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Framing the water-energy nexus for the post-2015 development agenda

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Abstract

World leaders are increasingly recognizing the importance of the water-energy nexus perspective as a conceptual framework to facilitate integrated planning and decision-making for the post-2015 development agenda. We present three fundamental narratives of the United Nations Sustainable Energy for All (SE4All) initiative to reinforce the argument for a global nexus perspective aimed at sustainable development: i) energy ought to be placed at the center of the global development agenda to address development challenges such as hunger, poverty, gender empowerment, education and access to water and sanitation; ii) by changing the way we produce and use energy, GHG emissions can be decoupled from economic growth with the possibility to stabilize climate change below 2 degrees Celsius; and iii) the energy system is intertwined with other global systems (e.g. water, climate change, land and food production systems, etc.), which are strongly interdependent. All three narratives require systems thinking and a nexus framework for a more coordinated approach to sustainable resources management, which in turn requires concerted action in all spheres of influence and at all levels of implementation. We seek the attention and support of international development partners to commit resources and support ongoing initiatives aimed at operationalizing the nexus perspective into concrete actions for the post-2015 development agenda.

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The global human requirement for water, energy and food is expected to increase substantially with the increase in world population that is projected to reach 9.6 billion by the middle of this century, according to the medium variant of the 2012 Revision of World Population Prospects, the official United Nations (UN) population projections prepared by the Population Division of the Department of Economic and Social Affairs (UNDESA, 2013). Projections on the rates of increase and actual demand by any given date differ substantially among various sources. This is primarily due to differences in fertility assumptions and data considerations for demographic and socioeconomic scenarios. Nonetheless, there is consensus that global population will continue to increase until at least by the end of this century and that the bulk of the increase in demand for resources will come from urban areas where currently more than half the population already lives, although there is still substantial variability in the levels of urbanization across countries (UNDESA, 2014). This means an increasing number of people will continue to depend and have an impact on already vulnerable resources to sustain life and economic growth while maintaining a healthy environment. Many rapidly growing cities, particularly in developing countries, face serious problems related to water, food and energy, with limited or no capacity to respond adequately. These challenges will be further exacerbated by demographic shifts, changing lifestyles, a burgeoning middle class and the growing influence of climate change on the demand and supply chains of these resources.

Understanding these drivers of global change in search of solutions is crucial to fully appreciate the value of systems thinking and analysis, which is required to facilitate integrated planning and decision-making. Both water and energy are linked with food production systems, climate change, biodiversity and even the technological solutions and institutional arrangements that are needed to manage and use resources efficiently. How these dimensions and their links are perceived and managed has far-reaching consequences for several global development goals, e.g. poverty alleviation, improvements in health, addressing climate change, energy security, addressing hunger and malnutrition, increasing access to water and sanitation, halting ecosystem degradation, etc.

Increasingly, the international development community is embracing the notion that the water-energy nexus is useful as a major policy and management concept for sustainable development. Gradually, we are seeing a surge in global acceptance of its value in leveraging the formulation process for the proposed UN Sustainable Development Goals (SDGs) and even for their subsequent implementation, especially to make more informed decisions on goals, targets and indicators; to support the integration of goals across sectors and clarifying how best to allocate resources between competing needs; to make implementation of SDGs more efficient and cost effective by facilitating coordination between international development partners; and to reduce the risk that actions to achieve SDG targets could later undermine one another.

Unfortunately, however, many nations still pursue isolated sets of policies for water, energy and food, because the relevant institutions often work in isolation from each other. In the same way, a significant portion of the business community and consumers alike are using natural resources in technically inefficient ways without trying to fully appreciate the benefits of the intertwined and interdependent linkages. Alternatively, when those linkages are explored in an inclusive framework, decision makers, investors and civil society are enabled to make the right decisions and find the right solutions that maximize co-benefits and minimize constraints and certain trade-offs. The fact that the so-called bottom billion of the global population who are lacking access to electricity, heating and clean cooking facilities, and those who lack adequate access to food and nutrition, as well as safe drinking-water and improved sanitation, are often more or less the same people attests to the close linkages and the rationale for addressing development goals in a coordinated way.

Three fundamental SE4All narratives rationalize the water-energy nexus perspective for the SE4All Global Action Agenda on universal energy access, renewable energy and energy efficiency: i) to address development challenges such as hunger, poverty, gender empowerment, education or access to water and sanitation etc., energy should be placed at the center of the global development agenda; ii) by changing the way we produce and use energy, GHG emissions can be decoupled from economic growth to stabilize climate change below 2 degrees Celsius; and iii) the energy system is intertwined with other global systems (e.g. water, climate change, land and food production systems, etc.), which are strongly interdependent. All three narratives require systems thinking and a nexus approach for a more coordinated approach to management and use of natural resources in a more integrated manner. These narratives can strengthen the global momentum on the nexus perspective as a conceptual framework to facilitate coordination and integrated planning and decision-making for the post-2015 development agenda.

Energy must take its place at the center of the global development agenda, at par with concern for climate change, water and food security, as we learn from lessons and experience of the past fifteen years. At the UN Millennium Summit in September 2000, several Heads of State and Government and many high-ranking officials unanimously adopted the Millennium Declaration, with a series of time-bound targets which became known as the Millennium Development Goals (MDGs). Among other targets, the MDGs were meant, for example, to eradicate extreme poverty and hunger, achieve universal primary education, promote gender equality and empower women, reduce child mortality and improve maternal health, as well as ensure environmental sustainability by the deadline of 2015 (UNGA, 2000). All the targets were no doubt carefully crafted and well thought through as world leaders committed their nations to achieving a set of values, principles and objectives to address pressing global challenges through collective action for the twenty-first century. However, we failed to include energy as an MDG, and it soon became clear that many of the targets as set out in the MDGs could hardly be achieved without access to energy, and without careful consideration of the way we produce and use energy.

Ultimately, since the Millennium Declaration in the last fifteen years, we have achieved some progress in addressing poverty, hunger, health, gender empowerment, water and sanitation, etc. However, for most of these major development themes, we did not meet the targets we set for ourselves in 2000 and the pace of progress is frustratingly slow in many countries. In many ways, this slow pace can be attributed to energy constraints, particularly the lack of access in many parts of the world to modern forms of energy for lighting, heating, cooking, and for running small businesses. As a result, SE4All has been working with a global coalition of multiple stakeholders for the inclusion of energy goals in the post-2015 development agenda as the MDGs draw to a close and the adoption of a new set of goals is launched. We remain optimistic given that major achievements have been made after three years of hard advocacy to put energy at the center of the post-2015 development agenda. We now have a proposed Sustainable Development Goal Seven (SDG 7) on securing access to affordable, reliable modern energy services and we have gained the attention of global leaders to say that energy has to be central to sustainable development.

But the job is not finished. We have taken the first step, which is to accept that energy is the ultimate enabler for food security, improvements in health and education, access to clean water and sanitation and economic empowerment, especially for women – and also to recognize as a matter of fact the negative externalities of using energy in the wrong way. The next challenge is to take further steps to plan and implement a development strategy that is all-inclusive, and in particular, one that will keep coordinating the linkages, be they energy-water or energy-water-food, energy and women's economic empowerment, energy-water-climate change, energy-water-health, etc.

Some may argue that increasing energy access these development challenges will come at a cost to the environment, in particular, climate change and in turn economic development. Yet, there is ample evidence to suggest that if we take pragmatic policy measures to advance climate change goals even as global energy needs increase, we can slow down climate change without hindering economic growth. What we are saying in effect is that we can decouple economic growth and greenhouse gas emissions by changing the way we produce and use energy. We know this because there is evidence from credible sources suggesting that a shift to low-carbon fuel types and technologies, coupled with energy efficiency gains, can minimize greenhouse gas emissions. For instance, global CO₂ emissions from the energy sector stalled in 2014, marking the first time in 40 years in which there was a halt or reduction in emissions of the greenhouse gas (IEA, 2014). According to the International Energy Agency (IEA), global CO₂ emissions stood at 32.3 billion tonnes in 2014, unchanged from the preceding year and this was not tied to an economic meltdown. This, according to the IEA, is a positive development for the climate change community, as it suggests that efforts to mitigate climate change may be having a more pronounced effect on emissions than has previously been thought.

The IEA attributed the observed stagnation in CO₂ emissions to changing patterns of energy consumption in key emitting countries, mainly China and OECD countries. In China, for instance, there was increased use of renewable energy sources such as solar, wind and hydropower, coupled with a decline in the use of coal to generate electricity. Other countries made significant progress recently on efforts to promote a more sustainable growth by implementing energy efficiency plans and increasing the amount of renewable energy in their energy mix (IEA, 2014). In OECD countries, for example, there has been recent effort to promote a more sustainable growth through energy efficiency plans in addition to increased use of renewable energy. This gives even more hope and motivation that we can work collectively to combat climate change, which is thought to be the most important threat facing us today. Put together,

all of these efforts are producing the desired results: decoupling economic growth from greenhouse gas emissions and slowing down climate change, while at the same time fostering economic growth.

Even as we argue strongly that energy as the ultimate enabler should be centrally placed for the global development agenda, we are aware that there are potential risks to energy investments if investment portfolios fail to take into account the strong dependence of energy investments on the fluctuating and unstable trends of other global systems. This is because the energy system is deeply intertwined with other global systems such as water, climate, food, as well as their drivers (population growth, urbanization, industrial development, etc.) and other human systems such as institutions and governance mechanisms that are very important and strongly expressed, particularly at the local level. It is well known, for instance, that climate change impacts strongly on water systems, which in turn affect food production systems and energy security and consequently economic growth (WEC, 2010). Already, limitations on the availability of fresh water supplies in some regions, for instance, are restricting the type and extent of energy development or the type of food production systems that can be pursued and developed. In many parts of the world, high energy costs or limited energy availability are a serious constraint on pumping groundwater to boost food production, or supplying clean drinking water and maintaining efficient sanitation services. At the same time, one third of all food produced is wasted. This is in part due to energy constraints and the absence of adequate infrastructure between producers and consumers, particularly transport, storage facilities and access to market, and also due to consumer habits, aesthetic norms and regulation, which play a significant part, especially in developed countries.

What this means in essence is that we cannot continue to deal with the energy system in isolation from other global systems, which are strongly interdependent. We want to achieve universal access to energy by 2030, but increasing access without considering the consequences of certain energy sources and technology types on our environment will have negative consequences for sustainable development. Therefore, it is important to recognize the consequences that increasing access to energy will have for other systems, particularly land, water and climate change, and in turn how these systems influence energy output and outcomes. If we produce and use energy in the wrong way, particularly in those countries where consumption is high, we put stress on land and water systems and exacerbate climate change – and of course, climate change and degraded land and water systems will in turn disrupt our good intentions to link energy, food, health, poverty and water, and the interconnections with some other global development goals.

In many ways the year 2015 is a crucial time in our history for sustainable development. It is the year of vital global institutional decision making, with major international gatherings. Key meetings include the UN Summit on the post-2015 development agenda in September, the tenth annual meeting of the G-20 heads of government in November and the UN Conference on Climate Change (COP 21) in December. The UN Summit and COP 21, in particular, are expected to set and reach agreement on decisive global milestones on sustainable development, and initiate the implementation process for the post-2015 development agenda.

Once the process is initiated, we need to strengthen international support to positively leverage the Post-2015 Development Agenda, particularly in implementing the SDGs. In this respect, the water-energy nexus perspective can be useful as a policy and management instrument for the SDG implementation process, to avoid the mistakes we made with the MDGs, both during formulation and implementation. For instance, the MDGs identified major sector goals, each with its own list of targets, but with little consideration of how efforts to attain a goal in one sector would affect (or be affected by) efforts to achieve goals in other sectors. Consequently, we saw how duplication of effort and limited coordination between sectors, as well as weak partnerships among development partners, led to failure in certain areas. These mistakes can be avoided in formulating and implementing the SDGs. With the nexus perspective we could, in particular, emphasize increased coordination and partnerships between sectors (e.g. energy, agriculture, climate change, water, industry, ecosystems, etc.), as well as between institutional/organizational bodies such as UN entities, governments (both local and central), NGOs, businesses, civil society organizations and so on. By so doing, we would be able to operationalize the concept as a framework for solutions to emerge with multiple gains in several nexus dimensions across various sectors and management entities. By emphasizing the significance of these so-called “nodes”, we can strengthen the interactions and links between key sector actors and in the process reduce the complexity of the nexus perspective.

For this to happen, however, concerted action is needed in all spheres of influence and at all levels of implementation. The international community could bring actors together and catalyze support for national and subnational governments, and in some cases regional and sub-regional entities. Governments could make and use policy in a much more coordinated way, while the business community could try to adjust production systems for

much more efficient resource use. NGOs and civil society organizations could learn to challenge and collaborate with the business sector and local authorities to help deliver solutions. Financing institutions and development agencies could use their experience in working with governments to promote further replication of nexus-driven initiatives. In addition, individuals and civil society as a whole could try to understand and manage their consumption patterns and the choices they make in an increasingly resource-constrained world.

However, resources need to be mobilized to support planning and decision-making processes across sectors in several countries, especially in those countries where development challenges are huge. We are therefore calling on international development partners to commit resources and support ongoing initiatives aimed at operationalizing the nexus perspective into concrete actions. In particular, resources are needed to support countries in rethinking existing policies and developing new ones in areas such as energy, climate, water and food, and aligning new policies with those of various nexus dimensions, as well as to ensure the evaluation of trade-offs and synergies as they implement new policies and mobilize financial, institutional, technical and intellectual resources, creating the enabling environment that is required. Countries and partnerships that have established good practices could serve as incubators and disseminators of best-practice cases for integrated policy, technology and innovation, as well as investor marketplaces for the dissemination of successful innovations across countries and regions. They could develop innovative technical tools and approaches, and policy-oriented material and guidance tools to assess, plan and manage resources in an integrated manner. They could facilitate responsible governance and the broad involvement of stakeholders to optimize desired outcomes, connecting actors working in different sectors. They could develop and promote human and institutional capacities to generate and manage knowledge, as well as providing channels to exchange information, skills and knowledge and build evidence-based platforms for exchange of experiences and expertise, especially knowledge and perspectives on water, energy, food and related development dimensions at the appropriate scale. Finally, the right set of capacity development programmes will increase awareness of the relevance of the nexus perspective to ensure that sector policies are more inclusive and better coordinated to address global development challenges.

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