

Headline: Cleaning windows: Shell's thinktank mulls over world's energy future

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Sherlock Holmes solving crimes in foggy London is such a Western image, but not far removed from that of smog-gray Beijing at midday on Jan. 13, 2013. That the capital of an economy in Asia, the new nexus of global economic development, was covered in thick smog earlier this year warns the next wave of "tiger economies" such as the Philippines of the risks that development entails.

As such, the Shell Strategy and Scenarios Team, whom political analyst Dr. Cho-Oon Kong refers to as "window cleaners," are looking at various possible energy futures and what can be done for more sustainable development.

Surely, even now people realize that energy transition is taking place for reasons of climate change, among others. Over the next few decades, "We face a range of more turbulent changes, not just in energy but also in economic and geopolitical terms," Kong said.

The Team has come up with two broad energy scenarios—"Mountains" and "Oceans"—based on perceived trends in the economy, politics, and energy as far ahead as 2100.

In the policy-driven Mountains scenario, gas is king. Or at least, it will be dominant by the 2030s over dirtier-burning coal and fossil fuels amid government moves to limit carbon dioxide emissions. Urban planning, moderate economic development, and policy-driven long-term projects could loosen the energy market. A profound shift in the transportation sector sees global demand for oil peaking in about 2035. By the end of the century, cars and trucks powered by electricity and hydrogen could dominate the road.

Technology to capture carbon dioxide emissions from power stations, refineries and other industrial installations becomes widely used, helping to curb CO<sub>2</sub> emissions from the power sector to zero by 2060. Nuclear power's share in global power generation could grow by around 25 percent in the period to 2060. Subsidy-dependent renewables are likely to lose out.

With these changes to the energy system, greenhouse gas emissions begin to fall after 2030. Nevertheless, emissions remain on a trajectory to overshoot the target of limiting global temperatures rise to 2 degrees Celsius.

The market-driven Oceans scenario sees power generation relying on solar photovoltaic panels around 2070 amid a tight energy market where high energy prices spark an aggressive drive for energy efficiency and opens opportunities for biofuels and renewables.

Public resistance and the slow adoption of policies and technology limit nuclear power and natural gas outside North America. Coal remains widely used until mid-century. Wind energy expands at a slower pace, due to public opposition to large installations of wind turbines.

Another reason why solar energy will rule is that fast-growing in Asia needs to fuel its industries. “We see most energy development in Asia, where, well, there’s lots of sun,” Kong says.

Solar power is also amenable to development in small cooperatives, and improved storage technology could be available by that time.

Ironically, although the Oceans scenario sees a dramatic increase in solar power, it also envisions greater fossil fuel use and higher climate-changing CO<sub>2</sub> emissions over the century than the Mountains scenario. Also, carbon capture catches on slowly, making electricity generation carbon-neutral some 30 years later in the Oceans scenario than in the Mountains scenario.

Oil demand continues to grow through the 20s and 30s, reaching a plateau after 2040. Liquid fuels still account for about 70 percent of road passenger travel by mid-century.

In both scenarios, Asia is seen as a growth driver economically and in terms of energy demand. The only difference is that development as well as energy requirements in this region are seen to surge more steeply in the Oceans story.

“We have high expectations for Asia, and energy demand may rise more steeply, which is functionally due to more rapid economic growth,” Kong says.

Both scenarios see global emissions of carbon dioxide (CO<sub>2</sub>) dropping to near zero by 2100. One factor is increasing use of technology that takes CO<sub>2</sub> out of the atmosphere, for instance by burning biomass to produce electricity, and then storing emissions underground.

The uncertainty lies in getting from here to there.

With the world’s population headed toward 9.5 billion by 2060 and the rapid growth of emerging economies lifting millions of people out of poverty for the first time, the scenarios project that world energy demand could double over the next 50 years.

If dirtier, shorter-term energy solutions win, we’re in for a fuzzy kind of heatwaved future with stronger storms, droughts, and flashfloods threatening food and water supplies, or even sinking urban areas.

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Sure, all these scenarios are still decades away. Why should we care? The future is starting now and we are all in it together—for foggy or for worse.