

Innovative environmental growth markets from a company perspective

- Executive Summary -

Research Project on behalf of the
Federal Environment Agency
(UFOPLAN) 206 14 132/04

by

Roland Berger Strategy Consultants

Dr. Torsten Henzelmann
Stefanie Mehner
Thilo Zelt

Imprint

Publisher: Umweltbundesamt (UBA)
Postfach 1406, 06844 Dessau-Roßlau
E-Mail: info@umweltbundesamt.de
www.umweltbundesamt.de

Bundesministerium für Umwelt, Naturschutz und
Reaktorsicherheit
Referat Öffentlichkeitsarbeit
11055 Berlin
E-Mail: service@bmu.bund.de
www.bmu.de

ISSN: 1865-0538

Edited by: Corinna Gather
Umweltbundesamt (UBA)

Peter Franz
Bundesministerium für Umwelt, Naturschutz und
Reaktorsicherheit (BMU)

Authors: Roland Berger Strategy Consultants
Dr. Torsten Henzelmann
Stefanie Mehner
Thilo Zelt

Dessau-Rosslau, November 2007

The full report is available in German at
<http://www.umweltbundesamt.de>

Innovative environmental growth markets from a company perspective

All over the world, the environmental technology sector is experiencing strong growth. Environmental technology is more and more becoming an important factor in countries' economies. And as it does so, there is a need for environmental policy to focus increasingly on innovation and industry.

This study is an analysis of the European environmental industry. Firstly, we look at current market volumes in Europe and determine the competitive position held by Europe and, more specifically, Germany. Taking this as a basis, we forecast what growth can be expected in the environmental technology sector over the coming years. Our examination focuses on a number of "lead markets" that were identified for the parent study.¹ The lead markets are as follows:

- Power generation and storage
- Energy efficiency
- Material efficiency
- Sustainable mobility
- Waste management and recycling
- Sustainable water management

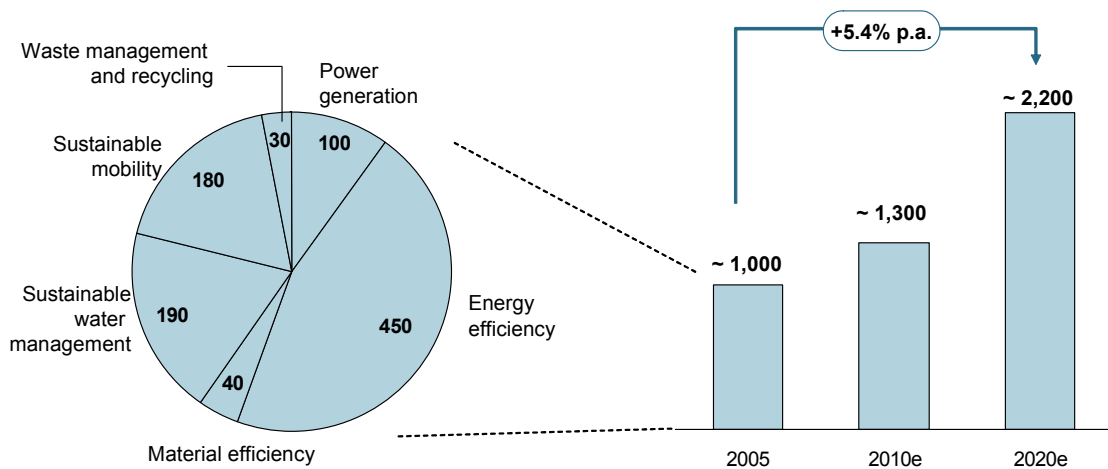
We then take a closer look at ten specific environmental technologies – selected,, in consultation with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Federal Environmental Agency. Here, we present an industry perspective. To this end, some 90 leading companies were asked from over 13 European countries for their view of the market and competitive situation. We also asked them what they thought were the critical success factors in environmental innovation and the key political instruments for promoting innovation. Based on the results of this survey, we then make a series of recommendations for governments – what they should be doing to promote innovation, and what form effective environmental regulation in Europe and around the world could take.

Market volumes and potential

The key finding of our analysis of lead markets is that environmental technology already represents an important economic factor. Overall market volume is estimated at around EUR 1 trillion worldwide. Technological solutions in the field of energy efficiency represent the largest chunk of this, with a current market value of around EUR 450 billion. With forecast average annual growth at 5.4% worldwide until 2020, environmental technology makes – and will continue to make – a sizeable contribution to economic growth and employment. The results of our analysis and our interviews with company representatives indicate that all the lead markets will show strong growth over the coming years; by 2020, total market volumes are expected to

¹ Umweltbundesamt und Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Hrsg.): Wirtschaftsfaktor Umweltschutz. Vertiefende Analyse zu Umweltschutz und Innovation, Dessau, 2007

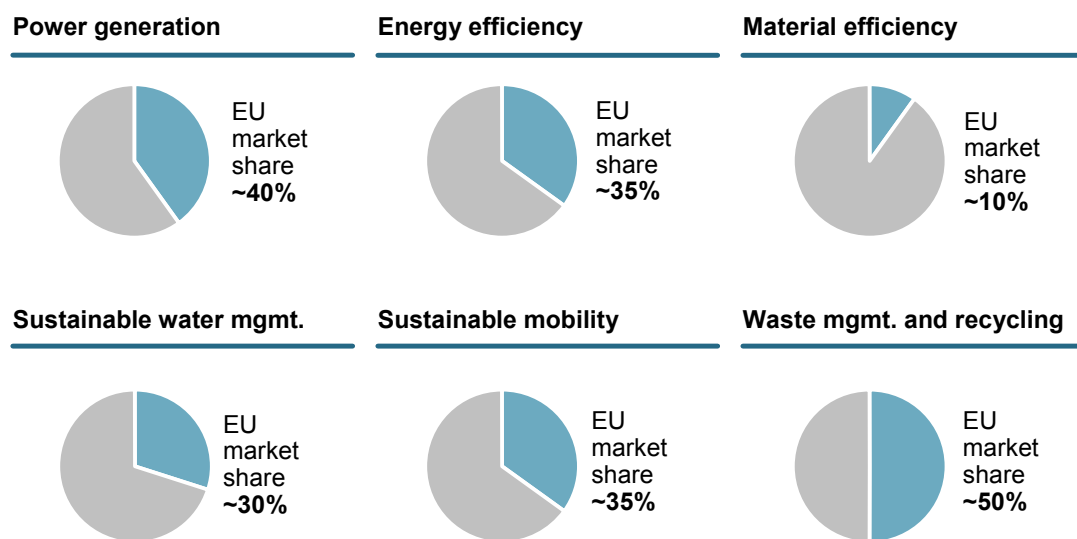
reach a value of EUR 2.2 trillion (see Figure 1).



Source: Market studies, expert interviews, own calculations

Figure 1: Global market volumes and forecast growth of environmental technology to the year 2020 (EUR billions)

Europe is highly successful both in the lead markets and in the specific environmental technologies examined further below. On average, European companies enjoy a global market share of more than 30%. The only exception is the market for material efficiency, where European companies currently account for just 10% of the market, although the market is growing at an above-average rate of up to 8% per year. Europe does much better when it comes to the market for waste management and recycling technologies. Here, the market share of European companies is around 50%. However, the market for waste management and recycling shows annual growth of just 3% or so; it is already well developed and consequently growth rates are less dynamic than elsewhere (see Figure 2).



Source: Market studies, expert interviews

Figure 2: Global market share of European companies in lead markets for environmental technology

In consultation with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Federal Environmental Agency, we selected the following ten specific areas of environmental technology for closer investigation. Our selection was based on criteria such as growth potential, market volume, innovation dynamic and reduction of environmental burden:

- Solar power stations
- Hybrid vehicles
- Solar cooling systems
- Automatic separation of materials
- Low CO₂ power plants (carbon capture and storage technology)
- Efficient storage of electrical energy using compressed air and hydrogen
- Membrane technology in the water industry
- Bioplastics and biopolymers
- Local treatment of water and rainwater management
- Synthetic biofuels

At present, the size of the market for these technologies varies widely. Compared to some areas of technology in lead markets, their markets are relatively small. However, a number of the technologies show enormous potential for growth. Thus the markets for solar cooling systems, energy storage and plants producing synthetic biofuels are still in their infancy. By contrast, the global market for local water management solutions is already worth some EUR 7 billion. Indeed, local water management solutions have the greatest potential in absolute terms: The companies that we interviewed expect market volumes to grow to around EUR 35 billion by 2020. At the same time, younger technologies such as hybrid vehicles, bioplastics and solar power stations are expecting the fastest growth rates – over 20% in some cases (see Figure 3).

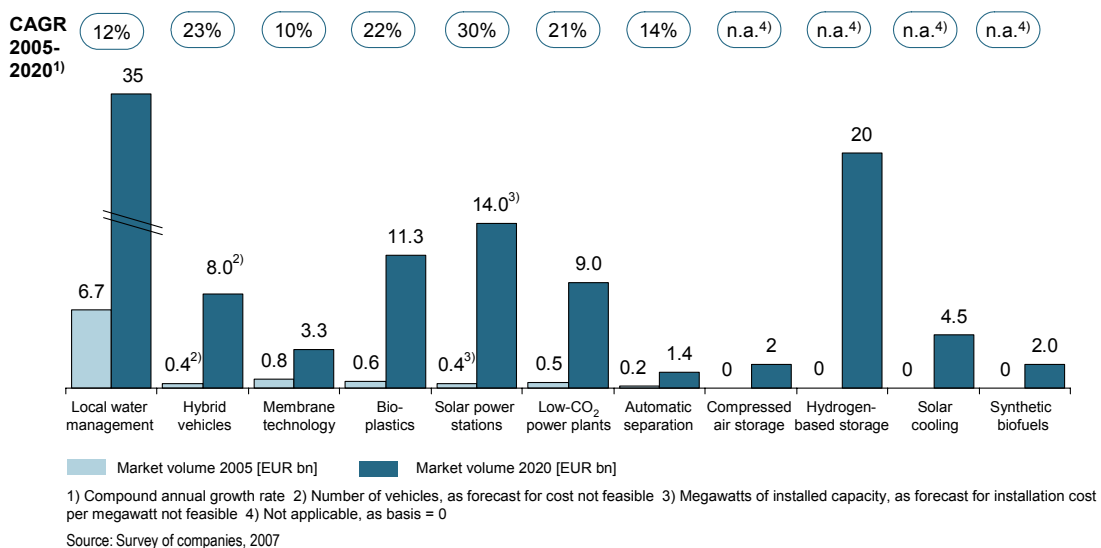
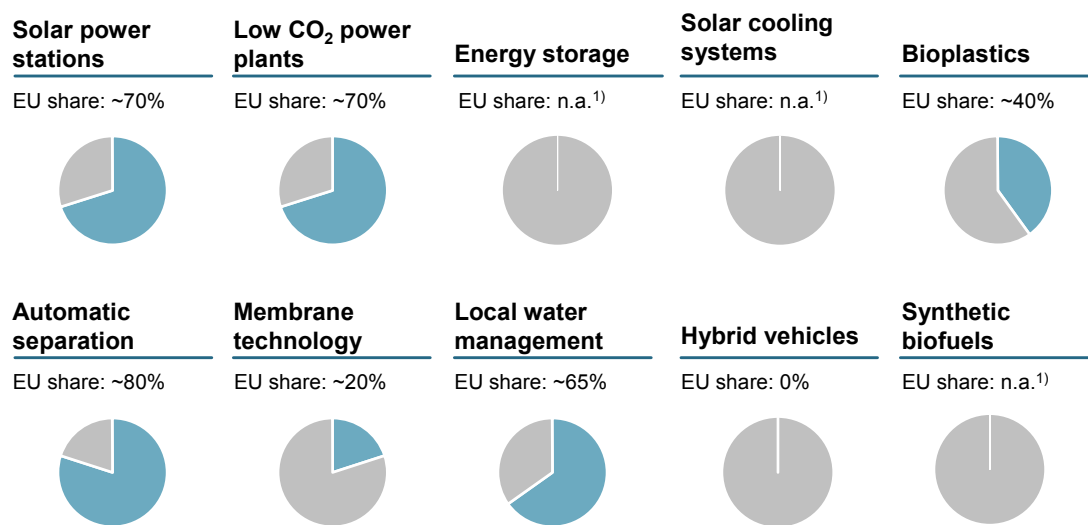


Figure 3: Global market volumes and forecast growth of environmental investment to 2020 in selected technologies

The share of global markets in European hands varies widely between the ten different fields of technology. Thus for automatic separation of materials and solar power stations, European companies account for more than 70% of the global market. In the area of hybrid vehicles, by contrast, no European company currently has a product on the market. For the remaining markets, the share of European companies ranges from 20 to 80%. In synthetic biofuels, solar cooling systems and energy storage technology, for instance, European companies lead the way in terms of research. However, market shares are practically non-existent here as the markets themselves are not yet established (see Figure 4).



1) Markets not yet established, therefore no market shares applicable

Source: Survey of companies, 2007

Figure 4: Market share of European companies in selected technologies

On the whole, German companies also enjoy an excellent market position. They have an average market share of around 20% in the selected technologies. This ranges from just 5% in markets such as membrane technology, right up to 65% in other markets such as the automatic separation of materials.

Different countries in Europe perform differently in the selected technologies. The overall leaders – in terms of both markets and innovation – are Germany, Spain, Scandinavia, the Netherlands, Great Britain, France, Italy and Switzerland, as shown in Figure 5.

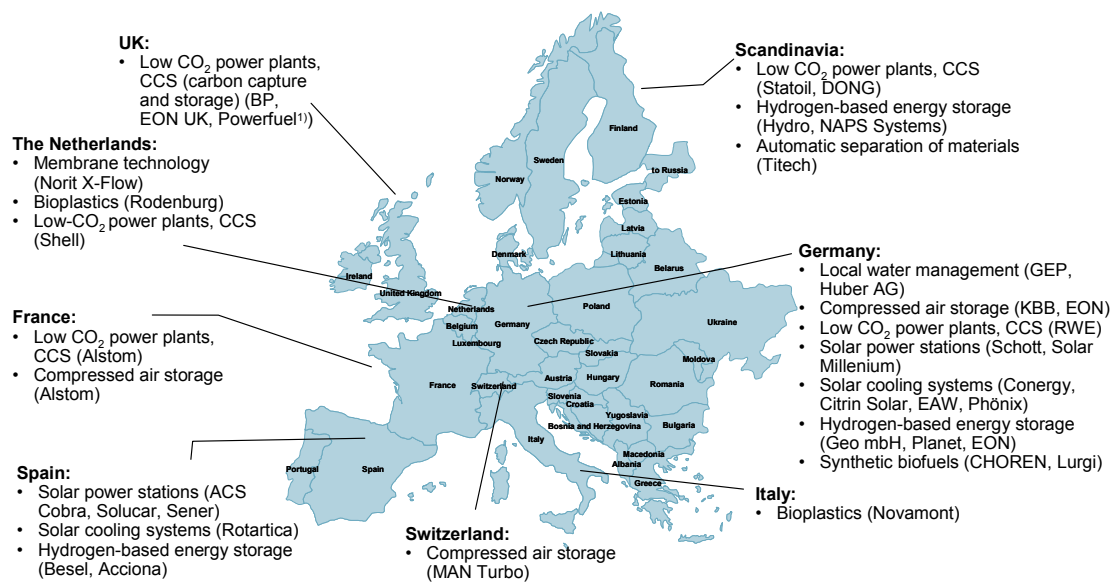
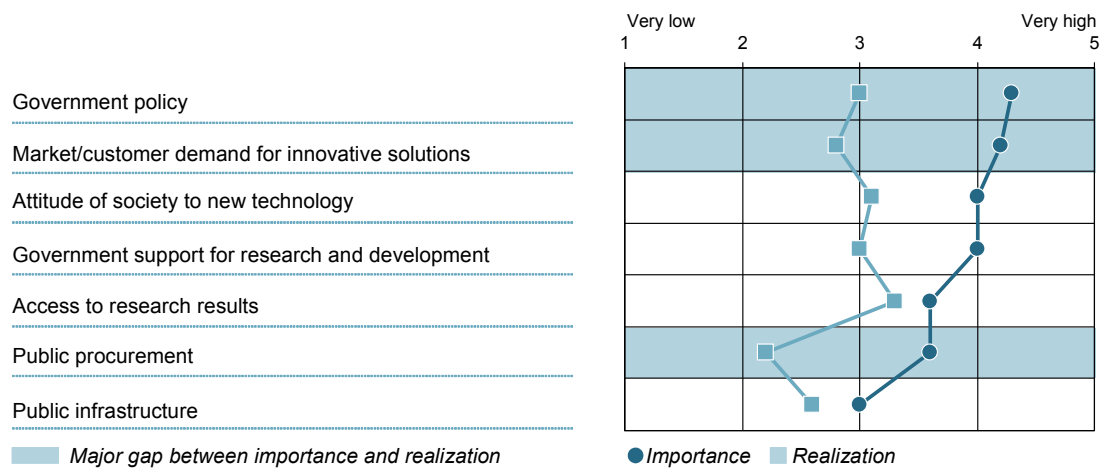


Figure 5: Positioning of European countries in selected technologies

Success factors and obstacles to innovation

We asked the companies what they considered to be the key success factors in environmental innovation and regulation, and what they believed were the chief obstacles. The companies cited both external and internal, company-related factors. Their responses form the basis of our recommendations for political action to promote innovation.

The key external factors cited by companies were government policy and the level of demand for innovative solutions by markets and customers. This applied across all the selected technologies. Companies see the greatest need for remedial action in the area of government policy. Practically all the selected areas of technology, in their view, require stronger support from policymakers to promote the diffusion. Companies also consider the level of demand from markets and customers to be a crucial success factor for all the areas examined. Here, again, they call for greater support in the form of government policy (see Figure 6).



Question D.1: How would you rate the following external factors in terms of their importance for promoting innovation? How would you rate them in terms of their current influence on your own innovation processes, i.e. how well are they realized?

Source: Survey of companies, 2007

Figure 6: External success factors for environmental technology companies

Our interview partners stated that traditional regulatory measures – threshold values, quotas, and such – are the most effective tools for promoting environmental innovation. Ambitious environmental targets can push companies into coming up with innovations. Instruments for stimulating demand are also helpful. One example is public procurement, which in addition to accounting for a considerable volume of sales also sends out an important signal to the community at large. Finally, governments can make the level of innovation achieved by the best-performing companies the new standard for the industry, as in the case of Japan's Top Runner Program.

The key internal success factors for environmental innovation – as cited by the companies in our survey – are a skilled workforce, corporate investment in research and development, and good access to financial resources (see Figures 7).

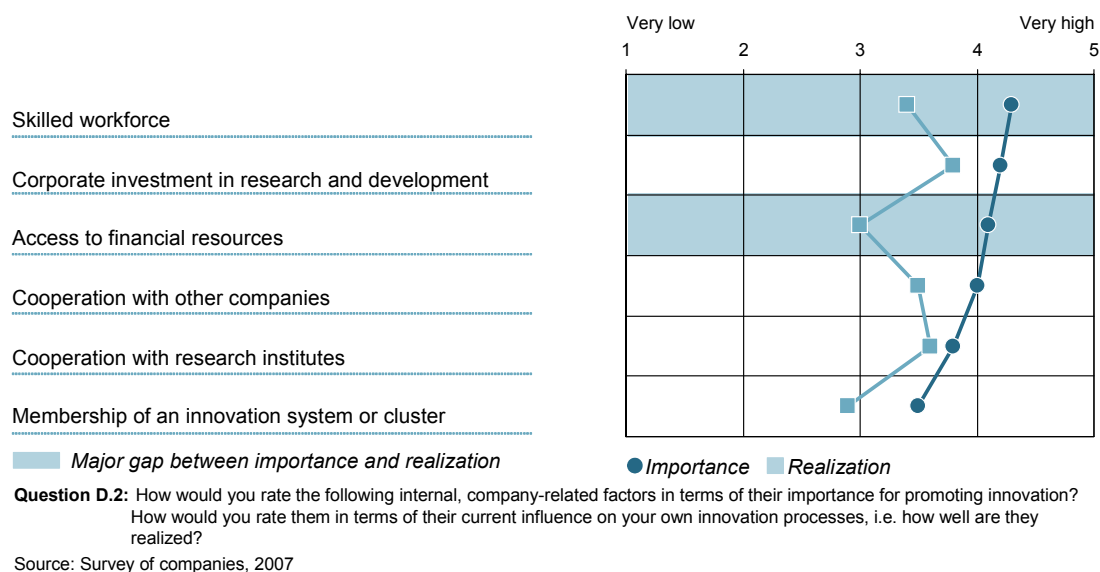
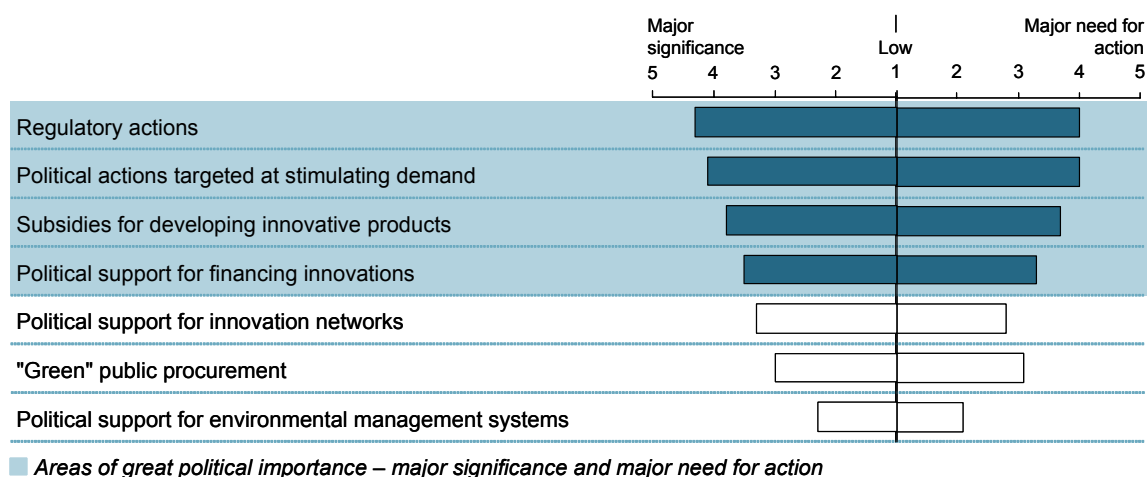


Figure 7: Internal success factors for environmental technology companies

Companies see particular room for improvement in the area of access to financial resources. They see a clear need for more and better-targeted subsidy programs and less bureaucratic procedures for grant applications. Furthermore, they stress the need for greater harmonization of environmental regulation across Europe. As markets become more and more global, European businesses are at a distinct disadvantage compared to other parts of the world: Although they have access to a larger domestic market in Europe, the framework in which they are forced to operate varies radically from country to country.

Today's innovations are the product of complex networks. These networks are influenced by various players, economic, political and social. Research has shown that it is vitally important to promote such networks and innovation clusters – a view backed up by the companies interviewed in our survey. However, companies also stress that the single most important external success factor – more important even than networks – is government policy. This, along with raising public awareness of environmental issues, is a major contributor to the success of innovations.

An important information for future environmental policy is the way that industry views the different policy instruments used by government. For the selected areas of environmental technology, the following picture emerges (see Figure 8):



Question E.4: What political instruments do you consider important for supporting innovation? Where is greatest need for action to improve political measures supporting innovation?

Figure 8: Role of political instruments and the need for action

The companies in the survey considered the following to be the most important political instruments for promoting innovation in the selected technologies:

- Regulatory actions
- Political actions targeted at stimulating demand
- Subsidies for developing innovative products

Companies see the greatest need for political action in these three areas, and in the area of "green" public procurement. This concurs with the findings of earlier studies. By all accounts, political instruments are needed to drive environmental innovation onward. This can take the form of regulations and laws, as well as measures designed to stimulate demand, such as subsidies.

Our interview partners pull no punches: They are calling for a political strategy for promoting environmental innovation. Such a strategy must be able to do the following:

- **Create a clear legal environment through regulation**
Governments should set clear, ambitious targets supporting the development of environmental technology and requiring its use. In addition, the European Union should harmonize the general framework conditions and regulations applying in member states.
- **Stimulate market demand**
As cited by the companies Europe should support the market launch and the penetration of the market by enacting measures aimed specifically at stimulating market demand. A lot of instruments are feasible, for example, France and Italy have already introduced tax incentives for buying hybrid vehicles.

- **Promote the development of specific technologies by supporting targeted research and development**
Research and subsidy programs at both the European and national levels should include concrete targets and milestones. This is the only way for subsidizing bodies to monitor the success of their programs and ensure that grants are used effectively.
- **Support the launch of new technology on the market through public procurement and incentive and commercialization programs**
Europe should stimulate demand for environmental technology by strengthening the public procurement of environmental products and establishing commercial launch programs. The US Biobased Products Public Procurement Program can serve as the model here. Under this program, public authorities are compelled to favor biobased products over other products in their purchasing decisions.
- **Run information campaigns aimed at the general public and raise awareness of environmental issues**
Governments should raise awareness among consumers that they, too, are responsible for protecting the environment. This will increase sales of environmental products and the use of environmental technology. Campaigns such as Al Gore's movie about global warming may be effective instruments for influencing both public thinking and the views of decision-makers in the corporate sector.
- **Simplify access to research and development money and channel funds toward SMEs**
Many public authorities have complicated application and approval procedures for subsidies. This makes it difficult for companies to get their hands on the money they need to support their innovation processes. Breaking down bureaucracy will help many firms to access public funds – especially small companies that lack a separate funding application department.
- **Introduce better financing options and make affordable loans more accessible**
Easier access to capital and affordable options for financing will allow companies to invest in research. However, companies also often lack the capital needed to develop innovative products. Venture capital, low-interest loans (e.g. from the Reconstruction Loan Corporation or *KfW*) and guarantees from state institutions for bank loans can help to remedy this situation.
- **Create planning reliability through long-term subsidy programs lasting 10 or 20 years**
For technology such as solar power stations, compressed air storage, low CO₂ power plants and plants producing synthetic fuels, companies have to make large investments in the initial construction work. To be sure that their investment will pay off, they need planning reliability such as that offered by long-term subsidy programs lasting 10 to 20 years. It is also important to create a stable legal environment (e.g. target levels for CO₂ emissions) over the same period of time, to give added security.

In Germany, the environmental sector has created around 1.5 million jobs to date. That number could double if the government makes the adequate moves. Environmental technologies are an economic motor of the future – but only if Europe does not lie back and wait for the rest of the world to match its environmental targets. Policies are needed that spearhead innovation and industry. Only thus can Europe build on its current competitive advantage and safeguard it for the future.