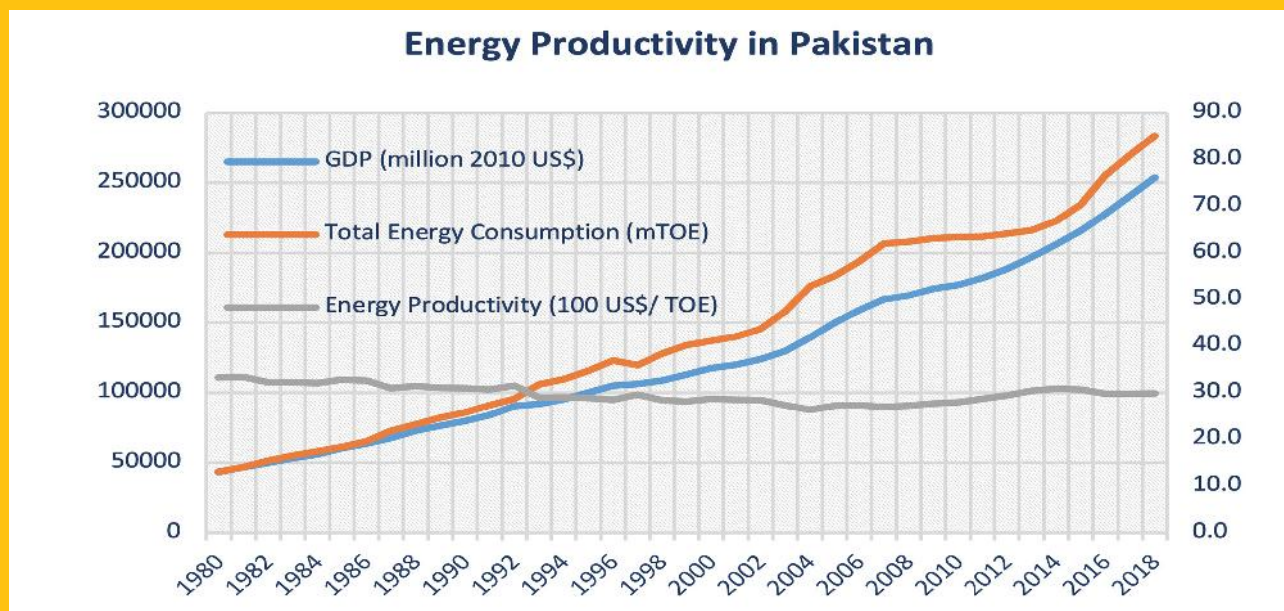


Energy Productivity for sustainable development

Afia Malik

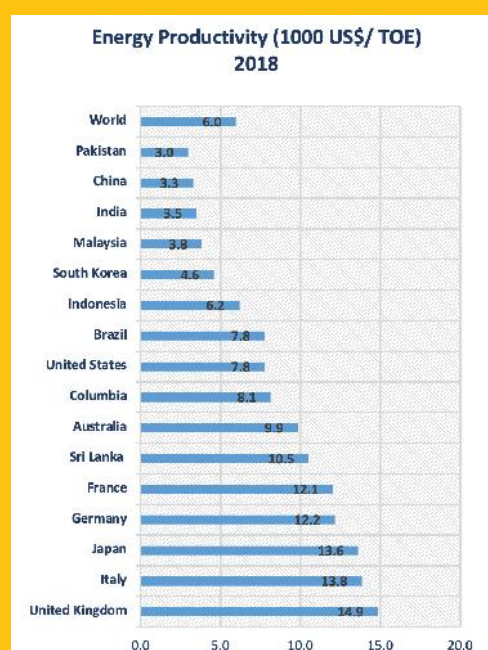


Energy productivity has become an important policy instrument across the globe, as it provides details of energy consumed while focusing on growth, economic diversification, innovative technologies and also efficiency in the use of energy. Its effects are positive on a country's economic growth. This new paradigm allows all economic activities to seize maximum economic benefits and minimize environmental concerns through the optimal use of energy. Its focus goes beyond efficiency and demand management, and includes generation through renewables.

Limited Decoupling of Energy and Economy

In Pakistan, unlike most of the countries, we can hardly see any decoupling of energy and economy taking place. Since 2000, the percentage increase in energy productivity in Pakistan is less than 5 percent. In comparison, since 2000 the world's average energy productivity has increased by about 11 percent; energy productivity in China, India, Malaysia, Japan, United Kingdom, Germany and United States has increased by almost 46 percent, 23 percent, 24 percent, 31 percent, 59 percent, 32 percent and 34 percent respectively. On the other hand, China and even India were much below Pakistan in 2000 and before, but they have improved significantly.

Energy demand in Pakistan has grown at about 5 percent over the years. 29 percent of the population is still without access to electricity. With rising urbanisation, growing population and burgeoning middle class, energy demand is expected to rise even more in the future. Thus, more environmental threats associated with increasing energy demand. Without countering these threats we will be endangering our future generations.



There is enormous potential to reduce demand for energy by increasing energy productivity.

According to one estimate, we can reduce 20 percent to 25 percent of energy demand only through its productive use in various sectors, as fourth industrial revolution has empowered us to consume energy more intelligently. 20 percent savings from efficiency and demand management in Pakistan corresponds to more than 50 percent reduction in oil imports.

Our industry is the largest consumer of energy, that is, 36 percent of total energy is consumed in industry, whereas, it contributes only 18 percent to our GDP. Most of our industrial units are

highly energy intensive and susceptible to high energy losses across various assembly lines. This leads to high energy bills and loss in productivity. Energy costs in total production costs ranges from 20 percent to 50 percent in various industrial units. This affects not only the financial health of our industry but its competitiveness in export markets. Giving them energy price concessions is not going to help, there is a need to improve energy productivity of our industrial units, especially SMEs, to boost their competitiveness. According to SMEDA, there is a little awareness and even

SECTOR	CONSERVATION POTENTIAL
INDUSTRY	25 percent
TRANSPORT	20 percent to 23 percent
AGRICULTURE	25 percent
BUILDINGS	20 percent to 25 percent

Source: ENERCON

less expertise in SMEs in terms of energy saving practices and skill development to achieve best energy management practices.

International evidence suggests, enterprises that implement plans to increase their energy productivity can enjoy reduction in overall costs, increase in profits and overall competitiveness. Besides, it mitigates greenhouse gas emissions, creates new jobs, and improves energy security.

Pakistan has the potential for industrial expansion. Our industry can increase its competitiveness by applying energy-efficient best practices in new industries. In existing ones, only by replacing obsolete technology can save enormous energy costs. For example, by 35 percent in boilers and 20 to 30 percent in electric motors.

INDUSTRY	ENERGY SAVING POTENTIAL
MARBLE	5 percent to 8 percent
POWER LOOMS	Up to 10 percent
FURNITURE	15 percent to 20 percent
AUTO PARTS	10 percent to 15 percent
JUTE	10 percent to 15 percent
TEXTILE	10 percent to 30 percent

Source: SMEDA

Similarly, transport is the second largest consumer of energy, i.e., 34 percent of total final energy consumption and almost 59 percent of liquid fuel consumption in Pakistan. We are dependent on imports for more than 80 percent of our liquid fuel consumption. In 2017-18, we spent more than 50 percent of our export earnings on oil imports. Saving energy in transport by only 10 percent in 2017-18 could have saved us about US\$ 1.2 billion. This can be transformed into a saving of about US\$ 10 billion (at the current exchange rate) by 2030. It is easily achievable, only through

strict compliance with fuel efficiency standards; discouraging low occupancy private cars; cost-reflective road pricing and through the increased use of renewables in various transport modes.

In buildings, whether they are domestic or in the commercial sector, energy efficient building codes are not enforced properly as building control authorities are short of resources as well as expertise. There is enormous energy saving potential in buildings (in monetary terms for the users also) which can be achieved through proper building design and through the replacement of inefficient lighting, air-conditioning and water pumping systems. Similarly, in agriculture instead of giving them subsidy, we can encourage them to use efficient water pumping and avoid wastage of water resources.

Renewable Energy

Other important aspect of energy productivity is use of renewable energy. The use of these resources is increasingly at an accelerated pace around the world but Pakistan has just begun to encourage its consumption. At present, more than 60 percent of the electricity generated in Pakistan comes from fossil fuel based generation, including gas, coal and oil. In comparison,

installed capacity of renewables (wind, solar and bagasse) is only 6 percent. Moreover, the upcoming generation capacity under CPEC is largely from coal-fired power plants, seven times larger than the expected renewable installed capacity. In Pakistan, the idea of energy conservation and demand management has not remained popular because of government neglect and because of lack of public awareness of its overall benefits. Likewise, we are going at a snail's pace in adding renewables in our energy mix.

Energy Legislation

We do have National Productivity Organisation (NPO); National Energy Efficiency and Conservation Agency (NEECA) in place of National Energy Conservation Centre (ENERCON); Ministry of Environment; Ministry of Energy, Alternative Energy Development Board (AEDB) to name a few; and number of policies formulated by them. What they have achieved over the years is clear from the above discussion.

In Pakistan, environment and energy legislations do exist that have the capacity to force a shift to a more resource efficient and low carbon economic activities. Implementation of existing laws has been hindered by weak coordination among the relevant institutions and ministries. Institutional framework for energy efficiency is weak in Pakistan. In energy efficiency regulations we are at 70 out of 141, in comparison to China and India who are at 21 and 33 respectively, in Global Competitiveness Ranking of 2018-19. ENERCON suffered greatly from a lack of funds, professional facilities and capabilities. Its functionality has remained dependent on donor assisted projects. This has meant that it has not been able to commercialise energy efficiency activities successfully. NEECA achievements are yet to be seen.

State of Science and Technology

The state of science and technology in Pakistan has been far below many emerging economies. In comparison, China despite being the largest consumer of energy in the world, has reduced its resource intensity and improved its energy productivity by 304 percent between 1980 and 2018. It happened through the adoption of energy efficient technologies and shifts in its industrial structures. Over the years, China has increased its R&D activities tremendously. Firms in-house technology development activities played a critical role in creating domestic absorptive capacity required for the successful diffusion of imported technology as well as for the local development of energy efficient technologies in China.

China is also leading in renewable energy developments. In 2017, almost half of global renewable energy investment (that is US\$ 125.9 billion) came from China. China will be the prime world market for renewable energy by 2040.

Japan is the fifth largest consumer of world energy and among the leaders in terms of high energy productivity. Japan managed to improve its energy productivity enormously by swapping half of its nuclear capacity through efficiency and conservation; and now is increasingly moving towards renewables. The country dramatically increased awareness of energy use and efficiency not in years but only in weeks in 2011. Their large companies are now managing high-profile efficiency programs. In fact, energy efficiency practices are deeply rooted in Japan's overall economy.

Similarly, in Germany, substantial improvement in energy productivity is through technical efficiency improvements on the energy demand side and the substitution of nuclear and fossil fuels with renewable forms of energy.

Improvement in energy productivity is indispensable for Pakistan. We need a clearer and targeted approach to increase energy productivity in all the sectors by about 3 percent annually. It is crucially important to have voluntary commitment towards energy efficiency/ conservation as happened in Japan. We need a committed business leadership to accelerate their investments in energy efficient technologies. Similarly, adopting strategies to accelerate the induction of renewable forms of energy in our systems is unavoidable.

In Pakistan, if we manage to transform our energy system, with increased use of renewable energy in combination with energy efficiency and conservation, it would reduce our net costs of energy production. There would also be substantial socio-economic benefits in the form of economic growth, job creation and overall welfare gains. It would certainly guide us to achieve the goal of clean climate and access for all by 2030.