



POLICY BRIEF #14

THE INTERLINKAGES BETWEEN ENERGY AND SUSTAINABLE CITIES

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DRAFT FOR PUBLIC CONSULTATION

This document is a part of a series of Policy Briefs being developed to support SDG7 review at the UN High-Level Political Forum to be held in July 2018. The objective is to inform intergovernmental discussions by providing substantive inputs on SDG7 and its interlinkages with other SDGs prepared through inclusive multi-stakeholder consultation processes. The development of these Policy Briefs is coordinated under the auspices of the Ad Hoc Informal Multi-stakeholder Technical Group of Advisors on SDG7.

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KEY MESSAGES

The world is experiencing an unprecedented trend of increasing urbanisation that is taking place mostly in the global south.

By 2030 cities and towns will house around 60 % of the world's projected 8.2 billion people from the 7 billion people of 2007. The urban population increases by around one million people per week. So is the energy demand that increases exponentially as the world urbanised.

Cities and towns globally consume up to 75 % of energy and are responsible for 70 % of greenhouse gas emission (GHG). Cities play a key role in economic development as 70 % of GDP are produced in urban. Most urban areas from around the world are designed and operated mainly using fossil fuel as the main sources of energy, which generate significant amount of GHG emissions.

Investment in clean, reliable and affordable energy and the adoption of energy and resource efficiency in the built environment (housing and infrastructures), are critical interventions for sustainable cities

Status of the Interlinkages between Energy and Sustainable Cities and progress towards achieving SDG 7. 1; SDG 7. 2. and SDG 7. 3.

Cities and towns of developing countries have limited access to modern energy which is a critical barrier to their sustainable development. Energy demand of their citizens is growing faster than energy supply. In developed countries with nearly 100% energy access; cities have initiated major programme on energy transition from fossil fuel driven economy to cleaner energy generation to increase the share of renewables in their energy mix. Energy and other resources are more and more used wisely and efficiently. Old building stock in Europe and in some middle east cities like Dubai, are being retrofitted to reduce their operation cost and their carbon foot print.

Promoting sustainable cities requires multi-sectoral investments and a range of actions including the following: (a) planning, design and implementation of densely, compact and accessible cities with abundant greener areas; (b) designing of clean, efficient and affordable public transportation options; (c) retrofitting of old buildings and designing of energy and resource efficient buildings (green buildings); (d) generating energy from local clean energy sources; (e) adopting efficient municipal waste management system with resource recovery; (f) promoting efficiency in the use of resources including water and electricity in the commercial and industrial sectors, as well as in the generation and transportation of energy.

Cities are the most critical arena for sustainable energy deployment. The transition towards cleaner energy sources has already started with several cities committed to 100% renewable energy targets. The demand in cities for cleaner, reliable and affordable energy is exponentially increasing as national and local governments adopt low carbon measures to address climate change. One example of such commitment, is the establishment of the Global covenant of mayors for energy and climate that brings together over 7000 cities and towns committed to reduce their carbon footprint through a well elaborated climate action plan.

The reduction in the cost of energy efficiency and renewable together with the associated competition in the business sector, is the golden opportunity for the deployment of sustainable energy in cities. This gives cities an unprecedented opportunity to transform, decarbonize, and enhance the resilience of their energy supply and consumption.

Sustainable Cities and the 2030 Agenda

Priority actions over the next 4 years

In order to achieve universal energy access, cities in developing countries need to invest more on green technology transfer, capacity development and responsive consumption. Developing countries should leapfrogging investment in green industrial transformation, where new jobs can be created and manufacturing and assembling of cleaner energy technologies (electric appliances and energy generation systems) are taken place.

Cities in developing countries should increase their investment in: production and use of cleaner energy options; renovation of infrastructure; retrofitting of old buildings by improving their efficiency in the use of energy, (electricity and gas), water and other resources etc.

Cities and towns globally should invest on resources efficiency in general, and promote resource recovery from municipal waste including energy generation and recycling.

Priority actions towards 2030

Policy reform

There is a strong need for policy reform in the energy sector considering the different innovations that had happened in the last 2 decades. Energy is no longer a monopoly of the sole national energy utility company. The attractive cost of off-grid energy system.

More technology innovation

The innovation in the technology front, with energy efficient appliance becoming more and more reliable and affordable.

Energy and Sustainable cities and the Sustainable Development Goals

Are we on track to achieving SDG 7 in cities?

Actions are too slow to take off at both national and local level. Fossil fuel still receive heavy subsidies. Cleaner energy technologies are still not exempted from taxes in many countries. However, there are several initiatives being undertaken.

Key challenges

The challenges are in the form of market barriers, inappropriate policy frameworks, and financing gaps, as well as limited capacity for design, planning and implementation, affordability and reliability of energy all the time. This is particularly the case in poor and vulnerable urban communities and Least Developed Countries and Small Island Developing States, where citizens disproportionately lack access to modern energy services. The case for urban poverty alleviation in this context is compelling.

Old building stock in Europe are energy inefficient and most of it is undergoing major retrofitting. (UNECE to provide more information)

Low energy access in cities of developing countries

The current level of energy generation in developing countries is far below the energy demand for countries economic growth, wealth creation and improvement of the people living condition. It is impossible to achieve the status

of sustainable cities with the current energy supply. Power shortages and rationing are too common and contributes to the high cost of doing business in developing countries. Despite the shortage of modern energy, African citizens pay the highest energy tariff of the world. Majority of urban dwellers are considered energy poor as they spend between 10 to 30 % of their income on energy services.

Wood energy

Wood is one of the dominant renewable energy sources in the UNECE region where some of the most efficient bioenergy systems have been developed. The region achieved 98% access to clean fuels and technology for cooking in 2014, up from 95% in 2000, but 23.3 million people in remote rural regions still relied on inefficient solid fuel systems for cooking in 2014. Often, they rely on locally gathered firewood. The fuel typically is burnt in a controlled combustion wood stove or a traditional high mass combined space heater and/or cooking oven. Inefficient stoves allow users to generate heat from low or no-cost local resources.

How to fill the gap to achieve SDG7 for Sustainable cities development (i.e. investments)

The sectors below require major interventions in the form of policy reforms; investments, capacity building, up scaling etc.

Low energy access in cities of developing country

Between 20 to 40 percent of urban dwellers in developing countries do not have reliable access to electricity. Policy maker should take more effort to increase investment in the energy access particularly for the urban poor who live in informal settlements. Access to electricity should be improved. Partnership are needed among the key players from the government, the private sector and the civil society organisations.

Energy generation in cities: Cities over the world are becoming prosumers

The New Urban Agenda commits to the generation and use of renewable and affordable energy in urban areas. In so doing, cities become energy prosumer as they produce part of the energy that they consume. Urban areas are endowed with renewable energy sources including also municipal waste that could be used to generate additional energy. Putting all these potential into use could reduce cities carbon footprint.

Investment in clean energy offers cities the possibility to directly control onsite power generation as oppose to the traditional centralized power grid control by parastatal or central government. Significant progress has been made in the adoption of feed-in tariffs and grid connection regulations allowing citizen and private entities to generate and sell clean energy to central or local energy grids. Although their adoption remains slow in developing countries, very few policies and enforcements regulations have been adopted.

Cities and national governments are adopting responsive energy efficient policies and practices, municipal energy strategies

Cities adopt more energy efficient policies and practices (in the transport; buildings, industry, commercial sector). The number of energy efficient building codes adopted by

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countries has been increasing in the last 5 years. Numerous countries have included energy efficiency interventions in their INDC with attentions for cities.

Local governments are well-positioned to encourage, enable, measure and regulate sustainable energy, as well as inform the decisions on deployment options, including adaptation to, and anticipation of, new technologies and changing energy requirements.

Cities and local governments, as managers of local infrastructures, can develop solutions that integrate energy and end uses such as buildings, industry, transport, waste, or sanitation, maximizing efficiencies and stimulating innovation in energy generation technologies and reducing consumption. Although several local and national government are committed to increase the share of their sustainable public procurement to reduce environmental and carbon footprints, and to foster market growth, very little is happening on the ground. Procurement manuals and procedures should be updated to include sustainability principles.

District energy in cities

District energy in cities (a new concept of energy generation and distribution system that focuses on energy efficiency and renewable energy).

Distributed electricity generation will become a key feature of new and existing cities, complementing sustainable utility-scale power plants, which are often outside cities. Cogeneration and district energy networks also provide the flexibility and storage to integrate an increasing share of renewables into the energy mix, while simultaneously improving energy efficiency through demand aggregation, increased scale of production sources and use of waste heat.

Planned urban form

Proper design and planning of urban form, infrastructure and buildings, according to their local environment and climates, could reduce significantly the demand for more energy and other resources for their operations. Energy and resource efficiency have not been applied consistently in major urban sectors such as industry, transports, buildings and infrastructures. Some cities are already integrating sustainable energy considerations in their urban neighbourhood design, planning and management, through use of performance metrics for energy production and consumption in zoning and land-use planning, permitting, infrastructure, buildings and transport decisions.

Energy and buildings: the green building council expansion

As buildings consume more energy than any other sector, the adoption green building concept is gradually taking shape in most urban areas. Green buildings councils are being created to promote the adoption of sustainable building design practices. There are different types of green building rating systems that promote environmentally friendly building design associated with responsive consumption of resources (water, energy, material, land and waste.). Massive deployment and integration of green building principles could be made through building permits where all new buildings are required to adopt minimum energy performance standards. This will not only reduce energy wastage in the built environment but also allow buildings to generate additional energy through their rooftops.

Smart energy grid and Smart sustainable cities

Smart grids are enabling major energy efficiency and resilience gains. Using ICTs, the grid is able to manage the energy demand and use the most efficient energy source on the system.

Smart energy grid also allows for the deployment of electric transport systems that are already contributing significantly in the reduction of carbon footprint of the urban transport sector, particularly when the power used are from renewables.

Urban mobility and sustainable transport systems

Cities and industrial development

Urbanisation and industrialisation are two interlinked processes with energy as a common denominator. In fact, availability of energy drives both urbanisation and industrialisation. These are transformative processes for job creation, economic growth, wealth creation.

Availability of financial resources to stimulate the uptake of energy access to sustainable cities development

The Paris Agreement on climate change calls for all countries to allocate sufficient resources to invest on low carbon economy including sustainable energy sector. Although several countries have allocated resources for green energy generations, access to these financial resource remains a big challenge. Such resources should be allocated to dedicated Green Investment Banks with qualified expertise. The Kenya newly created Green Bond aim at developing domestic green bond market focusing on climate and infrastructure targets.

Interlinkages with other SDGs (SDG 1-17)

Energy as a driver for development

“Energy is a cross-cutting agent for tackling the economic, social and environmental dimensions underlined by the SDGs.”

From a social point of view, the lack of access to energy is one of the biggest constraints to the main scope of Agenda 2030 that lies in the eradication of extreme poverty (SDG 1) including the urban poor who are estimated to be one billion people.

Energy access contributes to improve the quality of life since it provides better health-care services and a greater life expectancy (SDG 3) and the possibility to have access to quality education (SDG 4). The use of electricity allows to replace or facilitate time consuming activities in informal settlements and in peri-urban areas, especially for women and children (SDG 5), allowing them to develop their human and social potential empowering their role within their households and society. In addition, modern energy provides access to electricity and gas, the use of less polluting systems for cooking and heating (SDG 2), it promotes industrialization (SDG 9), telecommunication services (SDG 9), and it is critical for the supply of safe and drinking water (SDG 6) badly needed in cities of developing countries as well as for the development of inclusive human settlements (SDG 11). In relation to the economic dimension, energy allows the creation of jobs (SDG 8). Energy is crucial to mitigate the risk of climate change (SDG 13) and limit the use of unsustainable

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firewood – which remain the major cooking fuel in informal settlements- reducing deforestation and soil degradation (SDG 15).

Policy Implications and Recommendations

Cities being the major consumer of energy and the major contributor of GHG emissions, the built environment in urban area offers greater opportunities for the achievement of SDG 7, 11 and 13. This can be achieved through planning and designing greener and compact cities, green buildings, adoption of energy efficiency, clean energy generation, reduction of waste and promotion of responsive consumption practices.

However, there is a need for leadership that is committed to drive the energy transition in cities. Capacity building and tools development for practitioners such as architects, engineers and other experts, on sustainable building design are needed to bridge the gap. Training institutions should initiate or strengthen training courses on sustainable built environment.

Urban planners should design cities and towns, neighbourhoods with minimum wastage of resources and maximum use of locally available renewable energy resources.

Engage investors to finance resources efficient buildings and appliances through green mortgage. This will help remove financial barriers;

Above all the following key actions should be addressed:

Sharing information and technical expertise

Public awareness is crucial to stimulate consumer demand for sustainable products and to promote behaviour change. All urban energy projects and program should promote non-technological measures supporting behaviour shifts, such as knowledge-sharing and public information campaigns. This will complement the different initiatives being carry out at community level to engage the public and educate to understand issues related to climate change and energy transition.

Closer cooperation among energy stakeholders, and partnership

Achieving sustainability in cities requires that all stakeholder work in closer cooperation and avoid working in isolation. Main stakeholders including power utilities, and national and sub-national governments, academia, private sectors and civic society organisation should work closer to ensure that sustainable energy goals be achieved.

Energy efficient building codes

Considering that fossil fuel related energy will still be leading the energy sector in the coming years, national and local government should enact mandatory minimum energy performance standards, ratings and labels for energy efficiency in buildings, equipment, and appliances, especially lighting, heating and air-conditioning units, to reduce energy consumption and GHG emission. Similarly, energy efficiency measures in buildings should consider efficiency in energy

supply, and target the reduction of fossil primary energy such as through the promotion of building integrated renewables.

Switch energy sources in the transport sector

Some developed countries like Norway and Germany have set targets on cleaner transport system by 2025 and 2030. Electric vehicles can now be seen in the streets of developing countries. These are good trends that need to encourage. Priority should be given to the switch to non-fossil fuel-based transport, such as renewable energy-based public transport and electric vehicles, as well as increased use of other forms of eco-mobility and non-motorized transport reducing the use of single cars.

Compact and densify cities through proper integrated urban planning measures

Decarbonising cities require that low carbon urban planning measures are adopted. This includes the allocation of adequate, sufficient and equitable areas for the built and open spaces. The built spaces should not exceed 50 % and the remaining 50% should be allocated to streets, gardens and other open spaces. Sustainable cities should adopt adequate density and compact patterns with an average of 150 people per hectare. Connectivity is also equally important as it links different cities spaces together. Mixed land use combining economic and residential activities together to avoid the need for transport and finally the need for promoting social mix that integrate affordable houses with urban basic services with other classes of the society.

Key Performance Indicators for Smart Sustainable Cities, such as those developed by UNECE and the International Telecommunication Union (ITU) with 14 other UN system organizations, will enable cities to measure their progress over time, compare their performance to other cities and through analysis and sharing allow for the dissemination of best practices and set standards for progress in meeting the Sustainable Development Goals (SDGs) at the city level.

Capacity building

Long lasting development requires that the actors and beneficiaries are fully involved in clean energy generation. Any meaningful program on sustainable energy should include technology transfer and capacity building component. In so doing the sustainability will be ensured. Capacity-building and technical assistance, especially in developing countries, should be considered as a key element of sustainable urban energy solutions. Capacity building in energy in cities is vital considering that this sector was a prerogative of power utility companies and other energy providers base on centralized power generation and distribution systems.

Gender dimension

Contributions and concerns of women and men as far as energy in cities is concerned- need to be addressed given that the needs, expectations and aspirations could be different. Therefore, gender dimension of sustainable energy in cities should be incorporated in the design, planning and implementation of sustainable energy projects in cities. In reporting such projects or programs, gender-disaggregated data on access to energy and finance for energy, as well as employment in the energy sector should clearly show men and women benefited from the intervention. Women and

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children living in informal settlement or peri-urban areas are among the victims of indoor air pollution from cooking on traditional stoves. Promoting cleaner cooking program in urban areas should include women in decision making.

- *Involvement of urban youth in green technologies for sustainable development*
- The youth below 30 years constitutes over 60 % of the African population where most of them are disenfranchised and live in urban areas without formal job. Empowering them to participate in activities focusing on resource efficiency and renewable energy is key to the achievement of sustainable cities development. In the past years, several training initiatives to empower the youth on green technologies have revealed that these disenfranchised sectors of the society could increase energy access through local production and assembly of solar street lights and solar lanterns.

Engage other stakeholders such as power utilities to Promote energy efficiency and responsive consumption

Policy in regard to land management, particularly in remote areas where often traditional biomass is the only accessible heating option, might need to be revisited to allow the legal harvesting of biomass and encourage its regrowth.

Formal adoption of sustainability criteria to the management of renewable feedstocks and efficient energy conversion of wood pellets is needed. Such integration of sustainable land management and efficiency has been possible through cooperation among multiple stakeholders.

Improvements in energy efficiency are possible through establishment of incremental targets. This is illustrated by improvements in energy conversion rates and reduction in particulate matter emissions from high-efficiency residential wood energy systems.

Wood can be a traditional or a modern type of energy, the key is in the 'system' used to turn that biomass into energy. A high-efficiency combined heat and power (CHP) is a modern system that can use biomass, likewise high-efficiency stoves. We need to continue communicating this issue to IEA and others.

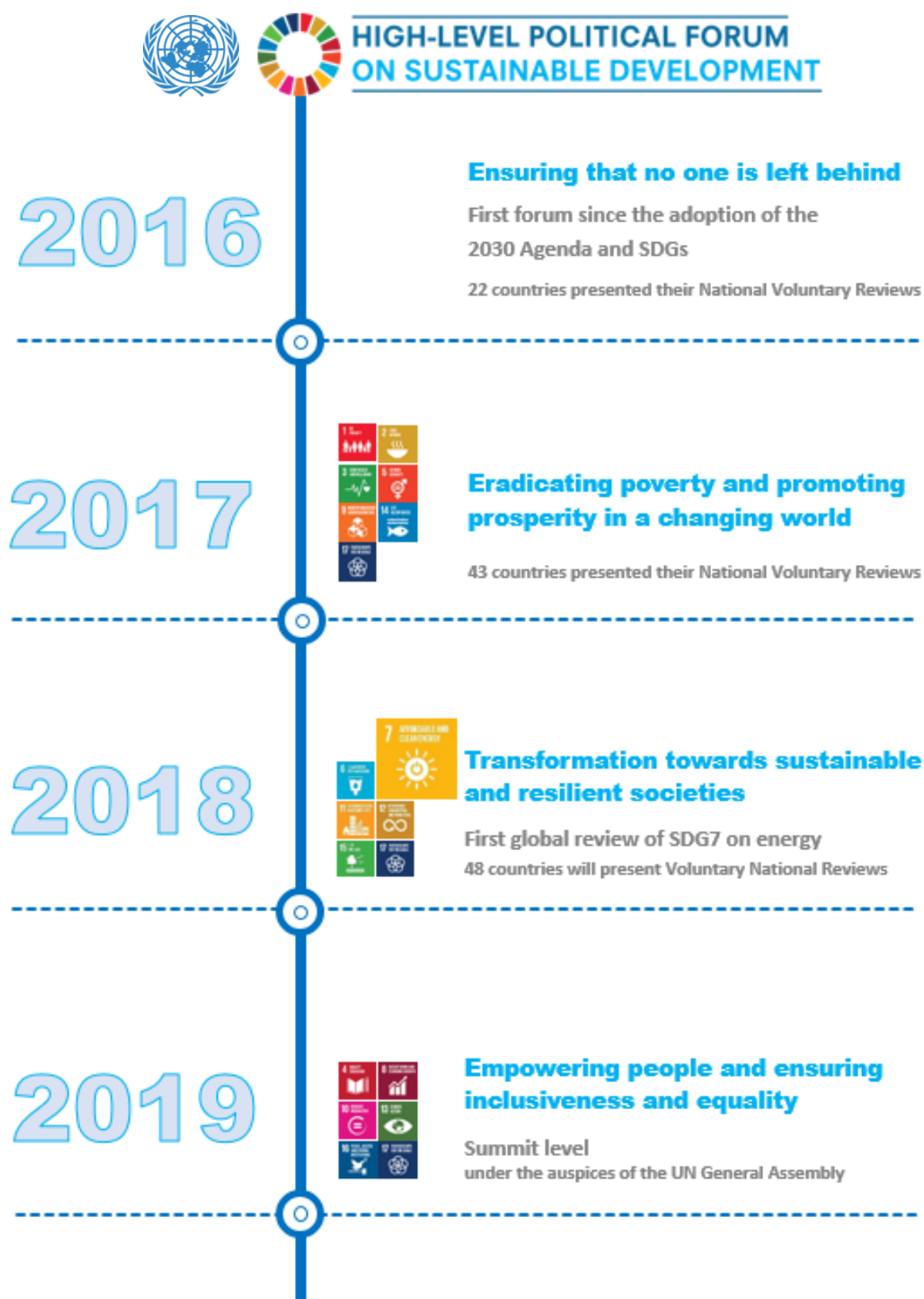
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