Advantages and disadvantages of FEED – IN TARIFFS

- Worldwide Background and Overview

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Abstract

Feed –in tariffs (FiT) are an important and successful steering instrument to facilitate the use of renewable energies. In many countries of the world feed-in tariffs play a fundamental part to rise the commercial interest of investors concerning geothermal electricity production. In 20 EU-countries, in USA, east africa, central america, overall more than 30 countries FITs for all kinds of renewable energy support the energy change. About 15 countries created a feed-in tariff for geothermal electricity. Some countries, notably France and Germany, use a system of bonus payments or adders to encourage certain kinds of geothermal development, for example, district heating.

Successful feed-in tariffs are typically based on the "cost" to generate electricity and not on its "value". Germany uses a multiple bonus system. There has been a bonus payment for project completion before 2016, another bonus for district heating, and a third for developing Enhanced Geothermal Systems, such as hot dry rock. Germany has decided new tariffs beginning in 2012 and geothermal tariffs have increased substantially to €0.25 /kWh ($0.36/kWh).

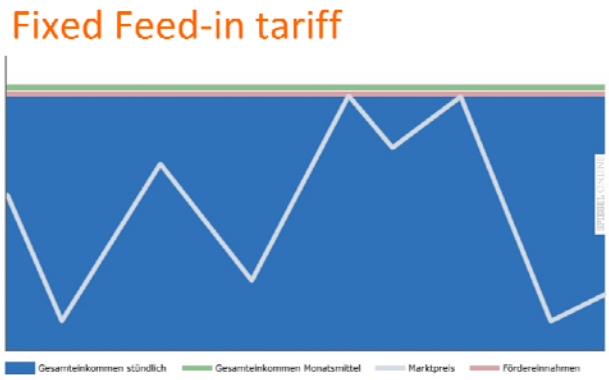
1. INTRODUCTION

Feed-in tariffs are simply payments per kilowatt-hour for electricity generated by a renewable resource. They are the world's most successful policy for the rapid development of significant amounts of renewable energy.

Feed-in tariffs are used i.e. in Germany, France, and Spain and have driven these countries to world leadership in renewable energy development. In so doing, feed-in tariffs have created hundreds of thousands of new jobs in Europe. But they are easily adaptable to all countries. There are no intrinsic limits on using them at either state, provincial, or federal level.

Feed-in tariffs work because they are more equitable than other policies. They enable everyone - including homeowners, farmers, cooperatives, and businesses large and small - to profit from renewable energy. They comprise a system of payments for each kilowatt-hour of electricity generated. The price that is paid is based on the cost of the electricity produced plus a reasonable profit for the producer. Feed-in tariffs can be implemented alongside existing renewable energy programs, such as net metering and renewable energy standards.

Table 1 Structure of Fixed Feed in Tariff



Feed-in tariffs

- Allow renewable energy generators to interconnect with the grid, and
- Specifies the amount that they are paid for their electricity,
- And specifies how long they will be paid.

Origin of Feed In Tariffs

The feed in tariff is an idea borrowed from Europe. Spain Italy and Germany all use it. In Germany there are enough wind mills and solar panel to match the capacity of the existing nuclear Powerstation and meet nearly 25% of the German energy demand. On sunny and windy Sunday mornings there is more than 100% of renewable energy in Germany so that the export of electricity from Germany is rising.

The payments are guaranteed for 20 - 25 years, they are Tax-free and index link. Feed-in tariffs are simply payments per kilowatt-hour for electricity generated by a renewable resource. In North America this simple idea is known by many different names: Electricity Feed Laws, Feed-in Laws, Feed-in Tariffs (FITs), Advanced Renewable Tariffs (ARTs), Renewable Tariffs, Renewable Energy Payments, and more recently CLEAN (for Clean Local Energy Accessible Now) contracts. Regardless of the name, they are the world's most successful policy mechanism for stimulating the rapid development of renewable energy.

Feed-in tariffs are also the most egalitarian method for determining where, when, and how much renewable generating capacity will be installed. Renewable Tariffs enable homeowners, farmers, cooperatives, and First Nations (Native North Americans) to participate on an equal footing with large commercial developers of renewable energy.

Electricity Feed Laws permit the interconnection of renewable sources of electricity with the electric-utility network and at the same time specify how much the renewable generator is paid for their electricity and over how long a period.

Electricity Feed Laws are widely used in Europe, most notably in Germany, France, and Spain. Geothermal feed-in tariffs worldwide vary from as low as $0.10/kWh for a 20-year contract in Spain to as much $0.40/kWh for a 20-year contract in Switzerland.

The secret of succesful energy policy with FIT: It is market orientated! The price of energy that is needed by an investor is calculated; this is the so called “Feed-in-tariff”. To hinder this system becoming a bottomless pit and incalculable risk for the customers or an gold mine for the investor the prices are declining, i.e. the producers are forced to produce at lower level over the years. Nobody has to control whether the targets are reached. The market does not have to be regulated. Starting in 1991 until 2005 Germany did not need a regulator. If the calculation for the tariff was right the politicians just have to control from year to year whether the prices have to be changed. This had to be done concerning the feed in tariffs for PV due to reduced production costs of solar panels.

- Priortity access to the grid for all
- Long contracts (20-25 years typical)
- Prices differentiated by technology, size, application, resource intensity
- Prices determined by cost plus profit
- Fair but not excessive profit

- Inflation protection
- Periodic Review (every 2-4 years)

Feed-in tariff (FIT) guarantees a minimum payment for each unit of electricity you generate from renewable sources. This means that anybody wishes to invest in buying and installing eligible technologies can be confident that the cost of their investment will be recovered.

Customer becomes Producer

A feed in tariff (also often referred to as a "feed-in tariff", "FiT," or "advanced renewable tariff") is a type of government policy that promotes renewable energy payments to entities that help generate renewable energy such as solar power, wind power, and geothermal power. The idea behind feed in tariffs is to eventually achieve "grid parity", which means to break the monopoly that huge energy producing companies hold on the traditional power grid in order to allow for renewable energy producers.

Under a typical feed in tariff policy, regional or national electric grid utility companies are given a government-mandated obligation to purchase renewable electricity from all eligible participants. The UK's new Feed-in Tariff Programme began in early April, 2010 and is often more well-known by the name "clean energy cash back."

Feed in tariff policies have been enacted in more than 63 nations in the world, including the UK and most of the members of the European Union. In recent years, a number of detailed analyses by the European Commission, the International Energy Agency, and others concluded that feed-in tariff regimes are generally the most efficient and effective support schemes for promoting renewable electricity.

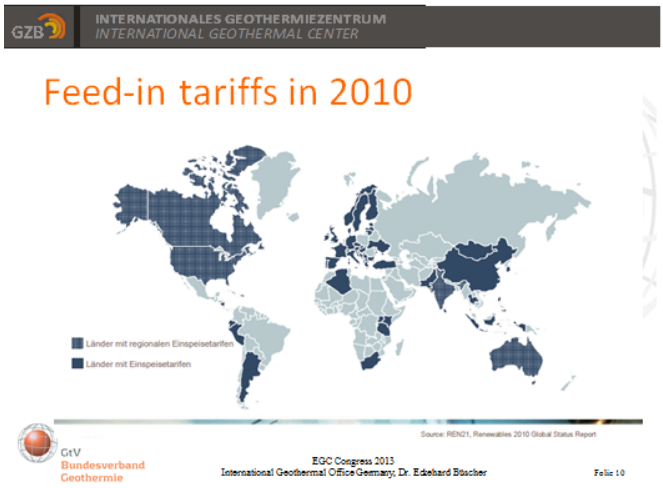
The following chapter describes countries worldwide which are increasingly turning to feed-in tariffs as a mechanism to develop geothermal energy. In the wake of the disaster at the Fukishima nuclear reactors, for example, Japan's civil society has suggested expanding the countries limited feed-in tariff to include geothermal energy.

In France, geothermal projects receive a bonus payment for using the heat content in addition to the generation of electricity. The payment rate is on a sliding scale relative to the proportion of heat used. The maximum payment of €0.08/kWh ($0.10/kWh) is on top of the base rate. Interestingly, France pays less for geothermal in its island territories where the electricity is far more valuable than in continental France.

Similarly, renewable energy advocates have proposed expanding Great Britain's new feed-in tariff program to include geothermal development. As with feed-in tariffs for solar and wind energy, most of the activity is taking place in Europe.

Italy with more than 800 MW in operation is fifth in geothermal capacity installed worldwide and its Larderello field in Tuscany is a "must see" on any renewable energy "grand tour" of Europe.

Table 2: Countries with feed-in tariffs in 2010



Italy has not chosen to emphasize new geothermal development. While Italy has an attractive feed-in tariff for geothermal, €0.20/kWh ($0.25/kWh), the tariff has been assigned to a small power ghetto along with small wind turbines. Italian policy limits the tariff for geothermal to projects less than 1 MW in size. This size limit is likely too small for any commercial projects.

On the other side of the Adriatic, Slovenia may be more attractive than Italy for generation. While Slovenia's tariff is lower, €0.15/kWh ($0.19/kWh), projects can be larger than those in Italy, up to 10 MW. Similarly, both Slovakia and France limit project size to less than 12 MW, but their tariffs are also as good as Italy's at €0.20/kWh.

Neither Switzerland nor Germany limits project size. Germany has one size tranche for geothermal: for less than 10 MW. Switzerland, on the other hand, uses four different size classes.

For projects less than 5 MW, Switzerland pays nearly €0.31/kWh ($0.39/kWh). This may be a typical project size for continental Europe outside of "hot spots" like Italy's Larderello field. For example, many of the geothermal projects under development in Germany are less than 5 MW each.

Outside of Europe, Africa and Asia has seen budding interest in using feed-in tariffs for geothermal. Taiwan recently revised its geothermal tariff to the equivalent of €0.12/kWh ($0.15/kWh).

Kenya and Uganda both have tariffs for geothermal energy, though Kenya's program doesn't offer a true feed-in tariff. The tariff in Kenya is a price ceiling rather than a minimum price. The final payment per kilowatt-hour in Kenya is negotiated.

Uganda, on the other hand, places a cap on annual geothermal development to control program costs. Geothermal development in Uganda is limited to 75 MW by 2014.

Country	Years	Tariff, EURO / kWh
Switzerland (<5 MW)	20	0.489
France		
continental	20	0.200
overseas territories & Corsica	20	0.130
Croatia	12	0.168
Germany (<5 MW)	20	0.250 (since 2012) + 0.05 technology bonus for petrothermal
Greece	20	0.150
Taiwan	20	0.117
Ecuador		
continental	15	0.098
Galapagos	15	0.108
Kenya	20	0.089
Ukraine	10	0.080
Austria	13	0.075

Table 3: Actual Geothermal Tariffs, worldwide examples

Bonus Payments

Some countries, notably France and Germany, use a system of bonus payments or adders to encourage certain kinds of geothermal development, for example, district heating.

In France, geothermal projects receive a bonus payment for using the heat content in addition to the generation of electricity. The payment rate is on a sliding scale relative to the proportion of heat used. The maximum payment of €0.08/kWh ($0.10/kWh) is on top of the base rate.

Interestingly, France pays less for geothermal in its island territories where the electricity is far more valuable than in continental France. Many of France's overseas territories are volcanically active, for example Martinique, and the cost to

develop geothermal energy is less as a high-temperature resource is close to the surface.

Future Development

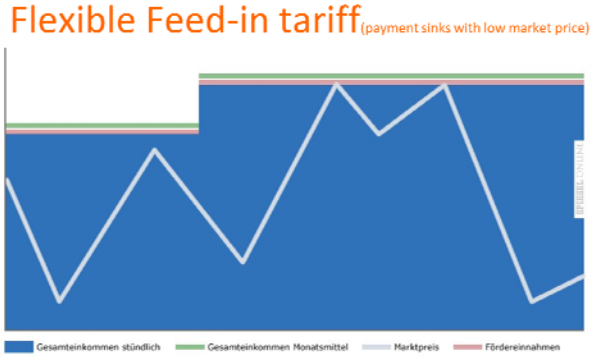
Meanwhile renewable energies and FIT are very successful in most of the countries they have been implemented. In Germany it is so successful that the contribution of renewable energies to electricity production reaches 25% in 2013. The German Feed-in law (EEG-Gesetz>) was designed for the first phase of the "Energiewende". The tasks of phase 1 were:

- to develop renewable technologies
- to reduce costs
- to accelerate the building of new power plants
- to replace nuclear power

These targets have been reached in a much shorter time period then that was expected by many experts.

Now phase 2 of the "Energiewende" begins. In Germany are intensive discussions about the future of the FIT. Main tasks are the integration of rising amounts of renewable energies in the existing network by enlarging the storage capacities and empowering some parts of the transition network.

Table 4 Possibility of flexible Feed-In Tariff



As soon as the (European) electricity market is able to handle the fluctuating feed-in from wind and solar power and enables the economical operation of renewable energies feed-in tariffs are no longer necessary in the existing form for some of the RE. But for the success of the Energiewende it is essential to develop the mix of renewable energies and to guarantee investment protection.

If and how the FIT will be affected by these next steps is heavily discussed. But as the reduction of FIT with the technical development is already included there is no need for a fundamental change of the principles.

3. CONCLUSIONS

Successful feed-in tariffs are typically based on the "cost" to generate electricity and not on its "value". Many countries made good experience with a multiple bonus system. There have been bonus payments for geothermal project completion before 2016, other boni for district heating, and a third for developing Enhanced Geothermal Systems, such as hot dry rock.

As FIT is very successful in many countries in enlarging the amount of renewable energy phase 2 with different calculation of FIT may be necessary. The new targets are the integration of the fluctuating energies like wind and PV in the network and to enlarge the storage capacities of electricity. For both targets geothermal energy will and should have a share. But these future steps are not depending on a change of the FIT. The existing idea of declining FIT depending on the year of inauguration makes cost reduction necessary and guarantees new technical developments.

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