

1. Stock-taking

Energy is central to sustainable development. It accelerates social and economic progress and enhances productivity. No country has developed without access to reliable and affordable energy. Without access to sustainable energy services, other development goals cannot be achieved. Energy directly impacts on people, communities and countries in terms of economic growth, employment, health, security and education. It also affects ecosystems and is linked to climate change. Sustainable energy is thus a key enabler of sustainable development for all countries and all people.

The UN General Assembly declared 2012 as the “International Year of Sustainable Energy for All” and the 2014-2024 decade as the “UN Decade of Sustainable Energy for All”. The latter declaration stresses *“the need to increase the share of new and renewable sources of energy in the global energy mix as an important contribution to achieving universal access to sustainable modern energy services, and recognizes that the activities of countries in broader energy-related matters are prioritized according to their specific national challenges, capacities and circumstances, including their energy mix”*².

The Millennium Development Goals (MDGs) did not include a specific goal on energy, but during the High Level Plenary meeting of the General Assembly on the MDGs in 2010 “energy” was recognized as a key prerequisite for achieving these goals. In 2011 the UN Secretary-General created the global initiative on “Sustainable Energy for All” (SE4ALL) which is a broad based partnership.

The world faces urgent and complex challenges related to access, sustainability and efficiency of modern energy services. Energy crises have the potential to generate major economic and political crises, with wide reaching social and environmental consequences. Nearly one out of every five people has no access to electricity. Twice as many – nearly 3 billion people – use solid biomass or animal waste to cook their meals and heat their homes, exposing their families to smoke and fumes that damage their health. Indoor air pollution kills nearly 3.5 million people a year, particularly women and children.³ More than 95 per cent of people without access to modern energy services live either in sub-Saharan Africa or developing Asia, and 78 per cent in rural areas. Although about 75 per cent of the world’s commercial

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The Rio+20 outcome document recognized *“the critical role that energy plays in the development process, as access to sustainable modern energy services contributes to poverty eradication, saves lives, improves health and helps provide basic human needs.”* It also recognized the need for global partnerships to address the socio-economic and environmental challenges facing nations in their pursuit to provide sustainable energy to their citizens.

The UN SG’s Sustainable Energy for All (SE4ALL) Initiative

was launched in September 2011 with the aim of achieving three main objectives by 2030: ensuring universal access to modern energy services, doubling the share of renewable energy in the global energy mix and doubling the global rate of improvement in energy efficiency. More than 70 Governments from around the world have formally engaged with the initiative. Businesses and investors committed over \$50 billion. The initiative aims to catalyse major new investments to speed up the transformation of the world’s energy systems. The initiative’s Advisory Board is co-chaired by the Secretary-General and the President of the World Bank.

¹ The Technical Support Team (TST) is co-chaired by the Department of Economic and Social Affairs and the United Nations Development Programme. Contributors to this brief include: UNEP, UN-WOMEN, UNDP, ESCAP, World Bank, DESA, UN-Habitat, OHRLLS, UNIDO, FAO, CBD, IFAD, UNFF, WMO, WHO, ESCWA, UNESCO and UN-Energy.

² GA, A/RES/67/215.

³ Lim S, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 2012, 380(9859):2224-2260.

energy is consumed in urban areas, the majority of the 850 million urban slum dwellers rely heavily on biomass fuel for cooking. The demand for fuelwood and charcoal contributes to environmental degradation and deforestation as charcoal becomes a thriving yet unsustainable industry in forest areas with easy access to urban centres. Some of the recent energy initiatives have not yielded the expected benefits to the poorest countries. Energy access rates are much lower for LDCs than for the other developing countries. To ensure that this "energy gap" is addressed properly, the specific needs of LDCs on energy should be prioritized in the various international energy initiatives and taken into consideration when discussing energy in the post-2015 development framework. Although the issue of universal energy access is critical, financing a global effort to achieve this objective is estimated to be relatively inexpensive, equivalent to only 3% of global investment in energy infrastructure over the period to 2030.⁴

Economic and social development is seriously impeded by the lack of sustainable energy services. Countless examples have shown that, once modern energy is available, families and businesses benefit enormously from services such as light, power, heat and opportunities for job creation and income generation. For instance, WHO estimates that if half of the global households that still use traditional fuels and stoves switched to cleaner cooking sources, over a ten year period, families would save \$34 billion per year and generate an economic return of \$105 billion per year.⁵

Energy is closely linked to food security. Energy is essential for modern and efficient agri-food chains, allowing higher output. High energy prices increase the cost of food production and hence influence food prices. High energy costs for cooking create an incentive for poor communities to use more firewood, from forests, contributing further to land degradation affecting biodiversity and the environment's capacity to sustain food production. A wide range of bioenergy types exist, as well as a variety of production and utilization systems that have very different social, economic and environmental impacts. In some cases, the use of staple crops as feedstocks may influence food prices. At the same time combined food-energy systems offer opportunities for improved efficiencies.

Gender inequalities are exacerbated by the lack of universal access to energy. *"Women and children bear the main negative impacts of fuel collection and transport, indoor air pollution, and time-consuming and unsafe cooking technologies"*.⁶ Often women spend from 1 to 4 hours a day collecting biomass for fuel, thus the burdens of energy poverty and unpaid work fall more heavily on women.⁷ Fuel collection is also a dangerous task, which increases women and children's exposure to violence, affecting households' and communities' productivity and well-being.⁸

Currently, 85 per cent of primary energy is fossil fuel based. Use of fossil fuels accounts for 57 per cent of all anthropogenic GHG emissions, with CO₂ concentrations having exceeded 390 ppm, or 39 per cent above preindustrial levels, by the end of 2010.⁹ Based on a business as usual scenario (current policies scenario), the world's energy demand will increase by 47 per cent by 2035, resulting in rising CO₂ concentrations and enhanced global warming.¹⁰ Air pollution from energy systems adversely impacts human health and productivity. Air pollution has other long term negative impacts on natural capital (e.g. water resources, forest and biodiversity) with further implications for sustained provision of

⁴ IEA, World Energy Outlook. Energy for all – Financing access for the poor, 2011.

⁵ UNDP, *Achieving Sustainable Energy for All in the Asia-Pacific*, 2013

⁶ SE4ALL, Global Tracking Framework, 2013, p. 80

⁷ World Bank, Household Cookstoves, Environment, Health, and Climate Change, 2011; WHO, Fuel for Life, 2006

⁸ WFP, Handbook on Safe Access to Firewood and Alternative energy, 2012.

⁹ <http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp252989.pdf>

⁹ http://srren.ipcc-wg3.de/report/IPCC_SRREN_Ch01.pdf

¹⁰ IEA, World Energy Outlook, 2012.

ecosystem services. Meanwhile, if the SE4ALL objectives for renewable energy and energy efficiency are simultaneously met, the probability of limiting global warming to two degrees Celsius increases to 66-90 per cent.¹¹

Although many countries already have renewable energy and energy efficiency programs with energy market reforms and revised regulations, more national and especially internationally coordinated policies and measures are required to make global energy systems more efficient economically, more benign environmentally and more equitable socially. In terms of the global energy system the Global Tracking Framework report notes: “...the world made major advances on the energy front during the last 20 years. An additional 1.8 billion people gained the benefits of electrification, while 1.6 billion people secured access to generally less-polluting non-solid fuels. Energy intensity has dropped significantly, cutting cumulative global energy demand by more than 25 per cent over 1990–2010”. Although renewable energy consumption grew by 2 per cent annually over 1990-2010, the share of renewable energy in the global energy mix increased only slightly from 16.6 per cent in 1990 to 18.0 per cent in 2010.¹²

Major transformations of current energy systems are needed. Energy choices made today will determine the energy future over the next decades, given the long investment cycles in this sector. Key elements of a transformation towards sustainable energy entail (1) designing and implementing robust policy and regulatory reforms, thus creating attractive investment climates, (2) strengthening the institutional capacity and creating effective business models, and building the necessary skills in the labour force to match the market needs, and (3) facilitating financing for investments from public, private, national and international sources.

Often energy issues are not addressed comprehensively as part of integrated national development strategies and sector policy reforms. Also, many countries do not mobilize adequate resources from public and private sources for energy investments. Numerous examples suggest that, in order to attract and sustain both large- and small-scale investments and ensure a coherent overall approach to energy development, enabling policy frameworks, capacities, institutional frameworks and expertise at national as well as local levels are needed. Creating favourable conditions and removing barriers for public and private investments in clean and sustainable energy solutions through policy and regulatory reforms will help to level playing fields for and lower risks of investments in clean energy. Conditions that govern energy markets, such as pricing, tariffs, access to finance and procurement practices are important.

In terms of energy access a clear focus on lower income, more vulnerable people and communities is needed. There is the need to increase the institutional and systemic capacity of developing countries, particularly LDCs and energy-poor countries, to access and benefit from financing, technology, knowledge and partnerships, as highlighted in the Istanbul Programme of Action for the LDCs.¹³ Decentralized energy solutions are particularly effective when they are combined with creating new employment and income opportunities and when they cater to demands from sectors such as health, education, agriculture and water, especially in rural areas. Strengthening energy supply chains via capacity development, standardization, guidance and training for users and local technology suppliers is also necessary.

Decarbonizing and increasing the efficiency of existing and new energy infrastructures is a key part of the energy transformation. Energy infrastructure needs to adapt to climatic changes, such as altered water cycles, warmer ambient air temperatures, sea level rise and more frequent extreme weather

¹¹ <http://documents.worldbank.org/curated/en/2013/05/17765643/global-tracking-framework-vol-3-3-main-report>

¹² SE4ALL, Global Tracking Framework, 2013.

¹³ A/CONF.219/7.

events such as floods or typhoons. The actual and avoided costs of such adaptation measures should increasingly be integrated within development planning.

Energy efficiency is key to the transformation of energy systems. It is a proven and immediate, cost-effective near-term option¹⁴, representing 70 per cent of the reduction in projected global energy demands in 2035.¹⁵ It offers a unique opportunity to reconcile economic competitiveness and industrialization with sustainable development and provides the added benefits of reducing the cost of energy and increasing energy productivity. It is an attractive upfront investment that pays for itself in a short period of time and its full value goes well beyond the energy savings and includes a wide range of socio-economic benefits, including security, job creation and poverty alleviation through greater energy affordability and access.¹⁶ Smart grids, which are a combination of electrical power technology and telecommunication technology, are expected to improve the energy efficiency of power systems.

Renewable energy potential in addressing the sustainable energy challenges. Renewable energy resources still remain largely unexploited, especially in developing countries. These resources could be used to satisfy increasing energy demand. Important technological advances have taken place in recent years that enable better harnessing of these energy resources and make them more accessible. Renewable energy holds much promise, but only if it is interlinked with the local knowledge base and related education and training. Investment in renewable energy also generates vast employment opportunities associated with development, construction, installation and maintenance for all renewable energy technologies in many countries.¹⁷

2. Overview of proposals

Several proposals for integrating energy issues into the Sustainable Development Goals (SDG) framework have been made so far. These can be broadly grouped into those that have a dedicated SDG on energy and those that have energy within other SDGs addressing different development dimensions. The majority of the proposals that have been developed so far support the option of an explicit goal on energy.

A) Proposals for Dedicated Sustainable Development Goals on Energy

This approach has been put forward, among others, by:

- **The Secretary-General's High Level Panel on the Post-2015 Development Agenda.** The illustrative energy goal of **"Secure Sustainable Energy"** consists of four main targets: ensuring universal access to modern energy services; doubling the share of renewable energy in the global mix; doubling the global rate of improvement in energy efficiency in buildings, industry, agriculture and transport; and phasing out of inefficient fossil fuel subsidies that encourage wasteful consumption.
http://www.un.org/sg/management/pdf/HLP_P2015_Report.pdf
- **The Sustainable Energy for All initiative of the Secretary-General** The goal consists of three objectives to be achieved by 2030: (1) ensuring universal access to modern energy services, (2) doubling the global rate of improvement in energy efficiency and (3) doubling the share of renewable energy in the global energy mix.

¹⁴ UNIDO, 2011: Global Energy Efficiency Benchmarking: An Energy Policy Tool (Vienna, UNIDO, 2011).

¹⁵ International Energy Agency (IEA), *World Energy Outlook 2012* (Paris; IEA/OECD, 2012), p. 282

¹⁶ International Energy Agency (IEA), *Spreading the Net: the multiple benefits of energy efficiency improvements* (Paris; IEA/OECD, 2012).

¹⁷ ILO, *Skills and Occupational Needs in Renewable Energy*, 2011

<http://www.sustainableenergyforall.org/objectives>

- **The Global Thematic Consultation on Energy and the Post-2015 Development Agenda.** A key recommendation was to establish “**Sustainable Energy for All**” as the global goal on energy. **UN-Energy, in its recommendation to the Global Thematic Consultation** proposed that “**Sustainable Energy for All**” (or an alternative wording reflecting the same idea) be considered the overall energy goal in the post-2015 development framework (<http://www.worldwewant2015.org/node/336381>). Furthermore, the Energy Consultation identified the nexus of energy and health services, as it pertains to women’s health, was identified as a priority. Two additional targets having clear gender impacts were identified: reducing by half the number of premature deaths due to indoor and outdoor air pollution, and providing modern energy services to 400,000 primary healthcare facilities in developing countries.

<http://www.worldwewant2015.org/node/339192>

- **Save the Children.** The vision of Save the Children for a post-2015 framework includes a goal for energy defined as “**By 2030 we will deliver sustainable energy for all.**” Four targets are recommended: universal access to modern energy services; eradication of preventable deaths from cooking stoves and open fires; doubling the share of renewable energy sources in the global energy mix; and doubling the global rate of improvements in energy efficiency.

http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/ENDING_POVERTY_IN_OUR_GENERATION_AFRICA_LOW_RES_US_VERSION.PDF

- **The United Nations Global Compact.** The set of global sustainable development goals proposed by the Global Compact includes as a dedicated energy goal: **Sustainable Energy for All**. This goal includes four targets: universal access to modern energy services; doubling the global rate of improvement in energy efficiency in production, distribution and consumption; doubling the share of renewable sources in the energy mix; and reducing by at least 50 % the particulate concentration in urban air, not to exclude the achievement of more stringent regional targets.

[http://www.unglobalcompact.org/docs/news_events/9.1_news_archives/2013_06_18/UNGC Post2015_Report.pdf](http://www.unglobalcompact.org/docs/news_events/9.1_news_archives/2013_06_18/UNGC_Post2015_Report.pdf)

- **Monash Sustainable Institute, Stockholm Resilience Centre, et al.,** (Nature, March 2013). This group of experts on planetary boundaries proposes the goal of “**Universal Clean Energy,**” to improve universal, affordable access to clean energy that minimizes local pollution and health impacts and mitigates global warming. This contributes to the UN commitment to sustainable energy for all and addresses MDG targets on education, gender equality and health.

<http://sustainabledevelopment.un.org/content/documents/1696griggs2.pdf>

B) Proposals for inclusion of energy within clusters of different Sustainable Development Goals

Proponents of this approach argue, among other issues, that bringing together related policy objectives along different dimensions would limit the number of goals and allow numerous related goals to be addressed jointly. This approach has, for example, been put forward by:

- **The report of the Sustainable Development Solutions Network.** This report proposes a shared framework for sustainable development composed of a limited number of priorities and associated goals. The goal that includes energy is “**Curb Human-induced Climate Change and Ensure Clean Energy for All.**” This goal calls for curbing greenhouse gas emissions from energy,

industry, agriculture, built environment, and land-use change to ensure a peak of global CO₂ emissions by 2020 and to head off the rapidly growing dangers of climate change. Also, the goal promotes sustainable energy for all. <http://unsdsn.org/files/2012/12/121220-Draft-Framework-of-Sustainable-Development.pdf>.

- **The European Commission in a Communication to the European Parliament.** The paper suggests that the framework could address the following clusters of issues by 2030: 1) “ensuring basic living standards”; 2) “promoting the drivers for inclusive and sustainable growth”; 3) “ensuring sustainable management of natural resources”; and 4) “promoting equality, equity and justice; and peace and security”. In this framework, **energy** falls under “**promoting the drivers for inclusive and sustainable growth.**” Please see: http://ec.europa.eu/europeaid/documents/2013-02-22_communication_a_decent_life_for_all_post_2015_en.pdf.

Additional proposals on targets and indicators that link energy with other development factors include:

- At a Head of State/Government level event on “**Sustainable Energy for the Least Developed Countries**”¹⁸ called for all the relevant actors to work together to develop and establish a common global goal on energy as part of the Post-2015 Development Agenda and that the special needs of the LDCs on energy should be specifically prioritized within this framework.
- **World Health Organization.** Expert consultations led by the WHO have proposed health indicators for energy targets, including indoor air pollution exposures, as well as access to modern energy sources in health facilities.¹⁹ http://www.who.int/hia/green_economy/indicators_energy2.pdf
- In addition, UN-Energy is currently preparing an analysis on possible options for energy goal/targets/indicators as an input to the on-going SDG discussions, including a potential global goal of securing sustainable energy for all, with a series of possible targets/indicators including on universal access, energy efficiency, renewable energy, energy-health nexus, energy-water nexus, energy-food nexus, and energy-women's empowerment nexus.

3. Way forward

From the proposals highlighted in the previous section as well as the global consultations on energy which culminated in the Oslo High Level Meeting on Energy in the post-2015 Development Agenda, consensus is emerging about the need for energy to be explicitly integrated into the new development agenda.²⁰ This could take the shape of a specific SDG on energy, with targets that are inspired by the SE4All objectives.

Energy is an enabler for development and is cross-cutting in nature. Thus energy could also be embedded in other potential goals, e.g. food security and nutrition, water, gender equality, livelihoods and health, via targets and/or indicators. Such integration would help remedy the silo approach, which has been identified as a lacuna in the MDG implementation. For example, within a target on food productivity, there could be an energy-related indicator on energy intensity of food production and

¹⁸ See also the Co-Chairs' Communiqué of High-Level Event on Sustainable Energy for the Least Developed Countries, which took place at the United Nations Headquarters on 23 September 2013.

¹⁹ Adair Rohani H et al. Limited electricity access in health facilities of sub-Saharan Africa: a systematic review of data on electricity access, sources and reliability. *Global Health: Science and Practice*, 2013, 1(2):249-261. (<http://www.ghsjournal.org/content/1/2/249>)

²⁰ http://www.regjeringen.no/en/dep/ud/whats-new/news/2013/energy_post_2015.html?id=725289

distribution systems. Similarly, an efficiency target could include energy efficiency of the water sector or water efficiency in energy production as possible indicators. Finally, targets on cleaner and more efficient stoves and cooking fuels and technologies for household needs would help improve the health and income-earning possibilities of women and wellbeing of their families, as well as freeing women's time for other activities.

Designing an SDG framework whose goals, targets and indicators respond meaningfully to multifaceted challenges should embrace the following characteristics: (1) Strong linkages between energy and other sustainable development goals; (2) Decoupling²¹ of socio-economic development from escalating resource use, fossil-fuel dependency and environmental degradation; and (3) Scientific monitoring and verification. Although suggested formulations of a possible "Energy SDG" vary in scope and exact wording, the following elements have emerged as important in the processes shaping energy in the post 2015 agenda:

Universality: An overarching goal on "sustainable energy" needs to be formulated keeping in mind its universality character.

Integration and nexus approach: Simultaneous increases in the demand for water, energy, food and materials resulting from a growing global population will require integrated resource planning at regional, national and local levels and should include all sectors. The planning and delivery of energy and all other basic services could benefit from a "nexus approach". Energy requires a people-centered and ecosystem-driven approach, across countries and sectors. Given the long investment cycles that characterize the energy sector, the sustainable energy transformation needs to start today. Energy plans need to have built-in climate adaptation mechanisms and need to be in line with other globally agreed targets, such as keeping global warming under 2°C and the Aichi Biodiversity targets. A holistic approach linking energy, employment and social protection policies should be encouraged. Efforts to promote affordable renewable energy can create employment and improve productivity in poor areas.

Flexibility and adaptability to local conditions: Investing in renewable energy technologies and energy efficiency is critical to enabling access to modern energy services. Renewable energy allows the harnessing of clean resources that are often available locally. Furthermore, renewable energy technologies have a competitive advantage, given their flexibility and adaptability, in decentralized energy systems particularly for use in rural isolated communities.

Participation of stakeholders, energy security and governance: At global, regional, national and local levels, access to clean and affordable modern energy services requires many actors and stakeholders whose involvement should be made more systematic and gender equitable. Increased transparency and accountability in energy-related decision-making and diversification of the energy mix will contribute to improving energy security. Energy efficiency will contribute to reducing the need for new infrastructure investments and to reducing fossil fuel imports.

Accountability and tracking: There are major data gaps in many developing countries that represent a key challenge for monitoring progress on energy objectives. More, better and gender disaggregated data need to be collected to inform decision making and gender mainstreaming in national energy plans and programs. Significant progress has been made on developing an accountability and tracking framework to support any potential future incorporation of energy into the post 2015 Framework, but more is needed in terms of quality and quantity of data at the country and local levels to ensure effective monitoring of trends and gaps.

²¹ http://www.unep.org/resourcepanel/decoupling/files/pdf/decoupling_report_english.pdf

Building capacities and a knowledge base: The energy challenges and the role of renewable energy in addressing these challenges, call for building capacities and promoting a local knowledge base to harness the available renewable energy resources, promoting local innovation and increased scientific knowledge adapted to different contexts and needs. Another priority is awareness-raising and outreach to explain the key role energy plays in sustainable development. Science, technology and innovation should be used to provide effective solutions and accurate information for such efforts

Technology: Support for R&D needs to be substantially increased to drive technological innovation and reduce the cost of efficient and clean energy technologies. A number of developing countries have engaged already in developing technologies adapted to local contexts, and South-South transfers will play an increasing role. Nevertheless, an effective technology transfer mechanism is necessary to accelerate the transformation of the energy systems in many developing countries.

Business Models: Different business models need to be promoted, including decentralized energy systems for rural remote areas and city locations (off-grid, small-scale, community-based, gender-sensitive sustainable energy planning). Development of sustainability criteria and reduction of costs for the sustainability certification of energy products are critical issues to address. Thus a process to develop such a set of sustainability criteria needs to be defined with follow-up implementation in the near future. Also, internalizing external costs associated with generation, distribution and use of energy should remain a long term goal.

Finance, trade and capacity development: Access to mainstream commercial financial products and services for clean energy investments should be made more readily available in developing countries particularly for women entrepreneurs and relevant partnership initiatives such as pro-poor public-private partnerships. Cross-border agreements and regulations for energy trade and investment need to be enhanced. Efforts could be undertaken to promote more predictable and competitive energy markets, including through fossil fuel subsidy reforms, trade agreements, and information exchange and dialogue. Trade disputes would need to be addressed to allow for complementary energy security, technology transfer and low carbon development. Developing capacities on energy issues is necessary for all stakeholders including policy makers, regulators, academics, civil society organizations, investors, entrepreneurs and financial institutions. Adequate skill development policies should be in place, especially for the youth, to empower workers to seize new opportunities and to mitigate the risk of skill shortages in renewable energy sectors. Strengthening women's access to education in science, technology and information will increase technology absorption and innovation capacity and underpin the effectiveness of the post-2015 agenda.

Existing global investment in the areas covered by the three objectives of SE4All was estimated at around \$400 billion in 2010. The additional annual investments required to achieve these objectives are estimated to be at least \$600 to \$800 billion.²²

²² SE4ALL, Global Tracking Framework, 2013.