Earth's physical resources: renewable energy.
Photovoltaic and solar thermal panels

Narrator:
Photovoltaics is also flourishing in other European countries.

At Amersfoort in Holland, PV has been directly integrated into a large new housing development.

It effectively has its own one megawatt solar power station.

It's part of a local response to the Dutch Government's national renewable energy targets.

Erik Lysen:
The development of photovoltaics is, is still going as planned in the Netherlands. We had planned to introduce about slightly less than ten megawatts in the year 2000, er and we have realised more than twelve, last year another five, so we come to 17 megawatt, which is fairly good for a small country like the Netherlands. We focus on installing photovoltaics on buildings, because we have the structure already, and we have the demand close to the supply so I say it's very attractive for the owners of those buildings to have a solar panel on their roof, and to know that, a large share of the electricity is generated on their own roof.

Franz Vlek:
Somewhere in '92, I guess it was, the city of Amersfoort was developing this area and they allowed for experiments in the renewable and sustainable context and we decided we should aim for a big project with PV in this area .

One of the problems when we started with the one megawatt project was that there were very few people that understood a little bit at least about designing with PV and therefore we had to convince the City Hall first, then the property developers, and after that the architects, of course.

Gijs van den Boomen:
The first issue was that they had to integrate the photovoltaic panelling into their design and the way they went about it was very different from one architect to another.

Narrator:
It's not only the roof designs that are different. The photovoltaic panels themselves come from different manufacturers, with Shell Solar and BP Solar as the main suppliers.

Gijs van den Boomen:
People have bought their separate houses from real estate developers but the construction on the roof where the solar panels are has actually stayed the property of the energy company, so they actually lease their roof from the energy company.

Narrator:
But the householders get a great deal in return.

Even on a misty morning like this, the photovoltaic panels generate a significant amount of electricity.

It's just before 9 am and the panels are supplying eighty nine percent of the energy demands within the house.

Increase the demand and more energy must be purchased from the grid.

But when the sun comes out, the PV panels start to repay the energy debt.

On this sunny afternoon, around four kilowatts of energy is being supplied back to the energy company.

It's a financially fair arrangement.

REMU pay each householder the same amount per unit for their solar electricity as they charge for the power consumed.

Supplies to and from each house are routed to the grid through one of two substations which serve the site.

Even the schools benefit from solar power.

They might be net users in term-time, but they're net suppliers at weekends and in the holidays.

The local sports hall makes use of two different solar energy technologies.

As well as the photovoltaics, it has a single section of solar thermal panels. Fluid flowing through the panels transfers energy to the water supply for the hot showers .

Across the whole site, the PV panels produce up to 1.3 megawatts of electricity, a significant contribution to the energy company's 10% target for renewable energy.

The Amersfoort development provides useful pointers for future photovoltaic projects.

Franz Vlek:
The way to implement PV in new building areas in the future I guess is to train architects, property developers, and to create public awareness of the fact that PV is a good option for generating power right on the spot where it's being needed.

Narrator:
But for residents, energy supply is rarely the most important thing in life.

Gijs Van Den Boomen:
Our aim was as an urban design company to not give them an idea that they're living in a large energy station but to give them the idea that they're living in a genuine human environment with everything which comes with that.

Narrator:
Photovoltaics have caught on rather more slowly in the UK.

Roger Higman:
Photovoltaics is another example of a technology where other countries, have pressed ahead, invested more government funds, in demonstrating the technology, and as a result we're being left behind.

Narrator:
Though still relatively expensive, PV panels are being fitted to individual houses, on public and commercial buildings.

The Peabody Trust has financed schemes like The Beddington Zero Energy Development, known as BedZed, in south London.

And they’re involved in Britain’s first major PV housing development - near Ladbroke Grove, in North London.

This former gas works is being remediated to remove any unwanted waste.

Whitby Bird are responsible for environmental engineering on the project.

Hannah Routh:
It's an £80 million project and its going to be developed over four phases. The first phase is under design at the movement and the last phase will be finished in about 2007.

Narrator:
The site will contain a mixture of a affordable and private housing and will include a large photovoltaic array.

Hannah Routh:
The 1500 metre squared array will be 200 kW peak, now over the course of a year this will give us between 15-20% of the sites needs. But on a sunny day like today you'd be looking at powering probably 200 of the 300 homes on the site so its a fair proportion.

The energy use of the dwellings on the site will be about a third of similarly sized good practice dwellings so we're looking at making energy savings in that way.

Roger Higman:
We'd like to see the Government introduce more incentives for the uptake of, of photovoltaics, particularly in new buildings, so that we actually, can try out the technology, and demonstrate its effectiveness, thus bringing costs down, so that we can start manufacturing it in bulk.

Hannah Routh:
The total capital costs of the scheme is £1 million of which a third is being paid for by the EC. The UK Government's recently announced further funding for photovoltaics and we're currently applying for the remaining 65%. So if we're successful, which we're optimistic we will be, the scheme will be 100% funded and Peabody wont be paying any capital costs for photovoltaics.

John Doddrell:
We've had field trials for domestic PV for PV in larger buildings, business and public buildings, er and we've just launched again earlier this year er a major new er PV demonstration programme with an initial £20 million funding, but aimed in due course at ramping up to achieve the types of levels of deployment that we're seeing in Germany and Japan for example.

Hannah Routh:
If we look at other European countries, for example Germany, they've got what's called a feed in law where there is a high premium paid for photovoltaic energy that is sold to the grid. We've taken a different approach, which is to provide capital funding and I suppose what remains to be seen is whether that's actually sustainable in the long term

Narrator:
Whether it's through capital grants for PV installations or feed-in schemes that pay high prices for PV power, the aim is to reduce costs by creating a mass market for photovoltaics

Erik Lysen:
For every doubling of the amount of megawatts produced, you see twenty percent reduction of price, this is the kind of standard er experience er, which we have all over the world. So, what we need is large scale production, but also large scale demand, because without demand there will be no production.

Narrator:
But PV panels aren't the only way of harnessing solar energy.

In many countries solar thermal panels are already making big savings in householders' water heating bills.

Erik Lysen:
The importance of solar thermal is often under valued in my view. We see now that, solar thermal can easily provide the hot water needs of an average family, 50% of it, by means of a simple solar collector of two to three metres, square metres. But we could go much further.

Narrator:
This field of solar thermal panels in Uppsala, Sweden provides hot water for use in a heating system that serves an entire district.

In summer, large amounts of heat are transferred to a huge underground reservoir which stores the hot water for use on winter days.

Another approach to solar energy, passive solar design, is already widely used throughout Europe.

Well insulated buildings designed to capture and store the direct heat of the sun make positive use of the greenhouse principle.

Passive solar design measures minimise the need for artificial lighting and have a short payback time, they can significantly reduce the building's overall energy demand.