

# Wind energy as an alternative to oil for energy production

[Environment](#)



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## **Facts**

According to Gallup Survey (US) in 2017, 71% of respondents prefer Alternative Energy such as wind / solar over 23% who preferred production of oil and gas. [1] Not surprisingly, youth is encouraging renewables more than elderly people.

The worldwide wind capacity reached 486'661 MW by the end of 2016, out of which 54'846 MW were added in 2016. This represents a growth rate of 11. 8 % (17. 2 % in 2015; reduction can be attributed to lessening subsidies and increase in other RE technologies like Solar). All wind turbines installed worldwide by the end of 2016 can generate around 5 % of the world's electricity demand. [2]

China and Latin America has increased their share of new installations to 53 % and 6. 5 % respectively. [3]

Whereas electricity production from oil has already noted a drastic decreasing pattern. In 1974, contribution of oil (in its various forms) in

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energy mix was approx. 21% and same was approx. 4. 75% in 2014. [4] So, renewable sources like wind is already replacing oil.

## **Cost**

Often, we compare the unit cost of electricity produced from wind versus conventional sources like oil. Although technological advancements and economy of scale has significantly reduced the cost of wind energy and almost make it comparable. In fact, if we talk about Pakistan then wind energy tariff is less than conventional power sources. Economical electricity generation is more a regional matter than a global. For example, some region may rich in oil and therefore, they naturally are inclined to produce energy from oil than any other source.

However, when we talk about cost then we are not used to consider the hidden costs associated with thermal generation like air pollution, T&D costs, climate change, health impacts on local and global community. These hidden costs are difficult to assess however, careful estimates have revealed that cost of per unit electricity shall be almost doubled if accounted in tariff petitions. [5]

Conventional thermal plants emphasize central generation and then distribute to small and large consumers through transmission and distribution system. Whereas wind energy has induced a unique concept of distributed generation. Wind plant can be standalone for largely dispersed communities and therefore do not required extensive T&D system.

Further, as per recent report published by NREL, science driven innovation can reduce the cost of wind energy further to 50% by 2030. It is in addition to previous cost reduction of 66% with current technology since 2009. [6]

## **Intermittency and Grid Issues**

Intermittency with wind energy has always remained a challenge, resulting utility operators to argue for thermal plants so that demand of base loads can be fulfilled 24/7. The difficulty associated with integrating variable sources of electricity stems from the fact that the power grid was designed around the concept of large, controllable electric generators. Intermittent renewables are challenging because they disrupt the conventional methods for planning the daily operation of the electric grid. Their power fluctuates over multiple time horizons, forcing the grid operator to adjust its day-ahead, hour-ahead, and real-time operating procedures. While renewables disrupt the grid's operation in a number of ways, it is not impossible to compensate for the additional intermittency and uncertainty.

The key is to have a mix of sources spread over a wide area: solar and wind power, biogas, biomass and geothermal sources. In the future, ocean energy can contribute too. [7] Moreover, if we apply the Law of Large Number to renewable energy, it dictates that the combined output of every wind turbine connected to the grid is far less volatile than the output of an individual generator. In a study commissioned by the Electric Reliability Council of Texas, General Electric calculated that an additional 15, 000 megawatts of installed wind energy shall only require an additional 18 megawatts of new flexible reserve capacity to maintain the stability of the grid. So, the

intermittency issue is often exaggerated out of proportion and it can be coped with additional measures by system operators. [8]

One conventional way of energy storage system is using batteries which is still expensive and inefficient from many aspects. Although market demand is forcing manufacturers to bring innovation and make usage of batteries more efficient. Investment in R&D sector has produced larger size of batteries which are more efficient also.

Further, many new energy storage methods like pumped water, flywheel, compressed air etc. are under development. [9] It is just a matter of time that these solutions shall be available commercially and solve the intermittency issues.

## **Climate Change**

Global climate change has already had observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted, and trees are flowering sooner. Effects that scientists had predicted in the past would result from global climate change are now occurring: loss of sea ice, accelerated sea level rise and longer, more intense heat waves. [10]

Pakistan makes a tiny contribution to total global greenhouse gas (GHG) emissions, less than 1% (among the lowest in the world) but it is among the countries most vulnerable to climate change, and it has very low technical and financial capacity to adapt to its adverse impacts. [11]

The Paris Agreement's ratified by 170 countries is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. [12] It sounds a good commitment, but we cannot achieve it unless we pursue clean energy sources and replace the use of oil.

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