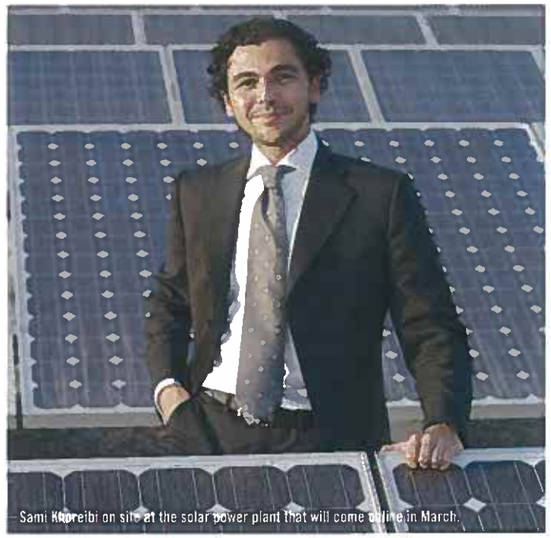
New kid on the grid

Enviromena's solar plant will come online in March. Its grid connection will make it a first for the region


Sami Khoreibi on site at the solar power plant that will come online in March.

Sometime in March the largest grid-connected solar power plant in the Middle East will go live. Built on a 212 000 m² site in Abu Dhabi, the plant is a product of the Masdar Initiative and will ultimately power Masdar City's university. In the meantime though, the renewable energy produced will support the construction of the city itself.

The EPC contractor for the power plant, Enviromena Power Systems, is an Abu Dhabi-based solar systems integrator, designing systems that use existing technology supplied by industry leaders. Relatively speaking, it's also the new kid on the grid, having been formed in October 2007.

"Abu Dhabi is the epicentre of solar power right now," said Sami Khoreibi, the company's president and CEO. "For Masdar this project is the first 10 MW of over several hundred, potentially. Also with Abu Dhabi's recently announced 7% renewable energy target, you are looking at a potential 1-1.5 GW [of renewable generation capacity]."

"Saudi Arabia has also recently announced a 2 MW plant, but I think we'll see much a wider roll out there too," said Khoreibi. "Countries that are comfortable with conventional energy, seem to be able to transfer that comfort to renewables."

The Masdar City plant will produce a peak of 10 MW from its 87 777 solar modules. This massive installation contains two different types of solar panel, thin film and polycrystalline silicon, in a 50:50 split. Thin film panels offer a lower cost per watt, but occupy a larger footprint, compared to the polycrystalline alternatives. Thin film panels are also expected to hold up better to high temperatures, suffering less degradation of peak power output.

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>
> **Sami Khoreibi, president & CEO of Enviromena Power Systems**

"The reason we're using two technologies is that this is a new type of installation for the region and we wanted to see how both would hold up under our unique conditions," said Khoreibi. "We went with proven best-of-breed technologies because we wanted to make sure we were using the best components available. We're not testing anything new, just ensuring that what we had in there was exciting."

Among the unique conditions referred to is the fine dust that will constantly cover the panels and the extreme temperatures to which they will be exposed. Cleaning will be a large component of the operations and maintenance schedule, but Khoreibi points out that this is relatively minimal compared to other technologies. The panels are installed at a fixed tilt, so there are no moving components, further reducing maintenance requirements.

"There are numerous factors you have to put in place when trying to design the most efficient system for the geography and for the footprint," said Khoreibi. "From a cost per-kilowatt-peak perspective, we've designed one of most efficient systems on the planet to date."

So, despite the challenges of the environment, the output of the panels is expected to provide some of the best results available.

"Compared to a panel, say in Germany, which has the largest installed capacity in the world, a panel here produces about twice as much energy, just based on how much sun we get," said Khoreibi. "As long as you keep it clean, it's very straightforward."

In order to do just that as efficiently as possible Enviromena is inviting cleaning companies to take on a portion of the solar plant and trial their particular technologies. This will let it measure results – through the real-time monitored power output of individual panels – and determine the most effective and sustainable cleaning method. This is an essential part of solar development in the region and determining the right cleaning method early on will expedite a wider roll out both in Abu Dhabi and elsewhere.

"Ensuring from the early days that we are using the proper technology and method to operate and maintain the modules will save everybody a lot of time and money," said Khoreibi.

INTEGRATION

Taking on the role of a technology integrator meant being able to make the most of the technologies available on the market. Doing this meant having an experienced design team.

"We were able to hire some very talented individuals, with dozens of years of experience, to head up our design and engineering team," said Khoreibi. "We're also building a staff of bright young engineers who are becoming solar designers.

"One of our goals, to fit with Masdar's sustainability mandate, is to foster local growth and use as many locally sourced projects as possible. For instance we designed our racking locally and used a local fabrication company.

"We're trying to keep the knowledge here. Our long-term success is based on the long-term success of developing the industry in the region and growing the Abu Dhabi-based solar economy."

Although Enviromena is a young company, its team had a well-developed skill set, based on previous projects.

"Members of our team have built utility-scale installations using some of the same modules," said Khoreibi. "They were able to use their experience, from previous plants, that had used the same technology.

"Both module manufacturers – Suntech and First Solar – needed to be comfortable that we had the skills to install their products properly. At the end of the day the reputation of product is also on the line if this wasn't done properly. We also had to meet very stringent sustainability criteria. This plant is an example that you can use sustainable practices and build on time and on budget with them."

Plugging into the city's municipal grid, using inverter technology from SMA in Germany, is a key element in the integration equation, allowing the solar plant to 'virtually store' excess power production for use later.

"This is far more cost-effective than battery technology," said Khoreibi. "It also reduces the challenge of getting people comfortable with the up front capital cost."

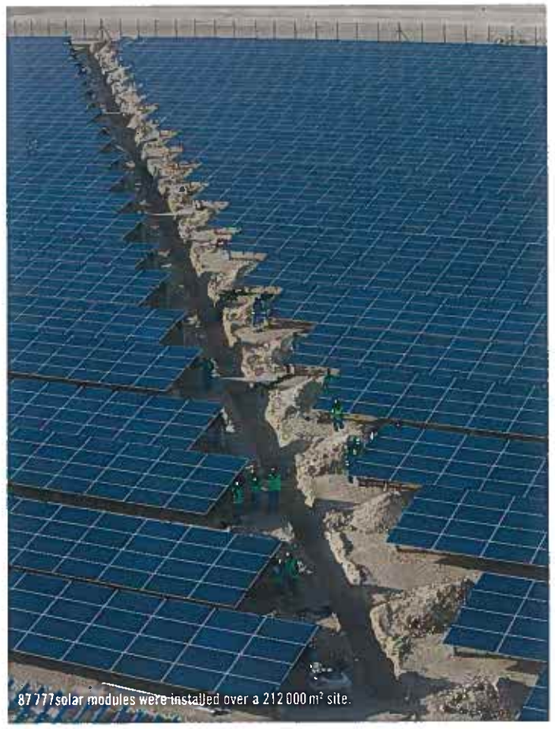
Solar energy always raises uncomfortable cost comparisons with conventional power sources. Improved supply of solar panel modules has helped to reduce costs, which had been kept artificially high by a supply shortfall, but Khoreibi believes that without subsidies or incentives in place, it is not a fair comparison.

"We do need to subsidise or have government support for the implementation of specific technologies, to get over the initial economic hump," he said. "What a lot of countries have done very successfully is promote solar through a rebate and incentive system.

"The most successful solar model is still Germany because it has the feed-in tariff, where power is brought back by the utility at a higher price than conventional energy, bringing down the payback period for the implementation of solar power systems. We hope to see the same thing put in place throughout the region."

Although the company has worked as the EPC contractor on the project, Khoreibi doesn't rule out expanding the company's remit in the future.

"A lot of our strategic investors are companies that also finance solar development, so what we can foresee is Enviromena taking ownership of some of these projects and selling power to the end user," he said. "This end user would not be exposed to the up front capital, but would generally see a slightly higher cost of energy from a kWh perspective."


87 777 solar modules were installed over a 212 000 m² site.

As Environmena looks forward to flicking the switch on its first project in the region, it has other tenders in process. Khoreibi is aware of the significant and growing interest in solar energy in the region. He also knows that the opportunity to get first hand operational knowledge of what it takes to run a plant here, puts Environmena in a prime position to exploit that interest.

"Our goal is to further develop the regional industry in line with the Masdar Initiative. Then we can start having home grown champions first, regional competitors next, then international competitors." Utilities

PROJECT PROFILE
Location: Masdar City, Abu Dhabi
EPC contractor: Enviromena Power Systems
Capacity: 10 MW solar power plant
Footprint: 212 000 m²
Panels: 87 777 solar modules
Panel type: 50:50 mix of thin film and polycrystalline silicon panels from Suntech and First Solar
Inverters: SMA