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"With energy use declining in many developed countries and China entering a much less energy-intensive phase in its development, India emerges as a major driving force in global trends, with all modern fuels and technologies playing a part"

Energetica India talks to Mr. Tim Gould, Head of Energy Supply Division, International Energy Agency (IEA) about recently released India Energy Outlook: A World Energy Outlook Special Report and India's role at COP21 Paris Summit.

About India Energy Outlook: A World Energy Outlook Special Report:

The International Energy Agency's (IEA) has released the report "India Energy Outlook". The report explores how major new policy initiatives, from "24x7 Power for All" to the "Make in India" campaign, affect India's energy outlook and identifies the investment required in India's generation and grid in order to provide universal, secure and affordable electricity supply. The report has also highlighted the growing role of renewables, led by wind and solar, in India's energy future, alongside the continued importance of coal.

Summary of the report:

- India, home to 18% of the world's population, uses only 6% of the world's primary energy. India's energy consumption has almost doubled since 2000 and the potential for further rapid growth is enormous.
- India is set to contribute more than any other country to the projected rise in global energy demand, around one-quarter of the total: even so, energy demand per capita in 2040 is still 40% below the world average
- India's urbanisation is a key driver of energy trends: an additional 315 million people almost the population of the United States today – are expected to live in India's cities by 2040
- India's need for new infrastructure underlies strong demand for energy-intensive goods, while the rising level of vehicle ownership keeps transport demand on an even steeper upward curve

- India's power system needs to almost quadruple in size by 2040 to catch up and keep pace with electricity demand that – boosted by rising incomes and new connections to the grid – increases at almost 5% per year
- Over 50% of new generation capacity to 2040 comes from renewables and nuclear, while new coal-fired plants in India represent nearly half of the net coal capacity added worldwide
- A large expansion of coal output makes India the second-largest coal producer in the world, but rising demand also means that India becomes, before 2020, the world's largest coal importer, overtaking Japan, the European Union and China
- India requires a cumulative $2.8 trillion in investment in energy supply in our main scenario, three-quarters of which goes to the power sector, and a further $0.8 trillion to improve energy efficiency

Energetica India: What role does India play in the global energy demand scenario?

Tim Gould: Looking out to 2040, as we do in the recently-released India Energy Outlook, we see India moving firmly to centre-stage in the global energy arena, accounting for the single largest share of projected growth in global energy demand. With energy use declining in many developed countries and China entering a much less energy-intensive phase in its development, India emerges as a major driving force in global trends, with all modern fuels and technologies playing a part. Increasing consumption of coal makes India, by far, the largest source of growth in global coal use. Oil demand increases by more than any other country, approaching 10 million barrels per day by 2040. India also steps up its deployment of renewables, led by solar power, for which India becomes the world's second-largest market. But even with this rapid growth in demand, energy demand per capita in India in 2040 still remains 40% below the world average.

Energetica India: What kind of outlook do you predict for natural gas production in India? Will the country be able to switch to more natural gas usage in the coming 5-10 years?

Tim Gould: India has significant gas resources, estimated at around 8 trillion cubic metres, including both conventional and unconventional gas, so there is considerable room to increase production. But getting this out of the ground will require investment, and it cannot be taken for granted that companies will invest in today's market and regulatory environment. Budgets for new oil and gas projects are being cut across the world in response to lower prices: upstream capital expenditure worldwide was down by at least 20% in 2015 and we expect a further fall in 2016, the first time that we have seen two consecutive years of reduced investment since the 1980s. And in India the incentives are diminished further by the way that gas is priced for domestic producers. So it may take time for natural gas production in India to pick up.

But India could nonetheless benefit over the next few years from the availability of gas available on the international market, as supply is boosted by new LNG projects coming on stream in Australia and the United States. For the moment, gas plays only a relatively minor role in the Indian energy mix, but there is an opportunity to switch to more usage in the future. Gas is quite versatile – it can be used for transport, residential use, for industry, power generation, as a feedstock for fertilisers and petrochemicals; it is cleaner than coal or oil, and can help to balance an electricity system that has an increasing share of variable wind and solar power. An expansion of gas use will though require moves on the policy and regulatory side, to ensure that a functioning gas market and infrastructure are in place and that the value of gas is recognised and remunerated.

Energetica India: India is making a lot of announcements on the wind and solar side and we are able to see the numbers as well. At the same time, why is the government and industry losing focus from hydro projects?

Tim Gould: Hydropower is still by far the largest source of renewable power generation and continues to expand in our view, but it's also the case that new hydropower projects – particularly large-scale projects – have faced difficulties with permitting and public acceptance. These sorts of obstacles are by no means specific to India, but they continue to slow the deployment of hydro over the coming years, in our view. By contrast, there are multiple suitable sites for new solar and wind projects in India; these can often be located closer to the consumers, including off-grid and mini-grid projects as well as utility-scale projects. With India's strong potential and equally strong policy commitment, wind and solar are set to play an increasingly important role in providing a sustainable solution to India's rapidly-growing power needs.

Energetica India: How will the outcome of the recent COP21 Paris summit impact India's energy policies?

Tim Gould: India was a key player in the COP21 negotiations and was instrumental to the successful outcome of the Paris summit, which was a historic milestone for the global energy sector. The commitments that India made prior to the summit, when it submitted its climate pledge (known as an Intended Nationally Determined Contribution), are set to have a significant impact, including the promise to reduce the emissions intensity of India's GDP by 33%-35% by 2030, compared with 2005 levels, and to build up a 40% share of non-fossil-fuel capacity in the power sector over the same period. This means an emphasis on more efficient, cleaner technologies; for example, India has a tremendous opportunity to expand and tighten energy efficiency standards in order to ensure that growing demand for energy services – for mobility, for cooling houses and offices, for powering industrial development – does not put too much strain on energy supply or the environment. It also requires a big drive in favour of low-carbon sources of power generation: this could include new large dams or nuclear plants, but given the uncertainty over the pace at which these will be built, in practice it means strong reliance on solar and wind power to achieve the pledged target.

Energetica India: What kind of trends do we foresee for annual energy consumption in India? What are the major drivers?

Tim Gould: The major drivers of India's energy consumption are robust economic

growth and a rising population, the drive to ensure 24x7 accesses to reliable electricity supply and achieve universal energy access, and the rise in appliance and vehicle ownership. Urbanisation is also a major underlying factor: an additional 315 million people – almost the population of the United States today – are expected to live in India's cities by 2040, accelerating the demand for modern fuels. Industrial energy use is pushed by the need for all the steel, cement, bricks and other products required to develop India's infrastructure and by the 'Make in India' campaign to promote domestic manufacturing. In the transport sector, more and more Indians buy their own vehicles and more freight needs to be moved by road and rail. As a result, even with gradual improvements in efficiency, India's total energy demand is projected to more than double over the next two-and-a-half decades.

Energetica India: Will India be able to provide access to power for rural area? Please explain how this will happen?

Tim Gould: India has made significant progress in improving access to power, halving the number without electricity since 2000. But everyone is aware that more needs to be done, both to provide all households with a source of electricity and to improve the quality and reliability of service elsewhere. Demand for electricity is rising fast and, if you also take population growth into account, we estimate that India needs to provide for almost 600 million new electricity consumers over the period to 2040. This is a huge investment challenge.

Part of the solution in rural areas will come, in our view, from extending the reach of the centralised grid, particularly for those living close to existing or planned transmission lines. But mini-grid and off-grid technologies, often powered in full or in part by renewables energy technologies, are also set to play a critically important role, especially in more remote areas with lower population density. All of this will require coordinated and targeted support from governments, innovative private business models, as well as an expansion of existing community-based projects ◂◂