Advanced Research Projects Agency • ENERGY

FIRST OPEN SOLICITATION

1366 TECHNOLOGIES

COST-EFFECTIVE SILICON WAFERS FOR SOLAR CELLS

PROJECT TITLE:	Direct Wafer: Enabling Terawatt Photovoltaics		
ORGANIZATION:	1366 Technologies (1366)	LOCATION:	Lexington, MA
PROGRAM:	FOA1	ARPA-E AWARD:	$4,000,000
TECH TOPIC:	Renewable Power Generation	PROJECT TERM:	3/1/10 – 11/30/11
WEBSITE:	www.1366tech.com		

CRITICAL NEED

Crystalline silicon wafers are the single largest cost item associated with making solar panels, which capture the sun's energy to make electricity. The high cost of silicon wafers has limited the widespread use of photovoltaic solar cells. Finding ways to lower the cost of silicon wafers would increase the demand for solar energy and help grow the domestic solar energy industry.

PROJECT INNOVATION + ADVANTAGES

1366 is developing a process to reduce the cost of solar electricity by up to 50% by 2020—from $0.15 per kilowatt hour to less than $0.07. 1366's process avoids the costly step of slicing a large block of silicon crystal into wafers, which turns half the silicon to dust. Instead, the company is producing thin wafers directly from molten silicon at industry-standard sizes, and with efficiencies that compare favorably with today's state-of-the-art technologies. 1366's wafers could directly replace wafers currently on the market, so there would be no interruptions to the delivery of these products to market. As a result of 1366's technology, the cost of silicon wafers could be reduced by 80%.

IMPACT

If successful, 1366 would significantly reduce the cost of solar power, making it cost competitive with coal power in some parts of the U.S. within 10 years.

- SECURITY: Most solar panels are made outside of the U.S. 1366's project would encourage domestic production, granting the U.S. greater control over its energy security.
- ENVIRONMENT: Positioning solar energy production as a renewable, environmentally friendly and cost-effective alternative to fossil fuel-based energy production would reduce millions of tons of carbon dioxide from the atmosphere.
- ECONOMY: 1366's project could help the U.S. capture a majority of the annual $20 billion silicon wafer market and motivate solar manufacturers to locate in the U.S.
- JOBS: Widespread use of solar panels could create thousands of high-paying jobs in construction, manufacturing, engineering, and sales.

CONTACTS

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