

POTENTIAL EFFECT OF FEED-IN TARIFF ON HYDROELECTRIC DEVELOPMENT IN THE UNITED STATES

Jan Konigsberg
Hydropower Reform Coalition



December 2009

Table of Contents

I.	Background.....	1
II.	Status of FIT by State	1
	Arkansas.....	2
	California.....	2
	Florida.....	3
	Hawaii.....	3
	Indiana.....	3
	Illinois.....	3
	Maine.....	3
	Michigan.....	3
	Minnesota.....	4
	New Mexico.....	4
	Oregon.....	4
	Rhode Island.....	4
	Washington.....	5
	Wisconsin.....	5
III.	Potential for Feed-In Tariff to Incentivize Conventional Hydropower.....	5

I. Background

On July 8th, 2008, hedge fund manager T. Boone Pickens announced his intention to develop a large wind farm in his home state of Texas, but a year later Pickens decided against doing so.¹ Troubled credit markets, along with falling natural gas prices, have eliminated or stalled many renewable-energy projects. The 1973 OPEC oil embargo gave impetus to federal and state policies to spur development of indigenous energy sources, including non-hydro renewable ones.

Yet, 40 years later and despite various financial incentives, the contribution of non-hydro renewable energy sources in meeting energy demands in various sectors of the economy is still miniscule. In the electric-power sector, which is the sector where non-hydro renewables has received the greatest policy, regulatory, and programmatic attention, non-hydro renewable-energy sources supplied less than 1% of the nation's total net electricity production in 2007. As one analyst suggests:

American renewable energy policy consists of a byzantine mix of tax incentives, rebates, state mandates, and utility programs. The complexity of the system results in more difficult and costly renewable electricity generation, and hampers the ability of states and communities to maximize the benefits of their renewable energy resources.

He further observes that the United States has been missing the boat:

Evidence from Europe suggests that a simpler, more comprehensive policy achieves greater renewable energy development, but at a lower cost and with greater economic and social benefits like local ownership. It is called a feed-in tariff, a price for renewable energy high enough to attract investors without being so high it generates windfall profits. The tariff can be varied to spur new emerging technologies or to achieve social ends².

Despite the success of the European feed-in tariff (FIT), the U.S. lags: there is no U.S. federal feed-in tariff (FIT) and at present, only four states and one municipality have implemented feed-in tariffs, albeit all are significantly more restrictive than the European FIT. Feed-in-tariffs have the potential of incentivizing conventional hydroelectric development in those states where new conventional hydro is an eligible resource under the state's Renewable Energy Portfolio requirements. In addition to the states that have already adopted a FIT, other states are considering establishing a feed-in tariff.

II. Status of FIT by State⁺

Below are brief descriptions of the status of FIT legislation and programs by state.* It is presumed that hydro eligible for a feed-in tariff, must also be eligible under the state's RPS criteria, if any.

* Recently, comprehensive explications of the feed-in tariff have been published:

>Farrell, John, Feed-in Tariffs in America: Driving the Economy with Renewable Energy Policy that Works, New Rules Project, April 2009.

<http://www.newrules.org/energy/publications/feedin-tariffs-america-driving-economy-renewable-energy->

>Karllynn Cory, Toby Couture, and Claire Kreycik, Feed-in Tariff Policy: Design, Implementation, and RPS Policy Interactions, National Renewable Energy Laboratory, March 2009. <http://www.nrel.gov/docs/fy09osti/45549.pdf>

Arkansas

HB 1851, "Arkansas Renewable Energy Feed-In Act of 2009" was introduced in March 2009. The Governor, the Arkansas Public Service Commission, and the Arkansas Economic Development Commission strongly supported the bill. Utilities opposed the legislation and it died in the House Insurance and Commerce Committee by a vote of 8 to 6. Another bill will be introduced in the next session of the legislature in 2011.

HB 1851 would have authorized the PSC to establish the tariff for a period not to exceed twenty (20) years.

~Hydro 5MW or less would be eligible for the tariff.

California

In 2006, California (AB 1969) established a tariff for energy produced from eligible renewable facilities sited at wastewater and water treatment facilities with rates are based on time-of-delivery. In 2007, the California Public Utilities Commission (CPUC) expanded the eligible sites by providing for a feed-in tariff for any customer-located renewable energy system in Pacific Gas and Electric Company (PG&E) and Southern California Edison (SCE) service territory. The tariff is set at market price, based on the time-of-day. For instance, for a system producing power throughout the day, a 15-year contract signed with SCE in 2008 would earn about 15 cents per kilowatt-hour on a summer weekday, while a system generating power from 8 a.m. to 6 p.m. (such as a solar power system), would earn about 22 cents per kilowatt-hour under the same circumstances. Overall, the tariffs range from 8 to 31 cents per kilowatt-hour. Facilities earning the tariff cannot participate in other state incentive programs. Overall, the sideboards of the current FIT law have resulted in an ineffective program.

There are several FIT bills in the state legislature, among which AB 1106 (amended July 2009) appears to be the leading bill, as its sponsor is the head of the House Committee on Utilities and Commerce. AB 1106 would establish two classes of renewable energy projects based on size with two different tariff types:

- *Tier 1 tariffs for projects less than 5 MW:* the cost of generation plus profit (reasonable profit defined as the same PUC-authorized rate-of-return for electric utilities). In determining the reasonable cost of production for each technology, the commission shall consider the availability of federal and state credits or incentives. No tariff, however, can exceed \$0.30/KWh. Contracts must be for at least 25 years.
- *Tier 2 tariffs for projects 5-10 MW:* the value of the renewable generation to the system (Market Price Referent), not on the cost of generation.* Contracts would for 10-, 15-, or 20-year duration.

AB 1106 would limit the total capacity eligible for FIT to 500 MW.

~ Hydro under 1.5 MW is currently eligible; AB 1106 if passed, hydro 10 MW or less would be eligible.

> Karlynn Cory, Toby Couture, State Clean Energy Policies Analysis (SCEPA) Project: An Analysis of Renewable Energy Feed-in Tariffs in the United States, National Renewable Energy Laboratory, May 2009. <http://www.nrel.gov/docs/fy09osti/45551.pdf>

* The major reason for the ineffectiveness of California's existing feed-in tariff program has been basing the tariff on the Market Price Referent.

Florida

The Gainesville City Commission approved the municipal utility – Gainesville Regional Utilities – proposal for a feed-in tariff for solar photovoltaics, which took effect in March 2009. Participants will be guaranteed a fixed rate of \$0.32/KWh for 20 years. It is estimated that investors will see a five percent return on investment for large-scale projects. The FIT caps total annual installation at 4MW.

-Hydro is not included.

Hawaii

Since 2006, feed-in tariff bills have been introduced in the legislature but none have advanced. The leading bills would only provide a tariff for photovoltaic systems. Meanwhile, the Hawaii Public Utilities Commission has opened a docket to implement a generation cost-base FIT pursuant to an agreement signed in October 2008 between the state and the Hawaiian Electric Company.

-Hydro may be eligible under a PUC implemented FIT.

Indiana

In January 2009, HB 1622I was introduced and has not been moved out of committee. It would establish technology-specific tariffs for 20-year contracts. For hydro, the proposed tariff is:

- Capacity less than 500KW –\$0.10/KWh.
- Capacity of 500 KW but less than 10MW– \$0.085/KWh.
- Capacity of 10 MW but less than 20 MW - \$0.065.

-Hydro retrofits on existing dams only would be eligible.

Illinois

In February 2008, HB 5855 – “Illinois Renewable Energy Sources Act – provided for a feed-in tariff. In March 2008, however, it was amended to remove feed-in tariffs.

Maine

The legislature enacted LD 1075 in June 2009, which authorizes a Community-Based Renewable Energy pilot program. The six-year program implements a simple feed-in tariff for qualifying projects. The program is limited to projects with installed capacity of 10MW or less and the program is capped at 50MW of installed capacity. The law provides that the PUC establish prices based on an analysis of reasonable costs and may establish different prices for different resources or technologies and different prices by time of generation; however, the tariff cannot not exceed \$0.10/KWh.

-Hydro is eligible.

Michigan

In September 2007, the HB 5218 – “Michigan Renewable Energy Sources Act” – was introduced, but it has not moved out of committee. The bill provides for technology-specific tariffs for wind, hydropower, biomass,

landfill gas, geothermal, and solar electricity and 20-year contracts. The tariff for hydroelectric projects is further differentiated between new projects and “upgraded” projects:

- New
 - Less than 500KW – \$0.16/KWh
 - 500KW - < 2MW – \$0.11/KWh
 - 2MW -<5MW – \$0.097/KWh
- Upgraded
 - Less than 500KW – \$0.149/KWh
 - 500KW - < 2MW – \$0.11/KWh
 - 2MW -<5MW – \$0.11/KWh.

-Hydro would be eligible.

Minnesota

In February 2008, HF 3537, essentially the same as Michigan HB 5218, was introduced, but died. In 2009, HF 932 was introduced to establish feed-in tariffs for wind and solar photovoltaics only. The bill remains in committee.

-Hydro would not be eligible

New Mexico

A resolution introduced in the House in March 2009 calling for the New Mexico Legislative Council to direct the interim committee that addresses water and natural resources issues to hear testimony on feed-in tariffs did not pass.

Oregon

The governor signed HB 3039 into law in June 2009. The Oregon feed-in tariff is limited to solar photovoltaic 500KW or less, with the program is capped at 25 MW of installed capacity; contracts are 15 years. The tariff is based on the value to the grid; “value” is defined as the avoided cost plus avoided distribution cost.

~ Hydro is not eligible.

Rhode Island

In 2008 a feed-in tariff bill was introduced, but died. In June 2009, the governor signed H5002, sub (A) to establish a procurement program for wind energy. No feed-in tariff legislation is pending.

Vermont

In July 2009, the legislature enacted H. 446 establishing a feed-in tariff. The program is capped at 50 MW and eligible projects are limited to 2.2 MW or less. Contracts are for 20 years. The program differentiates tariff by technology:

- Wind – <15 kW: \$0.20/kWh; >15 kW: \$0.14/kWh.
- Landfill, biogas – \$0.12/kWh.
- Photovoltaic – \$0.30/kWh.
- Hydro – cost of generation plus profit (less applicable tax credits and other incentives).

~ Hydro is eligible.

Washington

In 2005, utilities were authorized to provide a tariff for residential, commercial, and local government projects limited to solar PV, solar thermal, wind, and anaerobic digester systems. Payments range from \$.12/kWh to \$.54/kWh, depending on the technology type, with a maximum annual payment amount per project of \$2,000. Utilities are not obligated to offer the tariff.

In January 2009, HB 1086 was introduced, which provided for specific differential rates depending upon the renewable energy source. In February, the bill was amended to delete specific rates instead require that the state Department of Community, Trade, and Economic Development make recommendations to the legislature, while the Washington Utilities and Transportation Commission will establish limitations on the number of distributed generators and total capacity of distributed generators.

~ Hydro not currently eligible, but is eligible in pending legislation.

Wisconsin

Three utilities offer FIT programs.

- WE Energy: Solar PV projects only; 10-year contracts with a tariff payment of \$0.225/kWh for systems ranging from 1.5 kW to 100 kW in capacity. The program expires on December 31, 2009, or when the 10 MW cap is reached, whichever comes first.
- Madison Gas & Electric (MGE): Solar PV projects only between 1 kW and 10 kW with a 300 kW cap on program size.
- Xcel Energy: tariffs for wind power (\$0.066/kWh) and biomass/biogas (\$0.073/kWh); other technologies eligible on case-by-case basis. 10-year contracts; program is capped at 0.25% of retail sales over the previous year.

In January 2009, the Public Service Commission of Wisconsin opened a docket to investigate 'Advanced Renewable Tariffs' (ARTs).

~ Hydro may be eligible.

III. Potential for Feed-In Tariff to Incentivize Conventional Hydropower

With 34 states implementing Renewable Energy Portfolio Standards (RPS) and a pending federal Renewable Energy Standard (RES), development of renewable-energy sources for electric power will presumably occur more rapidly than would otherwise be case. The hydropower industry believes that

state-mandated RPS will facilitate the construction of new hydropower projects, particularly retrofits to existing non-power dams. Until the imposition of state-mandated RPS, the market for new hydroelectricity was extremely limited because of its high price compared to electricity from natural gas and coal-fired generators. As currently proposed in the pending federal RES, only new, conventional hydropower that is added to existing dams will be eligible; in 24 of the 34 states with an RPS program, however, hydropower projects entailing new dams or diversions are RPS-eligible.*

Yet, it is problematic whether RPS eligibility will incentivize construction of projects requiring dams or diversions due to time and cost: Assuming that most hydropower projects will be subject to jurisdiction of the Federal Energy Regulatory Commission (FERC) under the Federal Power Act, licensing and permitting alone typically take 5-10 years to complete.⁺ Consequently, because of the time for new hydro to be brought on line and the uncertainty about project cost – project cost depends upon licensing and permitting requirements and whatever the price of materials and services several years in the future – it is likely that utilities will favor acquisition of non-hydro renewables, mainly wind and even solar-electric, not subject to FERC licensing nor requiring the extensive permitting typical of hydropower. Nonetheless, where a hydropower facility can provide firm power, utilities will regard it as a more attractive resource than solar and wind.

While state and federal renewable energy standards have established a significant market for electricity produced from renewables, the supply of renewable-based electricity is not assured. For example, when California established its RPS in 2003 it required that 20% of electricity from California's investor-owned utilities be generated from RPS-qualified renewable-energy facilities by 2010. Between 2003 and 2008, however, the percentage of RPS electricity fell from 14% to 13%.³ The major impediment to increasing the supply of renewables is project financing; without a long-term, power-purchase contract, securing financing is difficult, if not impossible. A feed-in tariff– if properly designed to ensure an adequate rate to cover costs, plus a reasonable return – will provide investors with a high degree of certainty of making a decent return on the investment. Feed-in tariffs can significantly reduce the complexity and the risks of RE project financing. Further, due to the stability and predictability of the revenue streams, investors can often obtain a larger proportion of debt financing, lowering overall financing costs.⁴ Therefore, the feed-in tariff appears to be the most efficacious instrument for ensuring the development of renewable-based electric power sources to meet RPS requirements.

Therefore, whether a feed-in tariff program will incentivize the development of hydro, depends upon the particular tariff: The cost of power from new hydro plants at the busbar is the cost of licensing and permitting, capital construction, and annual operation and maintenance, debt financing. These costs are divided by the projected total generation over the life of the hydro plant to calculate the cost/KWh. Because the costs of construction and capacity factor are site-specific the cost of power can vary dramatically from site to site. The California Public Utilities Commission estimates the range of power from new,

* Arizona, Colorado, Connecticut, Delaware, Hawaii, Iowa, Kansas, Maine, Michigan, Minnesota, Missouri, New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Oregon Pennsylvania, Rhode Island, South Dakota, Texas, Vermont, Virginia, Wisconsin. (In addition, California, Montana, Nevada, Washington allow new dams if no new appropriations or diversions are required)

⁺ If a proposed hydropower project meets the criteria for an exemption from FERC licensing, the time required to bring the project on line can be shortened. The risk in seeking a license exemption, however, is the agency-imposed conditions on project construction and operation may significantly increase the cost of construction. On balance, exemption from FERC licensing may be most attractive for hydropower retrofits on existing dams.

conventional hydro (<30MW) in the western United States to between \$0.08 - \$0.29 /KWh.^{*5} It is likely that this range would also be the case in most of the other states, other than Alaska and Hawaii. Also, presumably, the cost of retrofitting hydropower to non-power dams, while also site-specific, would not be as expensive as new construction.

Consequently, if the feed-in tariff is technology specific and calculated to cover the costs of a particular facility, plus a reasonable return, then a FIT program will definitely incentivize construction of new hydro facilities, both retrofits to non-power dams and projects requiring dams or diversions.

* Of course, the price of power – which includes a rate of return on investment along with any other costs beyond the busbar – would be higher than the cost of power.

End Notes

- ¹ DeLegge, Ron, "Is Alternative Energy Dead?" EFTguide.com, July 17, 2009.
<http://finance.yahoo.com/news/Is-Alternative-Energy-etfguide-943990564.html?x=0&.v=1>
- ² Farrell, John, *Feed-in Tariffs in America: Driving the Economy with Renewable Energy Policy that Works*, New Rules Project, April 2009. <http://www.newrules.org/energy/publications/feedin-tariffs-america-driving-economy-renewable-energy->
- ³ California Public Utilities Commission, "Renewable Portfolio Standards: Quarterly Report, " July 2009.
http://www.cpuc.ca.gov/NR/rdonlyres/EBEEB616-817C-4FF6-8C07-2604CF7DDC43/0/Third_Quarter_2009_RPS_Legislative_Report_2.pdf
- ⁴ Karlynn Cory, Toby Couture, *State Clean Energy Policies Analysis (SCEPA) Project: An Analysis of Renewable Energy Feed-in Tariffs in the United States*, National Renewable Energy Laboratory, May 2009.
<http://www.nrel.gov/docs/fy09osti/45551.pdf>
- ⁵ California Public Utilities Commission, "Greenhouse Gas Modeling, Hydro V.4," 10/25/2007
<http://www.ethree.com/GHG/20%20Hydro%20Assumptions%20v4.doc>