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The Link Between Healthcare and Energy Supply

How Joined-up Thinking Can Lead to More Synergies Between the Two Policy Fields

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The connection between the policy fields of energy and health may be hard to grasp at first glance. Nevertheless, the negative externalities resulting from the consumption of fossil fuels are clearly identified. In January 2019, the World Health Organization (WHO) named climate change and air pollution as two of the greatest challenges to human health. A differentiated look at infrastructure, availability and quality of energy supply and healthcare as well as at access to both shows how closely intertwined these policy fields are. No modern hospital can operate without secure electricity supply and efficient cold chains are essential for storing vaccines. In line with the United Nations' Sustainable Development Goals (SDGs), the two policy fields must be designed and interlinked in such a way that they contribute to human security beyond national borders and take planetary boundaries into account. It is necessary to bring health and energy together and to create synergies between them. This would be an important step towards a swifter implementation of the SDGs.

While most Western OECD countries have high quality healthcare and a secure energy supply, many other countries around the world lack the most basic prerequisite for both: a stable and adequate electricity supply. Nearly 60 percent of healthcare facilities in sub-Saharan Africa have no access to electricity. In addition, almost half of all vaccines are wasted globally because approximately 60 percent of refrigerators used in clinics have no reliable electricity supply.

This link between health and energy is highlighted in the 2015 United Nations' Sustainable Development Goals (SDGs). The 17 Goals, including “Good Health and Well-

being” (SDG 3) and “Affordable and Clean Energy” (SDG 7), are designed in such a way that all the goals can only be achieved jointly.

The concept of human security is helpful to clarify the dependencies and interactions between the two goals. It was first mentioned in the Human Development Report published by the United Nations Development Programme (UNDP) in 1994. At its core is a paradigm shift from the territorial security of the nation state towards the security of the individual. In this way, the term encapsulates both security against acute threats such as hunger, illness and oppression as well as improving living conditions.



Broadening the traditional, state-centred concept of security to include a more comprehensive human security has direct consequences in political practice. The term human security allows security issues to be tackled in a more context-specific way and brings greater focus on prevention and the improvement of living conditions. Purely military considerations are one, but no longer the key component. The aim now is to improve human security by taking account of the complexity of social conditions.

This maxim states, for example, that synergies resulting from the need for infrastructure, financing, supply chains and communication channels should be systematically thought of as interrelated. Conceptually, the goal of sustainability can thus be better embedded in governance structures extending across policy fields. Therefore, its implementation can be more efficiently planned. Ideally, this approach helps to design effective and human-centred approaches to fundamental problems instead of merely reacting to symptoms. In practice, however, this concept is not easy to operationalise. Bringing energy and health together is a major challenge because of very different governance systems, schools of thought and priorities.

Health and human security

There is an obvious link between health and human security. Health is a value in itself, a global public good, a prerequisite and a consequence of security, stability and well-being. The task of health policy is to ensure accessible, effective and affordable healthcare for all people in their respective countries, to reduce health risks (also in other policy areas) and to create health-promoting living conditions. The connection between health and human security is particularly evident in healthcare and the individual doctor-patient relationship where a human-centred approach is considered as the gold standard.

Only resilient, well-resourced health systems can provide healthcare in times

of crisis, for example in the event of an epidemic. At the same time, health systems can only function in combination with infrastructure from other sectors. Health systems have proven particularly vulnerable when another infrastructure has shortcomings or fails completely.

However, intersections between health and human security exist not only at the individual healthcare level, but also at the collective, population-based level. In particular, factors such as nutrition, socio-economic status, educational background, living and housing conditions and location, water supply, sanitation and air quality have an impact on people's health. These factors are collectively known as health determinants. Life expectancy and the burden of disease are distributed unequally between and within countries, between urban and rural areas, between income and age groups and gender.

The Human Development Report mentioned above refers to the concept of health security as a dimension of human security. In contrast to human security, health security in political practice is usually understood in the traditional sense, i.e. as protection against cross-border threats to health such as infectious diseases or antimicrobial resistance. Driven by foreign policy interests, countries make massive investments in disease programmes beyond their own national borders in order to protect themselves against illness 'at home'.

This dual approach of reducing risks and promoting healthier living conditions is found not only in the concept of human security, but also in the right to health. The right to the "highest attainable state of physical and mental health" is one of the economic, social and cultural human rights. It is enshrined in the Social Pact of the United Nations since 1966. The right to health contains two inseparable components: firstly, the determinants of health and well-being, and secondly, the availability, quality of healthcare services and their usage and acceptability by the population. Unlike the concept of health security, the

concept of human security is reflected to a large extent in the right to health.

However, the concept of human security has far less of a legal basis than health security. The WHO's International Health Regulations, last revised in 2005, are considered a legally binding instrument to enforce infectious disease control at international, European and national levels. There is still no comparable instrument that goes beyond infectious disease control and comprehensively includes the right to health including all determinants of health.

SDG 3 is to ensure healthy lives and promote well-being for all at all ages by 2030. In its general programme of work 2019–2023, the WHO prioritises the concept of universal health coverage as a systemic approach and no longer prioritises disease-specific programmes. As a moral implication, people everywhere and of all ages should have access to high-quality health services that meet their needs and expectations without being exposed to financial hardship.

Energy supply and security

Energy security and human security have more interfaces and interconnections than is commonly thought. However, the shift in the concept of energy security from the nation state to the individual end consumer is still very new, seldom formulated and rarely operationalised. One example, though, is the EU's 2018 policy framework, "Clean energy for all Europeans".

Traditionally, energy security is more decisively defined and implemented by nation states or – as in the case of the EU – by a jurisdiction. In the EU, energy security is commonly defined as the availability of low-cost, stable, secure and sustainable energy.

The present understanding of energy security is changing. While the traditional concept of energy security is strongly linked to the issue of import dependency, due to the expansion of renewable energy sources and the increasing electrification of the energy system, flexibility, adequacy and

resilience have evolved as key concepts. With a relative decline of fossil resources in the energy mix, both the growing consumption of electricity and the expansion of renewable energies place new demands on system stability since fossil fuels not only have a high energy density, but can also be stored more easily than electrical energy. A greater focus is being placed on the combination of access and availability – that is, whether energy is available and affordable at the place and time, and in the form and quantity it is needed.

However, in view of the decarbonisation of the energy system and the growing importance of renewable energies and energy efficiency, the focus is shifting to individual consumers with their responsibilities and increased opportunities. In particular, the new technologies allow consumers to simultaneously become producers by feeding the surplus from private photovoltaic installations back into distribution grids or placing it on the market via local producer groups.

At the same time, the concept of energy justice has been added at the global level to those of security of supply and climate and environmental compatibility. While in high-income countries, energy justice is understood in terms of competitiveness and affordability of energy supply, in the global South it means inclusion and equal opportunities for accessible, available and affordable energy.

The paradigm shift from the nation state to the individual is still in its infancy, especially in terms of concrete implementation. The right to energy supply and access to energy has not yet been enshrined in international law. However, equitable distribution of energy resources is a prerequisite for most recognised social rights as established in Articles 9–12 of the United Nations International Covenant on Economic, Social and Cultural Rights (ICESCR). These include, for example, the right to work under just and favourable conditions, the right to an adequate standard of living and, not least, the right to health.

The political impetus for secure and reliable energy supply was formulated in forums such as UN Energy, Sustainable Energy for

All (SE4ALL) and in the global SDGs up to 2030. According to SDG 7, universal access to affordable, reliable and modern energy services needs to be ensured for all by then.

In order to achieve this goal, the share of renewable energies will have to increase substantially and energy use will have to become twice as efficient by 2030. Furthermore, international cooperation on universal access to clean energy and clean technologies should also be improved by 2030. Investments in energy infrastructure and clean technologies are to be promoted. By 2030, infrastructure should be upgraded and technology further developed to provide modern and sustainable energy services to developing countries and small island states.

According to the International Energy Agency (IEA), existing and planned policies will not be enough to achieve the goal of sustainable energy by 2030. At the same time, the transformation of the energy system offers great opportunities for development, energy justice and security of supply because renewable energies enable smaller and more decentralised off-grid solutions. Ideally, this could be linked to greater opportunities for participation by local communities who develop independent energy solutions for their villages and towns. Theoretically, such modern forms of energy are therefore more 'democratic' than conventional energy systems which are often provided by state monopolies or corporations as they require large investments and the construction of power lines. However, the prerequisites for decentralised solutions are knowledge transfer and access to modern and clean technologies.

Negative externalities of energy consumption on health

According to the IEA, more than 80 percent of global energy consumption still comes from fossil fuels, with five percent coming from nuclear energy. The IEA has calculated that, in 2016, around 27 percent of the global primary energy demand was met by coal, just under 32 percent by crude oil and

around 22 percent by natural gas. According to scenarios considered by the BP Energy Outlook out to 2040, coal consumption is expected to fall to just over 20 percent and oil consumption to 30 percent by 2030, while natural gas consumption will rise to almost 30 percent. Altogether, there are no specific signs of any fundamental shifts in the major trends; the share of nuclear energy will remain at around five percent. Renewable energies are currently being developed at a rapid pace, but energy consumption is also increasing. Although renewables cover a considerable portion of the growing demand, they have not reduced the absolute quantities of fossil fuels consumed. On the contrary, global oil consumption reached a record high of 100 million barrels per day in 2018. This energy mix comes with *negative externalities*, that is, negative and unplanned consequences such as air pollution and greenhouse gas emissions, which cannot be remedied by the market alone and reveal a market failure.

Climate change and pollution are key issues for health and energy policy. The main aim of decarbonising the energy system is to help slow down the warming of the planet. The energy sector is responsible for two thirds of global greenhouse gas emissions. Huge quantities of fine particles, nitrogen oxides and other air particles are further consequences of increased road traffic and fossil electricity generation, especially from coal. Air pollution is one of the biggest health risks worldwide. The impact of current energy use on health, the environment and climate is devastating.

The WHO estimates that nine out of ten people on Earth breathe air that harms their health. Seven million people die each year from air pollution which is, therefore, the fourth leading cause of death. According to the IEA, around 2.9 million people worldwide die prematurely each year as a result of urban air pollution. Around 2.6 million people die prematurely because households often use environmentally harmful fuels (such as coal and kerosene) and technology for cooking, heating and lighting in enclosed living spaces without

ventilation. Women and children, in particular, are most affected by household air pollution. The health consequences include respiratory and cardiovascular diseases as well as malignant lung tumours. Nuclear power plants also represent an intergenerational health risk. The threat of exposure to high levels of radiation comes primarily from accidents, but also from the final storage of fuel rods. For those living in the vicinity of nuclear power plants, there is an increased risk of developing leukaemia, especially among children.

Due to the many health risks involved, it is crucial that developing countries no longer rely on traditional biomass or fossil fuels to develop and expand their energy supplies, and instead turn to modern and renewable forms of energy. In its World Energy Outlook 2018, the IEA points out that, in 2017, the number of people without access to electricity dipped below one billion. The report also says that the number of people who continue to heat with wood, manure or kerosene is decreasing. Since 2010, more than 400 million people received access to clean energy for cooking as a result of China's and India's programmes to use liquefied petroleum gas (LPG) and policies to improve air quality. However, around 600 million people still lack access to electricity, mostly in rural regions of sub-Saharan Africa, and a further 50 million in other regions. Furthermore, since access to electricity is usually recorded in binary terms, i.e. as either present or absent, it is reasonable to assume that the access to electricity is not stable and secure enough to sustainably raise living standards by using technical devices.

Bringing health and energy together

The Club of Rome advocates considering the SDGs in planetary boundaries. The goals have to be anchored locally and across sectors. The primary focus is, therefore, on transforming the entire energy system: saving energy, using it more efficiently,

generating it from renewable sources and using it more cleanly has far-reaching positive consequences for human security, such as improving air and water quality, thus having a beneficial impact on everyone's health. An unstable, inadequate energy supply, on the other hand, can endanger the stability of the entire health infrastructure and, in the worst case, trigger cascade effects such as epidemics and hygiene crises.

In January 2019, the report of the Global Commission on the Geopolitics of Energy Transformation was launched during the International Renewable Energy Agency (IRENA) Assembly. The report entitled, "A New World", points out the positive effects of an energy system based on renewables. It can help alleviate the causes of political and social conflicts. Since renewables are widely available, increasingly cost-effective and can be used locally and at a decentralised level, they can promote development. A reduced burden on other resources, such as water and air is another positive outcome.

Certainly, the costs of renewable technologies, such as photovoltaics or wind turbines on land, have fallen so much they can now compete with conventional systems in many places. However, even if the marginal costs of wind and solar are now tending towards zero, i.e. more electricity can be generated at hardly any additional cost, the upfront costs and plant investment remain an issue. Therefore, it is difficult to see a global and radical trend towards sustainable energy transformation based on cost degression alone. There are still barriers and market hurdles rooted in the inertia and resistance of the old system. These include the regulatory framework, financing and business models that are still aligned to these conventional structures. In many, but not only, resource-rich countries the energy sector is closely intertwined with the political elite. There, the restructuring of the energy system directly impacts the issue of retention of power and the social contract.

If the two critical infrastructures of health and energy can be considered in tandem and if their availability and access to them can be made more equitable, we can expect

positive effects on human security. There is also reason to assume that a stabilisation of social and economic transactions will follow. A well-resourced, resilient, publicly funded health system that provides health-promoting, preventive, curative and rehabilitative healthcare services can help stabilise states and societies. In turn, the energy sector forms the backbone of every economy.

According to the United Nations High Level Political Forum (HLPF), measures that improve the effectiveness of and access to renewable energy sources also have the potential to provide co-benefits for health. If efforts are made to ensure a clean, locally available and easily accessible energy supply, risks from living and housing conditions can be minimised and those conditions can be designed to promote health from the outset.

Consideration should be given to cooking areas and lighting in households. According to the HLPF, the availability of clean energy for households, for example from electricity or LPG, is a priority, especially if it can be used under equivalent, but ideally more favourable, clean conditions. The way to ensure this is to adapt the framework conditions, that is, to promote renewable and clean energy and to finally phase out fossil-fuel subsidies. It is important to dismantle barriers to market entry and create a market for both modern energy sources and technical equipment. Consideration should thus also be given to financing matters, for instance micro-loans.

Cities require different solutions to those needed in rural areas. For this reason, the HLPF calls for the improvement of 'urban health' by promoting the development of renewable energy, efficient grids, clean transport and transport solutions. These can be achieved by adapting tax incentives and building regulations.

The example of the washing machine aptly illustrates the link between health and energy. Washing machines save households many hours of work and enable especially women to pursue other activities of their choice. This ultimately has repercussions for population growth, education and productivity. It results in better hygiene and,

consequently, a higher standard of living for the whole community. But none of this is possible without access to a stable and affordable energy supply. The same applies to the link between access to electricity, artificial lighting and learning in the evening hours.

Finally, the different levels of decision-making need to be better integrated so that the health sector can be supported by a secure, stable and clean energy supply. The HLPF is calling for national strategies and the development of local industries to provide clean energy services for healthcare.

The normative framework for a meaningful linkage of energy and health is set primarily by the United Nations, notably through the HLPF and the Sustainable Development Goals. Governance approaches aiming to consider these two areas jointly are still rare, yet they do exist. In 2018, the WHO for the first time brought together representatives from the transport and energy industries, representatives from health ministries and researchers at a global conference on health and air pollution. IRENA has also dedicated conferences to the subject. For the second year in a row, the IEA has presented an "SDG Policy Scenario" in its World Energy Outlook which suggests political implementation of the SDGs. Further organisations are considering the links between individual aspects of energy and health, such as clean cooking (Global Alliance for Clean Cookstoves), access to clean energy (Energia, Clean Energy Ministerial) and equitable access to healthcare and energy (SE4ALL, ECOWAS Energy-Gender Policy & Regulation). These efforts also help to improve the data situation, but disaggregation in terms of the health determinants mentioned, such as age, place of residence, gender, income and level of education, is largely lacking.

Conclusion and recommendations

On closer examination and in light of the SDGs, there are close links between energy supply and health. The SDGs and the planetary boundaries constitute the political

framework. In most causal chains between the two fields, the energy supply system acts either as an ‘enabler’ or as a risk for healthcare. Reducing social inequality is one of the key resultant synergies. Joint infrastructure planning and the trend towards more decentralised supply systems open up good opportunities to stabilise societies. A systemic approach for operationalisation and planning as well as identifying conflicting areas and setting common priorities is highly advisable.

High-quality and stable energy supply is indispensable for health infrastructure, be it hospitals, sanitary or hygiene facilities, cold chains for vaccines or air conditioning systems. Decentralised healthcare facilities are particularly dependent on energy supply, for example health centres in communities where new solutions are being developed with the aid of renewable energy sources.

The healthcare sector is a major energy consumer. It is responsible for an estimated five to eight percent of global energy consumption. Environmentally sustainable use of resources is, however, far from self-evident in health policy. Efficient and environmentally friendly energy production in this sector would, therefore, have noticeable effects. On the other hand, the decarbonisation of the energy system could be accelerated if actors from other sectors become enlightened change agents. This would make it easier to bypass path dependencies and sector-inherent resistances. Specifically, we recommend the following measures:

- Decarbonisation should be promoted in the health sector, especially in high-tech medical care. Advisable methods include waste management (lower energy consumption, recycling), long-term contracts with renewable energy producers and building efficiency.
- Enterprises should strengthen their commitment to taking responsibility for

negative externalities. In return, these companies could, for example, pay into a Green Health Fund which provides public health facilities with financial means for a clean energy supply.

- International energy partnerships, such as the Indo-German Energy Forum, can help better communicate the benefits of clean energy to health and highlight new options for energy-intensive emerging economies.
- A disaggregated and high-quality database on equitable opportunities in energy supply and healthcare is a prerequisite for developing resilient infrastructure in the according sectors and, thereby, for better living standards.
- Towns could be twinned under the umbrella of energy and healthcare. The WHO concept of Healthy Cities can serve as a model for this idea. In developing countries, health centres, as well as washing and hygiene centres could also be set up in rural areas as places where clean energy is generated.

In order to achieve the Sustainable Development Goals, it will be necessary to jointly consider the fields of energy and health more than ever before. It could be helpful that money for promoting health systems and energy supplies often comes from the same development cooperation funds and sometimes goes to the same recipients. Awareness of these synergies could create real added value for the societies concerned. Other forms of cooperation, such as public-private partnerships, exist in both areas but there is no crossover between them.

In both domestic and foreign policy, synergies between energy and healthcare must be explored to a much greater extent than they have been to date and it is important to pursue the approaches described above for both areas, in order to improve human security.

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