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The Financial Times reports on the latest developments in the field of amorphous silicon.

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Amorphous silicon consists of an irregular mass of atoms, rather than the regular crystalline structure of orthodox silicon. Amorphous silicon was developed in the late 1960s and early 1970s by scientists from Standard Telephones and Cables (STC) and from Dundee University in Scotland. The Dundee scientists perfected a technique of producing the material from a non-ionised gas called gaseous silane (silicon hydride); the silicon thus derived is deposited on a glass substrata, a process requiring much lower temperatures than conventional silicon production.

The principal application for amorphous silicon is in solar cells. Sanyo of Japan, for example, manufactures around 5m amorphous-silicon solar cells per month, many of which are used in pocket calculators. Total sales of all types of solar cells are currently estimated at around $100m to $150m per year, with an annual figure of up to $10bn projected for the end of the century. Energy Conversion Devices (ECD) of Michigan, USA, also manufactures amorphous-silicon solar cells in conjuction with Sohio and Sharp at plants in the USA and Japan, and is currently researching into the use of the material for large electronic switching displays and memories. Minnesota Mining and Manufacturing (3M), Polaroid and Solarex, a subsidiary of Amoco, are among the other US companies researching into further uses of amorphous silicon.

Another US company, Chronar, manufactures amorphous-silicon cells at plants in Port Jervis, New Jersey, USA, and at Bridgend in Wales, with a further plant scheduled to be opened in France in 1986. The company's annual output of cells has a potential capacity of 1 MW of electricity. Worldwide production of amorphous-silicon cells has an estimated potential capacity of 10 MW of electricity per year.

Currently, amorphous solar cells are produced mainly in the form of panels measuring one square foot, with a capacity of 6 to 10 watts. However, Glasstech Solar of Colorado, USA, which was founded by Dr Arun Maden, an Indian-born scientist who was involved in the development of amorphous silicon at Dundee University in the early 1970s, intends to manufacture panels measuring 3ft by 2ft on a substrata of tempered glass. Dr Maden calculates that such cells would be able to produce electricity at a cost of around $1.85 per watt; current production costs amount to between $5 and $10 per watt.

Photocopiers manufactured by Canon of Japan contain a photo-receptor drum coated with a layer of amorphous silicon; drums treated in this way are more durable than the conventional selenium-coated drums. Similarly, Mitsubishi of Japan uses amorphous silicon as an anti- static coating on TV screens, and Pilkington of the UK incorporates a heat-reflecting layer of the material in energy-saving glass. A number of Japanese companies, as well as the General Electric Company (GEC) of the UK, are developing the use of amorphous silicon for large TV screen displays.

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