

Submission by International Institute of Environment and Development (IIED) on ADP work stream 2: the pre 2020 mitigation ambition. Views and expert opinion in reference to 'renewable energy as a cost effective option for closing the pre 2020 mitigation ambition gap'

Work stream two of the Durban Platform noted the significant need to close the greenhouse gas emissions gap by 2020 in order to set the world on a sustainable emission pathway that can hold global warming below 2° C. To achieve the mitigation ambition concrete, scaled up actions are needed in terms of policies and technologies to reduce greenhouse gas emissions. The scaling up of renewable energy measures have an enormous potential for emission reductions, while providing the co-benefits of increased energy access and related contributions to development.

This submission presents an overview of specific renewable energy policies and programs that have the greatest mitigation potential; as well as strategies for overcoming any implementation barriers. These recommendations will serve as a basis for discussions to identify specific and cost effective mitigation actions to bridge the mitigation ambitions set for 2020.

The emissions reduction potential of renewable energy:

Renewable energy has a great potential to reduce the mitigation gap. According to IPCC estimates , the large-scale diffusion of renewable energies could lead to cumulative GHG savings equivalent to 220 to 560 Gigatonnes of carbon dioxide (GtCO₂eq) between 2010 and 2050(IPCC, 2012). This could contribute to achieving the global targets of holding global warming below 2 degree Celsius.

However, recent trends have not shown exceptionally high emission reductions from renewable energy. This is because renewables currently only constitute 7% (excluding large hydro) of the energy mix in the world. A further 93% of current energy production comes from coal, gas, nuclear, oil, and hydro sources. Despite the limited shift towards renewables, evidence supports their role in emission reductions. For example, renewables (not including large hydro) contributed to almost 6.5% of the total energy mix in 2011, and because of this investment renewables are now saving a Gigatonnes of CO₂ per year (GtCO₂e). According to UNEP emission gap projections, the emissions reductions needed to fill the 2020 ambition is estimated to be around 8 to 13 GtCO₂ (UNEP, 2012). This implies that 8-13 times more renewable energy is required to achieve the emission reductions target.

According to the recent IEA figures, investments in renewable energy is the only sector which has been on track to meet two degree scenario when compared to other sectors such as carbon capture storage, nuclear energy, bio-fuels and energy efficiency. Despite this progress, we still need to invest more in renewables if the mitigation gap is to be filled. Energy needs are increasing, especially in emerging economies. Increasing populations and industrial growth are both expecting to double energy demand in the Asia Pacific region by 2030. Electricity generations in 2009 emitted 4,781 Mt of CO₂ in Asia Pacific region. By 2035 these emissions are projected to increase by 140% (BNEF, 2013).

However, these countries also have enormous potential for renewable energy deployment. Innovative technologies, policies and programmes are needed to bridge this emissions gap and harness the potential of renewable energy.

Countries are experimenting with several policies and programme to realise this ambition. Many of these policies have been successful in encouraging suppliers to generate and supply renewable energy. However, various challenges make it difficult to implement or replicate these measures under various geographical and development circumstances. The following sections discuss some key programmes and policies that have shown to be more effective at achieving outcomes in scaling up renewable. We then discuss some barriers that challenge wider implementation of these options.

Innovative policies that incentivise the generation and supply of renewables:

Some policy options and instruments have shown to be effective at reforming and scaling up renewables in both developing and the developed countries. These can be categorised into three main areas: (a) policies that aim to increase the share of renewables in the energy mix through obligatory targets; (b) financial incentives and subsidies that provide a level playing field to renewable generators in terms of cost of producing renewable energy; and (c) policies that ensure access to finance for renewable energy adoption.

(a) **Mandatory Renewable energy targets:** Many countries have set up mandatory renewable energy targets based on legislative requirements. Schemes such as the Renewable Portfolio Standards (RPS) require electricity generating companies within a country to ensure a certain percentage of their electricity comes from renewable sources. By 2012, around 138 countries have introduced renewable energy targets (Ren21, 2013). Programmes further incentivise the electricity providers to source/ generate renewables beyond their targets by allowing them to trade renewable energy credits that they receive for generating renewable energy. The Renewable Obligation scheme is an example of this type of instrument currently being used in the UK. However, these target-based policies are uncommon in developing countries.

(b) **Economic Incentives:** Apart from obligatory and voluntary target based schemes, financial incentives can play an important role in the early or interim stages of renewable deployment, and are especially helpful when technologies, markets and the environment needs time to mature. Financial incentives also allow renewables to compete with fossil fuel based energy sources, which often tend to be cheaper than renewables.

- **Feed in tariffs (FITs):** One instrument that has proven to be successful in many countries is the 'feed in tariff' scheme. The objective of the scheme is to fasten investments in certain technologies. The scheme provides certainty of prices received by renewable energy producers on a long-term contractual basis to help finance investments in renewable energy. The scheme guarantees a price to the producers of renewable energy, allowing them to sell the generated electricity at price that is sufficient to recuperate their investment. The price of energy is based on the novelty or maturity of the technology. Technologies such as wind are offered lower prices per kilo watt hour because it is relatively mature, while solar is offered a higher price to encourage new investment. The tariff to feed in renewables also digresses over time once the technology becomes well established. So far around 80 countries have established feed in tariff schemes. While it was first introduced in the US and then Germany, feed in tariffs have now spread to developing economies such as China, India, Tanzania and Uganda. China set a tariff for solar and new onshore wind power plants to help early stage operators achieve commercial benefits. The state electricity authorities in India are also mandated to set up feed in tariffs for renewable technologies, and, for example, the state of

Gujarat has set up a tariff for photovoltaic that supports the national solar mission. While FITs have been an effective instrument in countries with strong administrative and financial capacities, in many developing countries they are yet to show effective results.

- **Reverse Auctions:** Reverse auctions are considered to be a better option than FITs in countries with lower financial and administrative capacities. They have shown to be more effective instruments for encouraging renewable energy development in a cost effective manner. Reverse auctions are an instrument where an agency announces a competitive bid to acquire electricity from renewable sources. This mechanism was introduced as part of the non-fossil fuel obligation in the UK and in developing countries such as Brazil, Uruguay and Peru. The competitive nature of the scheme is attractive to policy makers because generators are paid a cost effective price and the fiscal burden on public finance stays relatively low.
- **Tax credits for producing renewables:** Electricity providers receive tax incentives for electricity generated from renewable sources. Tax credits are an effective mechanism in the developed world but an uncommon scheme in developing countries.

(c) **The role of public finance in scaling-up renewable energy:** Finance is cited as a key barrier to scaling up renewable energy. Public finance can play a key role at two levels: (1) in making renewables affordable for users; and (2) by providing commercial incentives to the private sector and reducing the cost and risks faced by investing in renewable energy supply and markets in developing countries. Public finance is capable of providing credit, financing opportunities as well as leveraging private sector investments into the renewable industry in the long run. In developing countries various donor funded instruments are being used to address the finance gap. Initiatives such as NAMAs, Climate Investment Funds, and Sustainable Energy for All and various other donor financed programmes are supporting countries to access public finance to incentivise end-users to purchase renewable electricity and the private sector to invest in supplying renewables. Public finance programmes include:

- Credit enhancement through risk guarantees.
- Direct access to capital (debt or equity) to commercial banks at low interest rates and longer tenures to incentivise lending to local renewable companies, for example by special intermediation agencies in Bangladesh (Infrastructure Development Company Limited) which has helped installation of solar home systems in 2 million homes of Bangladesh and Nepal (Central Renewable Energy Fund).
- Capacity building and building-up the experience of various actors: private sector actors, developers and financial institutions, involved in funding RETs.

Barriers to wider implementation of these options in different development contexts:

Although Renewable Energy Technologies (RETs) have the potential to reduce greenhouse gas emissions, their deployment and diffusion in some countries requires overcoming policies, governance, and economic barriers. Many policy options that work in developed countries or other specific country contexts can be overly ambitious in other geographical or development circumstances. The following is an overview of some of the more prevalent barriers:

- **Countries may have difficulties implementing and financing regulatory target based instruments:** Setting up regulatory target based instruments may work in countries aiming to increase their existing renewable capacity. However, it may not be feasible from an economic

perspective in some least developed countries until the technology is at least at an interim advanced stage of development. The nascent development of the technology and associated high costs may render it impossible for energy suppliers to acquire renewable energy from low cost sources. In some countries, obligatory targets are therefore not a cost effective way of mitigating climate change.

- **Financial incentive based instruments may add to the fiscal burden of some countries:** Financial subsidies and incentives can be effective instruments to make renewables affordable or make renewable energy commercially viable for private suppliers. However, if nationally funded they can add excess strain to the national government budget. For example: policies such as feed-in-tariff can have a high level of fiscal and administrative burden if funded nationally. Although emerging economies and some low income countries have internalised improved digression based tariff policies (learning from precursors), low income countries will need more international support to adopt these financial incentive and subsidy based models.
- **Low readiness of the countries to scale up or integrate renewables:** Some countries may have governance and regulatory arrangements that are less prepared to implement certain RET policies. This may be due to a lack of experience with incentive based policies such as FITs. Inadequate technical expertise within the renewable industry may also influence the uptake of renewables. The political economy around renewables particularly industry groups and consumers groups lobbying against renewable energy incentives may also discourage implementation of policies.
- **Challenge of integrating renewable energy into existing supply systems:** Increasing the energy mix with a different range of renewables will present new technological and institutional challenges, in particular integrating them into existing energy supply systems and end use sectors. A lack of technical expertise on how to generate, transmit, or regulate loads from renewable energy supply in many developing countries may further aggravate this challenge. These constraints may include grid integration issues, issues around storage and base loads, and lack of abilities to operate and maintain the infrastructure and facilitates required to support renewable energy generation and use.
- **Competitive bidding based instruments such as reverse auctions may encourage unworkable low cost bids:** In many developing countries competition based schemes are more cost-effective than subsidy-based instruments (FIT), however, these schemes in the developing country context may suffer from certain disadvantages. Competition bidders may put forth unrealistic bids and in the absence of strict eligibility criteria, projects may never finish.
- **Policy uncertainty may disincentivize industry players:** Despite implementing various policy innovations, frequent policy changes may discourage the development of energy industry. Investors need enough certainty of benefits over a longer period tenure to justify investment. In a nascent market, policy uncertainty in terms of changes in financial incentives or the reduction of tariffs may discourage investment into risky markets.

- Low cost of fossils makes renewables economically unattractive: Despite various policy incentives, the wider scale up of investments into renewable energy may be discouraged by competition from lower cost fossil-fuel based electricity. On-going fossil fuel subsidies by both developing and developed country governments further add to the problem. As IEA chief states 'Fossil fuel subsidies are public enemy number one for green energy'(Barol, 2013). The cost effectiveness and certainty of profits from fossil fuel based electricity generation incentivises large scale investments in coal and gas-based energy generation. For example, the IEA projected that the investment into fossil fuel based energy production needed to reduce to \$98 billion to meet the 2020 gap. However, by 2012, new investment into fossil fuel based energy generation stood at \$148 billion, therefore outpacing targets for achieving the emission reduction (BNEF, 2013).

Strategy actions to scale up options and remove barriers:

To ensure that renewable actions are able to meet the 2020 mitigation ambition, critical actions are needed to scale up renewable technologies within the energy mix of both the developing and developed world, and reduce reliance on fossil fuel based energy supplies. The UNFCCC architecture can significantly contribute to overcoming these barriers and scaling up the implementation of policies. Actions are needed to ensure that policy, capacity, financial incentives, and technology are all appropriate for encouraging the uptake of renewables in different contexts if the 2020 emission targets are to be achieved.

At the financial level,

There is a clear role and rationale for international public finance. Financial incentives to encourage the renewable industry in low income countries can be funded by international climate finance programmes. The following financial instruments can be used to develop renewable energy industries:

- **Grants for country governments to help them provide subsidies or financial incentives to the renewable industry:** For example: fixed price tariffs, tax incentives, etc. Low income countries are in an unfavourable position to allocate finance from national budgets towards the subsidies and fiscal incentives needed to nurture and incentivise RETs. International finance can be used to nurture market development until they reach an interim stage where market-based instruments can be introduced.
- **Financial instruments to promote investment by the private sector in renewable:** Soft loans or low cost credit at favourable interest for long tenures, risk guarantees to lenders, grants for upfront installation costs, etc.

At the policy level,

Subsidies for fossil fuels make renewables unattractive and renewable policies ineffective. There needs to be a global policy push to redirect fossil fuel based incentives towards the support of renewables whilst ensuring safety nets for the poorest energy users. Monetisation and inclusion of carbon costs into energy prices is another way to make renewables economically attractive.

Consistency in policy is also crucial. Changing policies makes investors and industry players uncertain and insecure about the benefits of renewable energy. An emphasis on universally consistent policies will assure long term certainty to energy investors.

At the technical level,

Support for capacity building can be used to build the capabilities of different players in the energy industry—

- **Policy makers and regulators often** lack experience with implementing or reforming existing energy policies. For example, feed in tariffs, and reducing incentives as technologies develop, etc all require technical skills to plan and implement. Technical assistance can help countries absorb investments and scale up the renewable industry.
- **Energy suppliers and service providers** in developing countries may lack adequate technical expertise to integrate the renewable mix into the grid, install and maintain the technology, etc. Countries can gain from technical inputs, support, and sharing lessons from other countries to overcome these challenges.
- **Financial industries** can also gain from the experience of lending to the renewable industry. Local lenders are often hesitant to provide affordable loans to the renewable industry in low income countries. By demonstrating commercially viable models and lending arrangements, the experience of the finance industry can be strengthened in support of the renewable energy industry.
- **Support for research and technology providers** that are focused on finding appropriate solutions for developing country contexts is important to speed up the diffusion of renewables. Financial support can be used to facilitate technology development and information exchange.

While the above consideration can play an important role in scaling up renewables to bridge the mitigation gap, it is also important to note that increasing the supply of renewable energy in developing countries have lower emission reduction costs and wider socio economic benefits. Well-designed policy, financial and capacity building instruments can therefore play a strategic role in tackling the barriers and challenges associated with scaling up renewables as well as bring development benefits.

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