Energy in Crisis

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Abstract

The world seems to be continually in or on the edge of an "energy crisis". Although pressures on energy supplies have lessened since the start of the Russian-Ukrainian war, there always seems to be another geopolitical conflict over the horizon that can disrupt energy markets and the global economy. Even though we've had a relatively fast economic rebound and related energy usage after the pandemic the economy is still fragile with serious inflation and higher interest rates. On top of the disruptive geopolitical and economic issues there is this new battle over what type of energy is best. Five hundred years ago sources of energy were very simple—primarily wood or wood products then peat and coal. As we moved into the 19-20th centuries we added oil, gas, hydro, nuclear and some hydrothermal. Now we are adding wind, solar, more hydrothermal, hydrogen, etc. This is typically called "the Energy Transition"…I prefer to call it "Energy Integration" or "Energy Expansion". After all North American is still sending "woody fuel" to Europe in great quantities and realistic energy experts see us using petroleum products well into the future. The fact is we need all forms of energy. Energy access and standard of living are inseparable. Access to affordable and reliable energy is the key measure of human development and quality of life. Where there is low access to energy, there is poverty. Where there is high access to energy, there is prosperity. Where there is prosperity there is also more opportunity to protect the environment. When examining our energy future there are several key numbers that come to mind—they are +2 billion, > $2000 and 2050. It is expected in the next 25 years for the world's population to grow from 8 billion to 10 billion people barring major wars and/or plagues. These additional 2 billion people will need and want readily available energy supplies at a reasonable cost. For many people across the world in developing countries the basic standard of living is defined as $2000 per capita GDP. This is barely making it. They need at least 5x that amount to develop a decent standard of living. This will require more energy and place more pressure on CO_2 emissions. 2050 is the date many governments and companies call for net-zero emissions. This will require a concerted effort and new technology to meet those goals. Even as lower-emission options grow, most energy companies project oil and natural gas to meet more than half of the world's energy needs in 2050. Lower emission options, such as wind, solar, geothermal, and biofuels will continue to grow but will most likely be bridges to an energy future focused on nuclear and hydrogen. In addition to growth in demand due to population increase, there is also continued pressure on energy for new advances such as computing power. It is estimated that one single state-of-the-art AI data center can require as much electricity as one large nuclear reactor. Yet tech giants have promoted the shutdown of reliable fossil fuel power plants in favor of less reliable solar and wind. There are four drivers to Energy access—1) consumer support, 2) money to develop, 3) technology to find, and 4) policy to guide. All four affect how the world uses energy. Each driver influences the others and changes over time, with variances by region and political circumstances. Energy is essential for human progress. Economic expansion and improving access to energy enable people to lead longer, more productive lives.