SDG 7: Affordable and Clean Energy
Current Status

By Marijn van Rees

The 2012 United Nations (UN) Conference on Sustainable Development (or Rio+20) led to a resolution called '*The Future we Want*', followed by the adoption of the 2030 Agenda for Sustainable Development in September 2015.[1] The agenda enlists a total of 17 Sustainable Development Goals (SDGs) that came into force on 1st January 2016. In sharp contrast to the Millennium Development Goals (MDGs), the 2030 Agenda is much more comprehensive and universal in scope, especially in its environmental dimension, addressing both industrialized and developing countries. The SDGs themselves are more integrated in which different goals and targets are linked across multiple issue-areas. They are meant to encourage integrative and systemic approaches to global economic, social, and environmental problems, thus recognizing the interdependence and increasing complexities of human societies and socio-ecological systems.[2]

What is SDG 7 about?

SDG 7 is set out to ensure access to affordable, reliable, sustainable and modern energy for all.[3] According to the UN, energy is central to nearly every major challenge the world faces today. For one thing, the problem of energy is closely connected to the problem of climate change as the energy sector represents by far the largest source of Greenhouse Gas (GHG) emissions that are contributing to global warming.[4] Hence, SDG 7 builds on three main pillars (affordability, reliability and sustainability) that work toward three main targets (universal access, renewable

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[1] The Rio Summit in 1992 was the first major global conference on climate change, resulting in Agenda 21 on sustainable development. Ten years later, at the Johannesburg Summit in 2002 (or Rio+10), the Millennium Development Goals (MDGs) were established as a means of further implementing sustainable development. United Nations. (2012, September). *Resolution adopted by the General Assembly on 27 July 2012.* Retrieved from United Nations General Assembly: http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E. United Nations. (2018). *United Nations Conference on Sustainable Development, Rio+20*. Retrieved December 2018, from Sustainable Development Knowledge Platform: https://sustainabledevelopment.un.org/rio20.

[2] Monkelbaan, J. (2018). *Governance for the Sustainable Development Goals: Exploring an Integrative Framework of Theories, Tools, and Competencies.* p. 4. New York: Springer. Kanie, N., & Biermann, F. (2017). Introduction: Global Governance through Goal Setting. p. 12. In N. Kanie, & F. Biermann, *Governing through Goals: Sustainable Development Goals as Governance Innovation* (pp. 1-28). Cambridge, Massachusetts: MIT Press.

[3] United Nations. (2015). *Transforming our World: The 2030 Agenda for Sustainable Development.* Retrieved from Sustainable Development Goals Knowledge Platform: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf.

[4] United Nations. (2018). *Sustainable Development Goals: 7 Affordable and Clean Energy*. Retrieved November 2018, from The United Nations: https://www.un.org/sustainabledevelopment/energy/.

energy and energy efficiency) with target 7.a and 7.b constituting the governance elements (see table 1). Achieving these targets would greatly contribute to climate change mitigation and disaster risk reduction.[5]

Goal 7: Ensure access to affordable, reliable, sustainable, and modern energy for all	
Targets	*Indicators*
7.1 By 2030, ensure universal access to affordable, reliable, and modern energy services	**7.1.1** Proportion of population with access to electricity. Measured as the share of people with electricity access at the household level. **7.1.2** Proportion of population with primary reliance on clean fuels and technology. Measured as the share of the total population with access to clean fuels and technologies for cooking.
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	**7.2.1** Renewable energy share in the total final energy consumption. Measured as renewable energy as a share of final (not primary) energy consumption.
7.3 By 2030, double the global rate of improvement in energy efficiency	**7.3.1** Energy intensity measured in terms of primary energy and GDP. Measured as the quantity of kilowatt-hours produced per 2011 international $ of Gross Domestic Product (GDP).
7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency, and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	**7.a.1** International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems.
7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing states and landlocked developing countries, in accordance with their respective programmes for support	**7.b.1** Investments in energy efficiency as a proportion of GDP and the amount of Foreign Direct Investment (FDI) in financial transfer for infrastructure and technology to sustainable development services.

Table 1: Targets and Indicators for SDG 7[6]

This list of five targets and their respective indicators were developed by the Inter-Agency and Expert-Group on SDG Indicators (IAEG-SDGs) and adopted by the UN General Assembly on

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[5] United Nations Environment Programme. (2018). *Why do the Sustainable Development Goals Matter?* Retrieved November 2018, from UN Environment - Goal 7: Affordable and Clean Energy: https://www.unenvironment.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-7.

[6] United Nations. (2018, March). *Global Indicator Framework for the Sustainable Development Goals.* Retrieved from UN Department of Economic and Social Affairs, Statistics Department: https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%20refinement_Eng.pdf; SDG Tracker. (2018). *Sustainable Development Goals*. Retrieved December 2018, from SDG Tracker - Goal 7 Affordable and Clean Energy: https://sdg-tracker.org/energy.

6 July 2017. The targets specify the goal, whereas the indicators represent the metrics by which one can track whether these targets are achieved through implementation. However, many of the SDG targets and indicators remain comparatively vague, largely discarding their conceptual and political dimensions, thus leaving substantial room for interpretation and hence weak implementation.[7] Failure to recognize this might lead to distortions in the development of policy agendas.

Global Energy Trends

The International Energy Agency (IEA) points out that while there are some early signs of a global energy transition taking place, efforts fall short on global goals and cracks have become visible in the key pillars (affordability, reliability and sustainability). This crucially undermines sustainable energy (Box 1) as a necessary condition for climate change mitigation and disaster risk reduction. Affordability issues centre around the costs of renewables such as solar and wind and threats to fossil fuel subsidy reform. Reliability concerns stem largely from continued risks to oil and gas supply as well as new challenges in the power sector, in particular the need for power system flexibility. Sustainability is under threat due to recent increases in global CO_2 emissions.[8]

Box 1: Sustainable Energy

Sustainable energy includes both renewable energy and energy efficiency. Renewable energy is energy produced from sources that are replenishing but flow-limited. They are inexhaustible in duration but limited in the amount of energy that is available per unit in time. Major renewable sources include modern biomass (agriculture and forest waste), hydropower, geothermal, wind and solar. Non-renewable energy sources do not form or replenish in a short period of time. They originate as liquids, gases and solids. Crude oil is used to make liquid petroleum products such as gasoline, diesel fuel and heating oil. Propane and other hydrocarbon gas liquids, such as butane and ethane, are found in natural gas and crude oil. Major non-renewable sources include crude oil (petroleum), natural gas, traditional biomass (fuelwood, coal and charcoal), and uranium (nuclear energy). Energy efficiency is thus all the more important. Efficiency refers to both services and end-use technologies that require less energy to perform the same function, as well as energy conservation as any behaviour that results in the use of less energy.[9]

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[7] Kanie, N., & Biermann, F. (2017). Conclusion: Key Challenges for Global Governance through Goals. p. 299. In N. Kanie, & F. Biermann, *Governing through Goals: Sustainable Development Goals as Governance Innovation* (pp. 295-309). Cambridge, Massachusetts: MIT Press. Importantly, national governments are expected to show 'good, effective, and equitable governance practices' which have now become a sustainable development goal in itself. See: Ibid. 2. Monkelbaan, J. (2018), p. 201.

[8] IEA. (2018). *World Energy Outlook (WEO) 2018.* Paris: International Energy Agency. Retrieved from https://webstore.iea.org/download/summary/190?fileName=English-WEO-2018-ES.pdf.

[9] U.S. EIA. (2018). *Energy Explained: Your Guide to Understanding Energy*. Retrieved January 2019, from U.S. Energy Information Administration: https://www.eia.gov/energyexplained/index.php.

Global energy demand increased in 2018, driven by a robust global economy and higher heating and cooling needs. This is largely due to a profound shift that is taking place in global energy consumption and production patterns. Developing economies in particular push up global energy demand, as a result of which international energy trade flows are increasingly drawn to Asia. The shale revolution, meanwhile, continues to shake up oil and gas supply, enabling the United States to become the world's largest oil and gas producer. While electricity, renewables and efficiency improvements stem growth in coal consumption, the transport and building (heating/cooling) sectors keep overall oil demand on a rising trend with natural gas expected to become the second-largest fuel in the global energy mix. On the whole, demand for all fuels increased, led by natural gas, even as solar and wind became more competitive. Indeed, oil and natural gas are expected to continue to meet a major share of global energy demand in 2030.[10] According to the UNEP 2018 Emissions Gap Report, following a three-year period of relative stabilization, energy-related CO_2 emissions increased by 1.7% in 2017 and have continued to increase in 2018. Current commitments to tackle climate change, expressed in the Nationally Determined Contributions (NDCs)[11], are simply inadequate to bridge the emissions gap by 2030.[12]

Taking Stock of SDG 7

According to the Energy Progress Report by the World Bank (2018) and the custodian agencies, the world is currently not on track to meet SDG 7. Current progress falls short on all the SDG targets, which encompass universal access to electricity, a doubling of the rate of improvement of energy efficiency and a substantial increase in the share of renewables in the global energy mix. Nevertheless, real gains are being made in certain areas. Expansion of access to electricity in sub-Saharan Africa has recently begun to accelerate. Energy efficiency continues to improve, driven by advances in the industrial sector. Renewable energy is also making gains in the power and electricity sector, yet these are not being matched in the transport and building sectors.

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[10] Ibid. 8. IEA. (2018). *World Energy Outlook (WEO) 2018.*

[11] The 2015 Paris Agreement calls on the world to keep global temperature rise this century to well below 2 degrees Celsius above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius. Progress towards this ambitious goal depends on the successful implementation of the Nationally Determined Contributions, or NDCs. The NDCs spell out the actions countries intend to take to address climate change – both in terms of adaptation and mitigation. See: World Bank. (2016, October). *The NDC Platform: A Comprehensive Resource on National Climate Targets and Action*. Retrieved December 2018, from Climate Change: http://www.worldbank.org/en/topic/climatechange/brief/the-ndc-platform-a-comprehensive-resource-on-national-climate-targets-and-action.

[12] UNEP. (2018). *Emissions Gap Report 2018.* Nairobi: United Nations Environment Programme. Retrieved from https://www.unenvironment.org/resources/emissions-gap-report-2018. IEA. (2018). Global Energy & CO_2 Status Report: Latest Trends in Energy and Emissions in 2018. Paris: International Energy Agency. Retrieved from: https://webstore.iea.org/download/direct/2461?fileName=Global_Energy_and_CO2_Status_Report_2018.pdf.

Lagging furthest behind is access to clean cooking fuels and technologies, an area that has typically been overlooked by policy-makers. Use of traditional cooking fuels and technologies has serious and widespread negative health, environmental, climate and social consequences.[13]

Universal Access (7.1)

Currently, around 1 billion people (13% of global population) live without electricity, whereas 3 billion people (40% of global population) lack access to clean cooking solutions. The number of people gaining access to electricity has accelerated, but progress has been uneven (Figure 1).[14]
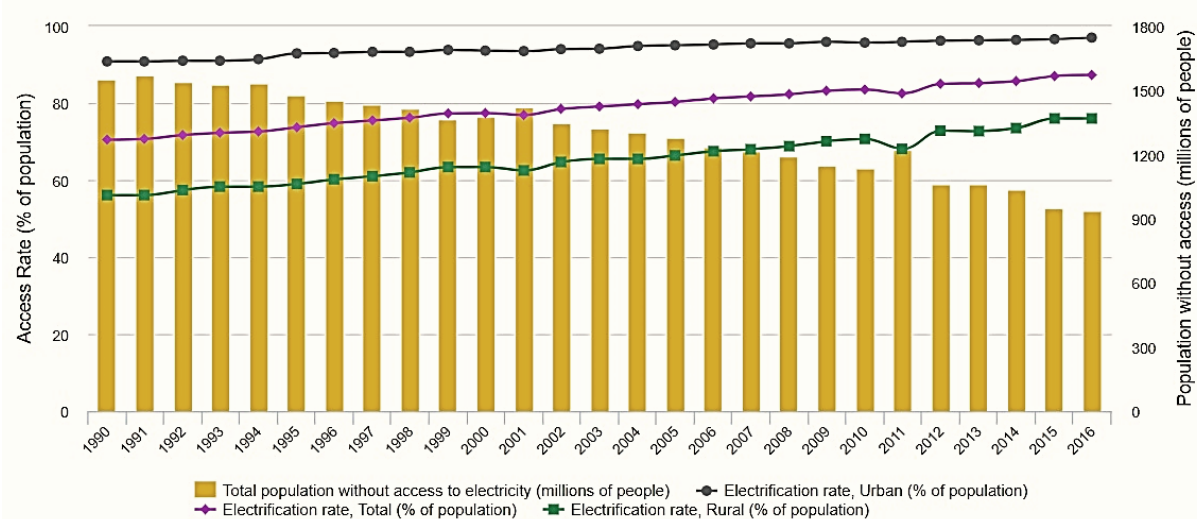

Figure 1: Access to electricity (based on World Bank data)[15]

If current policies and population trends continue, as many as 674 million people will continue to live without electricity and 2.3 billion people will continue to use traditional cooking solutions in 2030, perpetuating much of the current negative health impacts. According to the World Health Organization (WHO), household (or indoor) air pollution caused 3.8 million deaths in 2016. These deaths are compounded by another 4.2 million deaths due to ambient (or outdoor) air pollution, associated with global GHG emissions. A staggering 91% of the global population did not breathe clean air and more than half of urban population were exposed to outdoor air pollution levels 2.5 times above the safety standards set by the WHO.[16] The regions

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[13] World Bank. (2018). *Tracking SDG 7: The Energy Progress Report 2018.* Washington: IEA, World Bank Group, IRENA, UNSD, WHO. Retrieved from https://trackingsdg7.esmap.org/downloads. See also: UN DESA. (2018). *The Sustainable Development Goals Report 2018.* New York: United Nations Department of Economic and Social Affairs. Retrieved from https://unstats.un.org/sdgs/files/report/2018/TheSustainableDevelopmentGoalsReport2018-EN.pdf.

[14] Ibid. 13. World Bank. (2018). pp. 2, 4. *Tracking SDG 7.* UN DESA. (2018). pp. 6-7. *The Sustainable Development Goals.*

[15] Tracking SDG7. (2018). *Results.* Retrieved January 2019, from Energy Sector Management Assistance Programme (ESMAP). Tracking SDG7: The Energy Progress Report: http://trackingsdg7.esmap.org/results.

[16] WHO. (2018). *World Health Statistics 2018: Monitoring Health for the SDGs.* pp. 9-10. Geneva: World Health Organization. Retrieved from http://apps.who.int/iris/bitstream/handle/10665/272596/9789241565585-eng.pdf. For the

of sub-Saharan Africa and South Asia continue to have the largest access-deficit to electricity and clean cooking solutions. Furthermore, differences between urban and rural areas remain wide, with access rates to electricity in rural areas (at 76%) being much lower than in urban areas (at 97%). Rural areas make up 87% of the global deficit in electricity access. Although off-grid solar solutions (such as solar home systems) are emerging as an important driver of rural energy access, they remain concentrated in only a few pioneering countries. Affordability is an additional challenge for countries that are still working to reach universal energy access.[17]

Renewable Energy (7.2)

In 2015, only 17.5% of Total Final Energy Consumption (TFEC)[18] at global level was obtained from renewable sources, 9.6% of which came from modern forms of renewable energy such as modern biomass (agriculture/forest waste), geothermal, hydropower, solar and wind (Figure 2).[19]
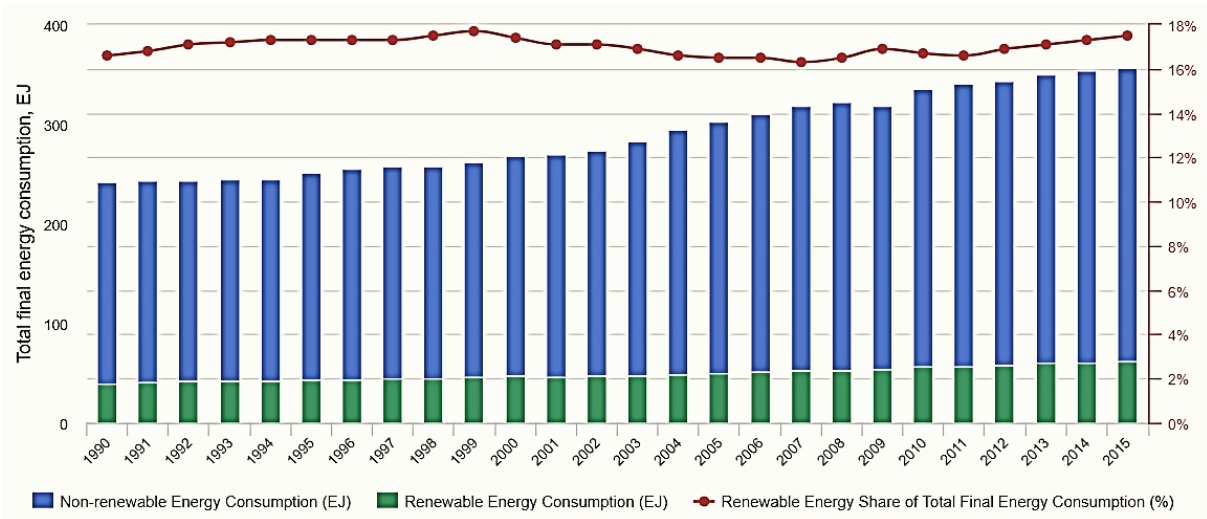

Figure 2: Renewable energy share (based on IEA and UNSD data)[20]

WHO Air Quality Guidelines, see: http://www.euro.who.int/__data/assets/pdf_file/0005/78638/E90038.pdf. These guidelines are the latest update from 2005, and are currently under revision with an expected publication date in 2020.

[17] Ibid. 13. World Bank. (2018). pp. 2, 4. *Tracking SDG 7*. UN DESA. (2018). pp. 6-7. *The Sustainable Development Goals Report*. IEA. (2017). Energy Access Outlook 2017: From Poverty to Prosperity. Paris: International Eneregy Agency. Retrieved from: https://www.iea.org/publications/freepublications/publication/WEO2017SpecialReport_EnergyAccessOutlook.pdf. UN HLPF. (2018). *2018 HLPF Review of SDG Implementation: SDG 7 - Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for all.* New York: United Nations High-Level Political Forum. Retrieved from https://sustainabledevelopment.un.org/content/documents/195532018_background_notes_SDG_7Final1.pdf.

[18] Total Final Energy Consumption (TFEC) covers the total amount of energy consumed by end-users. Total Primary Energy Consumption (TPEC) covers a country's total primary energy demand, including of the energy sector itself. Total Primary Energy Supply (TPES) covers the total amount of energy produced, including imports and minus exports and stock change.

[19] Ibid. 13. World Bank. (2018). p. 6. *Tracking SDG 7*. UN DESA. (2018). pp. 6-7. *The Sustainable Development Goals Report*.

[20] Tracking SDG7. (2018). *Results*. Retrieved January 2019, from Energy Sector Management Assistance Programme (ESMAP). Tracking SDG7: The Energy Progress Report: http://trackingsdg7.esmap.org/results.

The remaining renewable energy is derived from traditional uses of biomass (such as fuelwood and charcoal), of which a significant proportion is used by around 3 billion people in polluting cookstoves. Based on current policies, the renewable share is expected to reach just 21% by 2030, with modern renewables growing to 15% of total final energy consumption, falling short of the substantial increase called for in the SDG target. Rapidly falling costs and policy support have allowed solar and wind to become much more cost-competitive with conventional power generation sources, enabling the share of renewable energy in electricity to rise relatively rapidly. An important issue is that high shares in Variable Renewable Energy (VRE) increase system requirements for balancing supply and demand. As such, system flexibility has to be harnessed, from power generation to stronger transmission and distribution systems, storage and more flexible demand.[21] Nevertheless, electricity accounted for only 20% of total final energy consumption, highlighting the need to accelerate progress in the use of renewables for the transport and building (heating/cooling) sectors that account for 80% of total final energy consumption.[22]

Box 2: The European Union and SDG 7[23]

For the EU, increasing energy efficiency is one of the main pillars for reaching an affordable, reliable, sustainable and modern energy system as envisaged in SDG 7. To improve energy efficiency, the EU aims to reduce its primary and final energy consumption. Despite positive trends since 2001, with primary and final energy consumption falling with 7% and 4.2% respectively, both increased between 2015 and 2016, mainly due to stronger economic growth and lower fuel costs, especially in the transport sector. Positive trends generally can be attributed to a structural transition towards less energy-intensive industries, improvements in end-use efficiency and slower economic growth as a consequence of the economic crisis, as well as rising shares of renewables in the energy mix and falling consumption of primarily oil products and coal. As a result, overall GHG emissions have fallen by 11.9% since 2001 although with notable variations between Member States. These differences can be attributed to numerous factors, including varying progress on energy efficiency measures, each country's respective energy mix (coal is still a significant source of energy for some Member States) and pending infrastructure development.

On the supply side, the EU seeks to increase the share of renewable energy in total final energy consumption to 20% by 2020 increased to at least 32% by 2030. Use of renewable energy has increased with its share doubling from 8.5% in 2004 to 17% in 2016 in both the power/electricity, heating and cooling, and transport sectors.

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[21] IRENA, IEA, REN21. (2018). *Renewable Energy Policies in a Time of Transition.* Abu Dhabi: IRENA. Retrieved from https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_IEA_REN21_Policies_2018.pdf.

[22] Ibid 8. IEA. (2018). *World Energy Outlook (WEO) 2018.* Ibid. 13. World Bank. (2018). p. 6. *Tracking SDG 7.* UN DESA. (2018). pp. 6-7. *The Sustainable Development Goals Report.* Ibid. 17. UN HLPF. (2018). *2018 HLPF Review of SDG Implementation: SDG 7.*

[23] European Commission. (2018). *Sustainable Development in the European Union: Monitoring Report on Progress towards the SDGs in an EU Context.* Brussels: Eurostat. Retrieved from https://ec.europa.eu/eurostat/documents/3217494/9237449/KS-01-18-656-EN-N.pdf/2b2a096b-3bd6-4939-8ef3-11cfc14b9329.

However, despite the expansion of renewable energy sources, at 53.6% of final energy consumption, the EU has increasingly relied on fuel imports from non-EU countries to meet its energy demand. In 2016, all Member States were net importers of energy, with 14 Member States importing more than half of their energy consumption from other countries (EU and non-EU). So, while the share of renewable energy in total final energy consumption has increased, so has the EU's reliance on energy imports from outside the EU. In this context, the EU seeks to become more energy independent through increased domestic energy production (such as from renewable energy sources), increased energy efficiency and moderation of energy demand as well as through the implementation of necessary infrastructure.

Energy Efficiency (7.3)

Global energy intensity (ratio: energy used per unit of GDP) continued to fall at an accelerated pace of 2.8% in 2015, improving the average annual decline to 2.2% for 2010-2015 (Figure 3).[24]
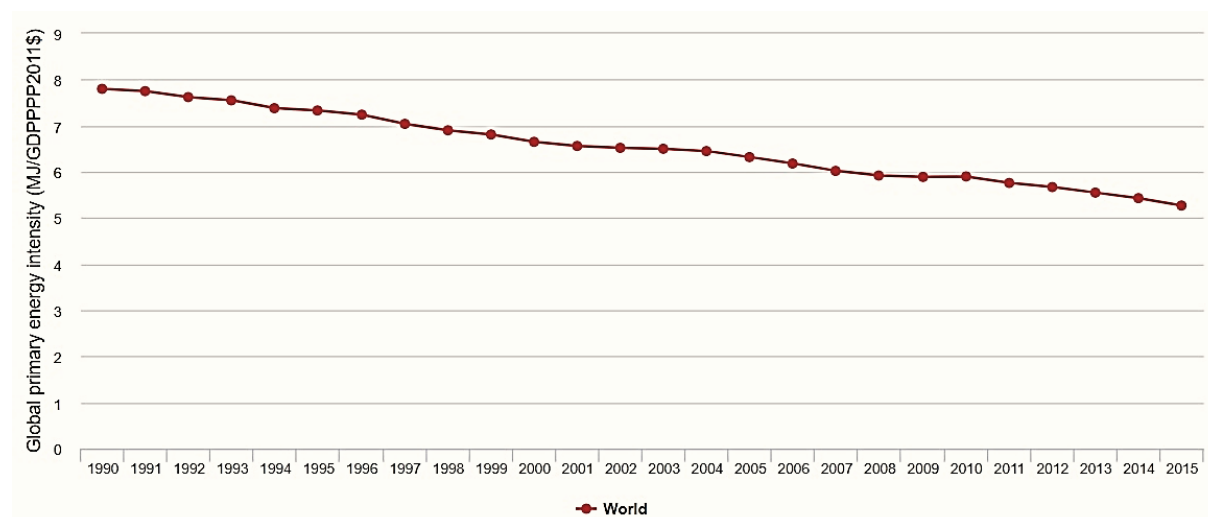

Figure 3: Improvements in energy efficiency (based on IEA, UNSD and WDI data)[25]

However, progress still falls short of the 2.7% annual *decline* needed (in other words, needs to *improve* at an annual rate of 2.7%) to meet the SDG target of doubling the global rate of improvement in energy efficiency in 2030. Unfortunately, improvements in energy efficiency slowed down dramatically in 2017 and 2018, with the rate of improvement in 2018 at 1.7% which is far below the 2.7% needed to meet the SDG target.[26] Improvement in industrial energy intensity, which is the largest energy consuming sector, has been more encouraging at 2.7% annually since 2010. However, progress was more modest elsewhere. In high-income countries, transportation is the largest energy consuming sector, where there is a great need to accelerate

[24] Ibid. 13. World Bank. (2018). p. 8. *Tracking SDG 7.* UN DESA. (2018). pp. 6-7. *The Sustainable Development Goals Report.*
[25] Tracking SDG7. (2018). *Results.* Retrieved January 2019, from Energy Sector Management Assistance Programme (ESMAP). Tracking SDG7: The Energy Progress Report: http://trackingsdg7.esmap.org/results.
[26] Ibid. 12. IEA. (2018). Global Energy & CO_2 Status Report.

efficiency gains. In low and middle-income countries, residential energy consumption is high and intensity has been increasing since 2010. Improving efficiency of electricity supply also poses a challenge, with thermal power generation presenting unmet potential for efficiency gains (such as heat pumps for building envelopes). In addition, transmission and distribution losses remained relatively high, especially in low-income and lower-middle income countries.[27]

Progress in Sweden and India

Sweden and India show large disparities when it comes to achieving SDG 7. Sweden has a comparatively favourable starting position for the implementation of the 2030 Agenda. An important reason is that its economic and social development over time has been strong. As a result, current progress is level and the trend remains at or above SDG achievement by 2030.[28] Sweden's 2017 Voluntary National Review (Box 3), presented at the UN High-Level Political Forum (HLPF), provides a general overview of how Sweden is currently progressing on the different sustainable development goals and targets as well as on the important challenges that lie ahead.[29]

Box 3: Voluntary National Reviews (VNRs)

Voluntary National Reviews (VNRs) are meant to support effective international cooperation and foster exchange of best practices and mutual learning. They are presented annually at the UN HLPF, enabling countries to report their progress and share information with other countries.[30] The major SDG reports point out that the strong performances evident within specific countries are more encouraging than current global trends, across both the developed and developing worlds. However, this is downplayed by the fact that some countries such as Sweden and Germany do so far not share technological innovations, thereby failing to contribute to overall global progress. Furthermore, an independent assessment by Civil Society Organizations (CSOs) argues that although the majority of countries reporting in 2017 appear to have established elements for SDG implementation, the VNR reports remain patchy. First, countries need to strengthen data availability for SDG monitoring and should plan on consistent annual follow-up reporting, as well as reporting to their parliaments for accountability. Secondly, most countries do not structure their VNR reports according to the UN Secretary General's outline in the common reporting guidelines, which hinders comparison of shared challenges and practices. Finally, reports tend to be very

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[27] Ibid. 13. World Bank. (2018). p. 8. *Tracking SDG 7*. UN DESA. (2018). pp. 6-7. *The Sustainable Development Goals Report.* Ibid. 17. UN HLPF. (2018). *2018 HLPF Review of SDG Implementation: SDG 7*.

[28] Bertelsmann Stiftung & SDSN. (2018). *Global Responsibilities Implementing the Goals: SDG Index and Dashboards Report 2018.* Gütersloh: Bertelsmann Stiftung & Sustainable Development Solutions Network (SDSN). Retrieved from http://sdgindex.org/assets/files/2018/01%20SDGS%20GLOBAL%20EDITION%20WEB%20V9%20180718.pdf.

[29] Government of Sweden. (2017). *Sweden and the 2030 Agenda: Report to the UN HLPF 2017 on Sustainable Development.* Stockholm: UN High-Level Political Forum. Retrieved from https://sustainabledevelopment.un.org/content/documents/16033Sweden.pdf.

[30] UN DESA. (2019). *Handbook for the Preparation of Voluntary National Reviews.* p. 8. New York: United Nations Department of Economic and Social Affairs. Retrieved from https://sustainabledevelopment.un.org/content/documents/20872VNR_hanbook_2019_Edition_v4.pdf.

long, repetitive and unnecessarily detailed, making it difficult to understand country needs and to identify avenues for support.[31]

With a full access rate in electricity and clean cooking, access to energy can be considered good and is largely unproblematic. In addition, at 53% of total final energy consumption, Sweden has the highest share of renewable energy sources at both global and EU level, yet with notable differences between sectors. The biggest challenge is the use of renewable energy sources in the transport and building (heating/cooling) sectors. Finally, energy intensity has improved by roughly 43% between 1990 and 2015. While during this period Sweden's GHG emissions have decreased by 25%, it faces some challenges as to its contribution to low emissions and climate-resilient development globally. Sweden could therefore make a better contribution through the diversification of its energy supply and sharing technological innovations to further increase the share of renewables at both regional and global level.[32] According to Karlsson and Symons, environmentally conscious countries such as Sweden and Germany perform well domestically, yet they warn that progress towards a renewable small-scale energy system may take the world as a whole further away from climate stability by reducing the domestic political pressure to innovate.[33] Innovation, and the sharing thereof, is essential in enabling less advanced countries to progress.

In relative comparison to Sweden, India has a much less favourable starting position for the implementation of the 2030 Agenda. Progress is stagnant or is increasing at a rate below 50% of the growth-rate needed to achieve SDG 7 by 2030.[34] Recently, the National Institution for Transforming India (NITI) developed the SDG India Index for 2018 as an advocacy tool and trigger for action at state level. Only ten of the 36 States and Union Territories (UTs) are performing relatively well of which seven states and three UTs. The bottom line is that there are large disparities between roughly the northern and southern states of India. Whereas the northern part of the country is still struggling with regard to its development, the southern part

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[31] CCIC. (2017). *Progressing National SDGs Implementation: An Independent Assessment of the Voluntary National Reviews.* pp. vi-vii. Ottawa: Canadian Council for International Cooperation. Retrieved from https://ccic.ca/wp-content/uploads/bsk-pdf-manager/2018/05/Full-report-Eng.pdf.

[32] Ibid. 29. Government of Sweden. (2017). *Sweden and the 2030 Agenda: Report to the UN HLPF 2017 on Sustainable Development.* Tracking SDG7. (2018). *Country Reports: Sweden*. Retrieved January 2019, from Energy Sector Management Assistance Programme (ESMAP). Tracking SDG7: The Energy Progress Report: https://trackingsdg7.esmap.org/country/sweden. Weitz, N. (2016). *Sustainable Development Goals for Sweden: Insights on Setting a National Agenda.* Stockholm: Stockholm Environmental Institute (SEI). Retrieved from https://mediamanager.sei.org/documents/Publications/SEI-WP-2015-10-SDG-Sweden.pdf.

[33] Karlsson, R., & Symons, J. (2015). Making Climate Leadership Meaningful: Energy Research as a Key to Global Decarbonisation. pp. 114-115. *Global Policy* (Vol. 6, No. 2), pp. 107-117.

[34] Ibid. 28. Bertelsmann Stiftung & SDSN. (2018). *Global Responsibilities Implementing the Goals: SDG Index and Dashboards Report 2018.*

continues to do relatively well. One of the key reasons for failure is the almost complete lack of political will, as well as badly developed governance practices in the northern states. This also affects global progress on the achievement of SDG 7, if not by the sheer size of the states in question.[35]
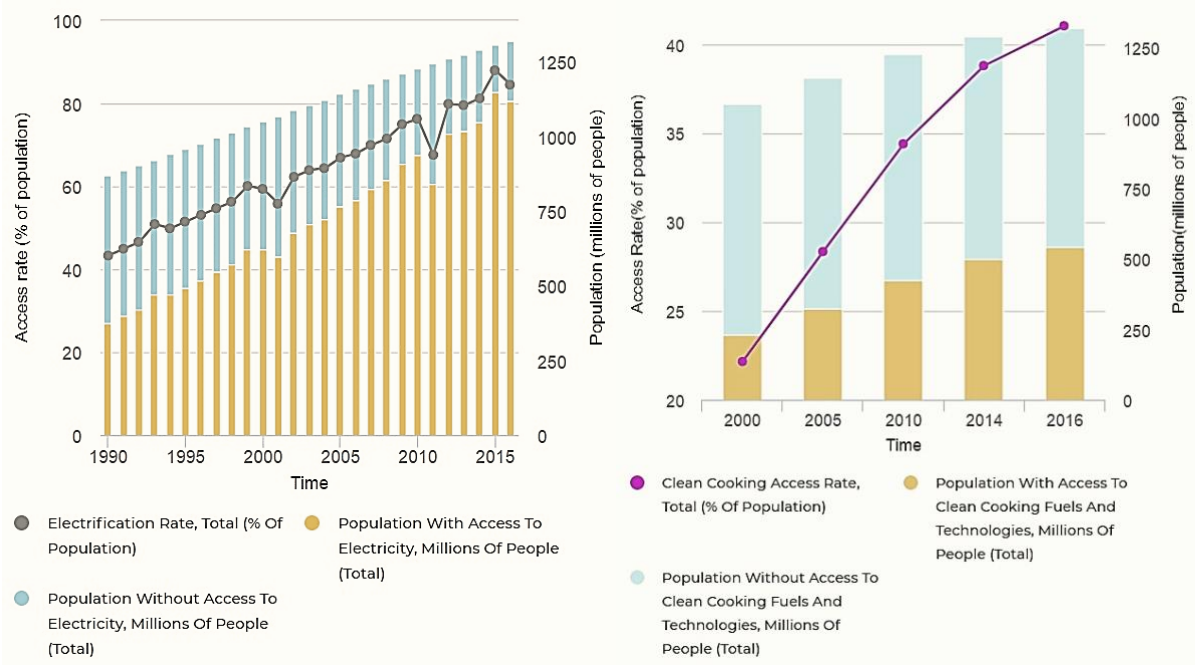

Figure 4: Access to electricity (left) and clean cooking (right) in India (based on World Bank, UNSD, WHO data)[36]

For India, sustainable energy is a precondition for its long-term socio-economic development, aiming for increased access to electricity. However, considering India's rapid economic growth, as well as overall population growth and processes of urbanization, total energy demand is expected to rise sharply over the next few years. In 2016, nearly 85% of Indian households had access to electricity, yet only 41% used clean cooking solutions, showing a significant divide between urban and rural areas (97.5% in urban and 83.2% in rural areas had access). Despite small improvements, nearly 205 million people continue to live without access to electricity and 780 million people are still dependent on solid biofuels for cooking (figure 4). Besides a considerable concentration of ambient or outdoor air pollutants, the lack of clean cooking solutions adds substantial levels of indoor air pollution comprising a significant risk factor to

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[35] NITI Aayog. (2018). *SDG India Index Baseline Report 2018.* New Delhi: National Institution for Transforming India, Government of India. Retrieved from http://niti.gov.in/writereaddata/files/SDX_Index_India_21.12.2018.pdf. NITI Aayog. (n.d.). *SDG India Index*. Retrieved January 2019, from National Institution for Transforming India: https://sdgindiaindex.socialcops.com/YuJbcq9d44/state-ut-ranking/basic#3/23.00/81.26. Hindustan Times. (2018, December 27). *Why northern states must take NITI Aayog's SDG Index seriously*. Retrieved January 2019, from Hindustan Times: https://www.hindustantimes.com/editorials/why-northern-states-must-take-niti-aayog-s-sdg-index-seriously/story-MQtzHwpJEqZoS0GsYLgHgJ.html.

[36] Tracking SDG7. (2018). *Country Reports: India*. Retrieved January 2019, from Energy Sector Management Assistance Programme (ESMAP). Tracking SDG7: The Energy Progress Report: http://trackingsdg7.esmap.org/country/india.

citizens' health. Energy intensity improved by 43.5 % between 1990 and 2015, yet the relative share of renewable energy in total final energy consumption declined from 59% to 36% due to an increase in the use of non-renewable sources (or fossil fuels), associated with India's rapid growth.[37]

Conclusions

The transition towards a more sustainable global energy system is essential for climate change mitigation and disaster risk reduction. Taking into account each of the dimensions of sustainable energy helps to understand why the world still falls short of achieving SDG 7 by 2030 and what kind of targeted efforts are needed to accelerate global progress towards the goal in the coming years. Further improvements on the levels of progress made so far will require policy-makers to show much greater commitment to scaling-up sustainable energy policies and financing, as well as the willingness to embrace new technologies on a much wider scale. This overview helps identify approaches that may deserve greater attention from policy-makers going forward.

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[37] Ibid. 35. NITI Aayog. (2018). *SDG India Index Baselin Report 2018.* Tracking SDG7. (2018). *Country Reports: India*. Retrieved January 2019, from Energy Sector Management Assistance Programme (ESMAP). Tracking SDG7: The Energy Progress Report: https://trackingsdg7.esmap.org/country/india. Ibid. 16. WHO. (2018). *World Health Statistics 2018: Monitoring Health for the SDGs.*