GLOBELICS POLICY BRIEFING

Issue 2 – December 2016

Towards low-carbon development – building systems of learning, innovation and competence

Climate change is just one of several threats to sustainable development. However, it is the most urgent since the boundaries for a safe operating space for humanity have already been crossed when it comes to climate change.

Low-carbon development is strategies that mitigate emissions to avoid dangerous climate change while at the same time achieving social and economic development. In this policy brief we emphasise policies and actions for low-carbon development that would reduce the consequences of economic development upon climate change or even support a positive climate effect.

Development policy should seek to combine the human development and environmental sustainability through promotion of processes of learning, innovation and development.

We suggest that policy makers and donor organisations should direct resources towards combining innovation and low-carbon development and build systems to leverage this agenda. Platforms for interactions between stakeholders and between economies are crucial. This includes national and international platforms for collaboration in the fields of technology, finance and competence building.

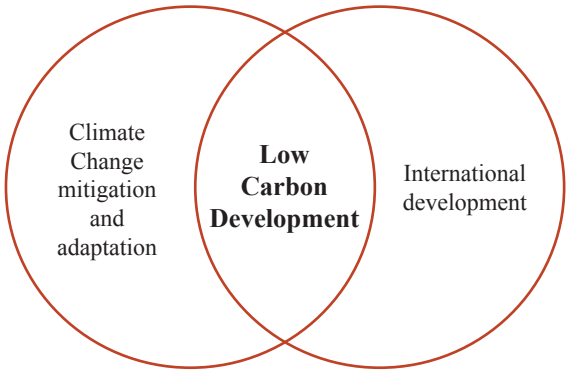
Climate change is the most urgent threat to sustainable development. Today there is consensus among climate researchers: the boundaries for a safe operating space for humanity have already been crossed.

Climate change affects continents and regions very differently, with the least developed regions most negatively affected. At the same time, in many regions of the world economic growth is still exceedingly important as a means to a better life. However, efforts focused on climate change mitigation tend to overlook this and the developing world's energy access imperatives. In 2016, 1,2 billion people were without access to electricity.

Low-carbon development is a viable pathway

The concept of low-carbon development is a necessary strategy to cope with these challenges.

Low-carbon development is defined as strategies that mitigate emissions to avoid dangerous climate change while at the same time achieving social and economic development in low- and middle-income countries.



Source: Modified from Urban and Nordensvärd (2013)

Low-carbon development is based on actions and technologies that exploit renewable resources such as wind, solar and water as well as technologies that help to reduce the climate impact of fossil fuel technologies.

Innovation and LICS are vehicles for low-carbon development

Any serious move toward low-carbon development has to rely on the development and implementation of new knowledge. In other words, it will hinge on technological and organisational innovation.

> Low-carbon development is a structural change that simultaneously improves living conditions in low- and middle-income countries and helps to mitigate climate change without adverse effects for other planetary boundaries.

Development and improvement of key renewable energy technologies is mostly taking place in the advanced economies and in emerging economies such as China and India. As a consequence, international technology transfer and collaboration in the field of renewable energy technology must be a central dimension of low-carbon development.

But low- and middle-income countries must be able to absorb new technology and effectively adapt it to local conditions. Absorptive capacities are often lacking today because they have insufficient capacity for selecting and using technologies in a way that effectively supports the goals of energy access, economic development and green transformation.

Building and improving effective Learning, Innovation and Competence building Systems – LICS – is a key precondition for coping with this challenge. LICS are systems that develop learning, innovation and competence building. They are systems of knowledge institutions – like universities, research institutions and vocational training institutes – business, policymakers and users who are involved in developing, using and evaluating solutions for low-carbon development.

In order to promote low-carbon development, countries in the South must build renewable and energy-efficiency technology-specific LICS. This will enhance the opportunities for absorbing new technologies and shaping to meet local needs.

But the current knowledge gap between North and South should not lead to a situation where countries in the South remain locked in their peripheral insertion into the global economy with dependence on innovation from abroad. This would undermine the development dimension of low-carbon development. For that reason, local LICS building should seek to maximise local embeddedness so that energy technologies establish and use local manufacturing and service capabilities and contribute to innovative and relevant development pathways.

Focus on learning and innovation capabilities

The concept of innovation is not only what happens in labs. Innovation encompasses changes in values, policies, institutional frameworks, cultures and economies. It is not only about breakthroughs and disruptions. It is as much about stepwise improvements.

Likewise, the concept of LICS is not limited to technology. The need for learning, innovation and competence building also includes the organisational, social, political and financial systems, which are sometimes weak in low- and middle-income countries.

Finally, innovation is not only a result of individuals and individual institutions. Innovation also relies on the interaction between them. Innovation is a comprehensive and interactive process. And it includes the users. Once relevant technical and organisational solutions are found, users should be involved in the product design processes.

The main point of a new direction that supports low-carbon development is that capabilities are built in a systemic way so that competences and knowledge can be replicated in new projects and on a larger scale.

It is necessary to rethink substantial parts of the development process as a learning process. Shifting attention toward learning and innovation capabilities is a way to increase the effectiveness of deployment of low-carbon development.

> LICS are systems that develop learning, innovation and competence building. LICS encompasses universities, research institutions, vocational training institutes and companies, but also institutions that influence the interaction between the components.

Barriers and drivers to low-carbon development

Barriers to developing a low-carbon development path in low- and middle-income countries are pronounced. These countries are often locked into fossil fuel-based energy systems: existing energy infrastructure is streamlined to fit the use of carbon-based technologies.

Subsidies for petroleum products, electricity, natural gas and coal are significant and mean that renewable energy is not competing on a level playing field. But their removal is hampered by the vested interests of the beneficiaries

of the old fossil fuel systems. Incumbent actors are often much more powerful than new "green" actors in terms of not only financial and human resources, but also of political influence.

Introduction of solutions to overcome these barriers are necessary for progress in low-carbon development. But we can also identify important drivers that might help accelerate low-carbon development.

Utilities and energy companies need to understand the financial risks associated with further investment in the high-carbon development path. Such long-term investments may result in 'stranded assets' that may undermine their own performance and survival, as invested facilities become liabilities when the world takes on the phasing out of fossil fuels. Conversely, big corporate investors in search of profitable new investment opportunities may open a path for new green models of economic development.

Engaging in low-carbon development means that innovation needs to take a new course that supports the shift to a green and balanced techno-economic paradigm. It is more about the direction of innovation than about the rate of innovation. The green transformation will require major changes in production and consumption across a range of technological spheres, not least energy, transport, and construction. It will be a process of 'creative destruction' in the original sense of the term: existing economic systems have to be destructed while new and more environmentally sound ones are created in their place.

Further reading

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Credits

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Policy recommendations on low-carbon development

Combine sustainability and growth
Development policy must ensure that the most adequate technologies are selected and adapted to local conditions. It must focus on the development of technologies that are particularly relevant in poor countries. It must furthermore ensure that they are disseminated and used in a way that improves living conditions, not solely reduces emissions.

Focus on low-carbon development
The aim of economic growth – and policies and development funds that stimulate this – must undergo a radical change and be directed toward the requirements of low-carbon development. The key task for policymakers, international agencies and donor organisations is to position sustainability in the mainstream of the national development priorities.

Innovation and learning is key in low-carbon development
Governments and donor agencies may support the creation of platforms for interactive learning, for instance through secondments in relevant institutions abroad to exchange experiences and inspirations. A top priority for aid policy should be combining support for innovation systems actors with support for system building, promoting LICS. It is crucially important that national policymakers and donor organisations ensure that system-building initiatives are appropriate to local context. This includes investment in the directed development of education, training, and research as well as infrastructures that stimulate this development.

Increase effectiveness of government action
National governments are still expected to be the main actors between global and individual action. However, when the effectiveness of governments is low, donor organisations may become important actors and engage in attempts to increase the effectiveness of government action. This includes policy learning and dynamic goal setting. It implies developing local capacity for anticipating risks, learning about barriers, formulating policies to address these barriers, and revising policies in the light of experience.

Political interventions needed
Public authorities need to engage in market formation by establishing technical standards, taxation and regulation, public procurement and financial incentives such as subsidies, feed-in tariffs, etc. Subsidies should not only be linked to renewable energy generation. They should also aim at supporting new and relevant infrastructures, such as mini-grids and other distributed forms of energy provision that increase the prospects for inclusion. Transforming and building infrastructures are central to low-carbon development as, for instance, transmission grids are often absent in rural areas. Donors are needed to fund experiments toward developing grid technology solutions and business models for decentralised energy provision.

Create alliances for financing, investment and trade
Donor organisations may introduce initiatives to connect institutional investors, for instance pension funds, in low- and middle-income countries with green energy investors in the developing world. Donor organisations may seek to match funds from the private sector or development banks with national initiatives and programmes. A key role of donors is to support experience with new business models for low-carbon development, bringing together financial institutions, energy service providers, equipment manufacturers and suppliers of operation and maintenance services. Part of this should be to support mechanisms to enhance South-South technology transfer by helping to establish learning-oriented collaboration between buyers and suppliers of sustainable technologies in the global South.