

**Strategies for Sustainable Design**  
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**Lecture – 8**  
**Economic Sustainability**

Hello everyone, today we will discuss about Economic Sustainability.

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## Global Trends

Economy & population growth



Increased energy consumption & pollution



Economic, environmental and social  
challenges



Threat to sustainability of life and lifestyles



Week 1: Definitions and Perspectives on Sustainability in Industrial Design and Built Environments  
Lecture 4: Technological interventions into building design  
Course: Strategies for Sustainable Design

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So, when we observe the global trends how things are happening across the world. Economy and population are the driving forces; that is leading to increased energy consumption and as a resultant pollution. That is leading to challenges on ESE fronts economic, environmental and social. And that is leading to the threat to sustainability at overall livelihood, overall existence of the different species; and the ecology of this planet is also threat.

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## Economic sustainability

- We must conserve resources for long-term.
- We must live on the “returns” of the Earth’s natural resources rather than consuming them.
- **Long-term economic sustainability concerns the present and future value of natural resources, like drinking water, as well as products, investments, consumption, markets and the global economy.**



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So, what is this economic sustainability? It is the philosophy which talks about conserving resources for future, for long term. So, we must live on the “returns” of the earth’s natural resources rather than consuming them. So, we must keep this as capital, as a capital investment and we keep on living on the interest which it generates. We should not eat the capital itself; because the moment capital is decreased or is kind of is going to go away or gets depleted we will be going for starvation. That will be crisis of every resources everything possible, whichever earth is currently able to provide us.

So, economic sustainability talks about a long term sustainability concerns in the present as well as future. Considering the valuable natural resources such as water, such as air, such as the earth itself, such as the other living things; such as this entire combination of this biosphere, which is making this life under this beautiful environment, not possible.

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The general definition of economic sustainability is the ability of an economy to support a defined level of economic production indefinitely.



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<https://www.think.org/sustain/glossary/EconomicSustainability.htm>  
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So, the general definition if we see of economic sustainability is the ability of an economy to support a defined level of economic production indefinitely. So, this indefinitely word here is of at most important. We have to survive for a longer period of time (())(2:36) as human species; we have to be here for an extension amount of time. And our future generations, our children who are going to inhabit this planet in the coming years. This should not be in such a position that they are not left with any these natural resources; this should not be left in the mess of pollution.

So, we must rework our sustainability, we must rework our economic model; and we consumed these resources in such a way that we always have the balance of the capital of this resource maintained with us.

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The world's nations presently define their top economic goal in terms of Gross Domestic Product (GDP). This is the total amount of production produced within a nation, usually within one year. In 2010 GDP varied from \$16 trillion for the European Union, \$15 trillion for the US, and \$6 trillion for China to \$16 billion for Afghanistan, \$7 billion for Haiti, and \$105 million for the Falkland Islands.

The top economic goal of most nations is a constant, never ending rise in total GDP of several percent per year. It's their economic growth target. Nothing is more important except for war. If a country's GDP goes flat, that's stagnation. If it falls for more than two quarters is a row that's a recession. Both are to be avoided at all costs.

The official GDP growth targets for several countries are: (Data sources vary per nation)

GDP for Selected Countries

Country Total Annual Target

India 9%

growth rate

China 8%

Vietnam 7%

United States (implied target) 2%

Japan 2%

England 1.7%

Sustainability is what people want to happen indefinitely. No country has a GDP growth target less than about 2%, except when recovering from a recession. Thus the defacto definition of development is steady growth in total national GDP of a minimum of about 2% per year.

But this is the wrong definition. Total national GDP doesn't tell you how much the average person's income is. Nor does it tell how many people are at the low end of the distribution of income and are thus starving. Nor is steady growth even possible forever. Steadily growing total GDP is thus a flawed goal that can lead a country, and the world, terribly astray.

<https://www.thwink.org/sustain/glossary/EconomicSustainability.htm>

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So, there is one example, one analogy given by this researcher team over here you can see the link. It talks about how the GDP is growing across different countries; and how the growth rate is happening, how the per capita GDP is increasing and what is disparity which is being observed right now in the different countries. So, if you see this slide it talks about the growth rate of the GDP of India is increasing almost at 9 percent; this is the data from last year 2019. The China's economy is growing at 8 percent, Vietnam 7, US 2 percent, Japan 2 and England 1.7 percent.

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Let's add a column to the table for average GDP per person. This takes us closer to what matters.

GDP for Selected Countries

Country Total Annual Target Average GDP per Person

India 9% 3,500

China 8% 7,500

Vietnam 7% 2,100

United States (implied target) 2% 47,200

Japan 2% 34,000

England 1.7% 34,800

*This perspective shows a large gap between the developing and developed nations. The high growth rates are an effort to catch up in average GDP per person.*

For a pillar of sustainability to be strong it must answer these questions with a yes:

1. Can it be sustainable?

2. Does it well support the goal of the system?

For the first question, can steady GDP growth be sustainable? No. But average GDP per

person can, if it doesn't clash with the goals of the other pillars or the goal of the system.

Now for the second question. As Thwink.org sees it, the goal of Homo sapiens is (or should be) to optimize long term quality of life for those living and their descendants. That's the goal of the human system. Does average GDP per person support that goal? Not quite. There's nothing in average GDP per person that allows comparison to the goal of quality of life. To do that we need the so called poverty threshold.

The poverty or poverty line is defined as "the minimum level of income deemed necessary to achieve an adequate standard of living in a given country." In poor countries the threshold is defined quite low, as low as \$1.25 per day. Below the threshold a person suffers malnutrition and frequently dies. Developed countries define the poverty threshold so much higher that it's no longer a "poverty threshold." It's the preferred minimum standard of living level. For example, in the US it's \$20 a day. This is widely called the "national poverty line," a confusing term. The more accurate term is "preferred minimum standard of living level," which is the one we will use.

Does the preferred minimum standard of living level (in monetary units) well support the goal of the system? Yes. So at last we have the correct definition. Development occurs when a political unit, such as a nation, has the preferred percent of its population below its preferred minimum standard of living level. The percent needs to be very low, somewhere around 5% or less, because everyone below the level is suffering, either physically due to poor health or psychologically.

<https://www.thwink.org/sustain/glossary/EconomicSustainability.htm>

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So, in the next slide if you see what is the average GDP per person; so this is drawn over here. India's growth rate was 9 percent, so this India is GDP per person is 3500. China is 7600, United States 47200 and Japan 34000. So, with this perspective if we see there is a huge disparity; even if economy of India and China is growing faster than the other Western countries. But, the overall per capita contribution the per capita value of this GDP is very lesser than the other counter parts. Let us see the next slide.

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**NPTEL**

How far the world is from economic sustainability is shown below. The CIA Factbook column was used for the developed countries. The International Poverty Line of \$2 per day was used for the three developing countries.)

**GDP for Selected Countries**

Country	Total Annual Target	Average GDP per Person	Percent Below Preferred Minimum Standard of Living Level
India	9%	3,500	76%
China	8%	7,600	36%
Vietnam	7%	3,100	48%
United States (Implied target)	2%	47,200	15%
Japan	2%	34,000	16%
England or UK	1.7%	34,800	14%

The last column shows how impossibly far the world is from economic sustainability. It's impossible for India, China, and other undeveloped countries to catch up with developed countries in terms of average GDP per person and be sustainable with today's technology. Even with 50 years from now it looks impossible. Here's why:

The **Ecological Footprint** is the measure of consumption of the earth's carrying capacity. Total global capacity is estimated at 12 billion hectares. In 2007 18 billion hectares were being consumed by the world's population, which is 50% overshoot.

Looking at the latest **Ecological Footprint** statistics, we see an average of about 7 hectares per person for European Union countries. They have an adequate standard of living and are the world's best at living sustainably, for developed nations. Suppose the entire world emulated the European Union countries. At a global population of 7 billion people (today's population) that would be a 49 billion hectare footprint. Global carrying capacity is 12 billion hectares, so at that point the planet would be in  $49 / 12 = 400\%$  capacity utilization. Above 100% is overshoot, so the overshoot would be 300%. That level of environmental impact would destroy the environment instantly.

<https://www.thelink.org/ucsbain/glossary/EconomicSustainability.htm>

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So, this one here compares the minimum standard of livings. If you see 76 percent of the population requires supports; so that they come up the level of the minimum standard of living. And in case of China this population is 36 percent; Vietnam 48 percent, United States they are still 15 percent; people can used to be brought up, this is minimum standard of living.

So, if we compare between these different economies from Japan, England and United States. The countries such as India, China and Vietnam they have a long way to go, long way to go to match this disparity which is there, in the volume of the population; and the population of these countries also very high.

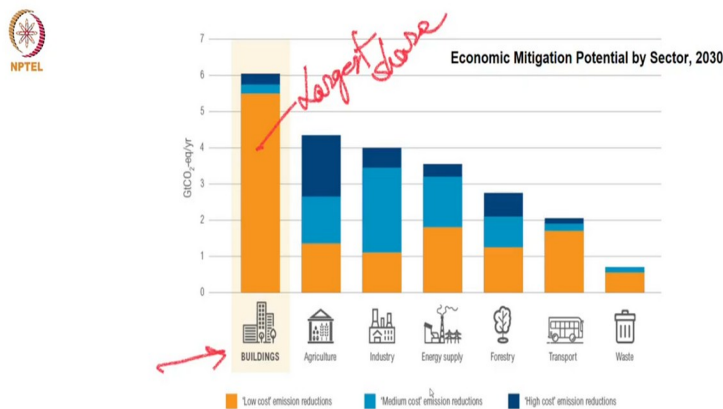
So, overall the number of people if we see who are behind, who are below this minimum standard of living is immense. So, how this disparity is going to be filled up? So, we must escalate our economic development, we must escalate overall gross domestic product of these countries.

But, what is going to happen if we escalate our these processes; they are going to escalate the ecological footprint also. So, the moment ecological footprinting increases the overall exertion, the overall impact on the ecosystem will be immense; because there is a huge number of people we are talking about.

We are talking about a huge requirement of the resources, requirement of the energy and the huge amount of emissions and other things also. So, overall if we see India or other countries together, this entire, all other countries together in this world; they have already crossed this ecological footprint and the bio-capacity of this planet.

And if we are going to maintain the taste to bring these many people on the parity of the other countries; it requires at least 300 percent of growth in terms of overshoot. So, that is going to completely destabilize the economic system. So, what is the way out in this scenario?

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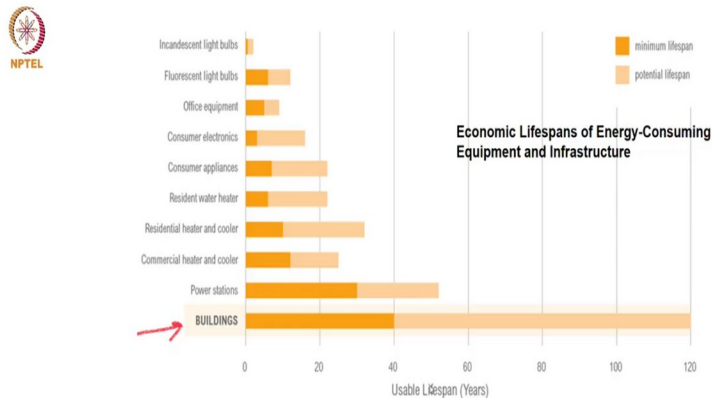


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So, I am leaving it to you for your understanding and discussion. Here, if you see in the economic mitigation potential if we see by a sector; it is a projected figure for year 2030; this is given by world resources institute. So, it talks about buildings or the largest they share the largest share low cost emission reductions; which is given by this orange colour. Blue colour represents medium cost emission reduction and the dark blue talks about high cost emission reductions. So, building as a sector has the largest share, if you see on the extreme left of the this graph.

And other sectors such as agricultural, industry, energy supply, forestry, transport and waste; they all come after this. So, it means this building sector itself has a largest potential for the improvement also.

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In terms of if you see economic lifespan of energy consuming equipment and infrastructure; so that wise also the buildings are the, they consume the longest lifespan. So, ranging from if you see there minimum lifespan to the potential lifespan which can take place; so from 40 to 120 number of years compared to any other sector. If you see power stations, commercial heater and cooler, so including any of these buildings lasts for long period of time. So, the amount of energy what they are going to consume will also be very high.

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UN's Priorities & some relevant SDGs mapped on to our Sustainability Focus Areas



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Here, on this slide if you see, it is a combination of the triangle work to be have been studying in initial portions of this lecture, like people, planet and products; so between these three there are four united these UNSDGs, SDGs are kept over here. The first one talks about the thirteenth climate action, and eighth one talks about decent work and economic growth. So, it happens between people and with the economic sustainability; and then the ninth one which is industry innovation and infrastructure. That has place of, it is the occurrence in between the economic sustainability to our community.

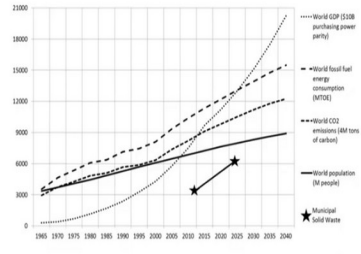
So, how the infrastructure, how the innovative place to develop the infrastructure are going to come around that. And the seventh if you see even SDGs affordable and clean energy to exist between economic activity with the environmental activity. So, this is a common these three UN SDGs, we can see are falling on the overlapping the common area of these respective triangles over here. Except the thirteenth one this climate action; it overshadows all of them put together.



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Population, Economy, Fossil Fuel Consumption, CO<sub>2</sub>, Garbage



This graphic display illustrates current growth trends. Projections show that growth is expected to continue into 2040.

- Important points that support this chart are:
- Emerging economies such as China, India and Brazil account for most of the economic growth in the out-years
  - Most of the population growth occurs in China, India and Africa. Other countries, such as Japan, are witnessing the consequences of a stable or declining population, namely aging.
  - Carbon dioxide in the atmosphere has reached unprecedented levels. As a result, the surface temperature on Earth is fast increasing and approaching thresholds of substantial to severe risks.
  - World oil consumption (included in fossil fuel consumption) is predicted to reach a point where consumption equals maximum production somewhere between 2030 and 2050
  - For most variables on the chart, there are built-in lags which prevent rapid reduction or leveling off. Most notable is population which would take generations to decline. (If all women had only the replacement number of children from today on, it would take 60 years to achieve zero population growth.)



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So, here if you see population, economy, fossil fuel consumption, CO<sub>2</sub> and garbage; so all these things in terms impact they are rising over the years. If you see this is gap of, this chart shows this data at the gap of a five years. So, between 2010 to 15 to 20 to 25; so we can see from starting from the 1965, this data table till the projected the figures from year 2040. Most of these emissions, whether it is energy consumption, whether it is world's GDP and purchasing power parity; so, all of those things are increasing. Well, overall livelihood and occupational facilities are increasing also; but overall impact is also increasing.

So, the challenge as far as economic sustainability is concerned over here is to establish that balance; where we can keep on improving on the economic wellbeing, on the economic welfare of the society, community and household, while maintaining the ecological balance.

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### Economic Sustainability

- Decoupling economic growth from environment
- Incorporating eco-efficient measures at the manufacturing and production stage
- Advocating Green Economy
- Expediting enforcement of environmental concerns into organizational management and strategizing
- Encouraging evolvement of regulatory institutions in tandem with cognitive ones



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So, if you see in a nutshell; what is economic sustainability? So, decoupling is economic growth from environment is very crucial nature over here, so that we can see among the environmental impact; and we can still improve on economic aspects. Incorporating eco-efficient measures at the manufacturing and production stage; this we have discussed in detail in the previous lectures. This is very important to improve on the measures of manufacturing, the measures of resource consumption and measures of energy consumption. Advocating green economy, which nourishes the balance of the three ESEs aspects of the sustainability; while maintaining its growth.

And expediting enforcement of environmental concerns into organizational management and strategizing. Encouraging evolvement of regulatory institutions in tandem with cognitive ones; so these are the some advices for improvement of the economic sustainability in the world right now, while maintaining the ecological balance.

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So, here if you see this economic growth, so economic growth involves the combination of different factors to produce goods and services. So, we have discussed in earlier slides, so the production capital which includes machineries, buildings, roads. They at the next level, they go to the human capital education, knowledge, skills, techniques or labor; so improvement in these are very necessary to maintain that balance. And the balance is also needed to be maintained at the natural capital level. The term I was talking about in the initial of this lecture, so that capital of the resources which can be there; we must keep it.

And we should only read the benefit part of it, we should only (13:12) interest part of it; we should never go for consuming the capital part itself. Because the moment the capital is lost, we will be in a deep trouble; the entire planet will be in a deep negative balance of these resources and energetic systems. So, maintaining that natural capital system of raw materials, forest services and carbon balance, et-cetera in the atmosphere. And while maintaining the social capital also of institutions, government, community and its people all together.

So, in an overall sense if you see what we need to mean by maintaining this sustainable growth is to maintain the capital of several types; which is production capital, human capital, natural capital, social capital. So, on all of these together we have to maintain the balance of it; so this is what economic sustainability is all about. Thank you very much.