

# CLEAN - FIT

**Clean Local Energy Accessible Now –  
Feed In Tariff:**



**Wind**



**Biomass**



**Solar**



**Small Hydro**

**A Program to Unleash Renewable Energy  
and Create Jobs in New York State**

**February, 2012  
Prepared by Buffalo Clean Energy  
For the Atlantic Chapter of the Sierra Club**

## Cover Pictures

Wind picture taken on a Wind Action Group tour of the Lackawanna, NY *Steelwinds* project

Solar picture: <http://nbcnews.to/zPoFvB> Photo by Robert Nickelsberg/Getty Images

Biomass picture: <http://www.alternative-energy-resources.net/biomassfuel.html>

Small hydro picture: <http://bit.ly/Aoh0Qn>

## Acknowledgments

**Bill Nowak** was the principal author for this report.

Buffalo Clean Energy wishes to thank the following individuals for their helpful comments and suggestions, many of which were integrated in the report:

**Paul Gipe** author, advocate, renewable energy industry analyst and proprietor of the Wind Works website

**Annie Wilson**, Chair of the Sierra Club Atlantic Chapter Energy Committee

**David Bradley**, Engineering Committee Chair of the Wind Action Group

**Bob Ciesielski**, Chair of the Sierra Club Niagara Group

**Tom Thompson**, Past President of the New York Solar Energy Industry Association and Board member of the NY Solar Energy Society

**Larry Snider**, alternative energy advocate, Treasurer Sierra Club Niagara Group

**Diane Ciurczak**, Chair, Energy Committee, Sierra Club Niagara Group

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**Walter Simpson**, energy professional, educator and activist

**Peter Gollon**, Energy Committee Chair, Sierra Club Long Island Group

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**Angela Knisley**, Sierra Club Niagara Group

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**Ellen Banks**, Sierra Club Niagara Group Energy Committee

**Harry Delano**, Sierra Club Niagara Group Energy Committee

Any mistakes, misstatements or misconceptions, are of course the sole responsibility of Buffalo Clean Energy.

## Acronyms and Abbreviations

C\$ - Canadian dollars

CLEAN-FIT - Clean Local Energy Accessible Now - Feed-In Tariff

CTC - Competitive Transition Charge

FERC - Federal Energy Regulatory Commission

FIT - Feed-In Tariff

GW - Gigawatt - one thousand megawatts, a million kilowatts or one billion watts

IEA - International Energy Agency

kWh - Kilowatt hour

MM - million

MOE - Merit Order Effect

MW - Megawatt - one thousand kilowatts, or one million watts

Ngas - Natural Gas

NRC - Nuclear Regulatory Commission

NREL - National Renewable Energy Laboratory

NYISO - New York Independent System Operator

NYPA - New York Power Authority

NYSERDA - New York Energy Research and Development Authority

PSC - Public Service Commission

PTC - Production Tax Credit

PURPA - Public Utility Regulatory Policies Act

PV - Photovoltaic

REC - Renewable Energy Credit

RGGI - Regional Greenhouse Gas Initiative

RHI - Renewable Heat Incentive

RPS - Renewable Portfolio Standard

SBC - System Benefits Charge

SIDJA - Solar Industry Development and Jobs Act

SOC - Standard Offer Contract

SPEED - Sustainably Priced Energy Development Program (Vermont)

SREC - Solar Renewable Energy Credit

TLC - Transparency, Longevity and Certainty

TREC - Toronto Renewable Energy Cooperative

UCP - Uniform Clearing Price

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# 1. Executive Summary

Clean Local Energy Accessible Now - Feed-In Tariff (CLEAN-FIT) programs are an efficient method of maximizing both job creation and rapid renewable energy deployment. CLEAN-FIT programs provide a guarantee that a wide variety of renewable energy projects are able to feed in to the energy grid on equitable terms at a long-term price that reflects the cost of producing the energy plus a reasonable rate of return.

CLEAN-FIT programs have been used in more than 80 jurisdictions around the world and have been very effective in creating jobs manufacturing, developing and installing renewable energy technology. Examples include Germany, which has created 367,400 clean energy jobs for a population that is less than 28% of the USA's, and Ontario, Canada, which has created 20,000 jobs under a recently established CLEAN-FIT program.

CLEAN-FIT programs provide a stable investment climate that makes financing projects less complicated, less expensive, more attractive, and more available to individuals, small businesses and communities. For those reasons, CLEAN-FIT programs have a strong track record at creating demand for renewable energy projects and speeding the transition to renewable energy and away from polluting sources of energy.

New York State has adopted some progressive energy policies and, according to the NY Energy Research and Development Authority (NYSERDA), it is the most energy efficient state in the continental US.<sup>1</sup> New York has tremendous hydropower resources that give it a head start in the transition to a low carbon economy. Yet it is seriously faltering in its efforts to make that transition and risks falling farther behind other states and jurisdictions as its policies fail to keep up.

CLEAN-FIT programs have not been embraced by the political establishment in New York State. Reasons include the strength of the utility and fossil fuel industries, and a backlash against the financial impacts of the "6-cent law" (a 1980's state initiative that primarily encouraged natural gas co-generation of electricity).

In the 2012 legislative session, a strong effort will be launched in New York to pass a Solar Renewable Energy Credit (SREC) bill — a positive development, yet one that would leave New York far short of where it needs to be in the race to cut greenhouse gas emissions by switching to renewables. Labor, environmental and clean energy organizations need to stake out a position that maximizes the chance for New York to adopt a CLEAN-FIT program. Their position relative to SRECs should be one of support, qualified by maintaining space for the more comprehensive goal of adopting a CLEAN-FIT program for New York State.

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<sup>1</sup> **Patterns and trends:** *New York State Energy Profiles: 1995-2009*, NYSERDA January 2011, page 2 <http://bit.ly/w3qz81>



## 2. Introduction

There is a program that has been proven to maximize the development of renewable energy, *and create renewable energy jobs*, at the lowest cost to consumers and taxpayers.

This program was adopted in 2009 by the province of Ontario, Canada, which has created 20,000 jobs and attracted \$20 billion in renewable energy investments as of July, 2011. Ontario is on target to phase out its coal burners — a major source of greenhouse gases in the province.

This program is known worldwide by the name *feed-in-tariff* or FIT. Some organizations in the U.S. describe the same program as a CLEAN program — a more descriptive title standing for Clean Local Energy Accessible Now. We will use the term CLEAN-FIT where possible in this paper because the term tariff confuses the program with a tax.<sup>2</sup>

In fact, CLEAN-FIT programs are not funded through taxes or tax credits. This is an important distinction to make, especially in an era of crippling government budget shortfalls.

However it is referred to, it is so effective that it is being rapidly adopted throughout the world. Vermont, Rhode Island, California, Gainesville, Florida and Fort Collins, Colorado are all trying modified versions of this program. It now has been used in more than 80 jurisdictions around the world.<sup>3</sup>

Figure 1 - World % of renewables due to FITs<sup>4</sup>



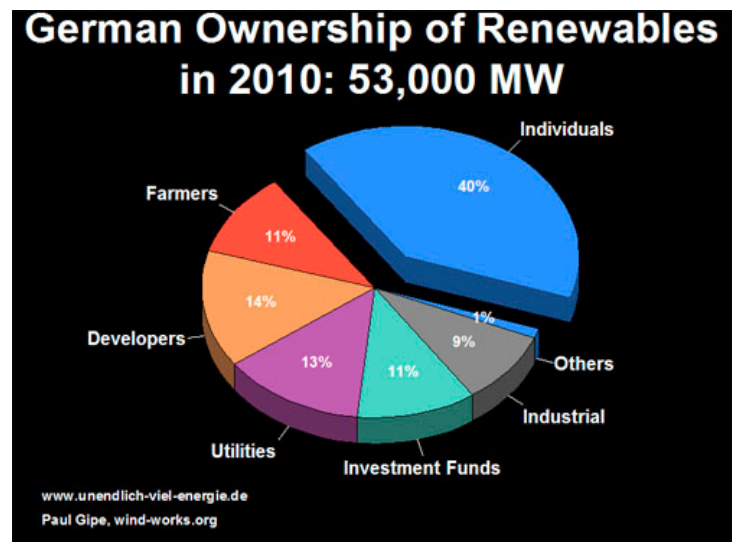
The policy was first implemented on a large scale in Germany and has resulted in Germany leading the world in renewable energy development. 367,400 green jobs have been created in Germany to date.

*"Unlike many of its European neighbors, Germany has emerged from the recent recession with a robust economy, thanks in large part to flourishing exports. Germany has a dominant market share in various green technologies as well as a substantial part of its workforce employed in the environmental sector. Meanwhile, greenhouse gas emissions have fallen in absolute terms, effectively decoupling economic growth from Germany's environmental footprint."*<sup>5</sup>

In the wake of Japan's Fukushima nuclear disaster, Germany has pledged to rid itself of nuclear power, and is using this program to achieve that goal.

One of the key features of the German program is that its simplicity, transparency and accessibility make it easy for individuals, farmers and community organizations to take an ownership role in renewable energy development.

Figure 2 - Ownership of Renewables in Germany<sup>6</sup>



<sup>2</sup> In the U.S., tariff has 2 definitions. The first is "A tax imposed on a product when it is imported into a country". <http://www.investorwords.com/4877/tariff.html> The second is "a schedule of rates or charges of a business or a public utility" <http://bit.ly/xAYjVs>

<sup>3</sup> Wind Works website at <http://bit.ly/A5PPxd> and Renewables 2011 Global Status Report Renewable Energy Policy Network for the 21st Century, page 52 <http://bit.ly/xkBgaD>

<sup>4</sup> Bringing the Renewable Energy Revolution Back Home with the California Renewable Energy Sources Act (CalRESA), Paul Gipe, <http://bit.ly/ACa4c6>

<sup>5</sup> How Germany Became Europe's Green Leader: A Look at Four Decades of Sustainable Policymaking By Ralph Buehler, Arne Jungjohann, Melissa Keeley, Michael Mehling <http://www.thesolutionsjournal.com/node/981>

<sup>6</sup> from Paul Gipe <http://www.wind-works.org>

## A. How CLEAN-FIT programs work

With CLEAN-FIT, prices for energy generated from renewables are set to reflect the cost of producing the energy plus a socially acceptable profit.

This removes price uncertainty, makes financing less expensive, and makes projects attractive and feasible to a much wider group of homeowners, communities and businesses.

CLEAN-FIT Programs give community members the opportunity to invest in clean local energy without exposure to the high financial risks, transaction costs and complexity that they would otherwise need to navigate.

### CLEAN-FIT Programs feature: <sup>7</sup>

**Grid Access:** They ensure that interconnection to the utility's distribution grid is predictable, affordable, and timely. This is achieved by having transparent processes, costs, and timeframes for all generators.

**Standard Offer Contracts:** Utilities are required to enter into a standard contract with each eligible renewable energy generator. The CLEAN-FIT Contract provides that the utility will pay a fixed price for a long duration (typically 20 years) for all renewable energy delivered by the generator to the utility's grid.

**Prices are based on the cost of production and a reasonable rate of return.** Prices are periodically reviewed and contract rates are adjusted for new projects coming on line in later years. This is typically done by the statewide utility regulator, such as the NYS Public Service Commission.

**Differentiation by Technology, Size, etc.** Advanced CLEAN-FIT programs: have been adopted in some countries that set different prices for projects based on technology, project size, local content and resource intensity, to reflect variations in the cost of production.

Figure 3 - Ready to access the grid <sup>8</sup>



Figure 4 - Prices for Vermont CLEAN-FIT Program Aka (Vermont SPEED) <sup>9</sup>

Technology	1st year price (per kWh)
Solar PV	\$0.240
Hydro	\$0.119
Landfill gas	\$0.087
Farm methane	\$0.136
Wind 1.5 MW	\$0.113
Wind 100 kW	\$0.208
Biomass	\$0.121

<sup>7</sup> <http://bit.ly/zjTna2>

<sup>8</sup> <http://bit.ly/zGikNb> Photo by Katie Romano

<sup>9</sup> <http://bit.ly/x7tbkb>



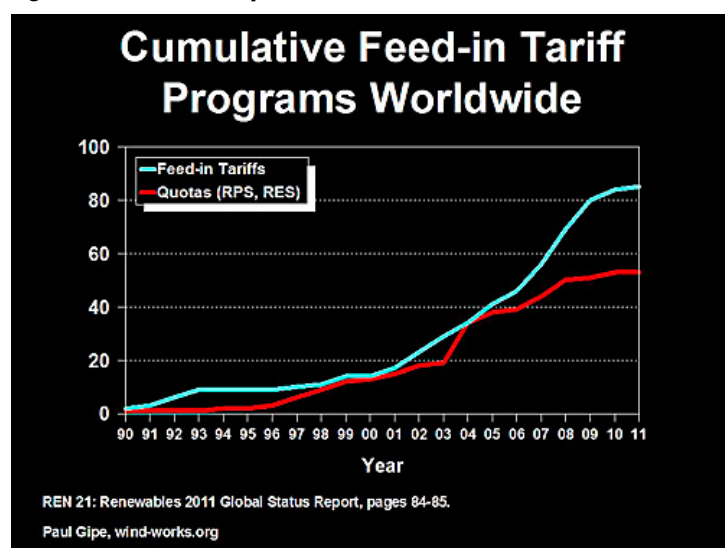
## B. Performance of CLEAN-FIT Programs

We will use the term Feed in Tariff (FIT) synonymously with CLEAN-FIT programs in this section because that is the term most commonly used by international analysts.

96 countries currently have a policy to support renewable power generation.<sup>10</sup>

*"Of all the policies employed by governments, feed-in tariffs (also called premium payments, advanced renewable tariffs, and minimum price standards) remain the most common. By early 2011, at least 61 countries and 26 states, provinces or local jurisdictions had FITs, more than half of which had been enacted since 2005."*<sup>11</sup>

Figure 5 - Feed-In-Tariff penetration



*"The first (Feed In Tariff) FITs...were implemented in Europe in Portugal (1988), Germany (1990), Denmark (1992) and Spain (1994). Because of the successful deployment of renewable energies at a comparatively low cost in these countries, many other governments decided to implement the same policy mechanism."*<sup>12</sup>

*"In Europe, 77 percent of all new electricity generation capacity from renewable sources installed between 1997 and 2008 occurred in countries using FITs, making the continent the world's largest renewables market."*<sup>13</sup>

The performance of CLEAN-FIT programs can be measured by their:

- Success in cost-effectively bringing renewables on line in an accelerated fashion
- Success in creating jobs by creating consistent demand for renewable energy and renewable energy equipment, and
- Success in attracting investment.

### Success in bringing renewables on-line

#### WIND

Figure 6 illustrates the per capita development of wind — the new renewable technology whose capacity has grown the most rapidly in recent decades.

Figure 6 - World leaders in wind capacity

	MW of Wind Power Capacity Installed	Population in millions (MM)	MW per MM people	Feed-in-tariff ?
Spain	20,300	47	434.2	Y
Portugal	3,837	11	356.6	Y
Germany	27,364	81	335.9	Y
U.S.	40,267	313	128.6	only in a few states
Canada	4,011	34	117.9	only in Ontario
Italy	5,793	61	94.9	recent (2011)
U.K.	5,862	63	93.5	recent (2010)
France	5,961	65	91.3	recent (2006)
India	12,966	1,189	10.9	recent (2009)
China	44,781	1,337	33.5	recent (2009)
Rest of the World	28,371	3,717	7.6	

The leading nations - Spain, Portugal and Germany - all have well developed FIT programs.<sup>14</sup> The US and Canada, wealthy nations with rich wind resources, have about 1/3rd of the wind capacity per capita of these three. The nations below the U.S. and Canada have all recently enacted FITs in an effort to move forward on the world renewable stage. The U.K is an excellent case in point. Britain had been the European bastion for "market based" renewable development, relying on renewable energy credits (RECs) and auctions to meet their "Renewable Obligation" goals (similar to NY's Renewable Portfolio Standard). After experiencing limited success, in 2010 they enacted a Feed In Tariff. During the first six months of the FIT program 15,468 installations - mainly small solar - registered to take part.<sup>15</sup>

<sup>10</sup> Renewables 2011 Global Status Report Renewable Energy Policy Network for the 21st Century, page 52 <http://bit.ly/xkBgAD>

<sup>11</sup> Ibid. page 55

<sup>12</sup> Powering the Green Economy. The Feed-In Tariff Handbook. By Miguel Mendonça, David Jacobs and Benjamin Sovacool ISBN: 9781844078585 Publisher: Earth Scan, October 2009, <http://bit.ly/zzPCNK>

<sup>13</sup> Italy's Make-or-Break Chance to Fix Its PV Feed-In Tariff Published on March 26, 2011 By Matthias Kimmel, The Worldwatch Institute's Climate and Energy Blog <http://bit.ly/wwd1Yr>

<sup>14</sup> figure from Paul Gipe - [wind-works.org](http://wind-works.org)

<sup>15</sup> UK Feed-In Tariff Enjoys Early Success By Andrew Williams, Contributor Renewable Energy World.com, January 26, 2011 <http://bit.ly/yhPjGI>

## RENEWABLE HEAT

Britain's new renewable program is notable for incentivizing renewable heat sources such as geothermal heat pumps and solar thermal.<sup>16</sup> The program is designed to supply 12% of Britain's heat from renewable sources by 2020. It opened in November of 2011 for industrial, commercial, public sector and non-profit property owners.

The tariff provides a continuous 20-year income stream based on the amount of heat generated by the technology. Small ground source heat pump systems will get 4.3 pence per kWh of heat generated and metered. Solar collectors get 8.5 pence/kWh. The government expects to announce a target date for a residential tariff early in 2012.

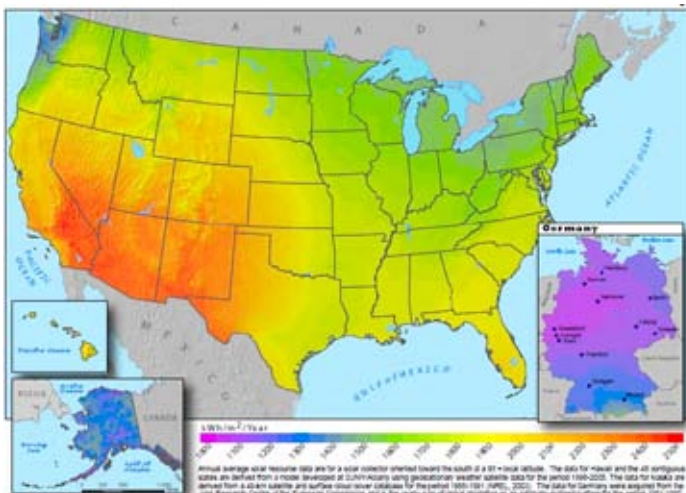
According to the government's Renewable Heat Incentive (RHI) website,<sup>17</sup>

*"We expect to see 500,000 jobs created by the end of the decade in the renewables industry with the RHI stimulating £4.5 billion of capital investment."*

## SOLAR

**Germany** is far and away the most successful at deploying solar even though this map from the National Renewable Energy Laboratory shows it has a solar resource that is less intense than all of the U.S with the exception of Northwest Washington State and Alaska.<sup>18</sup>

**Figure 7 - Sunshine in Germany vs. US**



**16 Renewable Heat Incentive**, UK Department of Energy and Climate Change, March 2011 <http://bit.ly/wfVjkm>  
Change, March 2011 <http://bit.ly/wfVjkm>

**17 Renewable Heat Incentive Scheme: frequently asked questions.p4**. Dept of Energy and Climate Change <http://bit.ly/wOuv8H>

**18** <http://www.al-solar.org/blog/index.html>

**19 Italy Passes 7,000 MW of Total Installed Solar PV** – Italy leaps ahead of both Spain and Japan to become second in world in total solar capacity, Paul Gipe, contributor Renewable Energy World.com, July 22, 2011 <http://bit.ly/w4Hbaf>

**20 Germany Installed 3 GW of Solar PV in December** – The U.S. Installed 1.7 GW in All of 2011 (and the Germans did it at roughly half the price) Think Progress edited by Joe Romm, written by Stephen Lacey on Jan 10, 2012 <http://bit.ly/ybVZrT>

**21 Italy Passes 7,000 MW of Total Installed Solar PV Leaps Ahead of Both Spain & Japan to Become Second in World in Total Solar Capacity**, July 21, 2011, Paul Gipe <http://bit.ly/A5zfjH>

Germany has 5.67 times the solar PV capacity installed as the U.S. even though it has less than 28% of the population and less than 4% of the land mass.<sup>19</sup> In fact, in December of 2011 Germany installed almost twice as many megawatts of solar than the entire U.S. developed during all of 2011.<sup>20</sup>

*"Preliminary figures show Germany ended the year with roughly 7,500 MW of installations; the U.S. ended up with about 1,700 megawatts, according to GTM Research."*

*Germans installed all of that solar at almost half the price. The average price of an installed solar system in Germany came to \$2.80 in the third quarter of 2011. In the U.S., it was about \$5.20 in the third quarter."*

*Why the disparity? The Germans have a much more mature solar market. The country's simple, long-term feed-in tariff makes financing projects less expensive, and has created a sophisticated supply chain that allows companies to source product, generate leads and get systems on rooftops efficiently."*

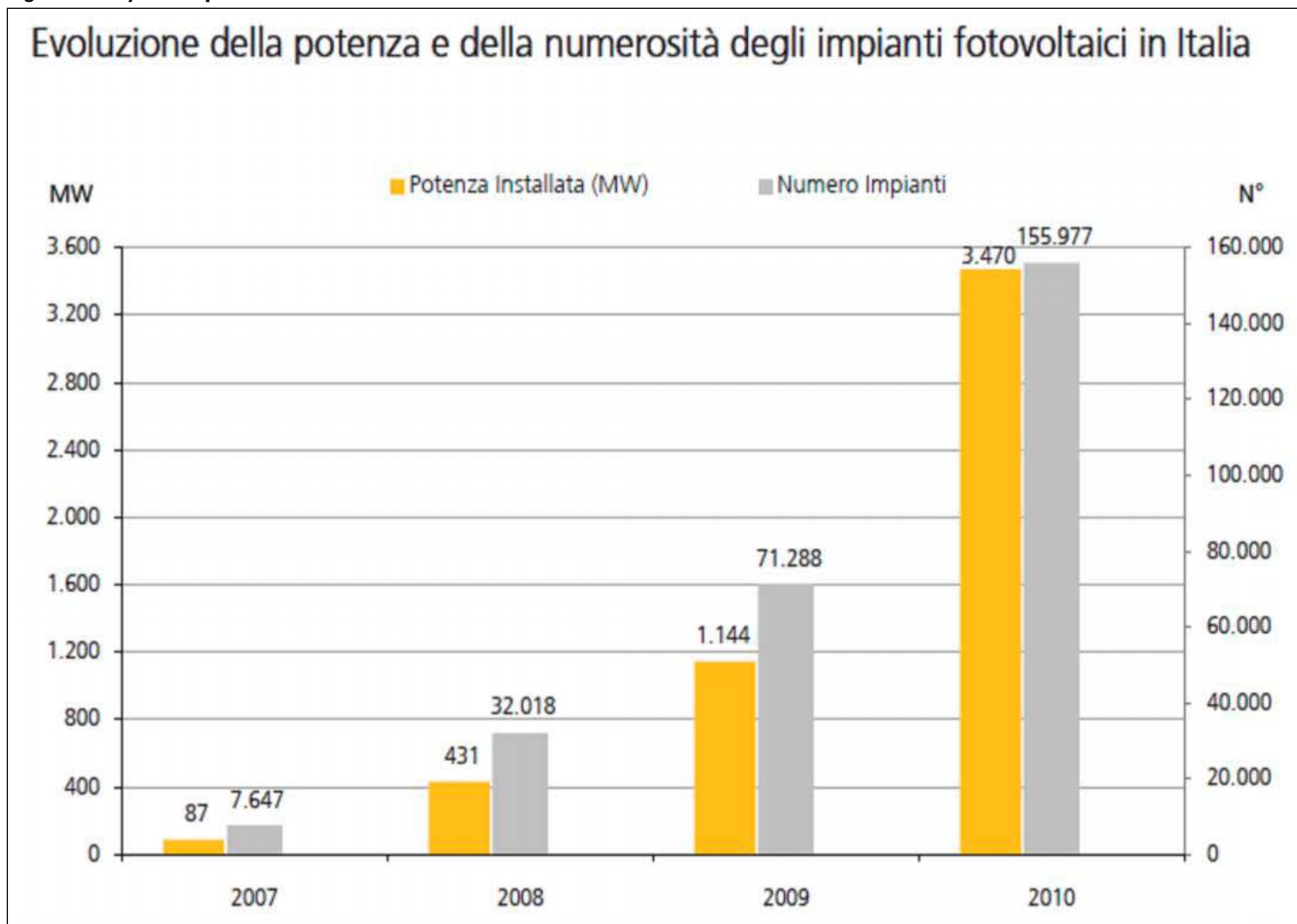
**Figure 8 - World Solar PV rankings**

World Total Solar PV Installed Mid-2011			
Rank		Approx. MW	Policy
1	Germany	17,000	Feed-in Tariffs
2	Italy	7,000	Feed-in Tariffs
3	Spain	4,000	Feed-in Tariffs
4	Japan	4,000	Net-Metering
5	USA	3,000	Net-Metering
6	Czech Republic	2,000	Feed-in Tariffs
7	France	1,500	Feed-in Tariffs
8	California	1,250	Net-Metering
9	China	1,000	?
Total installed capacity.			

Italy's solar feed in tariff took effect in 2007, leading them to quickly overtake Spain and Japan. Italy installed 2,300 MW of Solar PV in 2010.<sup>21</sup>

In comparison, recently proposed solar legislation in New York, targets the development of 5,000 MW of solar by 2026.

Figure 9 - Italy's solar performance <sup>22</sup>



The above figure shows the number of solar installations in gray using the scale at the right. The MegaWatts developed are in yellow, using the left hand scale. This figure shows the rapid growth of solar in Italy since adoption of their FIT.

Closer to home, **Ontario** is currently leading North America in renewable development with the feed-in-tariff embedded in their Green Energy Act that passed in May of 2009. This tariff builds on and improves the Province's 2004 Standard Offer Contract FIT program.

Ontario puts out bi-weekly reports and the September 30, 2011 issue <sup>23</sup> gives the following numbers for projects under development or in commercial operation:

Figure 10 - Ontario projects

	Projects	Megawatts
Large Scale	1,956	4,062
Mid Scale	1,721	324
Aboriginal	19	479
Community Owned	90	329
MicroFITS (99% solar)	7,815	67
Total	11,601	5,261

Politicians in New York State have seemed deathly afraid to take a stance on renewable energy that can be interpreted as raising consumer prices. The Ontario experience on this issue can be instructive. On October 6, 2011, the Liberal Party won a close election in Ontario, in which the Green Energy Act was a major issue. The Progressive Conservatives had promised to undo the Act, playing on concern over increased energy costs in the province. While the Conservatives led in polls 8 weeks before the election, they won only 37 of 107 provincial seats. Liberal Dalton McGinty will remain as Premier and the Green Energy Act remains in force as green jobs advocates won a major victory. <sup>24</sup>

<sup>22</sup> Rapporto Statistico 2010 Solare Fotovoltaico <http://bit.ly/xhqrBW>

<sup>23</sup> BI-WEEKLY FIT and microFIT REPORT, September 30th, 2011, Ontario Power Authority <http://bit.ly/xtpZ7V>

<sup>24</sup> <http://bit.ly/zgMt22>

Gainesville, Florida, a city with a municipally owned electric system, may be the best US example of the power of CLEAN-FIT programs to bring renewables on line. A December 2011 article on Gatorsports.com<sup>25</sup> opened with *“The solar capital of the United States might be in California, but Gainesville is producing more solar energy per capita than the Golden State.”*

The article closed with a quote from former Mayor Pegeen Hanrahan, who helped start the program:

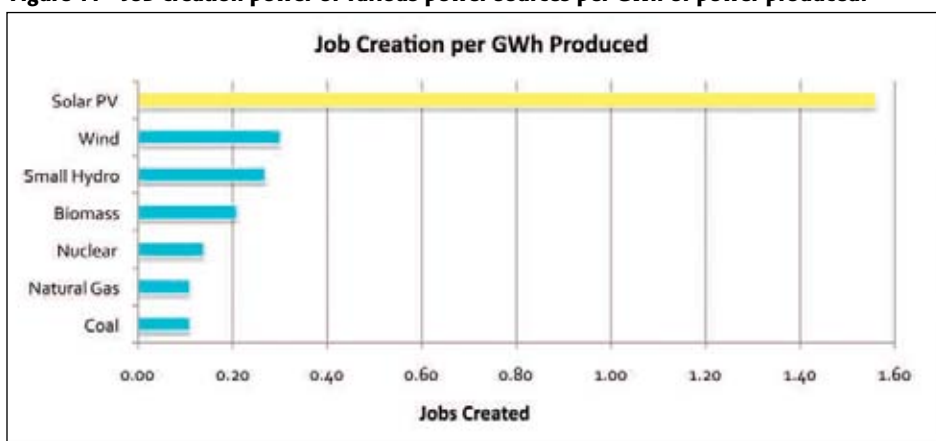
*“Our clean-energy commitment is putting Gainesville on the map and creating a lot of local jobs’ said Hanrahan... But she recognized that the industry in Gainesville, indeed the United States, has a long way to catch up with serious players like Germany. She spoke about energy in Berlin last year at a conference of the German American Chamber of Commerce, where a businessman told her something that stuck.*

*‘In Germany, solar is an industry,’ she remembers him saying. ‘In the U.S., solar is a movement.’”*

## Success in creating jobs

The job creating potential of renewables vs. fossil fuels has been documented in numerous ways. The table below compares job creation from various energy sources per gigawatt hour produced.

**Figure 11 - Job creation power of various power sources per GWh of power produced:<sup>26</sup>**



**CLEAN-FIT programs are specifically designed to capture the job creation potential in renewable energy development by creating a stable investment climate.** Companies that manufacture renewables parts and systems can’t plan properly, and have trouble securing financing, when incentives are subject to political horse trading (the federal production tax credit) or wild market swings (renewable energy credits). The result is a continued advantage for manufacturers from jurisdictions that have a dependable renewable incentive program.

The table below shows projected job creation with the adoption of recent recommendations for expansion of the program offered by 22 Ontario companies and organizations.<sup>27</sup>

**Figure 12 - Annual employment in the renewable energy sector**

Job Creation (includes 20 year O&M jobs in the year they are created)								
	2012	2013	2014	2015	2016	2017	2018	Total
Solar PV	18,461	23,075	30,767	30,767	30,767	30,767	30,767	195,373
Wind	9,678	11,061	12,443	13,826	15,209	16,591	17,974	96,782
Biomass, Biogas, Hydro	7,770	7,770	7,770	7,770	7,770	7,770	7,770	54,390
Total	35,909	41,906	50,981	52,363	53,746	55,129	56,511	346,545

<sup>25</sup> Gainesville gets recognized for solar energy output, By Chad Smith, Staff writer Published: Saturday, December 10, 2011 <http://bit.ly/xKs4Su>

<sup>26</sup> Comparison of jobs created from various types of energy generation. Source: ClearSky Advisors <http://bit.ly/yUQvTH>

<sup>27</sup> Ontario Feed-In Tariff Review 2011. More jobs, affordable, clean energy, and a brighter future for Ontario, page 24, Published Dec. 14, 2011, authors Tim Weis, Paul Gipe, Green Energy Act Alliance, Shine Ontario <http://www.pembina.org/pub/2299>

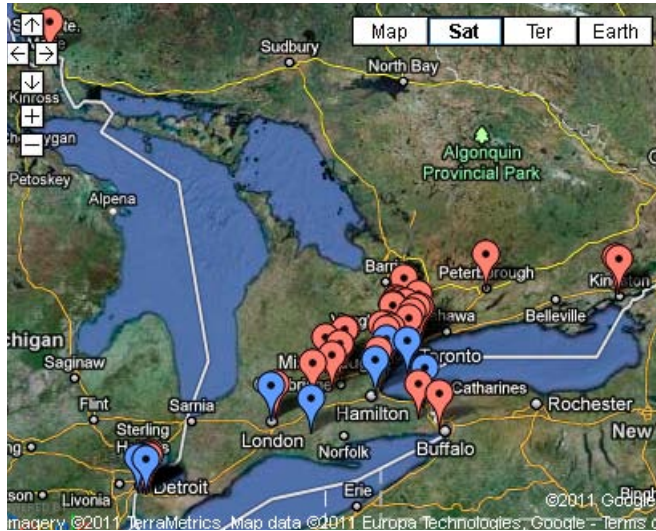


Ontario's website claims that

*"Ontario's clean energy economy has created 20,000 jobs to date, while supplying clean, renewable energy to power our homes and businesses".<sup>28</sup>*

Forty new manufacturing facilities have been announced in Ontario.

**Figure 13 - Ontario clean energy jobs map**

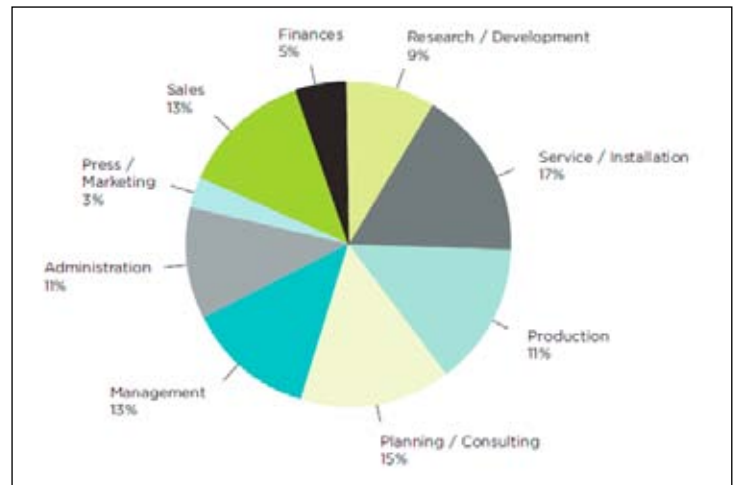


All jobs illustrated are projected or current direct employment and are Green Energy Act related. Red indicates existing jobs; blue indicates announced jobs. This map is not hyperlinked. To interact with the map go to the web link in footnote number 29.<sup>29</sup>

In Germany, 367,400 jobs have been created in renewable energy as successive governments of Social Democrats and Angela Merkel's Christian Democratic Union have embraced the feed in tariff program that was strongly pushed initially by the Green Party. Given that Germany's population is only a quarter of the U.S., this would be the equivalent of a 1.4 million-person industry.

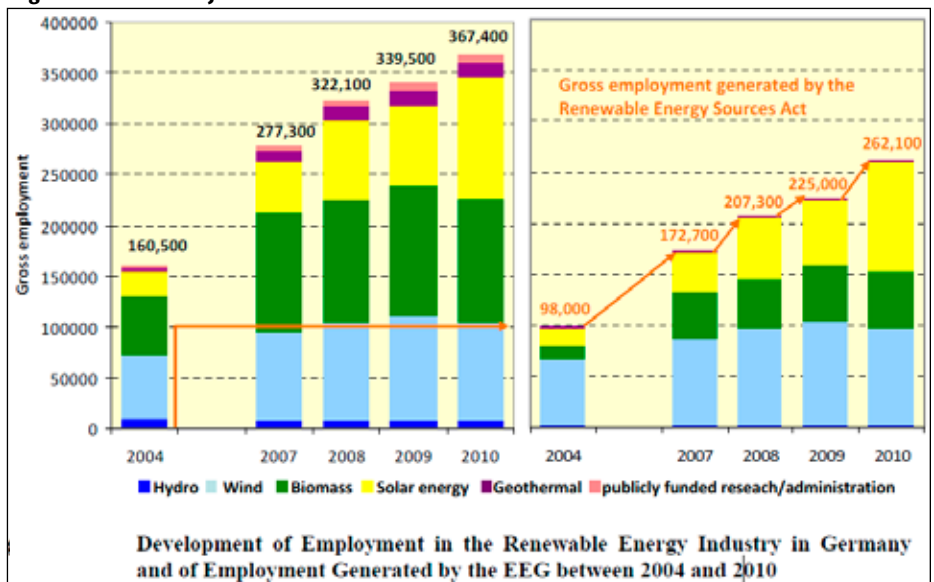
This figure indicates the types of jobs being created:<sup>32</sup>

**Figure 15 - German Energy Jobs by Field of Business**



As the chart below shows, about 2/3rds of those jobs, and most of the solar and wind jobs, are directly attributable to the Renewable Energy Sources Act or EEG, Germany's Feed-In law.<sup>30</sup>

**Figure 14 - German jobs attributed to FIT**



<sup>28</sup> <http://bit.ly/zEB0CB>

<sup>29</sup> <http://bit.ly/yj1tnp>

<sup>30</sup> **Short- and long-term impacts of the expansion of renewable energy on the German labour market:** annual report on gross employment Research project (Project ref.: 0325042), commissioned by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Gross employment from renewable energy in Germany in 2010,—a first estimate—As at: 18 March 2011 <http://bit.ly/zvkM8a>

<sup>31</sup> **Ontario Feed-In Tariff Review 2011** *More jobs, affordable, clean energy, and a brighter future for Ontario*, Published Dec. 14, 2011, authors Tim Weis, Paul Gipe, Green Energy Act Alliance, Shine Ontario <http://www.pembina.org/pub/2299>

<sup>32</sup> *Ibid.*, Graph from Arepo Consult, Berlin



In 2006, the Worldwatch Institute published an excellent article on renewable jobs, and the following lengthy quote illustrates the degree to which countries with CLEAN-FIT programs are capturing the job creation benefits of renewables:<sup>33</sup>

*“Driven by the gathering sense of a climate crisis, the notion of ‘green jobs’—especially in the renewable energy sector—is now receiving unprecedented attention.*

*Currently about 2.3 million people worldwide work either directly in renewables or indirectly in supplier industries. Given incomplete data, this is in all likelihood a conservative figure.*

*Renewables tend to be a more labor-intensive energy source than the still-dominant fossil fuels, which rely heavily on expensive pieces of production equipment. A transition toward renewables thus promises job gains...*

*A handful of countries have emerged as leaders in renewables development, thanks to strong government support. A study commissioned by the German government found that in 2006 the country had some 259,000 direct and indirect jobs in the renewables sector. The number is expected to reach 400,000-500,000 by 2020 and then 710,000 by 2030...*

*In the United States, federal policies have been weak and inconsistent over the years, leaving leadership to individual state governments.”*

## Investment

Another indicator of the attractiveness of CLEAN-FIT programs is the level of investment they attract. We will look briefly at the example of Ontario.

An October 6, 2011 Reuters report from the day after the provincial election stated:<sup>34</sup>

*“Ontario has attracted more than C\$20 billion (US\$19.5 billion) in renewable investment commitments since it launched its FIT program two years ago. The largest single commitment is a C\$7 billion investment by South Korea’s Samsung C&T, which the Conservatives threatened to scrap.*

*Thursday’s election outcome ‘allows us just to continue forward on the time frame that we hoped rather than guessing at what is coming down the pike,’ said Mike Garland, chief executive of Pattern Energy, which is developing four wind projects in Ontario with Samsung.”*

## C. 2011 Status of Renewables in New York State

New York State is stuck in neutral as it attempts to accelerate into a clean energy future.

On the positive side of the ledger:

- New York is the most energy-efficient state in the continental United States on a per-capita basis,<sup>35</sup> New York accounts for 4.0% of the nation’s total primary energy consumption, while representing 6.4% of the nation’s population. Of course, opportunities for conservation and efficiency abound in the state’s economy. Nevertheless, a combination of public consciousness and urban density gives New York a head start in the race to a more efficient future, at least relative to other American states.
- On an official level there is a strong recognition that the transition to clean energy must happen quickly and steadily if we are to avoid the worst impacts of climate change. New York has identified a myriad of destructive potential impacts from continuing to load the atmosphere with greenhouse gases such as carbon dioxide and methane.<sup>36</sup> These include rising sea levels, less consistent growing seasons, increases in deadly heat waves as well as catastrophic weather events such as floods and droughts, and the destruction of plant and animal species.
- There is also a commitment to specific near term goals - NY’s “45 by 15” initiative aims for 45 percent of the state’s electricity needs to come from renewable energy sources and improved energy efficiency.<sup>37</sup>
- The state has a Renewable Portfolio Standard (RPS) with a current goal of generating 30% of the state’s electricity from renewables by 2015.
- Cooperating to develop and implement the Regional Greenhouse Gas Initiative and slowing down the rush to hydrofrack the Marcellus Shale are two examples of New York’s leadership position among states.
- The Green Jobs Green New York initiative has the potential to become a national model for creating jobs and averting greenhouse gas emissions from housing and commercial buildings.

<sup>33</sup> Jobs in Renewable Energy Expanding <http://www.worldwatch.org/node/5821>

<sup>34</sup> Green energy sector cheers Ontario election result, Fri Oct 7, 2011 <http://reut.rs/wcWHpB>

<sup>35</sup> Patterns and trends: New York State Energy Profiles: 1995-2009, NYSEDA, January 2011, page 2 <http://bit.ly/w3qz81>

<sup>36</sup> NYSEDA ClimAID Synthesis Report - Responding to Climate Change in New York State, C. Rosenzweig, W. Solecki, and A. DeGaetano, M. O’Grady, S. Hassol, P. Grabhorn, 2011 <http://bit.ly/xqQQX2>

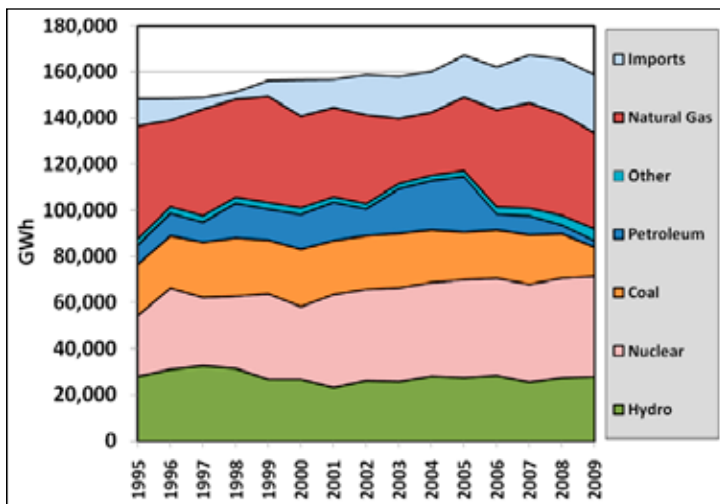
<sup>37</sup> N.Y. Gov. Pushes ‘45 by 15 Green Energy Plan <http://bit.ly/ziqp7p>

However, New York is falling far short of its potential to advance renewable energy. In January of 2011 NYSEERDA published its most recent annual *Patterns and Trends* report.<sup>38</sup> The latest data, as of the end of 2009, show only 1% of New York's electricity is generated from wind. Two percent is classed as other. The NYSEERDA report notes that, the "Other" category "primarily consists of wood, waste, landfill gas, and ethanol".<sup>39</sup> Notice NYSEERDA doesn't even mention solar in this context as its current contribution (31.6 MW as of 12/31/2010)<sup>40</sup> is still so small.

**Figure 16 -NY State Electric Generation by Fuel Type**

ELECTRICITY		
Sales decreased 3% from 2008		
Sales to ultimate consumers (gigawatt-hours).....		140,035
By sector:		
Residential .....	(34%)	48,246
Commercial.....	(54%)	75,347
Industrial .....	(10%)	13,417
Transportation.....	( 2%)	3,025
Generation (gigawatt-hours).....		158,780
By fuel type:		
Nuclear .....	(27%)	43,485
Natural Gas .....	(26%)	41,674
Hydro .....	(18%)	27,945
Net Imported Electricity .....	(16%)	25,110
Coal .....	(8%)	12,759
Petroleum.....	( 2%)	2,653
Other.....	( 2%)	2,888
Wind.....	( 1%)	2,266

**Figure 17 - NY State Electric Generation by Fuel Type, 1995-2009 <sup>41</sup>**



## The Renewable Portfolio Standard (RPS)

*"The 2002 State Energy Plan warned of the possible consequences of New York's heavy dependence on fossil fuels. The Energy Plan noted that New York State's fossil fuel resources (gas, coal, oil) are largely imported from abroad or out-of-state, have significant long-term negative environmental impacts, and face ultimate depletion".<sup>42</sup>*

The result was an RPS first adopted in September of 2004 committing the state to generating 25% of its electricity from renewables by 2013. This sounds impressive. If the US as whole were at 25% by 2013 it would be a major accomplishment. However, when the state adopted the RPS it was already at a baseline of 19.3%, largely from New York's major hydroelectric plants at Massena and Niagara Falls. In effect, the State set out to change 5.7% of its mix in an 8-year period. At this rate it would take over 113 years to reach 100% renewables in New York State.

In 2010, New York proactively revised the RPS goal to 30% by 2015,<sup>43</sup> a somewhat less anemic measure that would still leave us far behind many other nations and states in increasing renewables in the 21st century. Yet it is by no means clear that we are on course to meet the 30% goal. As projected by NYSEERDA, it would mean generating 10.4 million megawatt hours from their renewable programs in 2015. As the table below from NYSEERDA's 2011 RPS Performance Report shows, after 5 years of a 9-year process, we have reached less than 40% of this goal.<sup>44</sup>

**Figure 18 - NYS Renewable Portfolio Standard performance**

**Table 1. NYSEERDA 2015 RPS Procurements and Energy Targets (in MWh) and Progress as of December 31, 2010**

	Target	Progress*	Progress as % of Target
<b>Customer Sited Tier</b>	623,390	76,945	12%
<b>Main Tier</b>	9,774,464	3,930,000	40%
<b>Total</b>	<b>10,397,854</b>	<b>4,006,945</b>	<b>39%</b>

\* Progress represents only installed capacity and capacity under contract with NYSEERDA. Progress does not include any accepted-but-not-contracted applications for Customer-sited Tier technologies.

<sup>38</sup> Patterns and trends: New York State Energy Profiles: 1995-2009, NYSEERDA January 2011 <http://bit.ly/w3qz81>

<sup>39</sup> Ibid. page 45

<sup>40</sup> Ibid. Page 18

<sup>41</sup> Patterns and trends: New York State Energy Profiles: 1995-2009, NYSEERDA January 2011, page27 <http://bit.ly/w3qz81>

<sup>42</sup> New York State Renewable Portfolio Standard Performance Report, Program Period December 31, 2010, NYSEERDA, page 4., <http://bit.ly/wcaK4i>

<sup>43</sup> Ibid. page 4.

<sup>44</sup> Ibid. page 9. Main Tier projects sell their power into the NYISO wholesale market. Customer-Sited projects use their power on-site or "behind the meter".

In the RPS 2010 revision, NYSERDA pledged to fund its renewables program at levels considered adequate to meet the 30% goal. However in 2010, no new wind farms were brought on line and only one was nearing completion — Iberdola’s 74.0 megawatt Hardscrabble Wind Power Project in Herkimer County.

The table and chart below show a strong drop off in new wind projects in New York State. With an end to the 30% stimulus tax break on 12/31/11, and the end of bonus depreciation and the federal production tax credit on 12/31/12<sup>45</sup> some are projecting a continued low level of wind development in New York State.

Figure 19 - Wind farms developed under the NY RPS <sup>46</sup>

Station Unit	Zone	Town	County	In Service Date	Name Plate rating (MW)
Madison Wind Power	E	Madison	053	Sep-00	11.6
Western NY Wind Power	B	Wethersfield	121	Oct-00	6.6
Fenner Wind Power	C	Fenner	053	Dec-01	30.0
Maple Ridge Wind 1	E	Lowville	049	Jan-06	231.0
Steel Winds	A	Lackawanna	029	Jan-07	20.0
Munnsville Wind Power	E	Bouckville	053	Aug-07	34.5
Maple Ridge Wind 2	E	Lowville	049	Dec-07	90.8
Bliss Wind Power	A	Bliss	121	Mar-08	100.5
Ellenburg Wind Power	D	Ellenburg	019	Mar-08	81.0
Clinton Wind Power	D	Clinton	019	Apr-08	100.5
Altona Wind Power	D	Altona	019	Sep-08	97.5
Chateaugay Wind Power	D	Chateaugay	033	Oct-08	106.5
Canandaigua Wind Power	C	Avoca	101	Dec-08	125.0
Wethersfield Wind Power	C	Wethersfield	121	Dec-08	126.0
High Sheldon Wind Farm	C	Sheldon	121	Feb-09	112.5
Hardscrabble Wind	E	Fairfield	043	Feb-11	74.0

Figure 20 - NY RPS Wind development - graphic form

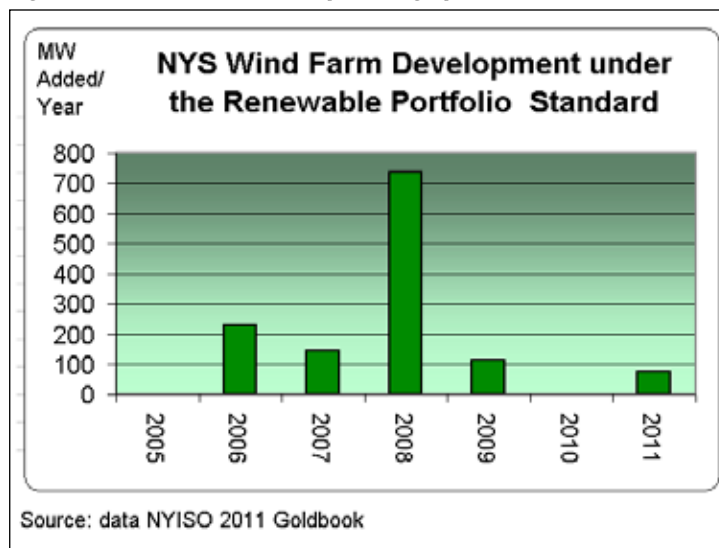
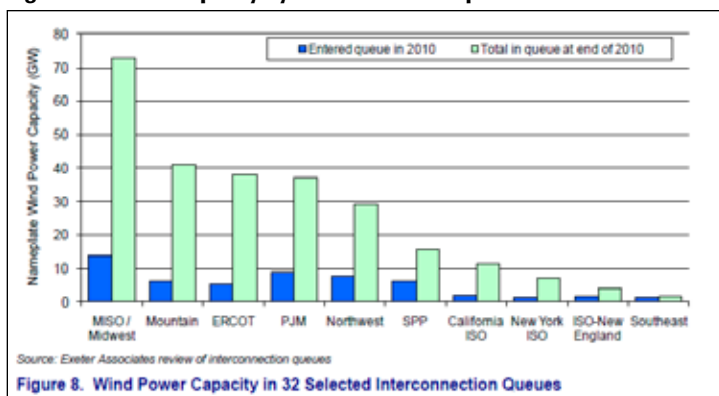


Figure 21 - Wind capacity by interconnection queue



<sup>45</sup> Database of State Incentives for Renewable Energy (DSIRE) website <http://www.dsireusa.org/>

<sup>46</sup> 2011 Load and Capacity Data, A report by the NY Independent System Operator “Gold Book” <http://bit.ly/xkOaaf>



The chart below show New York's wind development performance relative to other leading states.<sup>47</sup>

**Figure 22 - States ranked by wind power development**

Table 2. United States Wind Power Rankings: The Top 20 States

Capacity (MW)				Percentage of In-State Generation			
Annual (2010)		Cumulative (end of 2010)		Actual (2010)*		Estimated (end of 2010)**	
Texas	680	Texas	10,089	Iowa	15.4%	South Dakota	23.2%
Illinois	498	Iowa	3,675	North Dakota	12.0%	Iowa	16.9%
California	455	California	3,253	Minnesota	9.7%	North Dakota	13.5%
South Dakota	396	Minnesota	2,205	South Dakota	8.3%	Minnesota	12.3%
Minnesota	396	Washington	2,104	Kansas	7.1%	Oregon	9.8%
Oklahoma	352	Oregon	2,104	Oregon	7.1%	Wyoming	8.2%
Wyoming	311	Illinois	2,045	Wyoming	6.7%	Colorado	7.8%
Indiana	303	Oklahoma	1,482	Colorado	6.6%	Kansas	7.6%
Oregon	283	North Dakota	1,424	Texas	6.4%	Idaho	7.3%
North Dakota	221	Wyoming	1,412	Oklahoma	5.1%	Oklahoma	6.9%
Idaho	206	Indiana	1,339	New Mexico	5.0%	Texas	6.7%
Washington	196	Colorado	1,299	Washington	4.6%	New Mexico	6.0%
Missouri	149	New York	1,274	Idaho	4.0%	Washington	5.2%
New Mexico	102	Kansas	1,074	California	3.3%	Maine	4.4%
West Virginia	101	Pennsylvania	748	Montana	3.1%	Montana	3.9%
Maine	92	South Dakota	709	Maine	2.9%	California	3.9%
Maryland	70	New Mexico	700	Indiana	2.4%	Indiana	3.0%
Arizona	65	Wisconsin	469	Hawaii	2.3%	Illinois	2.8%
Kansas	61	Missouri	457	Illinois	2.2%	Hawaii	2.3%
Nebraska	60	West Virginia	431	New York	2.0%	New York	2.0%
Rest of U.S.	118	Rest of U.S.	1,974	Rest of U.S.	0.3%	Rest of U.S.	0.3%
TOTAL	5,113	TOTAL	40,267	TOTAL	2.3%	TOTAL	2.6%

\* Based on 2010 wind and total generation by state from EIA's *Electric Power Monthly*.  
\*\* Based on a projection of wind electricity generation from end-of-2010 wind power capacity, divided by total in-state electricity generation in 2010.

Source: AWEA project database, EIA, Berkeley Lab estimates

NYSERDA has pledged \$ 2.95 billion of ratepayer money from the System Benefits Charge (SBC) to reach the goal of 30% renewables. The SBC is a monthly charge levied on the electric bills of all ratepayers of New York's investor-owned utilities such as National Grid, NYSEG and Con Edison. When discussing the cost effectiveness of the CLEAN-FIT program in the next section of this report, it will be important to keep that figure in mind.

For now, the fact that New York is falling behind in its potential to transition to renewable energy has numerous negative impacts including the following:

- As this trend continues we are failing to create badly needed jobs manufacturing and installing renewable energy technology.

- We are falling far short of what needs to be done to make our children's future safe from climate catastrophe.
- In addition we are failing to create a secure economic future because we are continuing our reliance on foreign and out of state energy resources such as coal, oil, uranium and natural gas.

In 2009 only "thirteen percent (13%) of New York's total primary energy requirement (which includes transportation and heating as well as electrical generation) was met from in-state resources. This includes 7% from hydropower and 5% from waste, wind, wood, and landfill gas collectively. The remaining 1% was met with petroleum and natural gas production".<sup>48</sup>

**47 2010 Wind Technologies Market Report, USDOE**, June 2011, pages 8, 9 and 16 <http://www1.eere.energy.gov/wind/pdfs/51783.pdf>

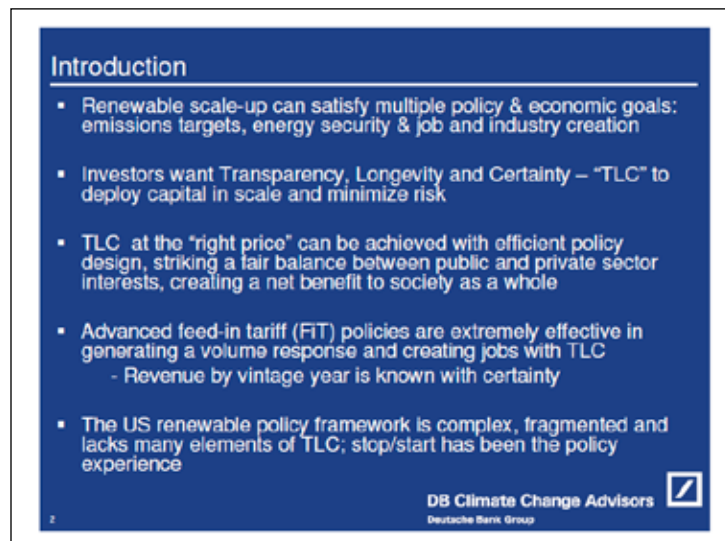
**48 Patterns and trends: New York State Energy Profiles: 1995-2009**, NYSERDA January 2011, page 46 <http://bit.ly/w3qz81>

### 3. Why CLEAN-FIT Programs Work

#### A. TLC - Transparency, Longevity and Certainty

According to Mark Fulton from Deutsche Bank, which is one of Germany's leading investors in renewables, "Investors want Transparency, Longevity and Certainty - 'TLC' — to deploy capital in scale and minimize risk."<sup>49</sup>

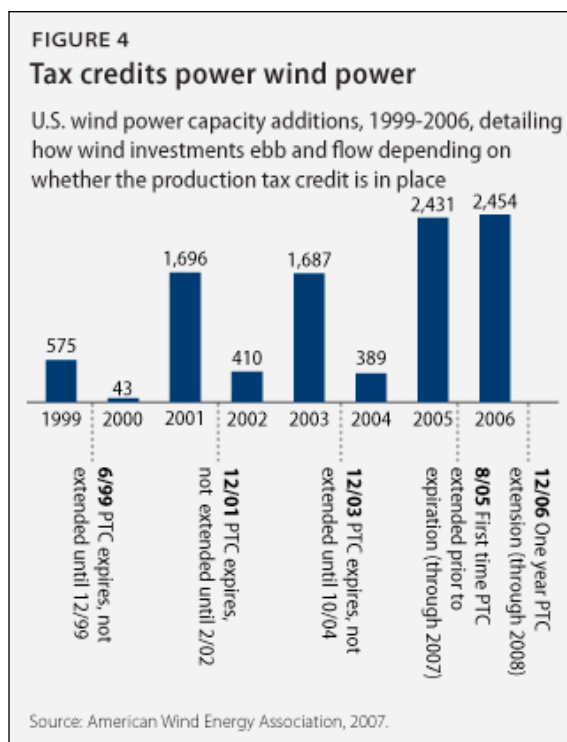
Figure 23 - TLC - Transparency, Longevity and Certainty



As Fulton's last point on the Powerpoint slide above notes, US renewable policies to date have lacked TLC. In the US in recent decades, the wind industry has seen the most dramatic growth in kWhs generated among renewable technologies. It has also been the most glaring example of the impact of inconsistent support. The primary national wind development incentive has been the Production Tax Credit (PTC), which has given investors in wind projects a tax credit worth between 1.5 cents (1992)<sup>50</sup> and 2.2 cents (2010) per kWh generated over its history, as it was increased to account for inflation. This credit can be applied only against passive income, (as opposed to wage income for example), and therefore is generally available only to the wealthy.

After its initial 5-year run from 1994-1999 the PTC has been authorized for short durations of 1 or 2 years. Renewals of the PTC have been caught up in Congressional horse trading, forcing disastrous breaks in its continuity. Wind development in the US has been a start and stop affair, correlated closely with Congressional success or failure to renew the Production Tax Credit.<sup>51</sup>

Figure 24 - Federal PTC - bumpy ride for developers



Given the current state of dysfunction in Congress it is increasingly important that states provide a stable environment for renewable energy investment.

The beauty of a CLEAN-FIT program is both its stability and its flexibility relative to price.

**Stability** — Once the price for wind, solar or other renewables is set for a given year, systems installed in that year will get that price for the 15 or 20 year duration of the CLEAN-FIT contract, giving investors or creditors the confidence they need to provide capital on good terms.

**Flexibility** - However, CLEAN-FIT programs are designed to be reviewed frequently - generally every one to two years. At each review, the long term, 15 to 20-year prices for new projects can be set to reflect changing market conditions. In addition, a good CLEAN-FIT design will include a degression factor so that each year between reviews, new projects will receive a lower 20-year price than projects from the year before. Degression factors are based on the fact that, unlike fossil fuel energy, renewable energy is expected to decrease in price as economies of scale and technological advances drive costs down.

<sup>49</sup> **Fit for Life**, The importance of establishing a stable investment climate for PV, January 26, 2010 presentation by Mark Fulton, Global Head of Climate Change Investment Research, DB Climate Change Advisors, Deutsche Bank Group, <http://bit.ly/wMDP1Y>

<sup>50</sup> **Production Tax Credit for Renewable Electricity Generation**, US Energy Information Agency, Issues in Focus, AEO2005 <http://bit.ly/yM9558>

<sup>51</sup> **Will We Bet on a Clean Energy Economy?** The Chips Are Down. It's Time for Congress to Ante Up, Center for American Progress, by Bracken Hendricks, Tina Ramos | May 27, 2010 <http://bit.ly/AfD9I3>



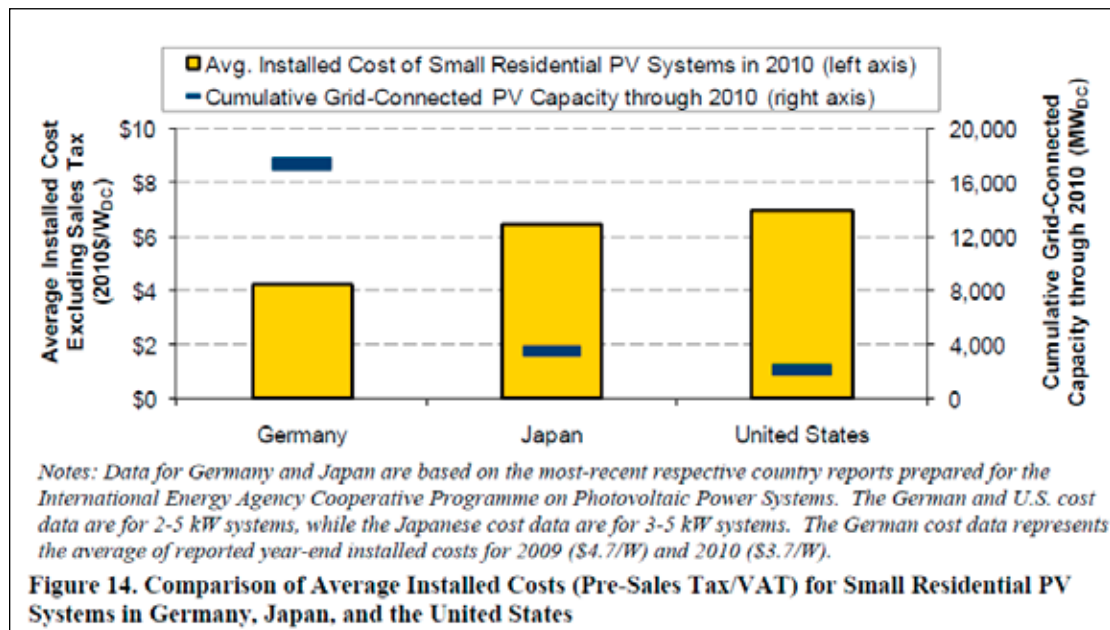
## B. Cost effectiveness

### 1) Financing

**The importance of consistency and stability in business decisions cannot be overemphasized.** When revenues and expenses are predictable they can be built into a business' operations and accounted for. A lending decision based on a transparent and consistent set of variables comes with a lower interest rate. Similarly an investment in a "sure thing" is likely to need a much lower rate of return than a speculative venture capital investment that may require up to a 30% projected rate of return.

*"International experience suggests that greater near-term cost reductions in the United States are possible, as the average installed cost of 3-5 kW residential PV installations in 2010 (excluding sales/value-added tax) was significantly lower in Germany (\$4.2/W) than in the United States (\$6.9/W), where cumulative grid-connected PV capacity in the two countries through 2010 totaled roughly 17,000 MW and 2,100 MW, respectively."*<sup>52</sup>

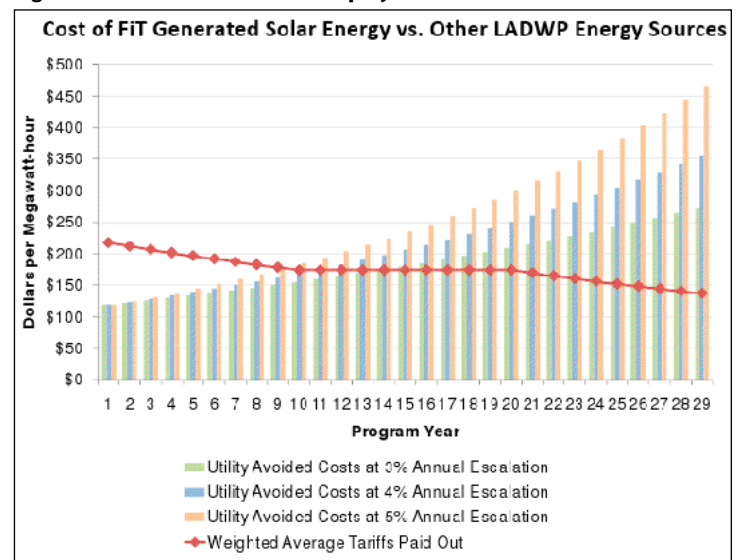
**Figure 25 - PV costs in Germany, Japan and US**



A recent publication by the Los Angeles Business Council is a good illustration of business community recognition of the cost effectiveness of CLEAN-FIT programs.<sup>53</sup> The chart below shows their projection that FIT costs would be less than utility avoided costs in the near future.

Avoided cost is "the cost to the electric utility of the electric energy, which, but for the purchase from {the qualifying facility}, such utility would generate or purchase from another source."<sup>54</sup>

**Figure 26 - LA Business Council - projected Solar FIT costs**



<sup>52</sup> **Tracking the Sun IV** An Historical Summary of the Installed Cost of Photovoltaics in the United States from 1998 to 2010, Galen Barbose, Naïm Darghouth, Ryan Wiser, September 2011, Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, page 2 <http://eetd.lbl.gov/ea/emp/reports/lbnl-5047e.pdf>

<sup>53</sup> **Bringing Solar Energy to Los Angeles** An Assessment of the Feasibility and Impacts of an In-basin Solar Feed-in Tariff Program Los Angeles Business Council Study in partnership with the UCLA Luskin Center for Innovation School of Public Affairs, July 2010 <http://bit.ly/ACd7u8>

<sup>54</sup> **16 U.S.C. § 824a-3** (2006); see, e.g., Connecticut Light and Power Company, 70 FERC ¶ 61,012, at 61,023, 61,028, reconsideration denied, 71 FERC ¶ 61,035, at 61,151 (1995), appeal dismissed, 117 F.3d 1485 (D.C. Cir. 1997) (Connecticut)

2) Price Suppression from the Merit Order Effect

CLEAN-FIT programs are also cost effective because the deployment of renewables suppresses the overall price paid by consumers for electricity in a very specific way known as the Merit Order Effect (MOE).<sup>55</sup> “Price Suppression” or the “Merit Order Effect” happens when renewable energy sources submit low bids and replace high-priced energy sources in a region’s fuel mix for a given time period.

The bidding system to secure electricity for the grid in most deregulated states and nations is a “uniform clearing price” (UCP) auction. Under a UCP auction the price is set by the bid of the highest cost fuel source that is needed to meet demand. This price is then awarded to all the fuel sources that are used for the time period in question. When the UCP is very high, as when expensive natural gas peaking generation is needed to meet demand, the result is that lower priced sources such as hydro, wind, coal, and nuclear, are paid substantially more than their bid.

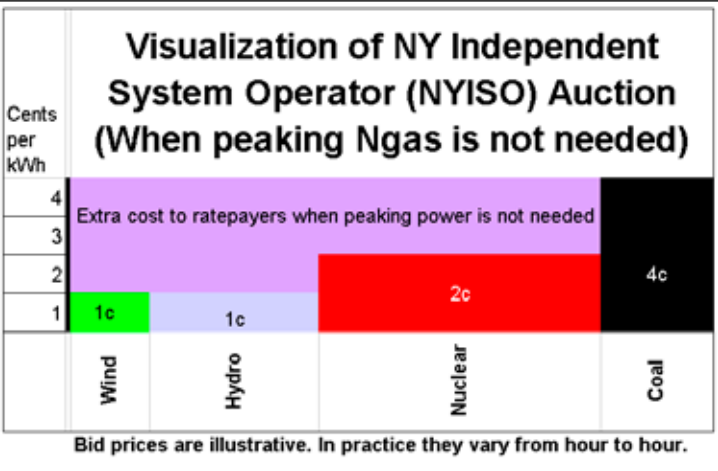
Since wind and solar plants have no fuel cost, they have very low marginal costs. They have an incentive to submit a very low bid, knowing it will cover their marginal costs, while winning them a spot in the fuel mix. This guarantees they will be paid the uniform clearing price, which usually will more than cover their marginal costs.

An Example:

Bid prices vary, but let’s take a typical example where wind and hydro generators might bid at 1 cent per kilowatt hour (kWh), nuclear bids at 2 cents per kWh, coal at 4 cents per kWh and peaking natural gas generators bid at 8 cents per kWh.

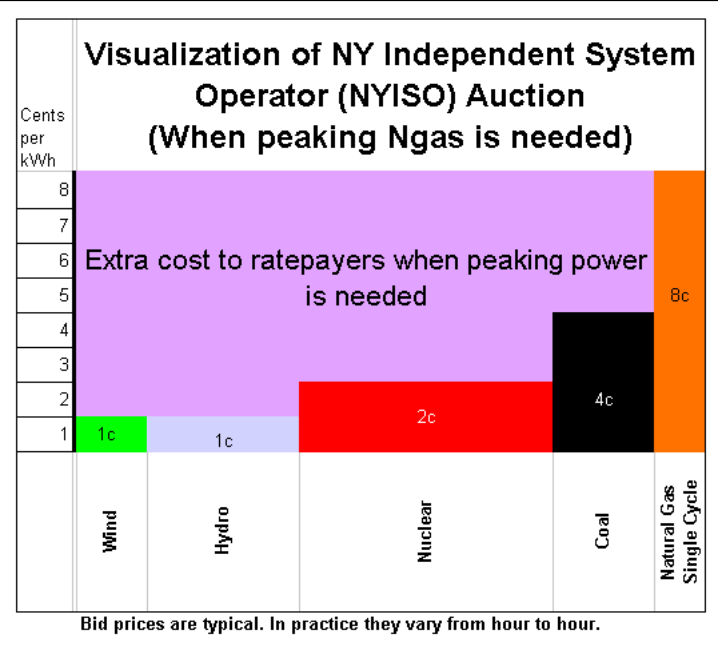
The Merit Order Effect takes place when the amount of wind electricity generated makes it unnecessary to use the gas-generated electricity. In that case, wind, hydro, nuclear and coal generators would all get 4 cents a kWh for the electricity they generate.

Figure 27 - NYISO - merit order - no peaking Ngas power



If the gas-generated electricity had been needed, all generators would have been paid 8 cents per kWh.

Figure 28 - NYISO - merit order - with peaking Ngas power



As you can see from this example when wind is able to knock natural gas out of the fuel mix, it can provide major savings for consumers on the “supply services” portion of their bill. Supply costs are about half of the average electric bill.

55 Wind Energy and Electricity Prices: Exploring the ‘merit order effect’ A literature review by Pöyry for the European Wind Energy, April 2010 <http://bit.ly/ynEwSV>

Many studies have examined the merit order effect (MOE). In developing New York's RPS, the Public Service Commission<sup>56</sup> and NYSERDA<sup>57</sup> both commissioned studies that predicted the "price suppression effect" of adding renewables to New York's generation mix. This effect would be magnified if a CLEAN-FIT program increased renewables in the state.

David Bradley, the Engineering Committee Chair of Western NY's Wind Action Group looked at the impact of the MOE on prices in NYISO Zone A which covers Western NY. In Zone A, wind generation overtook gas generation in 2010 as the 3rd ranking source of electricity generated, behind coal and hydro. Bradley estimates that Zone A consumers saved \$31 million due to the MOE during 2010.<sup>58</sup>

In Germany, according to the clean energy expert Paul Gipe,<sup>59</sup>

*"The Germans calculate that the EEG cost ratepayers a total of €4.5 billion in 2008. (EEG or Erneuerbare-Energien-Gesetz – literally translates to 'Renewable Energy Act' and is the law that initiated their Feed In Tariff program).*

*Meanwhile the ratepayers saved €2.7 billion from imports, and a whopping €5 billion from the merit order effect that lowers overall electricity prices. In addition, all citizens saved €2.9 billion from avoiding external environmental costs. The total savings tally €10.6 billion, more than double the cost of the program."*

## C. Increased local ownership

In Denmark, when talking about community owned renewables, farmers use the expression "Our Own Pigs Don't Stink". It describes the fact the visual, auditory and other impacts of wind and other renewables can be seen quite differently when they are imposed by large, impersonal corporations with no roots in the community, versus when they are owned and initiated by members of the community themselves.

An Institute for Local Self Reliance report summarizes this concept well.<sup>60</sup>

*"At the heart of the matter, citizens rightly see renewable energy as different, and find it frustrating to see new, widely available resources like sun and wind developed under the old, centralized paradigm and owned by the usual suspects. In a recent study by the ever-methodical Europeans, they found that opponents to new wind and solar power have two key desires: 'people want to avoid environmental and personal harm' and they also want to 'share in the economic benefits of their local renewable energy resources'.*

*It's not that people are made physically ill by new renewable energy projects. Rather, they are sick and tired of seeing the economic benefits of their local wind and sun leaving their community.*

*Such opposition is perfectly rational, since investments in renewable energy can be quite lucrative (private developers and their equity partners routinely seek 10% return on investment or higher). And the economic benefits of local ownership far outweigh the economic colonialism of absentee owners profiting from local renewable energy resources."*

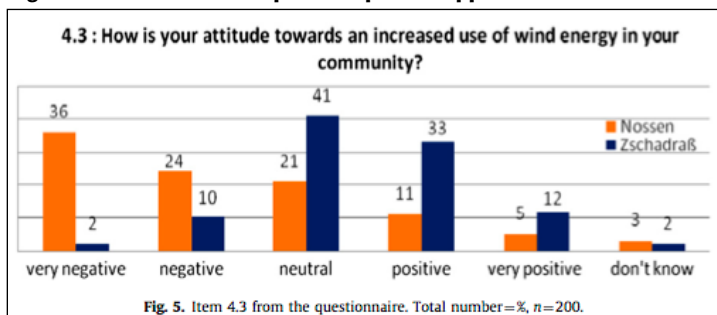
### 1) Examples of Local Ownership

For both centralized and distributed generation, local ownership becomes the key to unlocking local support.

For example, the following chart illustrates the local support for wind power in two **German towns, Nossen and Zschadraß**.<sup>61</sup>

With local ownership of the wind project, 45% of residents had a positive view toward more wind energy (Zschadraß). In the town with an absentee-owned project (Nossen), only 16% of residents had a positive view of expanding wind power; a majority had a negative view.

**Figure 29 - Local ownership boosts public support for wind**



<sup>56</sup> New York PSC Expands RPS to 30% by 2015 <http://bit.ly/zngRKv>

<sup>57</sup> New York Renewable Portfolio Standard Market Conditions Assessment, Final Report Prepared by SUMMIT BLUE CONSULTING, LLC Frank Stern, Nicole Wobus, and Jane Pater Nexus Market Research Greg Clendenning, February 19, 2009 <http://bit.ly/wx14k8>

<sup>58</sup> Estimate of the Wind Power Merit Order Effect in Western New York State in 2010, David A. Bradley <http://bit.ly/yJrmT6>

<sup>59</sup> The Merit Order Effect: A detailed Analysis of the Price Effect of renewable electricity generation on spot market prices in Germany, Fraunhofer Institute, 2007 <http://bit.ly/yp2BnM>

<sup>60</sup> Democratizing the Electricity System A Vision for the 21st Century Grid, John Farrell, New Rules Project, June 2011 <http://bit.ly/ybqHw9>

<sup>61</sup> The Political and Technical Advantages of Distributed Renewable Power, September 8, 2011 by John Farrell <http://bit.ly/zibC9P>

By unlocking economic opportunity, distributed generation and local ownership of renewable energy create a positive feedback loop for more investment in renewable energy.

In the U.S. in particular, the corporate model of renewable development is dominant. Incentives have been largely structured to favor resource rich corporations and projects that are large enough to absorb the expense of sophisticated financing mechanisms that take advantage of tax credits, many of which apply only to passive income. As defined by the IRS, passive income is income from “trade or business activities in which you do not materially participate.”<sup>62</sup> Thus tax credits can’t be used to offset salaries or wages — the types of income available to most Americans.

The CLEAN-FIT program mechanism puts individuals and community organizations on a more equal footing with large corporations. Simple grid access, and a guaranteed long-term price for production, makes it relatively easy for individuals, small businesses and non-profits to get fair bank financing and the ability to complete a renewable project. With ownership comes the ability to fully benefit from the project.

Ontario is a good example of how CLEAN-FIT can be designed to promote community projects. The figures below show the overwhelming use that communities and individuals are making of the Ontario program.<sup>63</sup>

**Figure 30 - Ontario - aboriginal, community and micro projects**

ABORIGINAL & COMMUNITY PROJECT SUMMARY				
Current Status	Aboriginal		Community	
	Count of Apps	Sum (MW)	Count of Apps	Sum (MW)
Submitted	11	23	119	335
Under Review	1	10	10	10
Application Complete	0	0	0	0
Awaiting ECT	28	699	46	571
Rejected/ Withdrawn	7	486	26	344
Contract Offered	0	0	1	0
Contract Executed	19	479	90	329
Contract Terminated	0	0	9	3
<b>Grand Total</b>	<b>66</b>	<b>1,697</b>	<b>301</b>	<b>1,592</b>

Note: Each status is mutually exclusive (i.e. a single application will only be counted in one of the statuses).

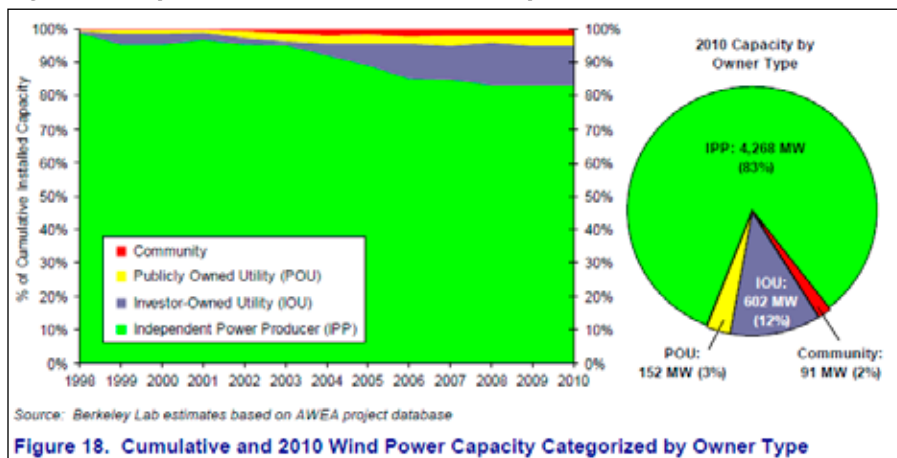
  

microFIT PROJECT SUMMARY		
Current Status	Number of Apps	Sum of Apps (MW)
Total Applications	40,817	376
Application Terminated	4,958	47
Conditional Offers	23,992	217
Contracts Executed	7,815	67

Note: 99% of microFIT applications are for solar PV

In contrast, the figure below shows that wind developments in the U.S. are almost exclusively the domain of IPP’s or Independent Power Producers, which are usually larger corporations.<sup>64</sup> These two figures are not an “apples to apples” comparison, but do capture the flavor of how types of incentives impact types of ownership.

**Figure 31 - Corporate dominance of US wind development**



<sup>62</sup> “Topic 425 - Passive Activities- Losses and Credits”. Retrieved 2009-06-18. <http://www.irs.gov/taxtopics/tc425.html>

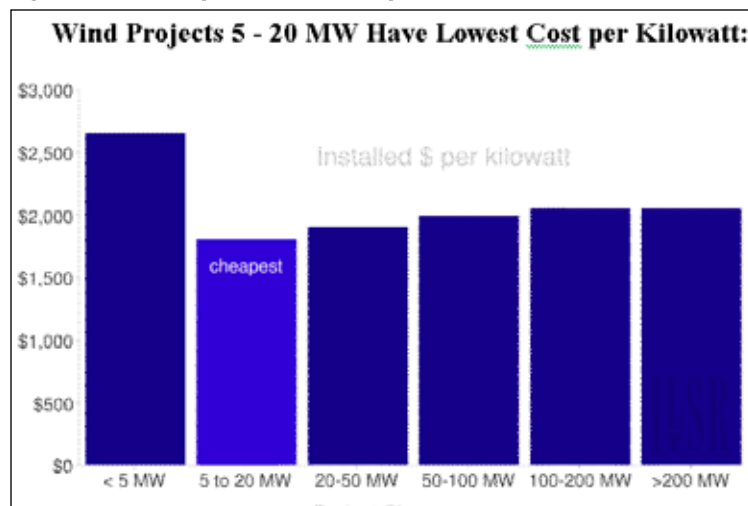
<sup>63</sup> Bi-Weekly FIT and MicroFIT Report, September 30, 2011 <http://bit.ly/AtBEOe>

<sup>64</sup> 2010 Wind Technologies Market Report, Usdoe, June 2011 <http://www1.eere.energy.gov/wind/pdfs/51783.pdf>



Small wind projects of a rooftop or homestead scale are far more expensive and less practical than scaled up projects given current technology. However this by no means requires corporate domination of wind. In fact, a recent study by the Institute for Local Self Reliance found a “sweet spot” for wind development in the 5-20 MW size project range, which could be ideal for ownership at the cooperative and municipality level.<sup>65</sup>

**Figure 32 - Sweet spot in wind development size**



*lesson from the report is that wind projects built at a smaller scale capture most of the construction and project economies of scale, but also may avoid diseconomies of scale that affect larger projects. These diseconomies can include higher financing costs due to multi-billion dollar project costs, time and money costs for new transmission infrastructure, and legal costs to secure the land rights for a large project as well as the cost of overcoming local resistance. In Germany, home to some of the most effective renewable energy policies in the world, more than half of its 27,000 MW of wind are in projects 20 MW and smaller. It's no coincidence that half of Germany's wind power capacity is also locally owned by farmers and cooperatives.”*

Because of the “TLC” factor of the German FIT, bank financing is commonly available to these non-wealthy owners.

**Figure 33 - Ownership of renewables - U.S. and Germany**



The graphic below, from author Paul Gipe, compares the difference in ownership of renewables in Germany and the US.<sup>66</sup>

For solar, a technology that fits most naturally on rooftops and in community settings, US incentives that favor large corporate projects are particularly inappropriate. (see Federal Solar Tax Credits Rule Out Half of Americans).<sup>67</sup>

<sup>65</sup> The Economics of Distributed Renewable Power - Why We Should Democratize the Electricity System, Part 2, By John Farrell , September 2, 2011 <http://bit.ly/yTZHr5>

<sup>66</sup> Slide from **Bringing the Renewable Energy Revolution Back Home with the California Renewable Energy Sources Act (CalRESA)**, Powerpoint by Paul Gipe, contact Paul at [www.wind-works.org](http://www.wind-works.org)

<sup>67</sup> Federal Solar Tax Credits Rule Out Half of Americans, January 11, 2011 - John Farrell <http://bit.ly/z2ERIO>

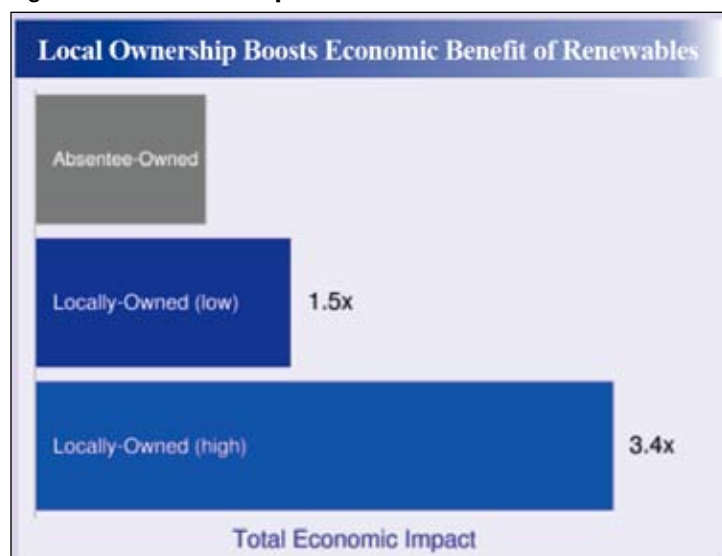


## 2) Economic Benefits of Local Ownership

Local ownership can make an enormous difference in the economic impact of renewable development for local communities.

The Institute for Local Self reliance looked at six studies and found a 25-300% greater economic impact for locally owned wind projects than for absentee owned projects.<sup>68</sup>

**Figure 34 - Local ownership increases economic benefits**



Local ownership increases local economic benefits in several ways:

- Local owners are more likely to contract with local businesses for labor, parts, and services needed to carry out a project
- Local owners receive the profits and spend them in the community
- Local owners control the long term benefits as renewable prices remain stable while fossil sourced energy increases in price
- Local owners pay business income and property taxes that remain in the community and the state

**Ontario's** FIT program has spawned an innovative financial instrument that further encourages local ownership.<sup>69</sup>

Residents of Ontario can invest in local solar power projects by buying "SolarShare" bonds. The \$1,000 bond provides a five percent annual return over five years, and the money is invested in solar power projects across the province.

**Figure 35 - Ontario SolarShare website**



Investors also become voting members of the SolarShare cooperative, a project of the Toronto Renewable Energy Cooperative (TREC) that both develops community-owned renewable energy projects and educates Ontarians about renewable energy, energy conservation and the community power model.

<sup>68</sup> Scale and Ownership of Renewable Energy Published October 2007 John Farrell <http://bit.ly/xlqc81>

<sup>69</sup> <http://bit.ly/Autma6>

## 4. Typical objections to CLEAN-FIT programs

The major objection to CLEAN-FIT programs is the fear that they will raise rates for consumers. It is true that in most cases renewable power is currently more expensive to produce per kWh than dirtier sourced power that nature took millions of years to form and that have been heavily subsidized for decades and continue to be subsidized.

It is also true that the full costs of fossil and nuclear power are not reflected in their price. Costly impacts on public health, our air, land and water and our very climate are left out of the equation, as is the expense of militarily protecting access to fossil fuel supplies.

The prices paid for most renewables under CLEAN-FIT programs will be more than the typical price paid for fossil or nuclear generated power, by the grid in New York State.

However, two key points that have already been explored in this paper bear repeating. The first concerns the Merit Order Effect. It is important to remember the following facts:

In 2008, German consumers paid \$4.5 billion above market rate for renewables purchased under the FIT.

At the same time the Merit Order Effect saved German ratepayers \$5 billion by decreasing the overall price of electricity.

This phenomenon has already played out in Western New York where wind energy saved consumers \$31 million in 2010

While the Merit Order Effect is a complex and counter intuitive concept, it has nonetheless meant that well designed subsidies for renewable energy can actually result in lower costs.

The second key point is that we are already subsidizing all forms of energy and the jurisdictions that are most effectively subsidizing renewables are the ones that are creating employment at home while developing the enviable position of being able to manufacture for export.

We are already spending \$2.9 billion on renewables in New York through the System Benefits Charge. Experience shows

that switching to a CLEAN-FIT program would give us a better shot at creating jobs and a bigger bang for our buck in generating clean energy.

### A. CLEAN-FIT and the Six-Cent Law

In New York State, the cost argument against a CLEAN\_FIT program often reaches back to New York's experience with the Six-Cent law.

It started when Congress enacted the Public Utility Regulatory Policies Act of 1978 (PURPA) "to promote long-term economic growth by reducing the nation's reliance on oil and gas, to encourage the development of alternative energy sources and thereby to combat a nationwide energy crisis."<sup>70</sup>

PURPA was meant to encourage both "green", or renewable power, and more efficient use of "brown", or fossil fuel, power through co-generation. However, for a number of reasons, it quickly slid into a program that primarily encouraged "brown" power in New York State.<sup>71</sup> PURPA's main effect was to increase New York's dependence on natural gas cogeneration plants.

PURPA required utilities to buy power from qualifying non-utility power producers. In New York State, PURPA power was priced at 6 cents per kilowatt hour (kWh). Utilities complained that this "Six-Cent Law" added to their costs and increased rates to consumers.

*"The assumption underlying the 'six-cent law' was that rising oil prices and the high construction costs of nuclear power plants would soon make 6¢/kWh a bargain for the buyers. In fact the opposite happened. Falling fuel prices, technological advances, and successful energy-efficiency investments created a surplus of generation that kept the cost of electricity well below 6¢/kWh, and the six-cent law created a substantial subsidy for IPPs and became a source of controversy for the public..."*

*The high cost of these contracts resulted in higher rates for customers. In the 1990s, regulators decided that the best strategy was to allow utilities to buy out the IPP contracts and treat the cost of doing this as a lump-sum loss."*<sup>72</sup>

<sup>70</sup> *Niagara Mohawk Power Corporation v. Federal Energy Regulatory Commission* AG UDG, U.S. Court of Appeals Second Circuit Argued: June 19, 2002. -- September 25, 2002 before Calabresi, Sack, and Parker, Jr., Circuit Judges <http://bit.ly/xTQ6Ej>

<sup>71</sup> *Risky Business?* Entrepreneurship in the New Independent Power Sector Cornell University ILR School, 6-1-2005 <http://bit.ly/zA09zF>

<sup>72</sup> *Alternatives to the Indian Point Energy Center for Meeting New York Electric Power Needs (2006)*, Board on Energy and Environmental Systems (BEES) <http://bit.ly/wWem1e>

IPP is the acronym for Independent Power Producer - a non-utility generator of power. IPPs were rare before PURPA was passed. When the utilities were forced to sell their generating facilities under deregulation, IPPs were the companies that purchased them. The board of directors of the Independent Power Producers of New York includes the major power generators in the state such as Entergy, AES and NRG.<sup>73</sup>

On December 15, 2011, the Buffalo News trumpeted the projection that National Grid's residential consumers would see an average 6% decrease in their bills. The decrease was attributed to a PSC decision that the "Competitive Transition Charge" (CTC) was no longer necessary. The charge:

*"which National Grid collected from customers to the tune of \$573 million this year -- was put in place as part of the 1998 rate plan for the former Niagara Mohawk. The charge was designed to reimburse the company for the costs of buying out some high-priced federally and state-mandated power supply contracts with independent power plants."*<sup>74</sup>

What the News article fails to mention, but what the Syracuse Post-Standard noted<sup>75</sup> is that the CTC was also instituted to help Niagara Mohawk (now National Grid) recover losses incurred when it sold its Nine Mile 1 and 2 nuclear plants.

Both CLEAN-FIT and the Six Cent Law mandate that utilities buy power at a fixed price. NY utilities and elected officials have cited this similarity, and the cost impacts of the Six Cent Law, as a reason to reject CLEAN-FIT programs. For this reason, it is important to define how CLEAN-FIT differs from the Six Cent Law.

In essence, the context in 2012 is far different that it was in the 1980's. Led by Germany, and more recently China, there is now global competition to create jobs and wealth through leadership in developing renewable energy. PURPA did not focus on creating jobs, while the production of distributed electricity generation through a CLEAN-FIT program is an industrial development policy that could be a significant job generator for New York State.

The "Made in New York" renewable energy promoted through a CLEAN-FIT program avoids the export of New York dollars to other regions and other countries

to pay for increasingly expensive fossil fuels. It also has a stabilizing effect on power prices.

Solar, wind, biomass and geothermal heat pump technologies, among others, are becoming more competitive in New York State almost monthly and they would be incentivized under a CLEAN-FIT program. The natural gas plants that dominated under the Six -Cent law are not eligible under CLEAN-FIT programs.

In addition, there was no flexibility, designed to protect consumers, built into the Six Cent Law. Under that law, the price remained at 6 cents regardless of circumstances. Utility consumers were stuck with the consequences when prices didn't rise above 6 cents as expected.

In contrast, CLEAN-FIT programs often have a built-in degression factor where rates for new renewable projects are reduced automatically on an annual basis. The table below shows the 2012 degression rates for Solar PV under Germany's Feed-In Tariff.<sup>76</sup> The degression rate is automatically adjusted to encourage the market to meet the growth target of 3,500 Megawatts per year.

**Figure 36 - Solar PV degression rates in Germany**

German Solar PV Degression EEG 2012			
Growth Corridor			
MW/yr	Base Degression	Additional Degression	Total
1,500	-9%	7.5%	-1.5%
2,000	-9%	5.0%	-4.0%
2,500	-9%	2.5%	-6.5%
3,500	-9%	0%	-9%
4,500	-9%	-3%	-12%
5,500	-9%	-6%	-15%
6,500	-9%	-12%	-21%
7,500	-9%	-15%	-24%

Degression determined twice per year: March-May, and September-October. The intent is to maintain in the corridor around the desired rate of growth for solar PV of 3,500 MW per year.

[http://www.erneuerbare-energien.de/files/pdf/s/allgemein/application/pdf/eeg\\_nouvelle\\_entwurf\\_2011.pdf](http://www.erneuerbare-energien.de/files/pdf/s/allgemein/application/pdf/eeg_nouvelle_entwurf_2011.pdf)

<sup>73</sup> <http://bit.ly/zuLUD8>

<sup>74</sup> **National Grid users get sharp decrease in electricity rates** Residents' savings will average 11% By Jonathan D. Epstein NEWS BUSINESS REPORTER Published: December 15, 2011

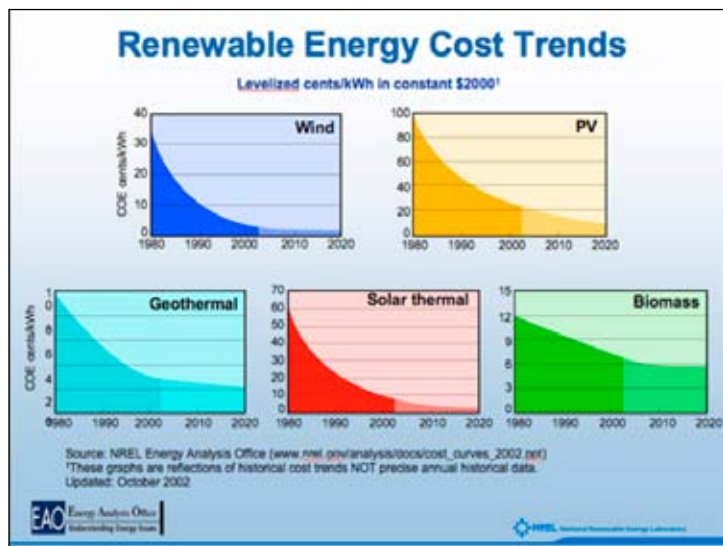
<sup>75</sup> **Update:** State approves significant cut in National Grid electricity rates, December 15, 2011, The Syracuse Post Standard, Tim Knauss <http://bit.ly/w1tm3z>

<sup>76</sup> **Germany passes new renewable energy law for 2012, raises targets and payments**, Paul Gipe, July 24, 2011, grist, a beacon in the smog <http://bit.ly/yQLYmn>

<sup>77</sup> **Regime Change Short-Circuited: Carbon Emissions and Japan's Feed-in Tariff System**, The Asia-Pacific Journal, by Andrew DeWit <http://www.japanfocus.org/-Andrew-DeWit/3249>



**Figure 37 - Renewable energy cost trends**



Degression rates are appropriate because the cost of most renewables has been dramatically reducing over time as this diagram shows.<sup>77</sup>

The 6 Cent Law tied utilities into purchasing relatively expensive fossil fueled power at the same price, year after year. In contrast, a CLEAN-FIT program is designed to capture the job creation benefits of the transition to truly clean energy, which is rapidly decreasing in price.

In addition to the flexibility built into CLEAN-FIT prices, it is possible to limit the rate impact of CLEAN-FIT contracts by setting a cap on the amount of renewables to be purchased under the program. For maximizing deployment of renewables, a cap is not a good idea, but it can be a valuable tool in balancing the need for clean energy with the need for affordable energy.

## B. Federal Pre-emption

Until recently Federal Energy Regulatory Commission (FERC) rulings had cast a pall over efforts to enact CLEAN-FIT programs by various states. FERC's rules, set up to protect ratepayers, bar utilities from paying more than "avoided cost" for power purchased from qualified power producers under PURPA.

As explained earlier, avoided cost is "the cost to the electric utility of the electric energy which, but for the purchase from [the qualifying facility], such utility would generate or purchase from another source."<sup>78</sup>

As the National Renewable Energy Laboratory pointed out: "The problem for state-level feed-in tariff designers is that a utility's avoided cost is likely to be lower than the price necessary to attract and sustain the renewable seller."<sup>79</sup>

States had been bending over backwards attempting to craft legislation that somehow met the avoided cost test while still providing prices that effectively encouraged renewable development.

On October 21, 2010, FERC issued a significant ruling<sup>80</sup> affirming the power of states to require utilities to buy certain amounts of different types of renewable power. States are also able to require that some percentage of solar power, for example, be projects of a certain size range.

FERC ruled that once a requirement is set, for example for solar power from projects under 100 kW, the avoided cost becomes the price necessary to develop solar projects under 100 kW to meet the requirement. This is essentially the type of price that is set under a CLEAN-FIT program.

PURPA still presents obstacles - for example there is a project size limit of 20 megawatts, which forces larger wind projects into a different set of considerations. The ambiguities in PURPA could have been addressed by Section 102 of the 1,428-page American Clean Energy and Security Act. This section was titled CLARIFYING STATE AUTHORITY TO ADOPT RENEWABLE ENERGY INCENTIVES.<sup>81</sup> The bill languished in a gridlocked Congress, but the provisions of Section 102 could be reintroduced as a stand alone bill and passed at any time.

For now though, FERC's October 2010 ruling gives New York a clear opportunity to design and implement an effective CLEAN-FIT program consistent with PURPA.

**78** 16 U.S.C. § 824a-3 (2006); see, e.g., Connecticut Light and Power Company, 70 FERC ¶ 61,012, at 61,023, 61,028, reconsideration denied, 71 FERC ¶ 61,035, at 61,151 (1995), appeal dismissed, 117 F.3d 1485 (D.C. Cir. 1997) (Connecticut)

**79** Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions Technical Report NREL/TP-6A2-47408 January 2010 <http://www.nrel.gov/docs/fy10osti/47408.pdf>

**80** ORDER GRANTING CLARIFICATION AND DISMISSING REHEARING (Issued October 21, 2010) UNITED STATES OF AMERICA FEDERAL ENERGY REGULATORY COMMISSION, Before Commissioners: Jon Wellinghoff, Chairman; Marc Spitzer, Philip D. Moeller, John R. Norris, and Cheryl A. LaFleur. <http://1.usa.gov/Z5DzW>

**81** 11th Congress, HR 2454 AN ACT To create clean energy jobs, achieve energy independence, reduce global warming pollution and transition to a clean energy economy. Section 102 CLARIFYING STATE AUTHORITY TO ADOPT RENEWABLE ENERGY INCENTIVES [http://en.wikipedia.org/wiki/American\\_Clean\\_Energy\\_and\\_Security\\_Act](http://en.wikipedia.org/wiki/American_Clean_Energy_and_Security_Act)

## C. Spain's solar market crash

In 2007, Spain adopted an overly generous solar feed-in-tariff. The FIT had no degression mechanism and quickly overheated the market. The expected progress under the FIT was 400 MW by 2010. Instead over 3,000 MW were installed in the first 18 months of the program.

The flood resulted in higher costs to consumers, a backlash, a government announcement that rates would be cut by 30% in September of 2008, and another flood as developers rushed to meet that deadline. In the wake of the reduction and a cap of 500 MW that Spain imposed, demand fell, causing layoffs in the Spanish solar panel industry.

In the wake of Spain's problems, many FIT critics and climate deniers- some gleefully - pointed to Spain as a reason to turn away from incentivizing renewables. While the Spanish experience is a cautionary tale, it would be far more productive to learn from the experience than to use it as an excuse to reject the mechanism outright.

A New York Times article summarized the lessons learned thusly: <sup>82</sup>

*"The photovoltaic market has been cutting its costs rapidly, and the Spanish tariff, with its high rates, created an artificial market, developers said. And unlike Germany, Spain had no system built in to reduce tariff rates if its capacity targets were exceeded. Indeed, there were no stepped reductions, or degressions, at all. There was no ability to react..."*

*Spain will remain a viable solar market, most in the industry agree. But the whole process could have been much less painful with a bit more foresight."*

The article notes that Spain now has a built-in mechanism for quarterly reviews of the PV prices. Also, a loophole that had overpriced larger ground mounted systems has been fixed. The current emphasis is on roof-mounted systems - which tend to deliver power closer to home and be owned by local consumers.

## D. Other Models/Strengths and Weaknesses

### 1) Renewable Portfolio Standard (RPS)

Renewable Portfolio Standards such as New York's are important commitments by states to increase the amount of clean, renewable power in their energy mix. There are

many possible techniques for states to stimulate the projects needed to meet an RPS. CLEAN-FIT programs are one such technique, and on the basis of the evidence, we have argued that they are in fact the most effective one.

### 2) Public Procurement

Another model for the transition from fossil and nuclear power to clean power is public procurement. For example, on June 10, 2001, Governor George Pataki signed *Executive Order No. 111* to promote "Green and Clean" State Buildings and Vehicles. The order was been renewed several times by subsequent governors, most recently by Governor Andrew Cuomo in January 2011. Among other provisions, it required that all State agencies purchase a certain portion of their electricity (at least 10 percent by 2005 and 20 percent by 2010) from renewable sources.

The quandary with the public procurement method is making it work. State University campuses for a number of reasons are among the most likely of state institutions to have implemented *Executive Order 111*. Yet an August, 2010 study released by Comptroller DiNapoli found that SUNY was purchasing "some of its power from renewable sources, but not enough to meet the 10 percent target." <sup>83</sup>

Once again, it could be argued that the development of a CLEAN-FIT program, under which the state would issue a standard offer contract for renewables using a CLEAN-FIT pricing format would probably have been the most effective way to reach the goals of Executive Order 111.

Another way in which public procurement can blend with the CLEAN-FIT concept is in the issuance of power purchase agreements by entities such as the NY Power Authority. For example, NYPA could offer CLEAN-FIT prices to meet 20% of its energy supply with new renewable sources.

### 3.) Renewable Energy Credits

In New York State many clean energy activists and organizations have concluded that passage of a CLEAN-FIT program is a political impossibility. They cite the strength of the utility, fossil fuel and conservative business lobbies that have a strong hold on the legislature.

They also site the legacy of the Six Cent Law, which was blasted incessantly in the press for raising utility rates, and which leaves politicians wary of anything that can be similarly construed.

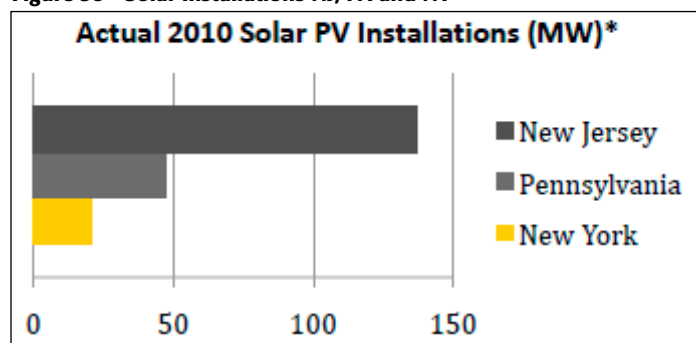
<sup>82</sup> Spain's Solar Market Crash Offers a Cautionary Tale About Feed-In Tariffs By Paul Voosen of Greenwire, New York Times, August 18, 2009 <http://nyti.ms/wYTYuy>

<sup>83</sup> Comptroller's Report 2010-F-15, August 19, 2010 <http://osc.state.ny.us/audits/allaudits/093010/10f15.pdf>



In addition, they have also witnessed progress in neighboring New Jersey, which in 2010 alone installed more than New York's entire historical installed capacity.

**Figure 38 - Solar installations NJ, PA and NY**



As a result, the main form of renewable incentive considered in Albany has been the Solar Renewable Energy Credit or SREC, based on the New Jersey model. In the 2010 legislative session SRECs were proposed in the Solar Industry Development and Jobs Act (SIDJA) (S-4178A Maziarz and a similar but not identical A-5713C Englebright). This bill, like New Jersey's, relies on Solar Renewable Energy Credits (SRECs) to boost solar development.

The SREC bill, as amended in the 2011 session,<sup>84</sup> would have required utilities to supply a percentage of their electricity from solar each year. In the senate bill, starting with 0.15 % in 2013, it would progress to 1.5% by 2025. As a comparison, the German Solar Industry Association estimates that the share of solar power in the German electricity mix will increase from around 4% in 2012 to approximately 7% percent in 2016.<sup>85</sup> They are aiming to top 10% by 2020.

Under the SREC program, NYPA and the Long Island Power Authority would need to supply 2.5% of their electricity from solar by 2025. Utilities would need to procure SRECs to satisfy these requirements. SRECs are defined in the bill as follows:<sup>86</sup>

*" 'SREC' means the environmental attributes associated with one megawatt hour of qualified solar energy generation."*

An SREC can be sold separately from the electricity. The price of an SREC is determined by the market forces of supply and demand, as moderated by the ability of utilities to meet their SREC requirements.

The bills require differing percentages of the SRECS to come from small projects and from projects not owned by the utility. They also allow for the utilities to develop solar projects of their own to meet their SREC obligations. This would be a major departure. One of the core principles of utility deregulation in NY is the arms length separation of generation companies from the distribution companies (utilities).

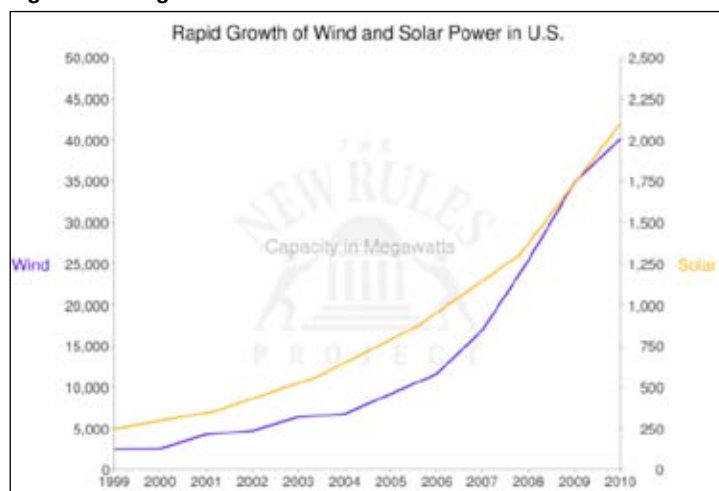
Utilities that fail to meet their quota would be required to forfeit an alternative compliance payment to NYSERDA to use for incentivizing other solar development.

An SREC bill, with a firm commitment to increase solar development, would certainly be an improvement over the status quo in New York. However, a CLEAN-FIT program would be better for several reasons:

- **SRECs are for solar only.** The vast majority of New York's new renewable energy has come from wind, and wind continues to have the best capacity for increasing NY's renewables and cutting greenhouse gases due to electricity production. Solar undoubtedly has a key role among renewable energy sources. It is ideal for smaller scale distributed projects and its costs are falling rapidly. However, it would be shortsighted to incentivize solar while neglecting other renewables.

The chart below<sup>87</sup> illustrates that solar and wind are growing at similar rates in the US. However, looking at the left and right scales, it is evident that wind power production is currently about 20 times that of solar.

**Figure 39 - US growth of wind and solar**



<sup>84</sup> <http://bit.ly/yDx4mt>

<sup>85</sup> Further solar power expansion in Germany leads to minimal additional increase in electricity price, by: BSW-Solar <http://bit.ly/zH0d66>

<sup>86</sup> Ibid., page 4

<sup>87</sup> Democratizing the Electricity System A Vision for the 21st Century Grid, John Farrell, New Rules Project, June 2011 <http://bit.ly/ybqHw9>

The state needs to move forward aggressively on all fronts if it is to do its part in forestalling the worst impacts of climate change and a comprehensive incentive that embraces all legitimate renewables needs to be in place.

- **Solar is the most expensive commercially available renewable.** By exclusively incentivizing solar, SRECs risk leaving other more cost-effective forms of renewables behind.
- **A properly developed CLEAN-FIT program would produce solar at a lower cost.** As cited previously, CLEAN-FIT programs provide transparency, longevity and certainty (TLC). These features mean that investors require lower rates of return and creditors require lower interest rates. The result is lower costs to the ratepayer.
- **CLEAN-FIT programs level the playing field for homeowners, small businesses and non-profits to participate in the process.** As seen in Ontario, Germany and elsewhere, CLEAN-FIT programs take the complexity and some of the expense out of renewable development, making it possible for ownership to become widespread throughout our communities.
- **Jobs** — The stability of a CLEAN-FIT program provides a far better environment for the jobs created by both developers and manufacturers of renewable technology.

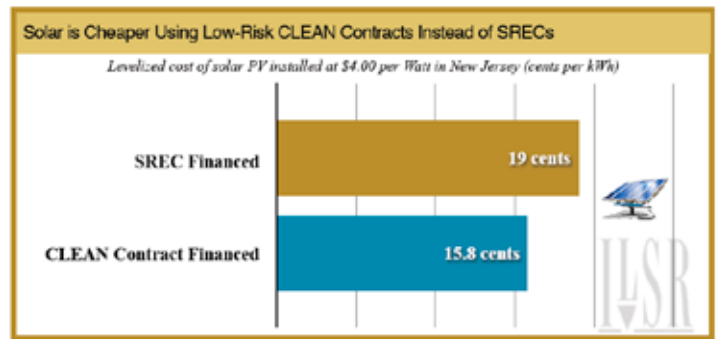
In October of 2011, the Institute for Local Self Reliance published CLEAN-FIT vs. SRECS, *Finding the More Cost-Effective Solar Policy*.<sup>88</sup> This paper examines the recent crashes in US SREC markets and takes an in-depth look at the relative merits of the two incentive programs.

The report is well worth reading in its entirety, but several highlights are worth injecting at this point:

*"SREC markets are subject to significant volatility, creating a high risk atmosphere where developers require higher rates of return and increasing the ratepayer cost of solar by 10 to 30%. The recent collapse of five state SREC markets highlights this volatility."*<sup>89</sup>

ILSR used a model that projected the cost of solar to consumers of 3 cents per kWh less under a CLEAN-FIT program than under the SREC program.

**Figure 40 - Comparative costs of solar with CLEAN-FIT vs. SRECS** <sup>90</sup>



The rest of this section will be quoted from the ILSR study.<sup>91</sup>

*"Interestingly, the value of SRECs have not tracked the installed cost of solar PV projects, as reported by the Lawrence Berkeley National Laboratory in Tracking the Sun III. While the New Jersey market SREC prices have slowly increased from \$250 to over \$600 since July 2008, the installed cost of solar has fallen.*

*Of course, the key to SREC markets is that they are not meant to accurately price the cost of solar power. Rather, SREC prices indicate whether the supply of solar electricity is too high or too low to meet the state mandate.*

*That's why the German feed-in tariff (a.k.a. CLEAN-FIT) is – remarkably – a better measure of the cost of solar power in New Jersey than the New Jersey SREC market. The following graphic shows how the German feed-in tariff price for small rooftop solar (green) has matched the installed cost of solar in New Jersey (blue) much closer than the SREC price (purple)."*

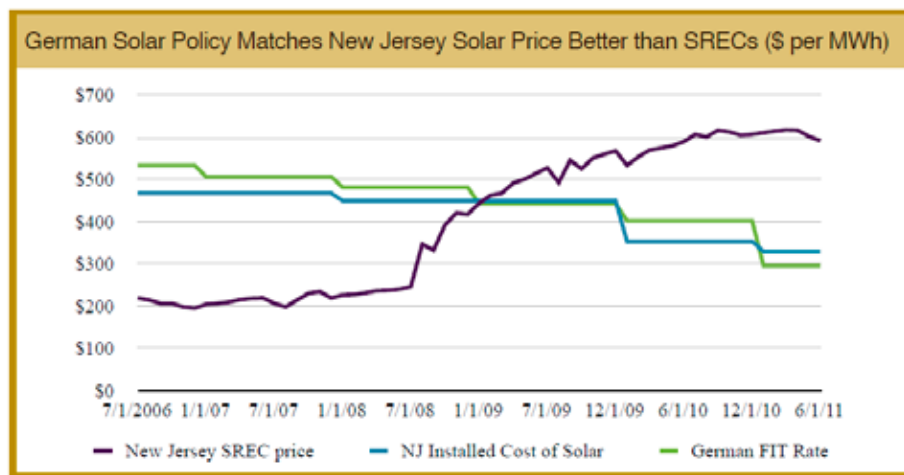
<sup>88</sup> CLEAN-FIT vs. SRECS, *Finding the More Cost-Effective Solar Policy*, John Farrell, Institute for Local Self-Reliance, October 2011 <http://bit.ly/wo6JK7>

<sup>89</sup> Ibid. page 1

<sup>90</sup> Ibid. page 1

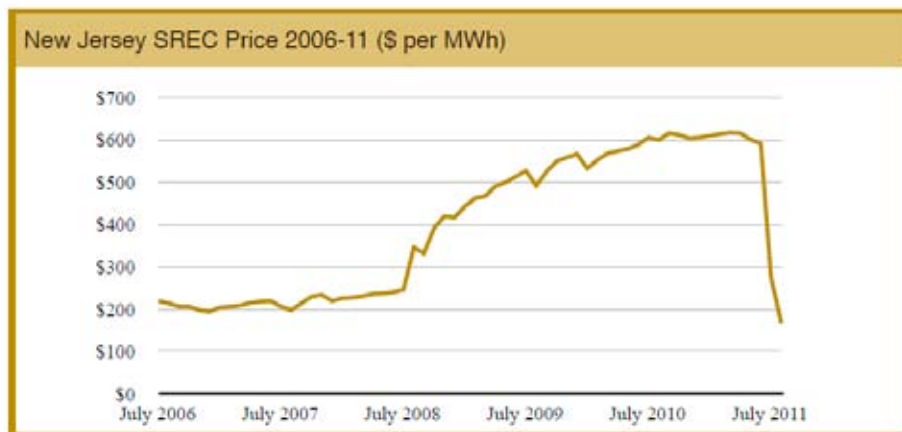
<sup>91</sup> Ibid. page 18

**Figure 41 - German FIT matches NJ costs better than NJ SRECS**



*"The next chart shows what happens when the SREC market works as intended. updating the previous chart of New Jersey SREC prices with the latest data. A shortage of solar power relative to the state's mandate pushed SREC prices near to the legal price ceiling by mid-2011. But in July, it became clear that the 2012 contract year would provide the first solar surplus, causing prices to drop precipitously.*

**Figure 42 - New Jersey 2011 SREC price crash <sup>92</sup>**



*Clearly, New Jersey's SREC market did support the development of solar, with nearly 140 MW installed by the end of 2010. But it's hard to see how it would be consistently cost effective for ratepayers.*

*Ultimately, the state mandate means solar installations will continue. But the issue for New Jersey is whether the discontinuity between SREC values and the installed cost of solar means higher costs for ratepayers and an unsustainable boom-and-bust cycle for solar installers."*

<sup>92</sup> Ibid.

## 5. Conclusion

A recent review of the International Energy Agency's (IEA) annual **World Energy Outlook** report notes. *"The IEA... warned that if our energy infrastructure is not rapidly changed, the world will head towards irreversible climate change in five years. At the same time the US Department of Energy released new figures showing a 'monster increase' in greenhouse gas emissions."*<sup>93</sup>

*"The door is closing,"* Fatih Birol, chief economist at the International Energy Agency, said. *"I am very worried — if we don't change direction now on how we use energy, we will end up beyond what scientists tell us is the minimum [for safety]. The door will be closed forever."*<sup>94</sup>

This paper is focused on the best way of bringing jobs and renewable energy to New York State. Given this limited focus, we have assumed readers understood the urgency of averting runaway climate change. But, that urgency is an important factor in understanding the necessity of getting our renewable energy policies right in a timely fashion. We emphasize it here to help set the context for this conclusion.

Energy policies for environmental organizations center on preventing, minimizing and terminating negative environmental impacts. As the world transitions to renewables, energy policies also present enormous opportunities to shift to sustainable production and the creation of green jobs as Germany and Ontario have demonstrated. It is the direct and indirect jobs created, as well as the businesses created or stimulated, that provide the social, economic AND political constituencies to move to a greener economy and a thriving environment.

New York State faces several significant impacts from its energy policy that need to be addressed. These center on three fuels used for generating electricity:

- Natural gas — the threatened opening of New York State to hydrofracking promises serious impacts to New York's water supplies, rural communities and public health.
- Nuclear — The Fukushima catastrophe has reinforced New Yorkers' resolve to close the Indian Point nuclear complex. The Nine Mile Point and Fitzpatrick nuclear plants near Oswego are also currently under review by the Nuclear Regulatory Commission (NRC) because they are among the 23 Fukushima style General Electric Mark I Boiling Water Reactors operating in the U.S.<sup>95</sup>
- Coal — In addition to being widely recognized as the worst source of greenhouse gases, coal is a major source of mercury, acid rain, and health-threatening small particle pollution. Western New York, which is more heavily dependent on coal than the rest of the state, needs to have a coherent plan for replacing its coal plants without hurting the local economy.

We need to replace these sources of energy by

1. Significantly reducing energy consumption and demand, and
2. Fast tracking renewable energy development

These fundamental clean energy strategies are of the utmost importance in protecting New York's environment and preventing the worst impacts of climate change. They are also one of the most promising ways out of the debilitating unemployment and economic malaise that is crippling New York's economy, particularly upstate.

New York needs to adopt the most effective program possible to develop its renewable energy resources. The incentives that New York has tried to date have failed to produce clean energy at a fast enough pace, and have produced relatively few jobs, especially in the manufacturing sector.

An SREC program for New York would be a step forward, but a well-designed CLEAN-FIT program would be far more effective at creating jobs and generating renewable development. We recommend that environmental, labor and clean energy organizations focus their efforts on the "whole loaf" solution of a CLEAN-FIT program. Any endorsement of SRECs should be given only in the context of advocacy for a CLEAN-FIT program.

A CLEAN-FIT program offers a proven and effective way to fast track renewable energy development. As an added benefit, it is also the most effective way to create jobs and transition New York to being a force in the green economy.

<sup>93</sup> IEA warns world headed for irreversible climate change in five years, greenhouse emissions soaring Greenblog, Red and Green Science, <http://bit.ly/zE47id>

<sup>94</sup> World headed for irreversible climate change in five years, IEA warns If fossil fuel infrastructure is not rapidly changed, the world will 'lose for ever' the chance to avoid dangerous climate change, Fiona Harvey, environment correspondent, Wednesday 9 November 2011 05.01 <http://www.guardian.co.uk/environment/2011/nov/09/fossil-fuel-infrastructure-climate-change>

<sup>95</sup> It's Time: Demand Permanent Shutdown of GE Mark I reactors in the U.S., Change.org <http://www.change.org/petitions/its-time-demand-permanent-shutdown-of-ge-mark-i-reactors-in-the-us>