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US wind industry threatened by tax credit withdrawal



Martha Wyrusch urged an extension of the Production Tax Credit

With the withdrawal of a tax credit, the US wind industry is looking at a dramatic slowdown in 2013. Junior Isles

The withdrawal of a tax credit for wind power production at the end of the year could result in massive layoffs and a delay or abandoning of projects.

The move is expected to have major ramifications in states such as Illinois, where 13 892 MW of wind projects are awaiting connection to the grid. Illinois, which benefits from strong midwestern winds, is home to more than 150 companies that support the wind industry. At least 67 of those companies make turbines or components for wind farms.

The wind power credit provides a 2.2 per cent tax credit for the purchasers of

wind turbines. Vestas officials have been seeking a multi-year extension of the tax credit as a way to ensure future sales, but Congress has been authorising the credit year to year. It is estimated to cost the treasury about \$3.5 billion a year.

It was thought there would be little opposition to continuing the tax credit and the decision by a House and Senate conference committee to leave the tax bill out came as a surprise.

The outcome left a Colorado congressional delegation scrambling for a new strategy – along with a new legislative vehicle to carry the wind

power credit on behalf of Vestas American Wind Technology, which has four wind turbine plants in Colorado.

In December Martha Wyrusch, president of Vestas American Wind Technology, Inc., gave testimony to the U.S. Senate Finance Subcommittee on Energy, Natural Resources & Infrastructure to urge an immediate extension of the Production Tax Credit (PTC).

"An extension of the PTC is necessary for the continued employment of the 80 000 people working in the U.S. wind industry," said Wyrusch.

"Wind energy has grown dramatically in the past several years, creating a manufacturing renaissance in the US, and the PTC has been a significant driver in that growth. The jobs at stake, which include 20 000 people in the US wind industry's manufacturing sector and technical jobs throughout rural America, are skilled-labour positions with competitive wages and medical and retirement benefits."

Wyrusch warned that if the PTC is not extended, hundreds wind industry suppliers in the US employing

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Path cleared for offshore wind

The completion of a study examining how offshore wind development would affect the US Mid-Atlantic Coast essentially clears the way for wind farm lease sales off the coasts of Delaware, Maryland, New Jersey and Virginia.

A recent study by the Interior Department concludes that it threatens "no significant environmental and socio-economic impacts" and says lease sales could begin by the end of this year.

"Offshore wind holds incredible potential for our country, and we're moving full-steam ahead to accelerate the siting, leasing and construction of new projects," Interior Secretary Ken Salazar said in a statement.

On top of unveiling the environmental assessment, the department also formally asked wind power

companies to specify which tracts they might want to lease.

Unlike Europe, which is experiencing huge growth in offshore wind installations, especially in the UK, the US has made no progress in establishing offshore projects. It expects this to change soon. Cape Wind – a 420 MW project with 130 turbines in Massachusetts' Nantucket Sound – has already received federal approval, and construction could begin this year.

Meanwhile, construction of a smaller project in Rhode Island – Deepwater Wind's 30 MW Block Island project – is planned to begin in 2013 or 2014. Other companies, including Apex Wind Energy and Fisherman's Energy, are also jockeying for space on the Mid-Atlantic Coast.

Salazar announced the results of the

study under President Obama's "all-of-the-above" energy strategy, outlined during January's State of the Union address. "When it comes to powering our nation's homes, businesses and economy, we need to take an all-of-the-above approach to safely and responsibly developing our domestic energy resources," Salazar said. Obama's plan involves 10 GW of offshore wind generating capacity by 2020, and 54 GW by 2030.

Bureau of Ocean Energy Management (BOEM) Director Tommy Beaudreau said at the beginning of February: "We are moving toward commercial-scale offshore wind energy leasing in the mid-Atlantic and adding the necessary tools to offer those leases."

"We considered public input and conducted a thorough analysis to ensure future projects are sited in the

right places, where the wind energy potential is significant and where environmental effects and conflicts with other uses can be minimised and managed."

Since the new environmental study was broad, he said the BOEM will conduct further site- and project-specific analysis before issuing permits.

Deputy Interior Secretary David Hayes described the Mid-Atlantic as a "sweet spot" for tapping offshore winds and called the latest announcement an early step in building "a world-class offshore wind industry".

This was echoed by the American Wind Energy Association, which called the move "a significant milestone in efforts to launch a vital new American offshore wind industry".

Technology

A leap forward for solar thermal panels

A new, high-vacuum flat collector at Masdar City could change the solar industry.
Junior Isles

Piero Abbate is supremely confident that the technology he passionately describes will “change the world”. “We are going to change the solar thermal industry. We are introducing the first panel that can enable air conditioning in real, daily operating conditions,” exclaimed the chief executive officer of Swiss company TVP Solar at this year’s *World Future Energy Summit* in Abu Dhabi.

In January TVP Solar announced that a field of revolutionary solar panels installed at Masdar City is to begin an 18-month test programme where it will be compared against concentrating solar thermal collectors for a solar cooling application.

Solar thermal technology has a long history and although there is a great deal of publicity surrounding its use for concentrated solar power (CSP) electricity generation, the main application is for residential heating applications such as sanitary hot water and ambient heating.

Abbate pointed out: “This market is huge. There are 30 million m² of collectors. This corresponds to one third of the world’s PV market – just for sanitary water heating. China alone has 20 million m² of collectors.”

Collectors can generally be segmented into two groups of products: traditional collectors for applications below 100°C i.e. predominantly residential heating applications; and concentrating solar collectors for applications that require higher temperatures e.g. industrial process heating or air conditioning/cooling.

TVP Solar has developed MT-Power, what it claims is a unique collector that can achieve temperatures of 325°C without the use of mirrors for concentrating the sunlight. Abbate said: “This is the only technology that can do this. The advantage of being able to consistently operate in any climate condition at 200°C means we can also use it to drive an absorption chiller for air conditioning/cooling.”

Absorption chillers are typically driven by gas, which is used to heat the working fluid to 180°C. TVP Solar’s technology, allows the heating to be done by solar energy. The MT-Power panels at Masdar City are designed to provide over 70 per cent solar-to-cooling conversion efficiency operating at 180°C to drive double effect absorption chillers.

The departure from concentrating mirrors for this application is



significant in hot dusty environments such as the Middle East, according to TVP.

Abbate explained: “The sun delivers 1000 W/m² no matter where you are on the Earth. What differs between the Middle East and northern countries is the number of hours of sunlight you get per day. The issue is how much of the sun’s power we can convert [to heat].”

Concentrating solar mirrors need to track the sun. However, the mechanical moving parts to move the mirrors require regular maintenance in dusty environments. Further, a concentrator is an optical device wherein the light has to hit the mirror at precisely 90°. It depends on direct light, and cannot convert energy when a cloud covers the sun because the light is diffused.

A traditional collector does not suffer these drawbacks. No tracking, and therefore no maintenance, is needed. Secondly, they can capture diffuse light, i.e. light from any angle, which means more sunlight can be captured for conversion to heat. “A country like Abu Dhabi receives 1950 kWh/m² per year from the sun. However, only 1100 kWh/m² is direct, the remainder is diffuse. This means flat panels are able to capture 45 per cent more energy output from the sun in Abu Dhabi,” noted Abbate.

The ability to capture diffuse light also means that the panels do not need regular precision dust cleaning as with concentrating mirrors.

“We still capture the light even if the panel is covered by dust. Although the dust [particles] change the angle of the sunlight, we still capture it as diffuse light,” said Abbate.

Existing traditional collectors, however, cannot heat water above 100°C. There are two types of traditional collector – flat plates and evacuated or vacuum tubes – but these cannot heat above 100°C and so are limited to low temperature heating applications.

In a flat panel, the sun’s energy heats

the glass panel absorber and conducts this heat to the internal pipes, which in turn heats the fluid used for the end process. The efficiency of the panel depends on the heat lost in transferring heat to the fluid through conduction, convection and emissivity.

“Convection is the real issue,” said Abbate. TVP substitutes glass wool insulation for a high-vacuum to minimise convection losses. Although the industry has long realised that a vacuum is the best form of insulation, manufacturers have been unable to produce a flat panel design that uses high-vacuum.

TVP has developed and patented an inorganic and flexible glass-metal seal that is the foundation of its high-vacuum flat solar thermal panels.

Abbate gave a brief history lesson in explaining the unique glass-metal seal invented by Dr. Vittorio Palmieri. “In 1898, Thomas Edison invented how to seal glass to metal to keep the electrodes inside a vacuum in the light bulb.

Then in 1953, RCA invented the second glass-to-metal seal for sealing the glass canopy to the electron gun in the cathode ray tube in televisions.

TVP Solar says it has invented the third glass-to-metal seal in history. “People have been trying to make vacuums in a flat plate for 50 years but no one was able to do it on a commercial scale,” said Abbate.

“When you have a high-vacuum [inside] it is the same as putting a pressure of 10 tonnes/m² on the glass. You have to seal in a way that the glass remains fixed to casing. TVP Solar has developed a perimeter seal all around the panel that seals the glass panel to the metal casing. This is a radical innovation.”

The company says that its collectors have several advantages over its competitors. With an efficiency of 62 per cent at 180°C, they operate at a much higher efficiency than any other solar thermal collector. TVP will not disclose the cost of the collector until October this year but claims they cost less than any other solar thermal collector. “It has a similar cost profile to other flat plate panels. A flat plate costs €150-250/m². Concentrators cost €400-700/m²,” noted Abbate.

High performance and a compact layout mean MT-Power has a low cost per watt profile. “We have the lowest installation footprint. This is crucial for roof installations since it means we can deliver more power from fewer square metres,” according to Abbate. He added: “Its lifetime is expected to exceed 20 years.”

Abbate believes there are so many things in favour of the technology that it will change the industry.

“I don’t believe in an industry that says, we are renewable but we will

cost a bit more. The world is in a crisis and we have to be honest; no one wants to pay more. This [panel] will cost very little to produce. It will compete with fossil fuels.”

The first installation at Masdar City is an important start for the future deployment of the MT-Power panel.

“We are so confident of our product, we have put the panels between the two best concentrating technologies on the market. Over the next six months we will demonstrate how much better we are,” said Abbate.

TVP aims to deploy further MT-Power solar fields during 2012 for solar air-conditioning applications with a double stage absorption chiller in a hybrid natural gas/solar system configuration that will operate on a 24/7 basis, covering peak and base loads.

The company has already started the programme to allow volume production, which will begin in April 2013. The first factory will be in the south of Italy. Production in India, Brazil, the US and the Middle East will follow in the next two years.

With the goal of producing millions of panels at low cost, TVP says it has developed a new manufacturing process that allows it to produce the panels using the same equipment lines used to produce plasma display panels.

Abbate said: “Solar PV panels require €100 million in CAPEX investment to generate €100 million in revenues. We will invest €10 million in CAPEX to generate the same €100 million in revenues. So we are not a capital-intensive industry; we can massively grow with a limited investment.”

Although power generation is an interesting prospective market, MT-Power panels address only applications requiring heat/steam between 100°C-200°C. Abbate says the focus will remain on thermal applications in the short-term. It is easy to see why.

He concluded: “In the residential market, lighting is about 25-30 per cent of the household consumption. Air conditioning, ambient heating and sanitary hot water heating together represents more than 60 per cent. In shopping malls and office buildings etc., air conditioning is the largest source of energy consumption.

“Cooling is the largest and fastest growing energy demand application in the world and it is a trend that will continue as there is more building insulation. So the issue is to serve thermal applications directly with thermal energy to have the best economic and energetic efficiency while maximising emission reduction.

The big mistake today is to use electricity for thermal applications.”

According to TVP, the new panels offer the best performance in any weather condition for any application

