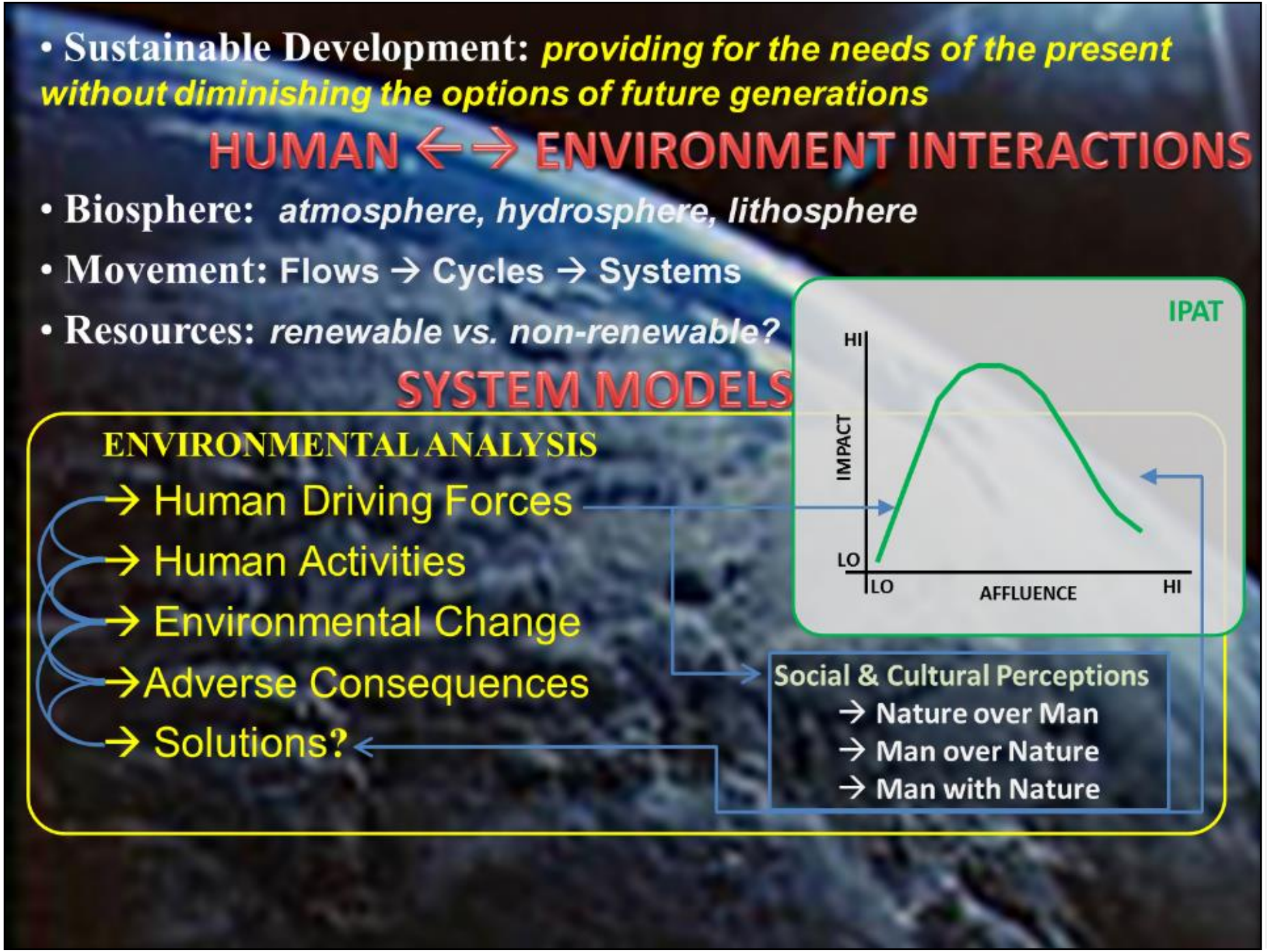

The text looks at two different models of assessing environmental impacts: the IPAT model and the Environmental Systems Analysis (ESA) model.
The IPAT model looks at the IMPACT on the environment of POPULATION, AFFLUENCE and TECHNOLOGY. These are very similar to parts of the ESA model… the ESA model is more detailed. The graphic at left shows the relationship of these. One other thing that is of note… Human Driving Forces (ESA) that are often also related to Affluence (IPAT) are often influenced by our cultural perception of the environment…

It might seem that as one became more affluent, the greater the impact would likely be. But… affluent (wealthy) societies also can have the money to minimize the impact they have (energy efficient appliances, hybrid cars, LED lights…). That is why there is often an upside-down U-shaped curve on the Affluence graph.

Also, environmental literature looks at the three stages of awareness… Nature over Man, Man over Nature, and Man with Nature.

Early man's history – for thousands of years – was that our activities were at the dictates of Mother Nature. Other than structures to protect ourselves from the environment, there was little else we could do. Over time, we developed technologies to irrigate, fertilize, dam rivers, and plow land we could never farm before. During the Scientific Revolution and the Industrial Revolution, we decided that it was possible that Man could control Nature. We were, of course, wrong in so many ways. Example: damming a river defeats the natural flood cycles and can have long-term devastating effects on land downstream, both due to the loss of "flushing" of the soils by the early part of the flood, and also because of the loss of fresh soils left from the silt content in the floodwater when the water recedes. The Nile River valley is experiencing this today. The Aswan High Dam was built in the 1960s, and the farmland along the river has become increasing salinized – salts are poisoning the soil.

Cultural awareness became more accepting of what many indigenous peoples (including most Native American tribes) had long understood… Man was part of Nature, not separate from it, and we need to be good shepherds of the environment. The environmental movement in the 1960s in the US saw the establishment of EPA (Environmental Protection Agency) and the passage of the Clean Air Act and the Clean Water Act.

Does North America has a greater impact on global CO2 emissions than Asia?

	Population	**GNP per capita**	**CO2 emissions per $ of GNP**
North America	300 million	$30,000	0.6
Asia	3,500 million	$4,000	0.6

Note that this is somewhat predictive of the idea that as affluence rises, we aren't necessarily having a greater impact. In North America, our CO2 emissions – with an economic contribution per person of over $30,000 per person – is about the same as folks in Asia who have less than a 7th the GNP per capita. More important, though, are the population numbers… the global impact in Asia is greater because the population is more that 10 times as large.

Unfortunately, the US was the ONLY western industrialized country to refuse to support the Kyoto Protocols, and we have now pulled out of the Paris accords. ***If we aren't going to support protecting the global environment… why should anyone else?***

So what can we do – collectively or individually?

At larger scales, it is estimated that the following are technologies can produce a one-billion-ton carbon reduction per year (and is easily do-able within 50 years):

a) Increasing the fuel economy of 2 billion cars from 30 to 60 miles per gallon,
b) Replacing 1,400 coal plants with natural gas power plants,
c) Stopping all deforestation globally (more difficult... the need to grow more food is critical in some parts of the world because of populations that are still increasing and would require sharing food surpluses),
d) Lowering residential and commercial electricity use globally by 25%,
e) Use one-sixth of the world's cropland to grow crops for ethanol for 2 billion cars (using little to no fossil fuels for fuel or fertilizer in the process… but converting corn to ethanol has its own energy challenges),
f) Recycling materials from obsolete/broken goods/packaging (this reduces the new material need to make new products),
g) Driving less… for example, planning errands to link them in order instead of multiple trips.

Even more could be done with increased use of wind and solar energy, especially as solar panels become less expensive, easier to install, and more efficient.

Everything you can do to reduce your footprint in the environment helps, and many are actually relatively easy to do, especially recycling and moving to natural gas (for home heating). Fuel economy could be easy if we'd give up the nutty idea that we need SUVs… and went to hybrids and electric cars (as battery issues are overcome on electric cars, this will be a more affordable option). Note that there are now two electric cars with 300 mile plus ranges and list prices just over $30,000 (just 5 years ago, there was only 1 electric car with that range and it was $90,000).

Really easy… reducing our electric use. Using the most efficient appliances possible… turning out lights and disconnecting certain electronics (TVs have a small constant drain, as do many stereo systems and some other similar products). And using high-efficiency lighting… I had an energy audit done at my house, and one thing they did while they were there was replace every lightbulb in the house with LED lights where they could, and with CFL bulbs where there wasn't an LED equivalent bulb available. I compared the average electric bill for one year before this and one year after… and it cut our electric bill by nearly 20%.