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Abstract

This article aims to provide a summary to governments and stakeholders in developing countries on the function, strengths and potential drawbacks of 'feed-in tariffs' (FITs) as one possible market incentive to increase the share of grid - and mini-grid - connected renewable electricity generation. It is important that FITs are not seen as a 'silver bullet', but rather as one policy option to complement others aimed at overcoming the barriers to significant and sustained investment in low-carbon energy. Despite the long-term rise in fossil fuel prices, the fact remains that most grid-connected renewable energy technologies (RETs) require financial support in order to compete with electricity generated from conventional primary energy sources, principally coal, natural gas and large-scale hydro-energy. In many countries, a lack of clear and stable revenue support for renewable energy (RE) has simply deterred investors from backing RE projects.

For developing countries, many of which have significant renewable energy resources, harnessing this 'freely available' energy is one way to offset domestic energy shortages, reduce import bills for hydrocarbons and expand energy access, especially in rural areas. In this article, an explanation is given of how FITs work followed by a discussion of their relative success in promoting RETs in OECD economies, taking into account broader aspects of the country and policy contexts. The rest of the article focuses on how FITs can be adapted for developing countries, considering their main benefits, potential costs and drawbacks.

Introduction

'Feed-in Tariffs' (FITs) provide a minimum guaranteed price paid by utilities to all generators of electricity from renewable energy, supplying, or 'feeding into' the grid. The exact value of tariff support is set by the government, usually for a fixed time period, and tends to vary according to the type of generation technology.[i] The cost of feed-in tariffs is normally assumed by electricity utilities and then passed on to, i.e. divided among, all consumers. As such, FITs are a form of cross-subsidy designed to encourage investment in clean and low-carbon electricity generation, without placing a cap or quota on the amount of RE generation (Couture and Gagnon, 2010; Haas et al., 2011). However, they are unlike conventional subsidies in that they are intended to spur market and technological development, driving cost reductions in the process. Opinion is divided over the long-term fate of FITs, as it is hoped that renewable technologies will be able to operate in the market without price support in the future. Importantly, FITs provide financial support only to electricity generated and delivered to the grid, as opposed to subsidies for the initial capital investment.

Basic FITs are conceptually very simple and easy to administer, which partly explains their popularity and success in accelerating the deployment of RETs. Approximately 75% of global installed solar PV capacity and 45% of wind power receive some degree of supply-side tariff support (Rickerson et al., 2010). While FITs are best known for their role in supporting investment in RETs in Europe, there is in fact a diverse and growing range of experiences across the world, from which it is possible to draw some lessons.

In many OECD countries with mature electricity markets, the use of FITs has led to widespread RET deployment, as in Germany, Denmark and Spain, which have Europe's largest shares of renewable energy generation – particularly grid-connected wind energy (Reiche and Bechberger, 2004). In Germany the first FIT was introduced in 1991, and by 2008 feed-in support totalled €2.5 billion. While 17% of German electricity generation is met by renewable sources (BMU, 2011), average financial support in 2009 was €0.13 per kWh, which equated to €3.83 per household per month, or 6% of the average electricity bill.[ii]

Crucially, and in order to incentivise constant efficiency improvements and innovations, per-unit FITs are normally lowered every year (at a predetermined and fixed rate), which brings them closer to average conventional generation costs. This is known as tariff 'degression'. As such, FITs have helped push down the per-unit cost of electricity generated by RETs by encouraging technical innovation and economies of scale. In the case of Germany, annual degression in the FIT paid for new RE generation were originally set at 1% for biomass, 1.5% for wind power and 5% for solar PV, which has the highest per-unit tariff. However the degression rate has been increased in recent years, most notably for solar PV, which, as of 2011, has a 13% degression rate (IEA, 2011). Nevertheless, FITs typically provide investors with a guaranteed revenue stream for 10-20 years, as long as the installation remains operational. FITs have therefore proved successful in reducing the financial risk of investing in RETs, as compared to other policies such as tradable permits.[iii]

However, once RETs take up a larger share of the generation market place, FITs can become expensive and harder to justify, especially where governments claim to be strictly endorsing the principles of electricity market liberalisation and/or placing a higher value on cheap energy in the short term. Therefore, it is important to bear in mind that FITs are only an interim policy, designed to accelerate the development and diffusion of RETs. Experience shows that diffusion will push technologies along the innovation cost curve towards market competitiveness with conventional energy sources, the environmental impacts of which should be internalised or priced in. On the other hand, in many developing countries, such as Uganda, which has a high dependency on diesel generation, the per-unit cost of mature RETs such as hydro and wind power is already lower than electricity generated from the fossil fuel base-load, which is itself on an upward price trend due to the increasing scarcity of easily accessible oil, gas and coal, as well as their climate and pollution externalities.

The most common features of FIT laws are the following:

- Utilities are obliged to purchase electricity supplied to the grid from RE sources generated specifically for that purpose (as distinguished from net-metering).
- The value of the electricity purchased (the FIT) is set by the government at a fixed rate each year, which normally declines in value over time so as to reward first movers and reflect technology cost reductions.
- The value of the FIT differs depending on the type, size and location of RE technology used, with higher rates paid to the least competitive technologies.
- Generators are usually responsible for paying for grid connection to the nearest connection point (shallow connection charges), whereas the grid operator bears the cost of grid extensions. Otherwise, in a deep connection charge system, the RE generator is normally responsible for the grid connection and all associated transmission upgrades.
- FIT contracts are signed between generators and utilities, typically for 10-20 years.

History and design of FITs in OECD countries

FITs have been successful in promoting investment in RE generation in many developed countries, mainly because they minimize the long-term financial risks surrounding individual projects. The world's first FIT was legislated in California in 1978 under the federal Public Utility Regulatory Policies Act (PURPA), which, in a context of high and rising oil prices, set the value of tariff support to reflect the avoided long run marginal cost of electricity, i.e. the anticipated cost of generating an extra kWh of electricity (Butler and Neuhoff, 2004). This, combined with an Investment Tax Credit implemented in 1979, underpinned the Californian 'wind rush' when approximately 15,000 wind turbines with a combined capacity of 1,200MW were installed during the early 1980s. However, the policy was withdrawn in 1985 (by which time oil prices had fallen to near pre-1973 levels) amid accusations that the financial support was too expensive and provided unrealistic rates of return for renewable energy investors. This experience in itself provided lessons for policy-makers seeking to legislate ambitious support for renewable energy.

Arguably the most successful FIT has been in Germany, where the policy was first introduced in 1991, initially with variable support linked to consumer energy prices. However, following a drop in energy prices during the late 1990s, the German FIT was fixed in 2000 (at different levels depending on the energy technology), which had the effect of greatly increasing investment in renewable energy capacity, particularly in wind and solar PV. While Germany's decision to fix FIT support was a significant boost to the RE industry, many studies conclude that other policies, as well as the wider market structure, were equally important, including the country's decision to phase out nuclear power (Jacobsson and Lauber, 2006).

In Germany, installed wind-power capacity increased from a total of 56MW in 1990 to 14,600MW in 2003, by which time wind power was already supplying 6% of Germany's total electricity demand (UNEP, 2007). In 2010, Germany's total installed wind capacity stood at more than 27,000 MW. In Denmark, a FIT underpinned rapid investment in wind power between 1980 and 2002, which, by 2007, accounted for 19.8% of domestic electricity supply and approximately 25% of installed capacity (Danish Energy Agency, 2009).

In the UK, plans to introduce a FIT were added to the government's Energy Bill in October 2008 after years of having resisted the introduction of direct tariff support, with the policy coming into effect in April 2010. This was a major departure from reliance on a micro-generation grant scheme and the 'Renewables Obligation' (RO), a quota-based mechanism that the UK has used to expand renewable energy supplies gradually since 2002. Although the RO has enabled a doubling of renewable electricity generation in the UK since 2002, this is unimpressive given the country's low starting point of around 2%. Indeed, it was partly the success of FITs in other countries that led the UK government to conduct a policy U-turn.

However, this was not done without a major policy campaign spearheaded by a coalition of NGOs and industry groups.

The specific value of FIT support is usually based on the type of RE technology, with the aim of 'levelling the playing field'. As such, FIT support, measured as € per kWh, is usually set higher for technologies like solar PV, which remain furthest from market competitiveness, i.e. are more expensive per kWh of electricity generation. Conversely wind power, which is often the most cost competitive, tends to receive a lower level of FIT support. In order to accelerate cost reductions through market expansion, it is important to match the relatively high tariff support for expensive RET such as solar PV, with a relatively steep rate of tariff degression, thus creating strong incentives to invest sooner rather than later (Auer et al., 2009).

In addition to technology-based criteria for establishing FIT values, the policy can also be calculated on a resource basis in an attempt to level the playing field further by preventing the developers of wind projects from capturing large rents in areas of high wind resources. This was done in Germany, where the value of tariff support provided for wind farms in windy locations was set at the same level as low-wind resource locations, but declined at a faster annual rate thereafter. However, a resource-based differentiation in tariff support can be difficult and time-consuming to calculate and administer, and the argument is often made that 'first movers' deserve to be rewarded (assuming they locate their wind farms in the windiest locations) for taking a risk with a lesser-established technology, and where costs tends to fall along with market expansion.

While support in the form of a high FIT has doubtless boosted the market for solar PV in Germany,[iv] it was not the only policy. The provision of direct installation subsidies, such as the 100,000 Roofs Photovoltaic Programme, which provided a total subsidy of 35%, was equally if not more important in Germany (Stryi-Hipp, 2009). The relative success of FITs also depends upon various non-market factors such as the ease of processing RE development applications, i.e., the degree of bureaucracy in each country, as well as wider social obstacles such as a strong 'NIMBY'[v] effect.

Some countries, such as the Czech Republic, Denmark, the Netherlands, Slovenia and Spain operate a 'premium' FIT, whereby developers can choose between selling their renewably generated electricity at price set at marginal X% above the market price, which tends to fluctuate, or opt for a (higher) fixed tariff support. In these cases, both the fixed and premium tariffs are reviewed by the government each year to reflect changes in energy prices and technology costs, while RE project developers are free to change between regimes. This flexible system is designed to protect both project developers and consumers by ensuring that losses and excess profits are avoided (Mallon, 2006).

Mendonça et al. (2009) argue that FITs are an inherently more inclusive financial mechanism to support RETs when compared to the tax credits scheme used in the United States. Taking the example of the development of wind energy in Denmark, they state that '..it was driven from the bottom-up, with enthusiasts influencing the political process in such a way that Government then engaged in providing the enabling conditions to boost the development of the sector, through economic incentives and favourable ownership restrictions' (p. 384). Taken together, Mendonça et al. argue that this institutional organisation in Denmark, and the process of creating a strong domestic political agenda to support RETs (in particular wind energy), was the product of what Danish academic Frede Hvelplund terms 'innovative democracy'. Specifically, this is understood as a process whereby stakeholders were actively engaged at all stages and levels of policy formation and where the development of community-owned wind farms spread the investment costs, and the income benefits, of wind energy down to the household level. This ensured both a high level of community 'buy in', as well as strong and longer term rural support for on-shore wind energy, the lack of which has been a major barrier in the UK, for example.

FITs are rarely used alone in support of renewable energy. In both Germany and Denmark, a combination of investment subsidies for individual projects (worth as much as 30% during the early days of promoting wind energy in Denmark), tax exemptions, soft loans and publicly funded R&D also played a major role. While these additional direct and indirect financial incentives for investing in RET were relatively expensive, it should be remembered that the costs of RETs per MW installed capacity have fallen dramatically since the 1970s, in large part thanks to the pioneering industry support and development that was achieved in countries like Denmark.

Criticisms and shortcomings of FITs in OECD countries

While FITs have been very successful in many EU countries, if judged in terms of RE capacity installed, they have some drawbacks and detractors. According to 'standard' neo-classical theory, as a form of cross-subsidy FITs should act as a drag on domestic economic growth, productivity and competitiveness. In reality, the direct economic impact of FITs is almost negligible, at least in high-income countries. In part, this is due to the relatively small component that electricity comprises for most household and business expenditure (indeed the share of electricity has steadily declined as an input factor among OECD countries since 1990). In 'pioneer' countries such as Denmark and Germany, tariff support for renewable energy also helped nurture a new multi-billion euro industry and created thousands of manufacturing and engineering jobs, though these are 'one-off' benefits that can only be captured by such pioneering states.

Taken at face value, fixed-rate FITs do not create competitive pressure between electricity producers since investors are able to calculate, with a higher degree of certainty, their rate of return based on the long-term structure of tariff support, i.e. they have a guaranteed fixed income. This can be compared to the policy of providing premium payments, or bonuses, on top of the market (i.e. variable) price of electricity, which in theory provides operators with a greater incentive to reduce their costs in order to maximize project returns. However, this assumes that the premium is not set too high, in which case it can lead to excess profits if the market price of electricity increases significantly, as was the experience in Spain. In an attempt to manage the cost of financial support to RE generators, Spain introduced floor and ceiling prices to its system of feed-in premiums in 2007.

Consequently, FITs as a generic policy are often criticised by free-market and fossil-fuel lobby groups as an expensive means to support investment in RE generation, and specifically because the cost of tariff support may become unsustainable once the share of RE generation becomes significant. As such, free-market advocates often argue that, by providing fixed payment levels, FITs are both inefficient and have a distortive effect on energy markets. In the EU, this has led some analysts to conclude that, if the cost of FITs were to rise significantly, they would undermine the Union's wider policy agenda of creating a single, liberalised European energy market (Sijm, 2002).

However, given the years of experience gained with FITs within many EU member states and the steady rise of RE installed capacity across the EU, energy policy debate has begun to centre on proposals to harmonise the support provided to RE. The European Commission favours 'well-adapted' FITs as the 'most efficient and effective support schemes for promoting renewable electricity' (Commission of the European Communities, 2008), a position supported by various academic studies, including Haas et al., 2011. Indeed, in July 2010, the European Energy Commissioner Günther Oettinger called for a harmonisation of FITs between EU Member States (Euractiv, 2010). As well as seeking to optimise net support for RE across the 27-Member State bloc, such policy harmonisation stands to reduce market distortions in anticipation of a region-wide energy trading system.

To a large extent, the success of FITs depends upon the stability and certainty they provide for investors. As such, too many changes made to FIT values can have a detrimental effect on the market by eroding investor confidence. In Europe, since 2008 the stability of some FIT regimes has been undermined by economic recession and government austerity. Although they are not directly financed by government budgets, FITs do contribute to a higher net tax burden for the economy, which has made them the target of governments wishing to reduce economy-wide costs, despite the greater long-term benefits of minimizing dependence on imported fossil fuels. Indeed, it is easy for governments to target FITs amid an economic recession, and in countries such as Spain that have a relatively high FIT bill, pressure to streamline the economy is also coming from the European Central Bank and international credit rating agencies.

FITs have also been the victim of their own success in many European countries, such as Spain and Italy, where investment in solar PV projects have greatly exceeded expectations, thus exacerbating political pressures to reduce the levelised cost of FITs among all ratepayers. In 2011 the UK government announced it would conduct a review of its FIT law, less than a year after it came into effect, which is highly likely to damage the country's nascent solar power industry. Such policy change can greatly undermine investor confidence in the stability of FITs. However, even if necessary economic incentives are introduced via a well-designed, clear and stable FIT, the rapid deployment of RETs (whether small or large-scale) can be hindered by unfavourable planning regulations, import taxation etc., depending on the circumstances in each country.

The pre-requisites and characteristics of successful FITs are as follows:

- Eligible RETs should be clearly defined, and include 'dispatchable' base-load generation technologies such as biomass, hydro and geothermal, as well as variable RETs such as wind and solar PV in order to encourage a diversified energy portfolio.
- Countries should conduct or commission in-depth renewable energy resource assessments and mapping and impact assessments, so that investors (be they public or private) know which RETs and locations are optimal.
- Tariffs should be technology-specific and based on the cost of generation, as opposed to final consumer prices or 'avoided' costs, so as to provide a clear and stable internal rate of return to investors (typically between 7-10%), while avoiding the risk of windfall profits at the expense of consumers.
- Apply a hybrid rate of tariff decline, i.e. where the annual rate of decline in tariff support has a fixed baseline, with the option to reduce tariffs for new projects further if and when major cost reductions are achieved for a specific technology.
- Especially in developing countries, FIT policies should be developed in conjunction with wider macro-economic policy-making and calculations so as to understand their likely impacts on the economy and development goals.

Sources: Couture and Gagnon, 2010; Mendonça and Jacobs, 2009; Haas et al., 2004; Haas et al., 2011.

Designing FITs for developing countries

Despite the success of FITs in various OECD countries, particularly in Europe, there are some basic reasons why they may have to be adapted to work in developing countries. Of fundamental importance is the fact that most developing countries have a smaller proportion of consumers connected to the grid, often less than 25% in sub-Saharan Africa, meaning that FITs will not in themselves help address the need to expand energy access. Indeed, they may even undermine policies to increase access to electricity in areas where demand can be met by lower-cost centralised thermal generation, especially in urban areas (though energy security and fuel-mix diversification are common concerns that reduce the cost benefits of conventional thermal generation). In countries where there is an abundance and high use of low-cost primary energy for electricity, such as with coal in South Africa, the cost of FITs will need to be relatively high in order to level the playing field between competing technologies. This is likely to make FITs politically unpopular, and in the case of South Africa, in 2011 the National Energy Regulator (NERSA) launched a review of the country's 2009 FIT with a remit to reduce tariff support by as much as 42% for solar PV.[vi]

Secondly, businesses and households in developing countries that do consume electricity generally spend a higher proportion of their income on it, meaning that any marginal tariff increase will have a greater economic impact. As such, the funding mechanism for FITs may have to be structured differently in developing countries, for example, with financing from international donors or centralised national funds, instead of by consumers. However, in countries that provide subsidies for fossil fuels, the net macro-economic cost of financing FITs could be zero or negative if these are phased out during the time period of FIT support.

There is also a risk that centralised financing for FITs could undermine their economic and administrative simplicity, i.e. their strengths, and move them towards a more traditional form of industrial subsidy that is exposed to greater political interference and uncertainty. Alternatively, in order to help minimise the costs to consumers, FITs can be designed with a nationally appropriate cap placed on the percentage of installed capacity from RETs. While this is far from 'ideal', it does at least allow for a controlled expansion of the local renewable energy industry, which is more likely to develop without future support once the initial cost and experience barriers have been broken down (IEA, 2010; Mendonça and Jacobs, 2009).

In the context of developing countries, many of which still operate state-owned and/or monopolistic electricity utilities, it is useful to remember that FITs do not depend upon a wider framework of market liberalisation, although such a framework is likely to provide greater security for investors. The important basic elements of FITs are that they combine guaranteed tariff support, purchase obligations and regulated grid access, which, if not tampered with by governments, provide a stable investment framework for a diversity of independent power producers. This means that investors will look closely at the stability of the public utility in order to assess the security of power purchase agreements, adding to the argument for focusing commercial investments on low-cost RETs such as hydro and biomass in developing countries.

There are also societal factors that stand to challenge the successful application of FITs, given that they have to be adapted to a particular set of national circumstances. For example, Mendonça et al. (2009) maintain that the conditions necessary to achieve the 'innovative democracy' that enabled the rapid deployment of RETs in Denmark are more likely to be found in industrialised and democratic societies, though they do not make sweeping statements to exclude all developing countries. It appears to be a moot point whether this process can be reverse-engineered in countries that do not have a strong culture of bottom-up and/or truly democratic decision-making.

In some developing countries, RETs are already cost competitive with conventional energy, especially where there is a high dependence upon small and medium-sized diesel generators. Where this is the case, the introduction of a relatively low FIT is likely to stabilise, and even reduce, the market price of electricity, especially when fuels are imported and continue to follow a long-run price increase. In these circumstances, the free-market response would be to argue that a FIT is unnecessary, since price signals alone would trigger investment in RETs. In theory yes, but in reality investors and governments alike tend to 'stick to what they know', even if there are clear short - and long - term costs in doing so. Given that FITs not only provide tariff support but also allow IPPs to connect to the grid, they can act as a 'package' enabling RETs to overcome the technological lock-in of conventional energy supplies. Nonetheless, it is evident that in most countries free-market price signals alone will not achieve the levels of deployment of renewable energy required to decarbonise our energy systems, hence the need for long-term bankable incentives.

There is increasing evidence for and arguments in support of applying FITs to mini-grids, especially in developing countries (DBCCA, 2011; Solano-Peralta et al., 2009). Developing business models for FIT application to mini-grids is especially relevant for geographically large developing countries with low levels of energy access. This could serve as an important economic bridge between the use of decentralised off-grid RETs used in mostly remote and isolated locations, and the high cost of connecting communities that have a low demand load, located relatively far from the grid. However, given the small size of the systems, it is not clear whether RETs would really 'feed in' (i.e. contribute to) the mini-grid, or simply dominate them. In the latter case there is a risk that, in applying FITs to mini-grids, they would end up operating as a direct subsidy paid to remunerate RE generators, as opposed to providing support at the margins to enable RETs to compete with conventional energy technologies.

Following the COP15 in Copenhagen, the United Nations Secretary General's Advisory Group on Energy and Climate Change (AGECC) requested Deutsche Bank Climate Change Advisors (DBCCA) to develop the idea of a public-private Global Energy Transfer Feed-in Tariff (GET FiT). The GET FiT concept is primarily designed to mitigate investment risk for RE projects in developing countries by passing the bill for FIT support on to donor agencies. DBCCA analyse FITs only from the perspective of investors, whose main criterion is to gauge the extent to which a particular policy framework is likely to achieve Transparency, Longevity and Certainty (TLC). This is a simple yet comprehensive approach to understanding policy 'best practice', though one focused on 'de-risking' business models and attracting mainly private investment in RE projects in developing countries.

Rickerson et al. (2010) focus on Tanzania as a case study of a developing country that is attempting to implement a politically viable and investor-friendly FIT. Applying the measures of TLC to the Tanzanian government's 2009 Small Power Producer (SPP) law, they conclude that the framework, which includes an initial FIT of US$0.077/kWh, is sufficient to attract investment in the 'low-hanging fruit' of RE projects such as small hydro and biomass, but not enough to promote wind or solar power projects.[vii] Rickerson et al. maintain that the key shortcoming in the design of the Tanzanian FIT is that the value is calculated on the basis of avoided costs, not technology-specific generation costs, which would provide greater certainty for investors who need to calculate a project's internal rate of return. At the same time, the Tanzanian SPP is praised for its transparency and for covering payments for projects connected to both grid and rural mini-grids. This is particularly significant in a country where less than 20% of the population have access to electricity.

Finally, the GET FiT concept maintains that FITs will not be successful in developing countries unless local financing is secured in RE projects, even though financial markets in developing countries (especially in sub-Saharan Africa) often lack diversity and flexibility and generally regard RE projects as high risk. Rickerson et al. argue that local financing can be secured by the provision of technical assistance to local lenders aimed at minimising fears regarding investment in alternative energy projects, and by sharing the financial risk with foreign investors and donor agencies. However, it is not yet clear how the necessary international funds can be secured in the long term to provide the financing for FITs that investors (whether local or foreign) are likely to demand. The problem of long-term financing is currently being addressed by the GET FiT initiative, including the possibility of tapping into bond markets, backed up by long-term annual commitments from donor agencies. Nonetheless, this centralised approach to financing FITs is inherently more risky in terms of longevity and certainty, especially since the cycles of donor financing do not currently fit this model.

Conclusions

Many studies have concluded that RETs are a viable means to increase access to electricity in developing countries, as well as helping to reduce emissions of greenhouse gases. Yet it is not always obvious how to reconcile a desired expansion of access to affordable electricity with an increase in the installed capacity of RETs that generally have higher per kWh up-front capital costs than fossil fuel generation. Nevertheless, when combined with grid expansion (and possibly mini-grids), FIT-backed renewable energy can also achieve co-benefits by facilitating wider investment in rural areas, e.g. with community electrification and generation programmes. This requires FITs to be implemented in conjunction with other rural development programmes. However, implementing a FIT alone does not guarantee that investments in renewable energy projects will follow, and it is important to remember that their success in many OECD countries has also been bolstered by other financial support mechanisms.

Further, FITs should be regarded as just one element in wider efforts to create an 'enabling framework' for investment in renewable energy, albeit a central element and one that can go a long way in helping to 'de-risk' RE projects in both developed and developing countries. However, in understanding the relative success of FITs the devil lies in the detail. There exist a wide variety of FITs across countries, all of which have a specific set of national circumstances. Good, location-specific design and implementation is key.

Although FITs aim to reduce economic barriers and create a level playing field for a variety of electricity generation technologies, they are ultimately an expression of political will and, as a form of price-setting regulation, cannot easily keep pace with technological progress or reflect cost reductions. This process requires regular monitoring in order to control costs, maintain industry stability, keep CO2 reductions and RE expansion targets on track, and maintain and enhance public support. The growth of a national RE industry and the creation of new business and job opportunities will inevitably bolster this support. Alternatively, countries can opt for tenders for a specific capacity volume, which imposes a ceiling and floor price for RE generation, thus creating a hybrid incentive mechanism that blends a price target with a quantity objective. This kind of performance-based incentive is similarly effective as FITs and appeals to countries with different economic models and cultures, e.g. Chile with its strict market orientation.

By providing fixed income support for RE generation, FITs will always be the target of free-market critics eager to brand such interventions 'inefficient and expensive'. However, this accusation is often unfounded and/or exaggerated and fails to appreciate the far larger costs associated with conventional energy systems. For example, little or no mainstream recognition is generally given to the higher external (non-market) costs of conventional fossil-fuel electricity generation, principally their CO2 emissions, contribution to air pollution and the simple fact that they are finite resources.

While the electricity sector in many countries is no longer in receipt of direct subsidies following a wave of privatization and liberalization policies (promoted, in the case of developing countries, by the IFIs during the 1990s and 2000s), the value of historical state subsidies, direct and indirect, provided to conventional fossil fuel-based and nuclear electricity generation runs into hundreds of billions of dollars – a history that has helped ensure the current low prices through technological development.

In conclusion, FITs can help investors overcome some of the strictly financial barriers to investing in RE projects. However, for effective scaling-up of investment in RE, there also needs to be concerted efforts to overcome the non-financial barriers, including low levels of stakeholder participation in decision-making processes and community ownership of individual projects. Although it is unwise to generalise, a particular risk in implementing a FIT in developing countries is that utility prices, including energy, are an easy target for political manipulation by governments keen to be seen as tackling poverty and providing politically popular welfare benefits. Even if strong and stable political support is provided for FITs, they may fall victim to cut-backs at times of economic constraint, as has happened in various OECD countries, including the UK, Spain and Italy.

On the plus side, FITs are conceptually simple and democratic, which makes them an appealing policy tool to help create a viable enabling framework for significant investment in renewable energy. While they have had most experience and success in developed countries, FITs can be considered by governments and NGOs in less developed countries where there is plenty of scope to innovate and adapt the basic elements of tariff support to suit local circumstances. However, in order to optimise the broader development benefits resulting from the scaling up of RETs, coupled with reduced environmental impacts, due consideration should be given right at the planning stage to institutional capacity and resource and impact assessments.

UNEP in support of feed-in tariffs

FITs are the most commonly used, yet only one out of many policy tools available to increase renewable energy deployment, and if chosen, should complement and support existing energy policy portfolios. Lessons drawn from existing FIT frameworks in mostly developed but also in some developing countries can help address the knowledge gaps in developing countries. Thus, the United Nations Environment Programme (UNEP) has initiated a project on the design and implementation of FITs in developing countries, as part of its broader remit to promote low-carbon growth and in the context of transition towards a green economy. The project has started, with the first activity being a study to improve understanding of the factors that determine the success or failure of FIT policies in developing countries, with a view to providing during a subsequent phase targeted advice and capacity building to countries that either plan to introduce a FIT or reform existing ones. Outputs of this work will include a 'Law Drafters Guide', intended to guide policy makers though the essential and optional elements involved in designing regulatory instruments for the effective introduction of an FIT, as well as a detailed study on the available financing options, and their economic impacts, for developing countries.

For more details, please contact Martina Otto: Martina.Otto@unep.org

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Endnotes

i. FITs should be distinguished from net-metering policies, which allow for usually small-scale generators of RE electricity to consume their energy on site, while remaining customers are connected to the grid. Although net-metering policies enable generators to supply the grid when their supply exceeds demand, the price paid for this electricity is normally equal to the market spot rate, i.e. unsubsidized and sometimes even zero.

ii. However, according to the Germany Ministry of Environment (BMU), the cost of FIT support is rising rapidly in Germany, largely due to the explosion of growth in higher-cost Solar PV installations. BMU estimates that the average cost of FITs will be more than 10 EUR per household per month (equivalent to 14% of the bill) in 2011. (Reference: BMU, April 2011, 'what effect does the promotion of renewable energies have on the domestic price of electricity?' (Welche Wirkung hat die Förderung der erneuerbaren Energien auf den Haushalts-Strompreis?). www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/hintergrund_ee_umlage_bf.pdf

iii. This conclusion has been reached by a number of authoritative studies, including the 2006 Stern Review into the economics of climate change mitigation. Stern reports that 'comparisons between deployment support through tradable quotas and feed-in tariff price support suggest that feed-in mechanisms achieve larger deployment at lower costs.'

iv. At almost 17,000 MW, Germany's installed solar PV generation capacity accounted for more than 50% of the global total in 2010, most of which is grid-connected.

v. NIMBY: 'Not In My Back Yard'

vi. However, in the case of South Africa, the key barrier to the success of FIT is that Eskom (the state-owned electricity utility) is the sole buyer of electricity and has no obligation to buy FIT-supported renewable electricity (Pegels, 2009)

vii. Examples of low-cost RE projects could include those identified by the Poverty Alleviation through Cleaner Energy from Agro-industries in Africa (PACEAA) project in East Africa. Funded by the European Commission's COOPENER programme, the project addressed the issue of rural electrification as a means of alleviating poverty, in particular by using electricity from agro-industries. www.paceaa.org/

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