

Shell International Renewables

Bringing together the Group's activities
in solar power, biomass and forestry

Press Conference
London, 6 October 1997

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Group Managing Director
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• JIM DAWSON •

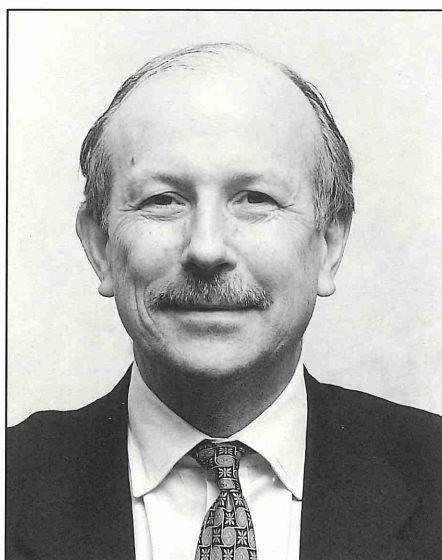
President
Shell International Renewables



Jeroen van der Veer became a Group Managing Director of the Royal Dutch/Shell Group in 1997. His spheres of interest cover: CIS; Central and Eastern Europe; The Hague and London offices; and Group research.

Having joined the Group in 1971, Jeroen van der Veer advanced through several positions involved with manufacturing in the Netherlands and in Curaçao before joining Shell UK as Marketing Manager for LPG in 1981. In 1984 he returned to the Netherlands, where he worked for Shell Nederland first as Manager of Corporate Planning and then Pernis Refining Manager. He went on to become Managing Director of Shell Nederland in 1992, after a stint as Area Co-ordinator for Africa and Liaison Officer for Canada. Before taking up his current position, he served as President and Chief Executive of the Shell Chemical Company in the US.

Jeroen van der Veer was born in Utrecht, Netherlands. He has two degrees, one in mechanical engineering from Delft University and the other in economics from Rotterdam University. He is married and has three daughters.



Jim Dawson has been appointed President of the newly formed Shell International Renewables company. He joined Shell Research in 1971 and worked at various laboratories before moving to Shell Chemicals UK in 1977. In 1981 he moved to Venezuela, where he was Petrochemicals Regional Advisor and subsequently Manager of Shell Química. After holding various commercial and planning positions in Shell International Chemicals, he became Head of Crop Protection Products in 1990 and then Head of Chemicals Strategic Planning and Economics in 1994. Before taking up his current position, he served as Director, Specialities for Shell International Chemicals Ltd – a position that made him responsible for lube/fuel additives, fine chemicals, catalysts, new business development and forestry.

Jim Dawson was born in Birmingham, England, in 1944. He received a D. Phil. in chemistry from Oxford University, which he followed with a post-doctoral fellowship at the California Institute of Technology. He is married and has a son and daughter.

The Royal Dutch/Shell Group is to establish a fifth core business by investing more than half a billion US dollars over the next five years in renewable resources. To that end, the Group's current activities in solar power, biomass (wood-based) power and forestry have been consolidated in a new business organisation, Shell International Renewables (SIR), which sits alongside the existing business organisations devoted to exploration and production, oil products, chemicals, and gas and coal.

As populations expand and develop, industrialising economies will require additional energy sources, some of which will be provided by renewable sources. Indeed, renewable sources are expected to provide between 5% and 10% of the world's energy within 25 years, perhaps rising to over 50% by mid-century. SIR will use the Group's existing experience in solar power to expand its commercial operations with the aim of capturing a 10% share of this rapidly expanding market before 2005. It will expand the existing tree plantation business and also apply its expertise in this area to the development of biomass power generation. SIR believes that biomass, which is already an established source of energy in some parts of the world, will become increasingly competitive for power generation as conversion technologies improve and wood becomes available from sustainable plantations. Investment opportunities in wind power and other renewable energy sources are also being appraised.

The following text is adapted from the comments made by Jeroen van der Veer, Group Managing Director of the Royal Dutch/Shell Group of Companies, and Jim Dawson, newly appointed President of SIR, at the press conference held to announce SIR's launch.

Jeroen van der Veer:

In the past few weeks you have been hearing from us about various actions concerning restructuring, new initiatives and acquisitions. I am very pleased to be with you today to announce another step in the Royal Dutch/Shell Group's ongoing transformation – the birth of a fifth core business unit – Shell International Renewables (SIR).

As you see in *Figure 1*, Renewables joins the core businesses of Exploration & Production, Oil Products, Chemicals and Gas & Coal. The renewables unit has been formed as a commitment to further develop business interests which complement existing activities. It also underscores the Group's strategic direction, which is:

- to provide energy and develop resources efficiently, responsibly and profitably in order to help meet the world's growing needs, and
- to do so in a way that contributes to sustainable development.

Clearly, renewables are an important part of those aspirations. They have been included in the Group's strategic thinking for many years.

Initially, SIR is made up of two areas which are being brought together: forestry, which I think is self-explanatory, and renewable energy, which at

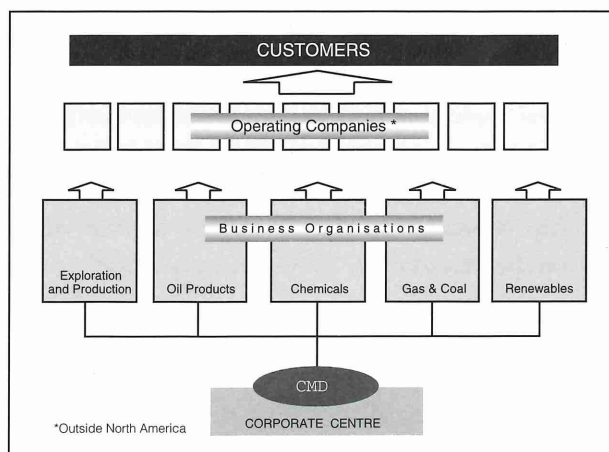


Figure 1: Organisation of the five core businesses

present is concerned with commercial opportunities related to biomass (wood-based) energy and photovoltaics, or solar cells.

SIR is a vehicle for:

- building on experience and driving technological innovation in chosen areas, and
- investing as appropriate to seize real, economically viable business opportunities.

A decision based on years of experience

As far as experience is concerned, there is a good foundation. For over 20 years, Shell companies have been building a variety of learning platforms in the area of renewables. In the course of wide-ranging investigations they have been learning about the technologies, seeing what works, and assessing what could be economic.

Some of the possibilities which were investigated were, of course, abandoned along the way. One of the early possibilities was a project in the Philippines for pelletising pineapple leaves for underboiler fuel. It didn't make the grade. But the Group's interests in forestry, solar energy and biomass have been pursued and assessed over the past two decades. Now, they are at a point where there are exciting opportunities ahead.

A little later, I shall hand over to Jim Dawson, President of Shell International Renewables, who will give you more specific information about what is going to be happening. But first, I want to look at it in the context of the Group's overall strategies, and perhaps anticipate some of your questions.

First, how does it fit with the existing fossil fuel activities? I said that the Group's strategies are aimed at helping to meet growing world energy needs into the long-term future – that is, over the next half century. *Figure 2* should help you see why, far from being in conflict with the oil and gas business, renewables will be necessary to complement it in the longer term under a scenario we call "Sustained Growth".

The main points to note from the figure are:

- Fossil fuels are still important, but they reach a plateau by 2020.

- Renewable energy will become significant by 2020.
- At first, renewable energy will grow in niche markets rather than compete with traditional fuels.
- The forms of renewable energy do not affect the overall picture; they will compete but the market will decide.
- Energy supply will become more diversified and hence more robust.

An alternative energy scenario called "Dematerialisation" has been devised, in which human needs are met through technologies and systems requiring a much lower energy input. For both scenarios, renewable energy sources gradually take an increasing market share, reaching 5-10% in 2025, depending on the scenario.

The continuing importance of fossil fuels in the Group's business portfolio is obvious, and we will certainly continue to produce and supply energy from these fuels efficiently, responsibly – and profitably.

Over the past 100 years, world energy demand per capita has increased from 3 to 13 barrels of oil equivalent per year, spurred by economic growth. You can see the dramatic progression of that demand in the coming century. Supplying the energy to meet it will be no small task.

What's behind this dramatic picture?

Some 100 million people are being born each year, 90% of them in the countries of the developing

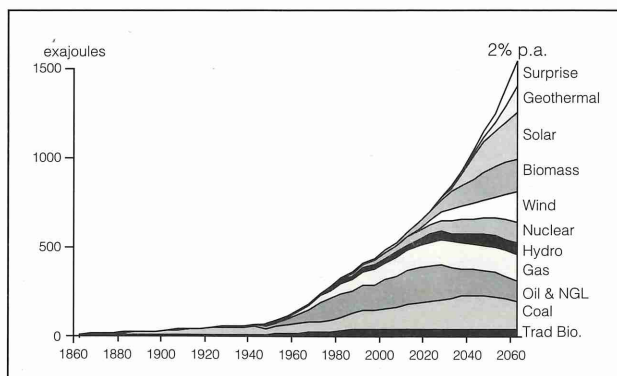


Figure 2: Sustained Growth scenario

world. Within the next few decades there are likely to be 40% more people on our planet. Even at today's population levels, vast numbers of people in developing countries have little or no access to the comfort provided by electricity, or the choices and opportunities that come from mobility.

Economic development is essential to provide better living standards for an increasing proportion of the world's people. As populations grow, it will be essential just to meet their most basic needs. And economic development depends on available, affordable, supplies of energy.

So expanding populations and developing, industrialising economies will certainly require additional sources of energy. Expanded supplies of energy will be needed to support growth, and for the next quarter of a century, that means oil and other liquid fuels will continue to account for the lion's share of the energy equation.

What are the prospects for renewables?

Reserves of fossil fuels are, of course, finite. The world is very far from running out. But inevitably, as demand rises, we will need complementary supplies and viable alternatives in the longer term. Already we can see that certain alternative energy sources – from wind, biomass and photovoltaics – are starting to become more competitive. By the year 2000, production costs of photovoltaic panels could come down by 40%. Between 2005 and 2010, a kilowatt-hour of electricity generated from photovoltaic panels is expected to be at least 70% cheaper than at present.

As the economics improve, renewable sources are expected to provide between 5% and 10% of the world's energy within 25 years, and this could rise to over 50% by mid-century. Some governments have already set targets for achieving a specific percentage of their energy supply from non-fossil fuel resources. So with the new core business, the Group is taking another step in shaping its portfolio of energy capabilities to supply anticipated world demand in an economically viable way.

Now let's look at the question of energy supplies in relation to sustainable development. Support for

sustainable development is another element of the Group's strategic direction, and this is underscored by the formation of Shell International Renewables.

We have stated the Group's position on support for sustainable development both in the *Statement of General Business Principles* and in the Health, Safety and Environment Commitment and Policy. One aspect of it is developing energy resources, products and services in a way that is consistent with the aim of protecting the environment. By its nature, SIR is an example of that commitment in action.

Here again, the issue of world population growth is a crucial factor. How is the world to achieve sustainable economic development in the face of that huge challenge? One answer is renewable energy resources, available close to local usage, and made economically viable by local market and technology developments. They are a crucial part of the drive for sustainable energy supplies at affordable prices. That is exactly what will be focused on through SIR. So this announcement today is a step along a road to a sustainable future – a road to which Group companies are illustrating their commitment.

The need to focus on commercial viability

In the run-up to Kyoto, concerns about climate change will be much in the news. In the course of the coming century, the development of additional energies will help to meet these concerns, but this will only happen gradually, as technologies and economics enable new sources to become commercially viable for the supplier and "buyable" for the customer.

I deliberately emphasise the competitive element, because the challenge of changing from dependence on fossil fuels to substantial use of renewable energy is so huge that no government could underwrite it. It has to be undertaken by private enterprise, and driven by market forces. If some governments choose to apply limited stimulus in the early days, it is their choice. And it may be helpful, provided it is not over biased towards one particular area. But large-scale subsidies cannot be

the long-term answer, and are unlikely to win short-term public approval if they mean a massive increase in Government spending. And I don't believe that many consumers would be happy to pay vastly increased prices for "greener" energies developed regardless of market mechanisms.

Long-range outlook, long-term investment

The processes of R & D and capital investment both take time, and demand a long-range outlook plus the willingness and ability to invest now for long-term benefit. As you will hear from Jim, this investment in new renewable sources may look relatively modest in comparison with the Group's other core businesses, because the economics are only gradually becoming more favourable. But Group companies have been looking at them in various ways for 20 years, and are investing in developing them for many years into the future.

The SIR focus is clearly on responding to market opportunities through commercial development of renewable resources. By developing them profitably – and therefore in a commercially sustainable manner – the Group will be pushing further ahead in the journey towards sustainable economic development.

The Group's world-wide presence, experience of doing business in a wide range of national cultures, financial strength and ability to take a long-term view are key factors for the success of the new core business. Add to that the experience and existing competencies, built up over the last 20 years, and you have the driving forces to make that business a key strategic element in our approach to the 21st century, and a profitable part of our portfolio.

Now let me hand over to Jim Dawson, who will tell you more about how Shell companies' experience will be harnessed to drive the opportunities we see ahead for forestry and renewable energy.

Jim Dawson:

I'm happy to be able to share with you some highlights about renewables – where the Group's been, where it is and where it's going. As you can imagine, these are exciting times for all of us in the

new core business unit. Our team has been given the challenge of seizing opportunities in renewables, and developing emerging energy sources, as a full-scale commercial enterprise. I imagine we must be feeling very much the same as the people in Shell UK Exploration and Production company back in the late 1960's: we're sure of the potential, now we've got to make it work in practice. I hope we'll be as good at it as they were!

As you heard, our new core business unit comprises forestry and renewable energy activities. At present, the renewable energies concerned are photovoltaics and wood-based biomass for electricity supply. Why did we decide on these particular renewables?

First, experience: Shell companies have had 20 years of investigating alternative energies, 15 years in forestry. They've been identifying opportunities and developing competencies. They learned what they couldn't do. They've learned what they can do, and they're still learning.

Second, the prospects: these are areas where we now see encouraging potential for market growth and financial returns. The plan is to achieve at least 10% market share in photovoltaics before 2005. In biomass, the business will be growing at 15% per annum, reaching 250 megawatts installed by 2005.

And the third reason was the fit with the Group's long-term strategies, which Jeroen described.

Once it became clear where to focus the efforts in renewables, the next step was the commitment to invest in this new core business.

Basis for investment

The plan is to invest some half a billion dollars in renewables over a period of five years. Like any other investment programme, this will be reviewed in the light of technology development and the economics of the industry. That means it could be increased if the technologies concerned develop faster than we have foreseen.

The sum of \$500 million may look comparatively small next to the Group's investment in its existing core businesses. But it is based on what the economics are likely to support in that period. The

most important thing is that it is a serious commitment to a new pillar in our business framework.

We're investing now to build a viable commercial enterprise for the 21st century. That's the nature of investment in this industry. With Shell International Renewables, you might say it's a small step in investment but a big step for the future.

There is the same kind of approach to SIR as Shell companies use in appraising the potential of frontier areas in upstream oil. In this area, the three main phases are identification through seismic surveys, drilling and then development. Each of these phases comprise a step change in the level of investment – and patient evaluation and appraisal activity – until the real economic opportunity is identified. That means keeping the balance between risk and reward.

Now let's look at where the money is going. To do that, I'll tell you something about the activities in renewables – past, present and in prospect.

Photovoltaics

I'll start with photovoltaics (PV), the direct conversion of sunlight into electricity. Here, as I said, the plan is to achieve at least 10% of the world market before 2005. Shell companies have been in the business of photovoltaics since 1973 – close to a quarter of a century. They have tried different technologies and different markets with varying success. They started in the US, through acquisition and joint ventures. The Group no longer has those, though, as Jeroen said, we learned from them.

Two ventures which began in the 1980's are more important to where the Group stand today. They are Showa Solar KK in Japan, and Shell Solar Energy BV in the Netherlands. Showa Solar is a joint venture with Siemens in which Showa Shell has a 75% interest, and it supplies around 10% of the Japanese domestic market. Shell Solar Energy BV produces photovoltaic systems at Helmond in the Netherlands. Additional production facilities have just been opened and will be further expanded to 5 megawatts by the end of this year.

The output is based on the latest technology for polycrystalline silicon cells.

That's where the Group is now. Here is an indication of where it's going:

SIR has a team working on the design of a 20-megawatt turnkey production plant which can be installed anywhere in the world, depending on market conditions. The first one is likely to be in the Netherlands.

Use of PV power is on the increase. Current world sales are around \$1 billion. The annual compound growth rate has been around 14% for over a decade. As costs decline and technology improves, more markets will be captured, leading to production increase and further cost reduction. A successful development of the PV business would involve annual 22% market growth linked to an annual 6% cost reduction in real terms, as shown in Figure 3.

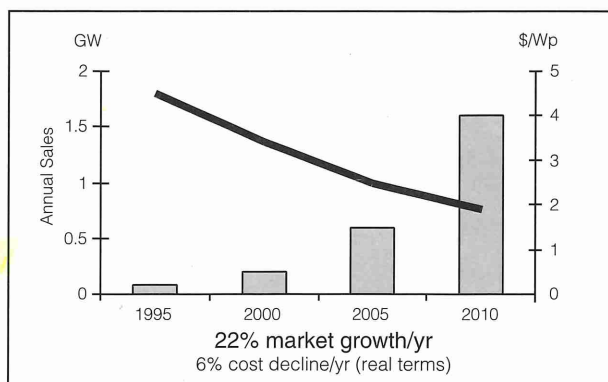


Figure 3: Projected sales volumes and prices for photovoltaic panels

Current predictions show a \$6 billion global market by 2010. That's the market that we're attacking. We will be:

- making aggressive efforts to reduce manufacturing costs,
- looking at new technologies, and
- considering acquisitions.

The aim is to build on experience, moving on into double-digit growth, and on again towards that 10% market share before 2005.

Forestry

I should like now to move on to the forestry element of Shell International Renewables. Shell companies' investments in forestry began in the early 1980s. From the start, the approach has been to identify key changes in the business, and to go in where new developments are taking place. One of the main changes that we anticipated was a shift in regions supplying world demand for wood.

Today, demand is increasingly being satisfied from man-made plantations of fast-growing trees, like eucalyptus, in the southern hemisphere. These are taking over from the traditional coniferous forests in the North. So, as you can see from *Figure 4*, there are Shell companies focused on those southern hemisphere opportunities.

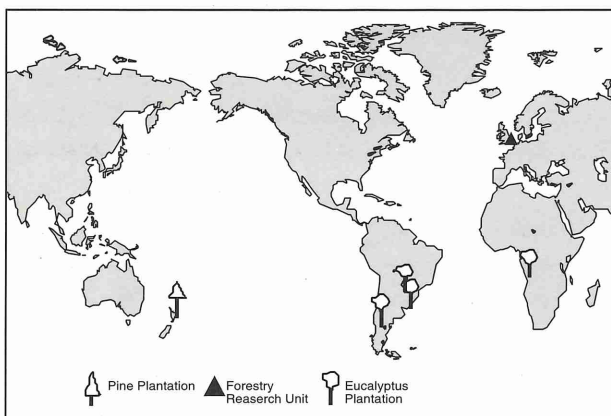


Figure 4: Plantations and research units of Shell Forestry

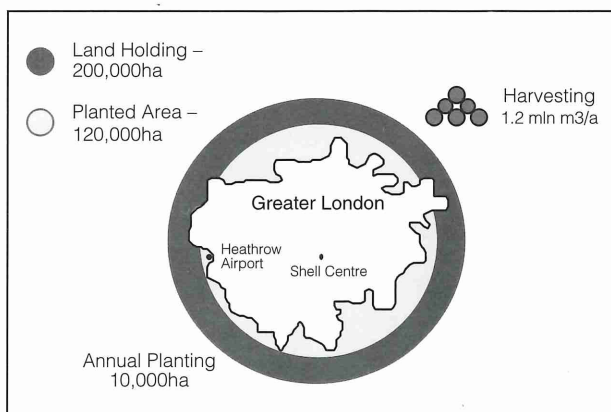


Figure 5: Scale of Shell Forestry's combined land holdings

Today, the Group has interests in six forestry and forest-products companies in three continents, and *Figure 5* gives you an idea of the scale. The total planted area would forest the whole of Greater London, filling in roughly the area within the M25 orbital motorway.

The main growth focus for forestry is based on competencies developed from experience. A few highlights are:

- hands-on operational involvement in high-yield plantation development;
- tree-improvement programmes;
- environmental management and conservation.

The businesses are likely to expand geographically, in Latin America and the Pacific Basin. And there is an R & D programme underway to improve the characteristics of fast-growing trees other than eucalyptus for energy production.

Shell Forestry is an asset as a stand-alone business. At the same time, it is also an important part of the equation for profitable biomass energy development. That, as I said, is the second element of Shell Renewable Energy.

Biomass

Biomass is a key renewable resource. Here it involves conversion of wood into energy by combustion in power units. The wood for biomass would come from purpose-built plantations, which would be sustainably managed. Replanting the trees will absorb the carbon dioxide liberated during combustion.

Prospects for biomass range from small-scale systems to large-scale power generation with a connection to the electricity grid. The main market for smaller-scale systems will be in the developing world, bringing electricity to those who are not connected to an electricity grid.

For the time being, SIR's biomass activities are aimed at three targets:

- Install four small-scale systems in 1998 and 20 in 1999.
- Begin implementation of a large-scale project in 1998.
- Reach 250 MW installed by 2005.

Shell Solar

According to World Bank surveys, several hundred millions of rural households could potentially spend some \$150 a year for basic lighting and energy needs. That's a market potential of tens of billions of dollars. It's also a potential improvement in the quality of life for the rural communities. A range of products and services will be offered to these customers under the Shell Solar brand.

Biomass and photovoltaics can be combined into what we term a "sun station" to supply mini-grids in villages and small towns. Photovoltaics alone could provide energy for basic lighting and for appliances such as TVs and refrigerators.

The Group will be able to build on experience in forestry, gasification and engine testing, and also benefit from work being done at Shell Research laboratories. They are developing proprietary technology relevant both to the forestry and the biomass businesses. State-of-the-art technologies have been identified for converting biomass into heat and power. Work like this should give the Group the potential for attaining clear technological advantages.

Looking further ahead, we can also see commercial prospects for large-scale power generation from biomass, connected to electricity grids. This would call for planting and harvesting of much larger areas of forest – a requirement in which Shell Forestry experience and expertise

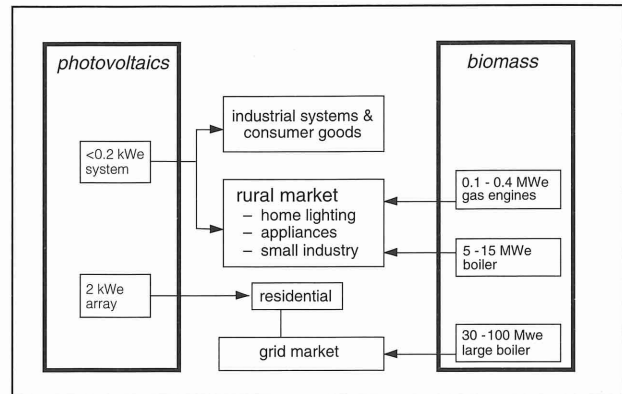


Figure 6: Markets for Shell Solar's products and services

would provide a head start. In addition, and again for the longer term, there are several possibilities for advanced biomass conversion technology. The markets being eyed by Shell Solar are shown in *Figure 6*.

There is also an interest in other renewable energy sources, such as wind power. We are actively investigating how we can use the expertise of Shell Group companies to help develop these other energy technologies on a realistic commercial basis. They will also play a significant part in the business portfolio of our companies.

I'm very pleased to have had this chance to introduce you to some of the plans to move ahead fast and profitably as a long-term player in the renewables arena.

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