

## Energy Efficiency Vs Energy Intensity

The ratio of the real Gross Domestic Product (GDP) to energy use, called the energy intensity of a nation, is often confused with wrongly correlated to the energy efficiency of a society. Energy intensities of countries are easy to establish and, therefore, published by financial institutions. This data is then often interpreted as: “The ration of real GDP to energy use provides a measure of energy efficiency”. This example was taken from a reputed publication. Let us further examine this false statement

Let us assume that the GDP of a firm in the Information Technology (IT) sector is equivalent to a firm manufacturing steel. Let us further assume that while the steel plant is most energy efficient in the world, the IT company is least concerned with energy savings and uses obsolete energy consuming devices. To prove a point, anyone in the business of manufacturing and selling software can be highly energy inefficient yet look as good on the energy intensity indicator as the most efficient steel plant.

To quote excerpts from a World Bank study, see the table below which shows the false claim that higher the number the more energy efficient the country and vice versa.

Based on the above, one may wrongly conclude that group 1 consists of extreme energy wasters, group 2 members have a lot to catch up with and group 3 members are highly energy efficient societies.

Country	Energy intensity: US\$ per kg of oil equivalent	Country	Energy intensity: US\$ per kg of oil equivalent
<b>Group 1</b>		<b>Group 3</b>	
India	0.8	Australia	3.7
China	0.7	Singapore	3.8
Nigeria	0.4	New Zealand	3.8
Russian Federation	0.5	Sweden	4.5
Vietnam	0.7	Hong Kong	12
Nepal	0.7	China	
<b>Group 2</b>		Switzerland	12
Canada	2.5	Japan	10.5
USA	3.4	Denmark	8.5

None of this is true. Canada (2.5) is certainly as energy efficient as Switzerland (12). However, Canada’s GDP does not come from tourism and banking as in the case of Switzerland. Hong Kong (12) appears to be the most energy efficient while Singapore (3.8) looks poor.

A more interesting indicator that can be correlated to development is “percentage of energy growth required to support 1 per cent growth in GDP”

For instance, Germany currently requires about 0.2 per cent more energy to support 1 per cent GDP growth. India requires about 0.8 – 1 per cent more energy to support 1 per cent GDP growth. Consequently, India requires about five times as much energy to grow by 1 per cent as Germany does. One may falsely conclude that this is so because Germany is very ‘energy efficient’ and India is very ‘energy inefficient’. There is a difference, yes, but it is not as dramatic as the difference in energy growth suggests. This is due to the fact that while industrialisation, urbanization and consumerism have peaked in Germany, in India they are on their way.

A valid goal and objective of a nation should be to formulate policies and initiate steps to decouple domestic growth from energy growth. One cornerstone of such a policy is measures to increase market penetration of energy efficient technologies and processes. However, these measures alone will not achieve the objective. Behavioural changes, restructuring of the industry and commerce as well as curtailing population growth are equally and even more important. There is also a difference between an energy efficient and an energy modest society. This is how: in the former let’s say, all own a 400 litre

state-of-the-art refrigerator with excellent energy efficiency, consuming 2.5 kWh/day. In an energy efficient and energy modest society, all own a 200 litre state-of-the-art refrigerator consuming 1kWh/day. The sum of energy modesty and energy efficiency makes a nation competitive and development sustainable.

The problem lies in the fact that too many developed nations are proud of being energy efficient, while losing sight of being energy modest as well. Being only energy efficient will require three more worlds to provide the resources for all an we do not have these worlds available to us. We do not even have the resources of one world any longer available to us, since most are or will be depleted soon.

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**Reference book:**

The Bulletin on Energy Efficiency  
April 2001,  
Vol. I, Issue 5