Feed-in-Tariffs vs Feed-in-Premium Policies

Excerpt from NREL Technical Report *"A Policymaker's Guide to Feed-in Tariff Policy Design"*, July 2010, http://www.nrel.gov/docs/fy10osti/44849.pdf

FIT Policy Definition

A feed-in tariff (FIT) is an energy supply policy focused on supporting the development of new renewable energy projects by offering long-term purchase agreements for the sale of RE electricity. These purchase agreements are typically offered within contracts ranging from 10-25 years and are extended for every kilowatt-hour of electricity produced. The payment levels offered for each kilowatt-hour can be differentiated by technology type, project size, resource quality, and project location to better reflect actual project costs. Policy designers can also adjust the payment levels to decline for installations in subsequent years, which will both track and encourage technological change. In an alternative approach, FIT payments can be offered as a premium, or bonus, above the prevailing market price.

Successful feed-in tariff policies typically include three key provisions: (1) guaranteed access to the grid; (2) stable, long-term purchase agreements (typically, 15-20 years); and (3) payment levels based on the costs of RE generation. In countries such as Germany, policies include streamlined administrative procedures to shorten lead times, reduce bureaucratic overhead, minimize project costs, and accelerate the pace of RE deployment. In addition, eligibility is typically extended to anyone with the ability to invest, including but not limited to homeowners; business owners; federal, state, and local government agencies; private investors; utilities and nonprofit organizations.

FIT Payment Calculation Methodology

One of the most fundamental design challenges for a FIT policymaker is how to determine the actual FIT payments awarded to project developers for the electricity they produce. A worldwide overview of FIT policies reveals that a variety of approaches are used, which reflects diversity in the policy goals. These different approaches can be divided into four basic categories.

(1) Based on the actual levelized cost of renewable energy generation. This approach is the most commonly used in the EU, and has been the most successful at driving RE development around the world.
(2) Based on the "value" of renewable energy generation either to society, or to the utility, generally expressed in terms of "avoided costs." This approach is used in California, as well as in British Columbia.

(3) Offered as a fixed-price incentive without regard to levelized RE generation costs or avoided costs. This approach is used by certain utilities in the U.S.
(4) Based on the results of an auction or bidding process, which can help inform price discovery by appealing to the market directly. An auction-based mechanism can be applied and differentiated based on different technologies, project sizes, etc. and is a variant on the cost-based approach.

Advantages and Disadvantages of FIT Policies

The arguments in favour of a FIT policy are primarily economic in nature. These include the ability to:

- offer a **secure and stable market for investors**
- stimulate significant and quantifiable **growth of local industry and job creation**
- **only cost money if projects actually operate**
- can secure the **fixed-price benefits** of RE generation for the utility's customers by acting as a hedge against volatility
- distribute **costs and development benefits** equitably across geographic areas
- **settle uncertainties related to grid access and interconnection**
- **enhance market access** for investors and participants.

Other benefits are that FIT policies:

- have a measurable **impact on RE generation and capacity**
- tailor the policies using a range of design elements that will **achieve a wide range of policy goals**
- **encourage technologies at different stages of maturity,** including emerging technologies
- customize the policy to **support various market conditions,** including regulated and competitive electricity markets
- do not constrain the timing of project development through rigid solicitation schedules
- are **compatible with RPS (Renewable Portfolio Standards) mandates**
- **can help utilities meet their RPS mandates**
- can provide a purchase price to renewable energy generators that is **not linked to avoided costs**
- demonstrate a flexible project-specific design that allows for adjustments to ensure **high levels of cost efficiency and effectiveness**.

A number of the arguments against FIT policies are largely economic in nature although they are not always proven in practice:

- FITs can lead to **near-term upward pressure on electricity prices,** particularly if they lead to rapid growth in emerging (i.e., higher-cost) RE technologies
- FITs may **distort wholesale electricity market prices**

- **FITs do not directly address the high up-front costs of RE technologies** – instead, they are generally designed to offer stable revenue streams over a period of 15-25 years, which enables the high up-front costs to be amortized over time
- **FITs are not "market-oriented,"** primarily because FITs often involve must-take provisions for the electricity generated, and the payment levels offered are frequently independent from market price signals
- Due to the fact that RE investments are generally limited to citizens with disposable (i.e., investable) income, as well as with property on which to install RE systems, **FITs may exclude lower-income individuals from participating**. Because these individuals are generally required to share the cost burden via higher bills, this can create or exacerbate social inequity. *(This can be resolved by 100% financing by Banks for small residential systems, as is the case of Greece).*
- It may be **difficult to control overall policy costs** under FIT policies, because it is difficult to predict the rate of market uptake without intermediate caps or capacity-based degression.
- FITs **do not encourage direct price competition between project developers.**
- It can be **challenging to incorporate FITs within existing policy frameworks and regulatory environments**.

It can be **difficult to equitably share costs** across ratepayer classes, as well as between different geographic areas. In addition to these economic issues, there could be other limitations due to the political requirements for successful FIT policy implementation. For example:

- FITs accompanied by guaranteed grid interconnection, regardless of where projects are located on the grid, could lead to **less-than-optimal project siting**, and thus impact grid reliability, while not using existing transmission effectively.
- **FITs require an up-front and continuous administrative commitment** to set the payments accurately. If the FIT payments are set too high, they could result in a higher overall policy cost; and if too low, it could result in little or no new RE generation.
- FITs have been shown to function best when **a long-term policy commitment** is made to renewable energy development; if this commitment is absent, start-and-stop policy implementation could hinder policy success.
- As a result of rapid technology and cost changes within the RE industry, policymakers may be **tempted to over-exercise the flexible nature of the FIT policy**. If these amendments are too sudden and/or too large, they could directly decrease the stability (and hence attractiveness) of the renewable energy market for potential investors.
- As FIT policies are created to promote growth and expansion of RE technologies, it is possible that RE industries could **develop a reliance on the policy**.

FIT Payment Structure

A central element of FIT policy design is determining the payment structure. While early FIT policies in Europe determined the FIT payment levels as a percentage of prevailing retail rates, both fixed-price and premium price policies structures are more common today.

Percentage of Retail Price Policies

The first national feed-in tariffs to make significant impacts in Europe were based on providing RE developers a FIT payment that was a percentage (usually less than 100%) of the retail price, shown in Figure 1. As mentioned, this structure is no longer in use today.

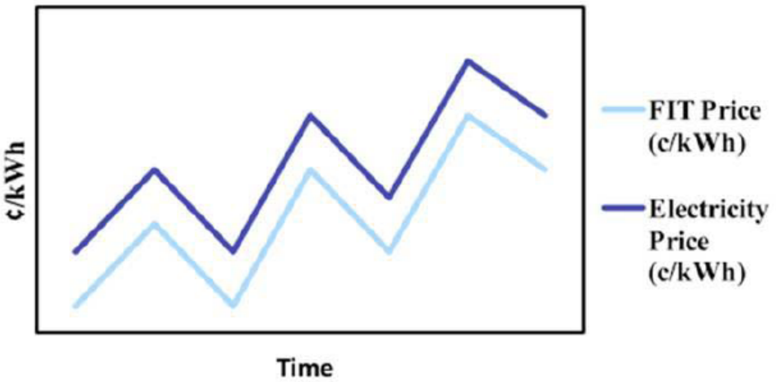

Fig. 1: Percentage of retail-price FIT model

Description of Fixed-Price FIT Design and Premium FIT Design

The main FIT payment level design choice is whether the payment level is tied to fluctuations in the actual market price of electricity. Therefore, FIT policies can be categorized as either independent or dependent from the market price. The majority of countries with FITs currently choose the market-independent, fixed-price approach.

Figure 2 illustrates a fixed-price FIT policy. In this policy design, the payment levels remain independent from the market price, offering a guaranteed payment for a pre-determined period of time. As described below, a number of adjustments can be made to this basic fixed price to track inflation, adjust for cost reductions, encourage certain choices and behaviours, and address other factors.

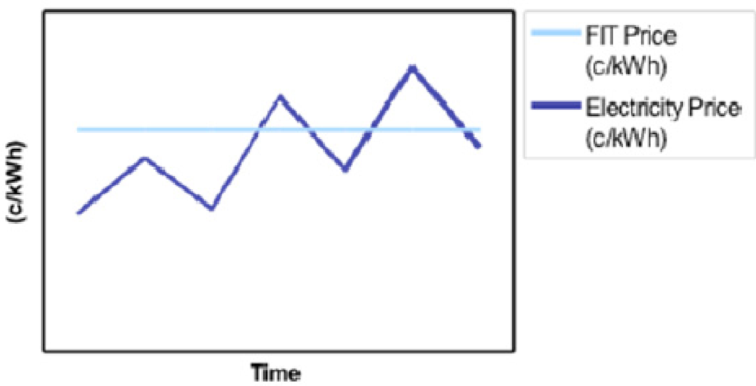

Fig. 2: Fixed-price FIT model

The second option for FIT policy design (shown in Figure 3) is the premium-price option, which offers a premium on top of the spot market electricity price. This achieves one of two objectives: 1) to explicitly account for the environmental and societal attributes of RE, or 2) to help approximate RE generation costs. In this market-dependent model, the payment level is directly tied to the electricity market price, rewarding RE developers when market prices increase, and potentially penalizing them when they drop.

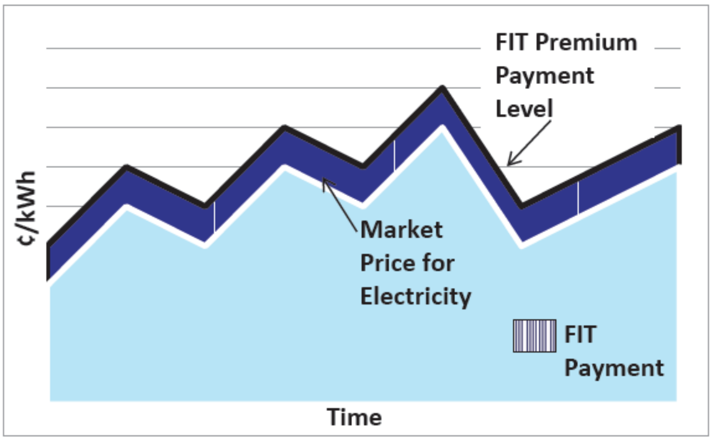

Fig. 3: Premium-price FIT model

Fixed-Price FIT Payment Models

Fixed-price feed-in tariff policies are the most widely implemented of all FIT policy designs. They are used in more than 50 countries around the world, including Greece, Germany, France, Switzerland, and Canada. **Based on experience in these countries, fixed-price FIT payments have demonstrated a higher level of cost efficiency compared to premium price FIT payments; and have created, on average, lower risk and more transparent market conditions for RE development**.

Fixed-price feed-in tariff policies can be differentiated in several ways, which explains why they are sometimes described as employing a “stepped” or “tiered” design. In some instances, the considerations that apply to the fixed-price FIT design are different from those that apply to the premium-price designs.

There are four key elements of the **project-specific tariff design:**
a) the type of technology and/or fuel used,
b) the size of the installation (total capacity),
c) the quality of the resource at the particular site, and
d) the value of generation to the market or utility, based on the particular project location.

Second, there are a number of **ancillary design elements:**
a) predetermined tariff degression
b) responsive tariff degression
c) annual inflation adjustment,

d) front-end loading (i.e., higher tariffs initially, lower tariffs later on),
e) time of delivery (coincidence with demand to encourage peak shaving).

Third, there are the **bonus payment options**, each designed to target specific goals and encourage certain types of choices and behaviours on the part of the RE developer:
a) high-efficiency systems (e.g., CHP),
b) use of particular waste streams,
c) repowering (i.e., replacing older wind turbine models, or hydro sites, with newer, larger or more efficient ones.)
d) specific ownership structures (e.g., community-owned),
e) use of innovative technologies, and
f) vintage of installation (where a bonus is awarded if a project is installed before a certain date).

Premium-Price FIT Payment Policies

Premium-price FIT policies offer a premium above the average spot electricity market price, which distinguishes them from the fixed-price FIT payment structure. Fixed-price FIT payments are independent of market prices; however, for premium-price FIT payments, either the premium or the total payment is dependent on the market price for electricity.

The premium payment can be designed to achieve two objectives:

1) to represent the environmental and/or societal attributes of RE generation, or

2) to better approximate RE generation costs. In the premium-price approach, electricity generated from RE sources is typically sold on the spot market, and producers receive a FIT premium above the market price. This is in contrast to the fixed-price approach, where a purchase guarantee is typically included and keeps the RE generation separate from spot market dynamics.

Premium-price FIT policies have been offered in Spain, the Czech Republic, Estonia, Slovenia, the Netherlands, as well as Denmark for onshore wind energy. Some areas offer both a fixed- and premium-price option, which provides a choice for electricity producers. Spain, Slovenia, Estonia, and the Czech Republic have offered a premium-price option. In Spain, the choice was valid for one year, after which the operator should decide which payment option they would like for the following year. **More European countries choose fixed-price policies over premium-price FIT payments.**

Similar to the fixed-price FIT policies, premium-price FITs can be differentiated to allow for a more cost-based payment level for each technology type, fuel type, and project size. Many of the design choices can apply, in a slightly modified way, to premium-price FIT payments. However, because the total revenues of the project are dependent not only on the FIT premium but also on the market price of electricity, different considerations apply. First, **the FIT premiums can be constant or sliding**. Constant premium policies typically provide a “constant” (i.e., non-variable) adder on top of the spot market price. In this design, the bonus rides on top of the market price and remains unresponsive to changes over time and continues to be offered even if electricity prices increase. In several sources, these premium payments are called “fixed-premium” FIT policies. The term “constant” is used here to avoid confusion with the term “fixed-price FIT policies,” where the total payment is fixed over the life of the contract (instead of just the increment above the spot market). Certain jurisdictions have introduced sliding premium designs to address some of the challenges with the constant premium design. In this approach, the FIT premium varies with the market price. FIT policy designers can also introduce payment “caps” and payment “floors” on either the total premium amount or on the total payment amount. If market prices increase, the policy can respond through the sliding premium option, which will potentially help minimize overall policy costs by providing a more cost-based payment structure.

Description of Constant Premium-Price FIT Policies

There are several ways to determine the premium FIT payment. The first structure examined here defines the premium as a constant, predetermined adder on top of the spot market.

Between 1998 and 2004, Spain offered RE developers a choice between a long-term fixed FIT payment and a constant premium FIT payment (i.e., above the spot market price). Spain discontinued this option in 2004 to make room for a new FIT policy structure in which both were defined as a percentage of the prevailing market price. The Czech Republic also offered the option of both a fixed-price FIT and a constant premium-price option. In this case, the payment levels offer higher payments under the premium-price FIT payment option, which encourages participation in the spot market. Slovenia also offered both a fixed-price and a constant premium price option, but the payment level was designed to be approximately the same under both. RE developers could also sell a portion of their electricity under the fixed option, and the rest on the open market.

Constant premium-price FIT policies create an incentive to generate electricity in times of high demand and when market prices are high. The high spot prices, combined with a fixed adder on top, tend to encourage supply when it is needed most. The prospect of higher payments (the upside potential) may be understood as a compensation for the added market risk. However, because a constant premium is added to the spot market price, the incremental payment remains agnostic to spot market prices. This can result in higher average payment levels when electricity prices increase, which puts upward pressure on overall policy costs. This is confirmed in an analysis of constant premium-price FIT policies, where payment levels average 1-3 cents/kWh higher than those under fixed-price FIT policies. In addition, the constant-premium model does not consider that electricity prices can decline suddenly as well, which causes projects with high up-front capital costs to struggle with revenues insufficient to cover project costs. This can significantly increase the risks of the FIT policy framework to the project developer. This uncertainty over future revenue streams creates an additional risk for the investor, who is likely to increase the required equity returns and potentially the debt interest rates, which increases the marginal costs of RE deployment.

Description of Sliding Premium-Price FIT Payments

In response to the potential problems created by the constant-premium approach, certain jurisdictions allow the FIT premium payments to vary based on market price. In this approach, as the market price increases, the premium amount can be designed to decline (and vice versa) to minimize windfall profits. There are four examples of sliding premium-price FIT policies:

Sliding Premium-Price FIT Payments: Caps and Floors on the Total Premium Amount

In its Royal Decree 661/2007, Spain introduced a sliding premium option that included both a payment cap and a payment floor on the *premium amount* (in €/MWh). With this sliding premium FIT policy, Spain hoped to mitigate problems experienced with its previous FIT policy, where both the fixed FITs and the premium FITs were tied directly to the spot market price. The old approach led to rapidly increasing policy costs when marginal electricity generation costs increased unexpectedly.

The Spanish FIT, which introduced a range within which the premium varies, is **applicable to all technologies except solar PV (which is only offered the fixed-price option)**. In this new approach, if average electricity market prices increase, the premium paid begins to decline. A floor price is provided, below which the combined revenues of the premium price and the market price cannot drop – this provides added investment security. In this way, the premium slides between an upper and a lower range in response to changes in the spot market price. Figure 4 illustrates Spain's FIT premium payment levels for onshore wind in 2008. This floor price was set at €73.66/MWh, which means that if electricity market prices drop below that level, the premium amount must increase to ensure that minimum payment level. As the electricity "pool" price increases, the premium amount declines until the average electricity market price rises above €87.79/MWh. At this point, the premium offered falls to zero and RE developers receive the spot market price.

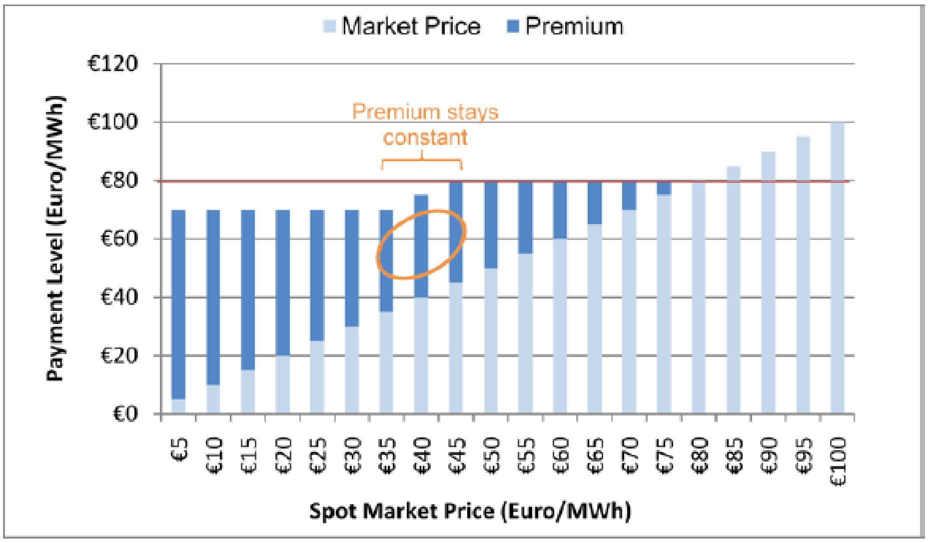

Fig 4: Spanish sliding FIT for offshore wind with a cap and floor on the total premium amount

Sliding Premium-Price FIT Payments: Caps and Floors on the Total Payment Amount

An alternative approach to introducing a cap and a floor on the total *premium* amount (€/MWh) is to do the same for the entire allowable *payment* amount (€/MWh). This provides a way of limiting the total FIT payment, while still allowing it to vary within a range sufficient to allow profitability. For a short time in 2003 and 2004, Denmark used a cap on the total payment amount for onshore wind. A premium was offered to plants that were connected to the grid after December 31, 2002, which decreased based on market price so that the sum of the market price and the premium did not exceed €0.0483/kWh. This made the policy effectively a sliding premium policy with a cap on the total allowable payment amount. In 2005, this cap was abolished and the policy reverted to a premium structure in which operators received a constant premium of €0.0134/kWh.

Sliding Premium-Price FIT Payments: Spot Market Gap Model

The spot market gap model represents a different approach to implementing a sliding premium FIT policy. This model offers a total guaranteed payment level (which can be differentiated by technology and size of project), similar to the fixed-FIT design examined above. This provides revenue certainty for the RE developer and associated investors. However, instead of having the FIT payment cover the total amount, the sliding FIT payment only covers the difference between the guaranteed payment level and the average spot market price (Figure 5). This means that the premium payment varies based on the prevailing electricity price. Unlike other premium-price policies, RE developers receive a guaranteed total price for their output. The Netherlands and Switzerland used a variation of this model.

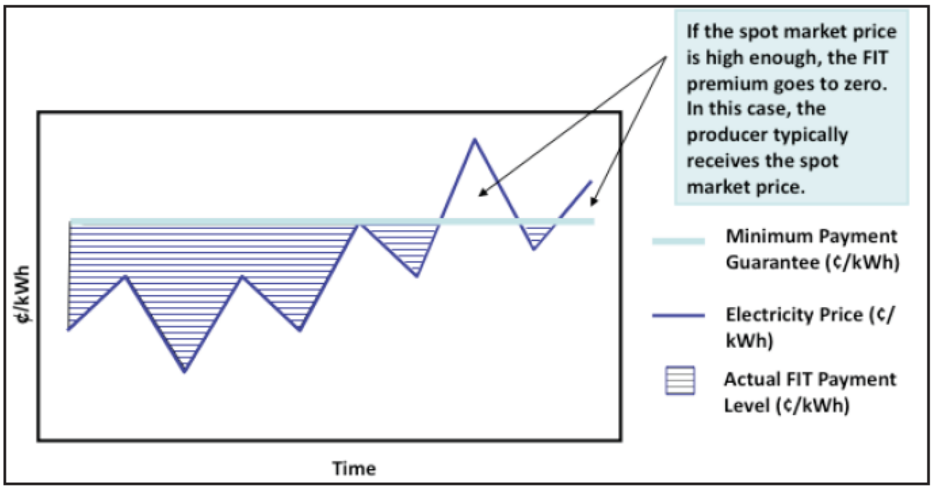

Fig. 5: Spot market gap model

Sliding Premium-Price FIT Payments: Percentage-Based Premium-Price FIT Model

Under Spain's RD 436/2004, both the fixed-price FITs and the premium-price FITs were defined as a percentage of the spot market price. This meant that the actual FIT payments could increase and decrease suddenly in response to market price trends. For solar thermal power projects, for example, the premium was established at 300% of the spot price during the course of a 25-year contract. Spain abandoned this policy in 2006 and introduced a new sliding premium FIT policy in 2007.

When the premium is added as a predetermined constant quantity, it could result in overpayment if electricity market prices increase significantly. This could have the undesirable consequence of higher FIT payment levels, while leading to higher overall costs for society because the total FIT payment is higher than is needed to be to drive investment. There is also the risk that electricity prices drop, which could undermine the profitability of existing

projects. Detailed EU analyses suggest that constant premium-price policies, therefore, may be less cost-efficient than the basic fixed-price model, partly because of added investor risks.

Sliding-premium FIT policies address some of these challenges. First, by allowing the premium amount to vary based on market price, they reduce the chances of overcompensation. In addition, where caps and floors are introduced, they can be designed to reduce both the upside and downside price risks by providing a guaranteed minimum range within which the FIT payments will fluctuate. This reduces the possibility of wide divergences between FIT payment levels and actual generation costs, which improves cost efficiency. Third, because FIT payments still respond to market prices under sliding-premium structures, they retain the market orientation of the premium-price designs, which offer proportionally higher payments if electricity prices increase. This can help retain the incentive to produce electricity in times of high demand, while removing the artificial separation between RE and conventional electricity within electricity markets. The sliding-premium model enables the first portion of the total payment to be determined by the spot market price, while awarding a sliding payment to make up the difference and ensure project profitability. This means that RE electricity is still sold on the spot market, rather than in the context of separate, fixed-price purchase guarantees. This has been touted as one way of furthering the "integration" of RE electricity into conventional electricity markets and may prove increasingly important as the share of renewable energy increases in proportion to conventional electricity generation. While a sliding premium-price FIT introduces increased complexity, it can help avoid some of the pitfalls of having a constant adder on top of a volatile electricity market price.

FIT Premium-Price Differentiation

Similar to fixed-price feed-in tariff policies, it is possible to differentiate the premium amount to better reflect RE generation costs. The differentiation of premiums is arguably as important as the differentiation of the tariff levels in the fixed-price option. It allows the total expected payment amount to better approximate the actual levelized costs of developing the technology, while still retaining the market orientation. By differentiating the premium amount, countries using premium policies can differentiate the payment level awarded per kilowatt-hour with greater accuracy, even though it is unlikely that the actual payment levels will match the generation costs as closely as the fixed-price option.

Evaluation of Fixed-price vs. Premium Price FIT Policies

The two dominant ways to structure FIT policy payments are as fixed, long-term prices (which may or may not be indexed to inflation) and premium prices, which are offered as a bonus above market prices.

Fixed-Price FIT Policy Advantages and Challenges

This section explores the advantages and disadvantages of fixed-price FITs; it is followed by a similar analysis that explores premium-price FIT designs.

1. **Remove price risk.** Detailed analyses of average payment levels for a number of FIT policies in the EU have shown that **fixed-price FIT policies have demonstrated, on average, a higher degree of cost efficiency than premium-price designs - this leads to lower per-kWh payments for renewable energy. The stability of the long-term fixed-price payments involves lower risks for both RE project developers and investors, and is therefore likely to lower the costs of financing. Understood in this way, fixed-price FIT policies are a way of removing price risk, which can lower the per-kWh costs of RE deployment**.

2. **Better approximate actual project costs.** Fixed-price FITs are likely to better approximate actual RE generation costs if the FIT prices are established appropriately. This cost-based payment structure is likely to encourage more investment in RE projects, due to be better targeting of actual project costs.

3. **Reduce market risk.** Fixed-price FITs are typically accompanied by a purchase guarantee, which further reduces market risk. The guarantee that a reliable counterparty will purchase the electricity reduces risks by providing greater revenue certainty.

4. **Hedge against electricity price volatility.** Fixed-price FITs can more effectively act as a hedge against energy and electricity price volatility by introducing fixed-price supply into the electricity supply mix. This effect can help reduce wholesale electricity prices at times when the cost of RE supply is lower than the marginal cost of conventional supply. Therefore, **by having a portfolio of electricity generation that includes fixed-price renewable energy resources, a jurisdiction can protect ratepayers through reduced exposure to energy price volatility**. This is likely to be particularly important in electricity markets where a substantial share of generation comes from natural gas.

5. **Encourage distributed RE generation.** Fixed-price FITs are likely to encourage smaller RE project developers to develop distributed RE generation. Homeowners and community groups are likely to prefer the stability and reliability of fixed-price policies because of the transparency of the revenue streams they generate. This transparency makes financial calculations easier and could encourage a larger diversity of participants (including residents and municipalities) to invest. By allowing more local residents to invest in RE generation, more of the economic benefits are retained within the communities where the electricity is generated – this can have positive economic multiplier effects.

6. **Support emerging technologies.** Finally, fixed-price policies may also benefit emerging technologies by offering stability through guaranteed minimum prices. This approach also attracts investors during the commercialization and deployment phase. These advantages create a lower-risk environment for both RE developers and investors, which puts downward pressure on the rate of return requirements and the subsequent cost of capital. Taken together, these factors can ultimately help lower overall RE project costs.

In spite of these advantages, fixed-price FIT policies have in theory some disadvantages.

1. **Unresponsive to market prices.** Fixed-price FIT policies typically do not adjust in response to the market price of electricity. The prices are locked in, often in long-term contracts, and typically

do not create an incentive for project operators to adjust their production according to demand. Certain countries have addressed this issue by adjusting the tariff amount based on the time of day or season.

2. **Distort electricity markets.** It has been argued that fixed-price FIT policies, which offer long-term fixed-price contracts for electricity sales, may distort wholesale and retail electricity markets.

3. **High public cost.** Fixed-price payments could lead to high costs for society in the long term, particularly if they are targeted at higher cost RE technologies and structured with full (i.e., 100%) inflation adjustment over 20 to 25 years.

4. **Little incentive to optimize project location.** Unless tariffs are differentiated by project location, it is possible that fixed-price policies will fail to create an incentive for developing electrical resources where they are needed most. In particular, fixed-priced FIT policies that guarantee grid interconnection may not provide the incentive to develop in high-load or congested areas, where spot market prices tend to be higher, or alternatively, where the marginal value of new generation is highest.

Premium-Price FIT Policy Advantages and Disadvantages

Premium-price policies have several advantages that are not captured by the fixed-price approach.

1. **Better for optimizing market participation.** Premium-price FIT policies are arguably more “market-oriented” than fixed-price designs because the FIT payments are dependent on the prevailing electricity price. As a consequence, this structure can create incentives to produce electricity in times of high demand and to install new generation in areas with higher average market prices because of locational pricing structures.

2. **Target more efficient grid management.** Second, this market orientation could help alleviate pre-existing stresses on the grid, which could lead to more efficient grid management and a better provision of ancillary services.

3. **More compatible with deregulated generation markets.** Premium-price FIT policies arguably demonstrate a higher degree of compatibility with deregulated (or liberalized) electricity generation markets, by allowing both renewable and conventional generation to be sold directly on the spot market.

4. **Encourage competition between new generation.** Generators are typically required to market their electricity on the spot market under premium-price FIT policies, so that RE generators compete with one another and with conventional generators. Therefore, it is also argued that premium-price FIT frameworks are more likely to encourage competition among electricity producers.

In spite of these advantages, premium-price FITs also have a number of challenges.

1. **Higher average payments per kWh.** Premium-price FIT policies have demonstrated a lower degree of cost efficiency than fixed-price FITs, which results in higher average payments per kilowatt-hour. This is primarily because the premium- price option requires greater risks due to the less-predictable revenue streams. These increased risks are likely to lead to higher required returns and result in greater costs per-kWh for society, if the same levels of RE deployment are to be reached.

2. **Increased risk without a purchase guarantee.** Premium-price FIT policies do not typically include a purchase guarantee. Those participating in the premium option sell their electricity on the spot market and receive the corresponding market price, with an added FIT premium. Investors see the absence of a purchase guarantee as an added risk in the premium option, which will tend to put further upward pressure on the required returns.

3. **Decreased emphasis on wind and solar PV.** Because most wind and solar PV projects cannot readily influence the time they supply electricity into the grid, these technologies will be less likely to benefit from a premium-price framework in which electricity is sold on the spot market (or with time-of-delivery pricing). Thus, while it may provide useful incentives for developers of hydropower, solar thermal electric, biogas, and biomass projects – for instance – wind and solar PV power are unlikely to be able to cost-effectively adapt to these market price signals by adjusting their supply.

4. **Loses the hedge value of fixed-price renewables.** Any hedge value provided by renewable energy sources against volatile and/or increasing fossil fuel prices is lost because the total payment levels increase in tandem with electricity prices under premium-price policies. This removes a valuable benefit of renewable energy generation, and fails to capitalize on the rate stabilization value that a diverse, fixed-price renewable generation portfolio can deliver. Despite these downsides, there are ways to mitigate the risks – and, therefore, reduce the costs – of premium-price FIT policies. These include introducing a payment cap and a payment floor on the total premium amounts, which Spain has done in its FIT policy. Caps and floors can also be introduced on the total allowable payment amount, which was done in Denmark. This provides flexibility within a range of electricity price variability, and limits windfall profits while protecting RE developers against unanticipated drops in spot market prices.

Premium-price FITs have higher average prices

In a series of analyses, researchers in the EU demonstrated that premium-price FITs tend to provide higher total payments than fixed-price FITs. Spain and the Czech Republic offered a choice between fixed and premium policy options. In these countries, the expected profits were incrementally higher for the premium option than the fixed-price FIT structure, ranging from an additional premium of €0.01/kWh to €0.03/kWh. The greater investor risk, compounded by the greater uncertainty over the policy costs for society, are likely to make premium FIT policies a costlier policy design choice.