase species habitat will often involve private landowners; encouraging them to allocate parts of their country properties, farms, or commercial forests to the protection of species.

5. *FOOD* (farms & urban markets, heritage crops/animals, urban gardens)

In the past, much of the food for a city came from its surrounding region. In many countries, however, local supply has been replaced by national and international food distribution systems. An Eco-City project to encourage use of locally produced food could reduce the energy use and pollution of long-distance transportation. It would have two other benefits: fresher food for urban residents and higher incomes for local farmers. If such a project included heritage crops and meats, it could help maintain agricultural biodiversity. Development of urban gardens is another way to provide city residents with fresh food, as well an enjoyable pastime.

6. *NATURAL CAPITAL* (maintaining land, water, soil, natural materials)

The expansion of a city into the countryside can be reduced through urban planning and building design. Also, a country's best soils are often near large urban areas. Projects that promote compact urban form, encourage sustainable agriculture or maintain forest cover near cities can help preserve precious soil resources.

Urban growth increases the demand for fresh water; while the infilling of wetlands, the destruction of aquifers, and water pollution reduce its availability. An effective way to maintain the quality and supply of fresh water for urban areas is to retain forest cover and reduce agricultural pollution in upstream areas.

Materials used for urban construction include crushed rock, sand, wood, metals, etc. Eco-City projects that reduce road expansion or recycle construction materials can reduce the use of natural resources.

7. *WASTE* (processing of wastes, recycling, efficient design, conversion to energy)

In urban areas, efficient processing and reduction of waste will reduce the amount of land needed for dump sites. One component of this is recycling, which reduces energy and materials use while providing local employment. In rural areas, training in the use and storage of farm chemicals can reduce groundwater contamination and protect the health of farmers.

Another way to reduce waste is through re-design of equipment or re-structuring of manufacturing processes, and business partners in an Eco-City can provide leadership in these areas. Projects focused on the recycling of parts can include products used in the home, office, or industrial plant.

Plasma technology may soon provide a reliable electricity supply through the very high temperature conversion of waste to energy.

8. *HEALTH* (clean air and water, safety, tranquillity, environmental needs of vulnerable groups)

Access to clean air and water is a necessity, yet in many cities it is not universally available. In rural areas, residents of villages and farms are often the victims of water or air pollution from rural industries. Projects that address these problems would engage multiple partners, including government, industry, and community representatives.

Safety is another concern of urban residents. Where automobile traffic is a threat to urban populations, the use of compact urban design and mass transit can produce pedestrian-friendly cities; and reduce the potential for injuries. Crime reduction can be addressed through neighborhood design, and recreation projects, and training projects.

Tranquillity is enhanced in urban areas by the creation of green spaces, a more human scale of city design, and reductions of traffic and noise. In a Biosphere Eco-City, experimental projects can be used to create and measure these benefits on a neighborhood-by-neighborhood basis.

The environmental needs of vulnerable groups are an important health issue. Children need open areas to play in, that are close to their homes, healthy and safe. Seniors and handicapped persons require similar areas. Planning for parks and green spaces should address these needs.

9. *RECREATION* (urban, rural, and agricultural - e.g. farm visits)

Parks and pathways are important elements of urban recreation, and their supply should be tailored to the needs of neighbourhoods. As well, rural areas have the potential to address some of the recreational needs of urban residents. An Eco-City

project that coordinated the rural supply of recreational areas, such as camping and picnic sites, could provide enjoyment, while generating rural income. Another possibility is farm visits, which are an educational experience that brings urban people closer to nature. This also provides extra income that helps to maintain traditional farms, with benefits for both the environment and rural society.

10. *SENSE OF PLACE* (feeling of belonging, sense of community, and stewardship)

A city that contains natural areas, that is easy to get around in and where people do not feel oppressed by traffic tends to encourage residents to explore more of their surroundings. This exploration increases the vitality of the city. At the same time, positive contacts with other people and nature give them a sense of belonging.

Where people feel they belong, they share a sense of community. This usually leads to greater participation in civic activities and more volunteers to help others in need. This participation can make it easier to govern a city and to address social problems. In rural areas, maintaining the traditional sense of community is related to opportunities for young people to remain in the hamlets and on the farms.

Citizens who take part in civic life, in either urban or rural areas, tend to learn more about the role that the environment plays in their well-being. Such knowledge could be a starting point for a project of environmental stewardship.