

# Ecospherotron

## A SYSTEMS VIEW OF THE WORLD

*"We don't fully understand how the world works; we don't even understand how much we don't understand."*

The Ecospherotron (E-Tron) is a model representing our living planet. Through a sequence of 5 artistic images, the E-Tron portrays the relationships and interdependence of our human world and the Earth's life support system on which we depend. Each of the 5 images depicts a different state and a different time in our planet's history:

1. **MIRACLE**
2. **BALANCE**
3. **OVERSHOOT**
4. **CRASH**
5. **RESTORATION**

### A SYSTEMS VIEW OF OUR LIVING PLANET

Our planet is a system – a whole of interdependent parts. The system is more than the sum of these parts and we can only make educated guesses as to how it works. A *systems view* allows us to get our heads around the amazing complexity of our world. There are many examples of systems. The human body, a forest, a car, a city, a school and a bird are all examples of systems. Likely the most important system to understand and appreciate is our living planet.

#### 1. MIRACLE

The **MIRACLE** E-tron image models our planet's essential features and working parts before the arrival of humans:

- The **green 'life ring'** represents Nature and the Circle of Life. On one side of this ring are plants or 'sun munchers'. Only they can convert the energy of sunlight into more plant material or food for the animals which appear on the other side of the ring. Without plants, animals would not exist. Not only would they not have food to eat but without plants, which produce oxygen, animals wouldn't be able to breathe. But that's not all. Some of the oxygen plants produce drifts up into the air and is hit by the sun's powerful radiation splitting the O<sub>2</sub> molecule into atoms of oxygen. These atoms are then free to link up with another O<sub>2</sub> molecule creating the protective ozone (O<sub>3</sub>) 'blanket' that shields life from the sun's lethal ultraviolet rays.
- To maintain an average temperature of about 10 degrees C, the earth must release as much solar heat as it receives. It does that by radiating heat out into space. That's what the **red arrows** represent.
- The Earth's **crust** is the hard surface layer which is full of different minerals which in turn are full of elements such as iron, aluminum, nitrogen. These elements in differing combinations create a potential stockpile of nutrients for living things to use. Two processes

can liberate these important elements so that they are available to life – volcanism and weathering. Volcanism acts to inject these elements into the machinery of Nature and weathering is the process that slowly breaks rocks down to their constituent elements.

- What makes our planet Earth unique is life. There is only one living planet in the known universe. Life in all its weird and wonderful forms is called Nature. Everything in Nature cycles. When living things die they don't just disappear. They break down into the basic building blocks of matter which then are free to recombine perhaps into new living things. There's no such thing as waste in Nature. What is no use for one organism becomes a valuable resource to another. Life sustains itself by constantly taking in and passing out materials. Since Earth is a finite planet, waste that is produced must somehow be transformed back into nutrients again or soon waste would pile up and all nutrients would be gone. Birth, life, death, birth, life, death ... Nature's Cycles create an endless machine of renewal that ensures a steady supply of resources on which living things depend.

## 2. BALANCE

- The most conspicuous difference in the **BALANCE** E-tron is the arrival of a new species that occupies a unique place in the natural world. Homo sapien sapien, a Latin term meaning the wise one has entered the scene – and it is us. Humans will grow to become an earth changing agent more significant than earthquakes, glaciers or climate and are therefore given a place of their own in this model of our world.
- The recent arrival of a modest population of humans is represented by a **small ball** that connects to the rest of the world in three very important ways. These connections form the life support system for the human world without which humans would not survive. These three life-giving functions are depicted in the model as coloured tubes – much like the ones that keep a patient alive in hospital.
  - The **green tube** represents all the goods and services non-human Nature provides the human world – air, water, food and materials that we must have to meet our basic needs for clothing, shelter, transport and sustenance.
  - The **grey tube** is a symbol for all the earth's materials that humans extract from the surface or crust of the planet. At this stage in our history the materials we were taking are simple, easily accessible and non-toxic.
  - The **purple tube** is the waste tube from the human world back into 'Nature'. Like a living organism the human world consumes from the living and non living parts of Nature. This means that whatever goes in and is used will eventually come out as waste – receiving and treating this waste is an essential service. At this stage in our history – say around 5,000 to 10,000 years ago we can see that what is coming from the human world is of a low volume, biodegradable and non-toxic.

## 3. OVERSHOOT

- The human world has grown much bigger and this E-tron image of **OVERSHOOT**, depicts our world today. With the 'taking power' of modern technology, rising human expectations for more, and a population of over 7 billion people, the human 'ball' has become obese – a startling expansion that has compromised its life support system, the green life ring of Nature. For the human economy to grow, the energy and materials had to come from somewhere and that somewhere is Nature. The life saving ring is showing obvious signs of deterioration, overuse and disrepair. Here's why:

- Humans are taking more out of the crust than is going back in. In other words we are extracting matter from the Earth's crust and dispersing it into the ecosphere at a rate exceeding the ability of natural processes to return this matter to the crust. We are systematically creating an accumulation of both solid and gaseous waste. Examples of this are the 25% increase in carbon content of the atmosphere, sulphuric acid rain, heavy metal poisoning, phosphate loading of our lakes and increases in radioactivity from isotopes of uranium.
- The Human world is producing substances of a type and at a rate that nature can't deal with. We are producing substances that are alien to nature like DDT, PCB's or CFC's. (70,000 more of these synthetic chemical compounds are now commercially available). These cannot be processed by Nature so they persist and accumulate. We are producing substances familiar to nature but at a rate faster than it can process or cope with also leading to accumulation. This growing pile up increasingly gets in the way of the effective operation of the E-tron.
- Human society is reducing the productive capacity of Nature to create resources and maintain its life support services. All major living systems are in decline including oceans, forests, and grasslands. Since 1950 the world has lost a quarter of its topsoil and a third of its forest cover. The human economy has become a powerful parasite on Nature.
- Human needs are not being met worldwide. We live in a 20/80 world where 20% of the human population uses over 80% of the planet's energy and material resources. Said differently, 1.2 billion people are under nourished while 1.2 billion are over nourished. If all members of the human family lived like the average Canadian we would need five Earths. We are role-modeling to the rest of the world a wasteful, inefficient lifestyle while many, looking on, go without.

#### 4. / 5. CRASH or RESTORATION?

The final two E-tron images represent two different outcomes for the future. One lays out a vision if we fail to act now in significant ways. The other assumes that we've hit a watershed in consciousness that has us thinking and acting in fundamentally different ways. **CRASH** is where we will end up if we don't act swiftly now to de-carbon our economy and move beyond the growth paradigm – which, on a finite planet is a matter of life. Back in the 20<sup>th</sup> century or before that we could ignore resource constraints but now in the early stages of the 21<sup>st</sup> century we are seeing all the signs that to continue to do so will be lethal to the human enterprise. **RESTORATION** suggests that there is another way forward but it isn't easy. It requires that our lifestyles in the 'West' get a fundamental shake and that we realize immediately that the 'best things in life aren't things'. Presently we are consuming 40% more Nature than can renew itself each year. We will have to return as quickly as possible to one planet lifestyles which will require *huge reductions* in the amount of water we use, the amount of 'international' food we eat, the amount of garbage and toxins we create and the amount of greenhouse gases we produce. It won't be easy but the benefits if we start now will be enormous – a planet that can support us.

***“A living planet is a rare thing, perhaps the rarest thing in the universe.”*** Kenneth Brower