

think:act CONTENT

Fresh thinking for decision makers

A new economic day is
dawning | The trend
toward green business
is irreversible | Stimulus
packages worldwide are
fueling the green revolu-
tion | That is good news
for the environment |
And for companies in
green markets too



TRANSFORMING

CONVENTIONAL BUSINESS MODELS + CREATING
NEW INDUSTRIES = PROFITABLE, SUSTAINABLE
GROWTH FOR THE LONG TERM



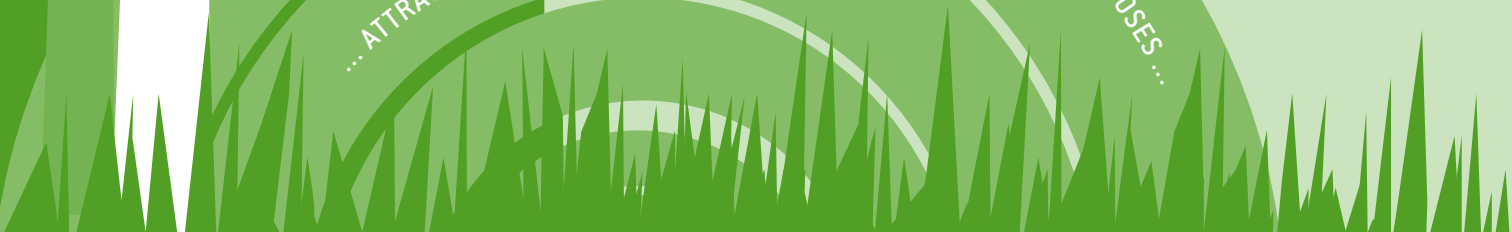
**ENVIRONMENTAL
TECHNOLOGY**
The 21st century's
lead industry

SIX LEAD MARKETS
Engines of a new industrial
revolution

**THE ECO-INDUSTRY
WORLDWIDE**
Smart followers hot on
the heels of first movers

... ATTRACTS ANOTHER DOLLAR!

EVERY DOLLAR USED FOR GREEN PURPOSES ...



As the economic crisis draws to an end, companies in the industrialized world find themselves facing a twofold challenge. On the one hand, it is hoped that restructuring and cost-cutting programs will shore up their survival and growth in the **short term**. On the other hand, the corporate sector is itself a key driver of the **long-term** transformation of our economic and social system.

True, financial, economic and national crises are shaping the course of events right now. Not even profound economic turmoil does anything to change the fundamental challenges that confront today's world, however. Pollution of the environment, the population explosion, the growing scarcity of resources even as emerging economies demand more and more raw materials, the resultant rise in the prices of raw materials, dwindling biological diversity, the spread of urbanization and demographic change are all rapidly accelerating the transition in industry. The efficient use of energy and raw materials in particular is emerging as a pivotal issue in the battle to preserve prosperity and keep business locations competitive.

Climate change clearly ranks among the very biggest challenges. CO₂ emissions are not being reined in fast enough. A voracious appetite for energy and prosperity among what used to be termed the developing and emerging countries clashes head on with the shift in values and awareness that is gaining ground in more mature economies. The Copenhagen climate summit may have failed, the US American Clean Energy and Security Act may be dragging its feet, and doubts may be repeatedly raised about the reliability of models forecasting the condition of our planet, but none of this can obscure two undisputed facts: At the very least, the brakes must be put on global warming, and the unbridled consumption of resources must be cut back drastically if sustainable growth is to continue to underwrite an attractive quality of life and relative prosperity.

We stand at the dawn of a new economic day. The critical issues right now are the development of new industries and the transformation of conventional business models in order to facilitate profitable growth as a long-term proposition. These two issues can create competitive advantages, diminish economic and ecological risks and safeguard jobs.

Governments are doing a fair amount to help. The industrialized nations have put together programs worth billions to promote the development of new technologies. Green industries currently account for a 15% share (approx. USD 430 billion) of the world's economic stimulus packages. According to calculations made by the International Monetary Fund, every "dollar used for green purposes" attracts another dollar. Europe alone is plowing EUR 7 billion into energy efficiency – to make cars more economical and buildings and factories more energy-efficient. EUR 6 billion is being channeled into development of renewable energies, while EUR 3.5 billion has been earmarked for energy infrastructure. A further half a billion euros will be spent on offshore wind farms. In the midst of the crisis, Germany has injected some EUR 80 billion into the economy, about 13% of which is set aside for climate and environmental protection activities. Compared to the international community, that is a fairly modest sum. South Korea, for example, plans to pump around USD 36 billion – fully 80% of its overall stimulus package – into

MEGATREND 1

Global population in 2010

6.8 

BILLION PEOPLE

Global population in 2050

9.0 

BILLION PEOPLE

MEGATREND 2

Globalization



MEGATREND 3

Global pursuit of prosperity



3.1

TRILLION EURO IN SALES

will be generated by the global green industry by 2020



energy efficiency, renewable energy and water pollution control over the next four years. In absolute terms, China is spending most (in the context of economic stimulus) to protect the environment and the climate: more than USD 220 billion – twice as much as the USA. As early as 2013, the market for environmental technologies including renewable energy should be worth USD 1 trillion in the People's Republic.

A change in consumer awareness is providing welcome impetus for the shifting trend. Buyers expect companies to give them innovative solutions, and ecological criteria in particular are increasingly influencing purchase decisions as consumers "shop for a better world." Scarcely any industry – from automotive to engineering to fishing – can afford to close its eyes to this trend.

"ENVIRONMENTAL TECHNOLOGY – THE 21ST CENTURY'S LEAD INDUSTRY"

"Environmental technology is the 21st century's lead industry," says Burkhard Schwenker, Chairman of Roland Berger Strategy Consultants. His view is supported by an exclusive survey of 1,300 businesses and 200 research organizations carried out by the company. The key findings make compelling reading. Revenues in the global environment industry will more than double between now and 2020, reaching a level of EUR 3,100 billion. The environment industry generated revenues of over EUR 1,400 billion in 2007, nearly EUR 270 billion of it in Germany. Renewable energy alone gives work to some 300,000 people in this country and 2.3 million people worldwide.

Another recent study by Roland Berger Strategy Consultants, carried out in collaboration with the World Wildlife Fund (WWF), puts Germany in third place in the world's green technology rankings. "Green tech made in Germany" is already up among the leaders. The country's research effort commands worldwide respect, while its experts boast excellent qualifications – a healthy point of departure indeed. In forward-looking segments such as photovoltaics, solar thermal energy, wind power and hydropower, German companies have global market shares ranging from 21% to 35%. German manufacturers of biogas actually control 90% of the world's market. The country's engineering companies were likewise quick to spot energy efficiency as an emerging megatrend. The environment industry is "one of the standard bearers as we anticipate the end of the oil age," in the words of Deutsche Bank.

Coordinated action in many areas is needed if Germany is to fully exploit the potential afforded by the green economy. Roland Berger Strategy Consultants has conducted in-depth analyses and studies of the following key questions: How can existing competitive advantages be converted into more growth and new jobs? Which thematic areas in particular lend themselves to this drive? And which markets hold out the greatest opportunities?

SIX LEAD MARKETS – ENGINES OF A NEW INDUSTRIAL REVOLUTION

Wind power and photovoltaics are the driving forces behind the lead market for **environmentally friendly power generation and storage**. The boom in the global wind

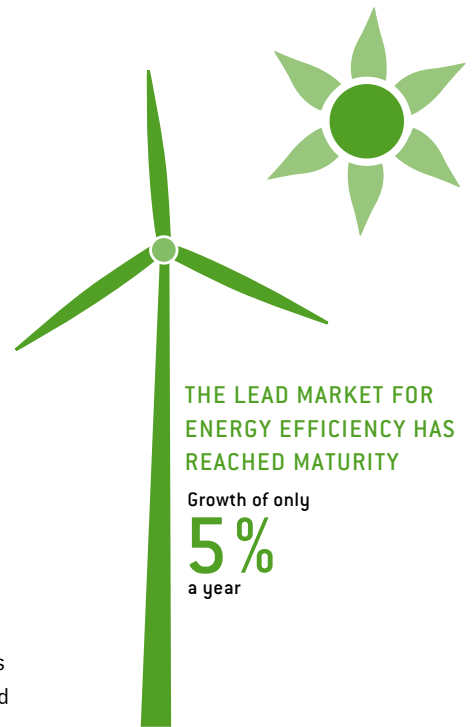
power segment is continuing unabated in Germany. Defying the economic crisis, the volume of newly installed output rose by 31% year-on-year in 2009. At the same time, the industry is on the verge of a massive structural transition. Whereas pioneering companies dominated the market in the past, the balance is now tipping in favor of major power utilities – with dramatic consequences for both manufacturers and suppliers. As project sizes swell, the threat of overcapacity is emerging. According to a new study by Roland Berger Strategy Consultants, consolidation in the industry is inevitable. Manufacturers have no choice but to grow, improve their efficiency and cut their costs. Suppliers, too, have a lot of adjusting to do.

Between now and 2020, the lead market for **energy efficiency** will once again double in size in Germany. While this figure indicates only comparatively modest annual growth, the technologies concerned are already more than ready for the market. Measurement and control systems and electric motors are fueling most of the current growth. Driven by biotechnology, the lead market for **material efficiency** will triple in the same period. Successful key technologies such as automated separation systems are shaping the lead market for waste management and recycling. These systems alone could realize annual growth rates of 15% according to Roland Berger Strategy Consultants. The key driver in this market segment concerns the growing body of worldwide regulations to protect people and the environment. Through 2020, the lead market for **sustainable water management** will expand by a modest 3% per annum. Emerging countries in particular will exceed this growth rate as they ramp up and modernize their infrastructure.

The transition in the green economy is clearest in the lead market for **sustainable mobility**. Today's market volume will rise from EUR 200 billion to around EUR 300 billion by 2020. Never before has modern automotive history experienced a technological upheaval as fundamental as the current rapid development in alternative, low-emission engines. Electric cars are playing a central role here, as are CO₂-neutral fuels. Both areas will have a formative influence on the future of personal mobility.

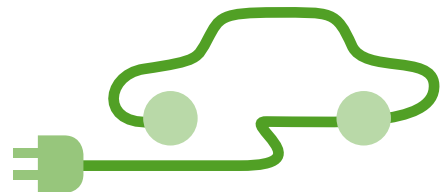
E-mobility responds to four megatrends in one: huge growth in the global population and traffic volumes (in China alone, some 300 million people are on the point of buying their first car); the imminent collapse of traffic flows in megacities such as Mumbai, Mexico City and Bangkok (70% to 80% of the world's population will live in cities by 2050); the need to reduce pollutants and greenhouse gases (private cars are currently to blame for around 7% of the world's CO₂ emissions); and our need to come to terms with limited fossil fuel resources. The German government wants to see a million electric vehicles on the country's roads by 2020. The "National Electromobility Development Plan" also aims to establish Germany as the lead market for the relevant technologies. "We must reinvent the automobile," says Daimler boss Dieter Zetsche. VW CEO Martin Winterkorn is clearly thinking along similar lines: "The future of Volkswagen," he says, "is green."

Car producers have no choice in the matter. Governments are stepping up the pressure with ever stricter laws on emissions. In all the major automotive markets, electric cars will sharply increase their market share thanks to substantial reductions in the cost of batteries. However, the new Roland Berger Strategy Consultants market study



SUSTAINABLE MOBILITY

E-mobility is a response to four trends



"Powertrain 2020: Li-ion batteries – the next bubble ahead?" predicts that even those investment projects that have already been announced will run up significant overcapacity as early as 2014 to 2017. This will happen especially in the USA and Japan. Accordingly, only six to eight battery manufacturers with a global reach will be able to survive.

Consumer acceptance will naturally be critical to the success of electric cars, as buyers will have to fork out between EUR 5,000 and EUR 10,000 more per vehicle. That, in the view of Volkswagen, is too much for the majority of car buyers. Manufacturers are thus already banking on government-backed incentive programs along the lines of the cash for clunkers scheme.

For the next stage of development, as they prepare electric cars for volume production, the auto companies are setting their sights on metropolitan regions. For this there are two reasons. One is that urban sprawl is already causing personal mobility to strain at its limits in terms of traffic congestion and air pollution, for example. Clean, intelligently networked vehicles such as the Megacity Vehicle planned by BMW are the obvious solution. The other is that it is easier to set up the dense network of charging stations that is still indispensable for electric cars in large cities. In Berlin, for example, RWE has teamed up with Daimler to launch a pilot project involving 100 electric cars and 500 charging stations. And it is only a matter of time before other car makers and power utilities follow suit. Some cities themselves are wooing the owners of electric vehicles with special perks. In London, for instance, electric vehicle users don't have to pay the regular inner-city access charge. And Los Angeles reserves special parking spaces for exceptionally efficient vehicles.

SMART FOLLOWERS ARE HOT ON THE HEELS OF FIRST MOVERS



GREEN PATENTS GRANTED BY THE EUROPEAN PATENT OFFICE, 2007

23%
GERMANY

22%
USA

19%
JAPAN

THE ECO-INDUSTRY WORLDWIDE: SMART FOLLOWERS HOT ON THE HEELS OF FIRST MOVERS

Three trends appear to be shaping the face of the green industry. The **first** is fierce predatory competition as the first movers are accompanied by smart followers – companies that intelligently plug into other companies' technological developments. A willingness to invest heavily in research and development will be critical to the success of today's market leaders. Green technology is an extremely innovative industry characterized by short innovation cycles, so most growth happens when good ideas are quickly turned into marketable products.

Patents are a good indicator of growth. Recent surveys of the environmental technology industry show that their number rose by about 19% per annum to 1,044 in the period from 2004 through 2007. German companies lead the field around the world. Of all new environment-related patents granted by the European Patent Office in 2007, 23% came from Germany. The USA (22%) and Japan (19%) followed close behind.

It is important to use patents to protect good ideas. Having said that, good ideas only take on economic relevance when they become marketable products and hence part of a value chain. In the past, German companies have not always been good enough at transforming R&D into market success. Why? Because the road from basic research to marketable application is often too long. One of the biggest challenges is for science and industry to

work closely together – including strategic alliances with the public sector. An outstanding example of such cooperation is the Fraunhofer Center for Sustainable Energy Systems in Masdar (Abu Dhabi), the world's first carbon-neutral city. Such approaches ensure that theoretical research finds its way directly into practical applications.

Second, many environmental technology markets are only now reaching the critical mass they need to accommodate production on an industrial scale. Fragmentation remains a conspicuous feature of the environmental technology industry. Roland Berger Strategy Consultants believes that waves of consolidation will sweep over the industry in the years ahead. This will be the case especially in areas where off-the-peg products enable ever greater economies of scale. A series of well-resourced companies is already exploiting growth opportunities by means of acquisition strategies.

Smaller players are under pressure to consolidate. If they fail to make it over the next technological hurdle, they run the risk of being edged out of the market. The fact that R&D and material sourcing are not really scalable is one of the major reasons why these companies will be forced to explore new models of collaboration. Otherwise they could well end up as little more than an extended workbench for the big producers – a development witnessed years ago in the automotive supply industry.

Third, even price-conscious target groups nowadays consider ecological aspects of consumption when making product purchase decisions. In the USA, 30% of consumers already see themselves as belonging to the "lifestyle of health and sustainability" group, or LOHAS. LOHAS like to enjoy life, but only with a good conscience, for which they are more than happy to pay a dollar or two more. Marketing experts distinguish between a hard core of environmentally aware consumers and a wider circle of consumers who vacillate between buying ecological and non-ecological products depending on the situation. The hard core really do want to make the world a better place by shopping green and creating a "demand pull" for more environmentally friendly products. Though not very big in absolute terms, they form a well-networked community that has a seminal influence on the image of green products.

The challenge of reconciling economic and ecological interests demands a new concept of progress. In this context, the environmental technology industry is emerging as an extremely dynamic factor. Companies in Germany can tap vast potential not only in their domestic market but also in the USA, Japan, Brazil, Russia, India and China. The true extent of this potential is revealed by a study commissioned by the US chambers of foreign trade. In collaboration with Roland Berger Strategy Consultants, they asked 300 companies in the US green-tech industry – including the US subsidiaries of a number of German firms – about their expectations for the future. Some 34% of the US companies said that they expect their revenues to grow by more than 10% within the next year and by a further 51% in the next five years. The mood among the subsidiaries of German firms in the USA was even more upbeat: 38% expect at least 10% higher revenues in the next year and a further 60% increase over the next five years. The labor market will also benefit: fully 87% of companies in the study plan to quickly create new jobs.

GREEN GROWTH, GREEN PROFIT

The new book on "Green Growth" by Roland Berger Strategy Consultants will be published in October in our "think:act" book series!



MANY CONSUMERS

want a clear environmental conscience without foregoing pleasure!



IF YOU HAVE ANY FURTHER QUESTIONS,
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