



REPORT  
SUMMARY

INT

2011

# THE ENERGY REPORT: 100% Renewable Energy by 2050

S U M M A R Y

**“By 2050, we could get all the energy we need from renewable sources. Such a transition is possible and also cost-effective, providing energy that is affordable for all and producing it in ways that can be sustained by the global economy and the planet. This report should inspire governments and business to come to grips with the challenges that undoubtedly exist and to move boldly to bring the renewable economy into reality.”**

**Jim Leape  
Director General  
WWF International**

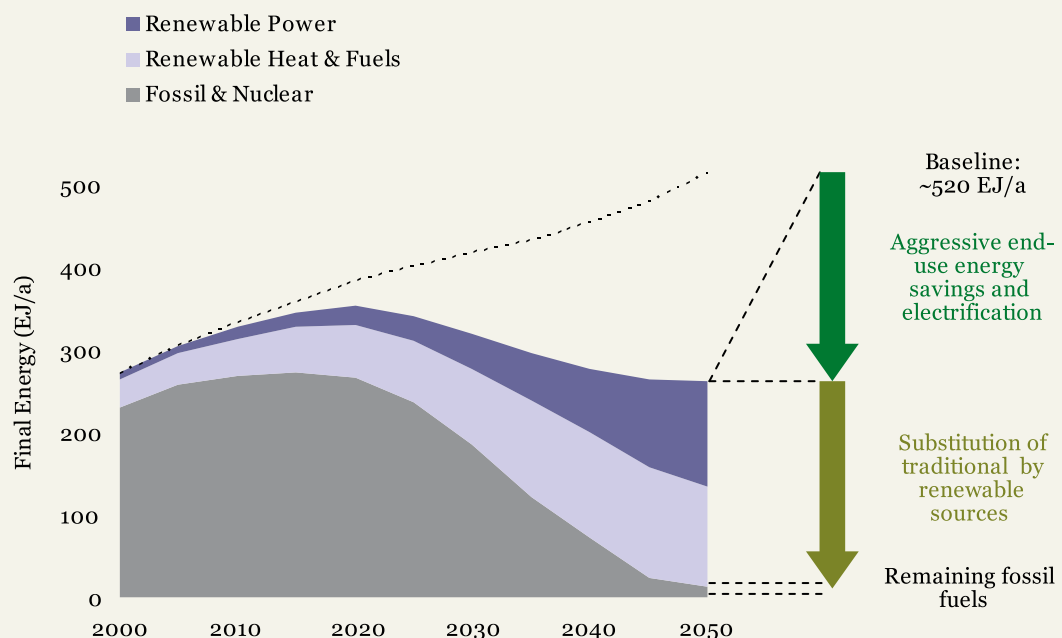
# INTRODUCTION

A world powered by 100 per cent renewable energy. That's WWF's vision for the middle of this century. Achieving it will mean avoiding catastrophic climate change, less pollution, increased energy security and improved health for people worldwide.

But is it possible? We called upon respected energy consultancy Ecofys to investigate. The result is the most ambitious science-based examination ever of a renewable and clean energy future on a global scale. The study shows that it is technically possible to achieve almost 100 per cent renewable energy sources within the next four decades.

The Ecofys scenario raises many issues and challenges, outlined in this summary document and discussed in more detail in *The Energy Report*. Meeting the energy needs of current and future generations is one of the most important, difficult and urgent political tasks for every government. This paper sets out our recommendations in light of these challenges.

The Ecofys scenario has at its core two principle energy evolution trends: aggressive energy savings and electrification to reduce demand; and substitution of fossil fuel energy sources with renewable technologies. See figure below.



**Evolution of energy supply in the Ecofys Energy Scenario, showing the key developments.**

Source: The Ecofys Energy Scenario, December 2010.

# 10 RECOMMENDATIONS FOR A 100% RENEWABLE ENERGY FUTURE

**CLEAN ENERGY:** Promote only the most efficient products.  
Develop existing and new renewable energy sources to provide enough clean energy for all by 2050.

**GRIDS:** Share and exchange clean energy through grids and trade, making the best use of sustainable energy resources in different areas.

**ACCESS:** End energy poverty: provide clean electricity and promote sustainable practices, such as efficient cook stoves, to everyone in developing countries.

**MONEY:** Invest in renewable, clean energy and energy-efficient products and buildings.

**FOOD:** Stop food waste. Choose food that is sourced in an efficient and sustainable way to free-up land for nature, sustainable forestry and biofuel production. Everyone has an equal right to healthy levels of protein in their diet – for this to happen, wealthier people need to eat less meat.

**MATERIALS:** Reduce, re-use, recycle – to minimize waste and save energy. Develop durable materials. And avoid things we don't need.

**TRANSPORT:** Provide incentives to encourage greater use of public transport, and to reduce the distances people and goods travel. Promote electrification wherever possible, and support research into hydrogen and other alternative fuels for shipping and aviation.

**TECHNOLOGY:** Develop national, bilateral and multilateral action plans to promote research and development in energy efficiency and renewable energy.

**SUSTAINABILITY:** Develop and enforce strict sustainability criteria that ensure renewable energy is compatible with environmental and development goals.

**AGREEMENTS:** Support ambitious climate and energy agreements to provide global guidance and promote global cooperation on renewable energy and efficiency efforts.

# WHY THE WORLD NEEDS A 100% RENEWABLE ENERGY FUTURE

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Switching to renewable energy isn't just the best choice. It's our only option. The way the world produces and uses energy today is not sustainable.

- A fifth of the world's population has no access to reliable electricity.<sup>1</sup> More than 2.7 billion people are dependent on traditional bioenergy (such as wood and charcoal) for cooking and heating<sup>2</sup> – with serious economic, environmental and health impacts.
- Production from known oil and gas reserves will fall by around 40-60 per cent by 2030, according to the International Energy Agency.<sup>3</sup> Continuing to depend on fossil fuels will mean substantially higher and more volatile energy costs, driven by the increasing scarcity of oil and gas and a move to unconventional – and increasingly environmentally damaging – sources. Supply disruptions, accidents and disputes over energy resources will continue to challenge energy security.
- The global energy sector is responsible for around two-thirds of global greenhouse gas emissions. And its emissions are increasing at a faster rate than any other sector. “Business-as-usual” scenarios show an increase in emissions that would lead to very dangerous levels of warming, far above the threshold agreed by governments of 2°C above pre-industrial levels.
- Nuclear is a risky and expensive option, producing dangerous waste that remains highly toxic for thousands of years. It could also potentially contribute to political instability and insecurity.

**WE CAN REDUCE  
OUR RELIANCE ON  
FOSSIL FUELS  
BY 70% BY 2040**

The Ecofys Energy Scenario,  
February 2011



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<sup>1</sup> IEA, *World Energy Outlook (WEO) 2010*, Paris  
<sup>2</sup> IEA, *World Energy Outlook (WEO) 2010*, Paris  
<sup>3</sup> IEA, *World Energy Outlook (WEO) 2009*, Paris

# THE ECOFYS SCENARIO IN A NUTSHELL

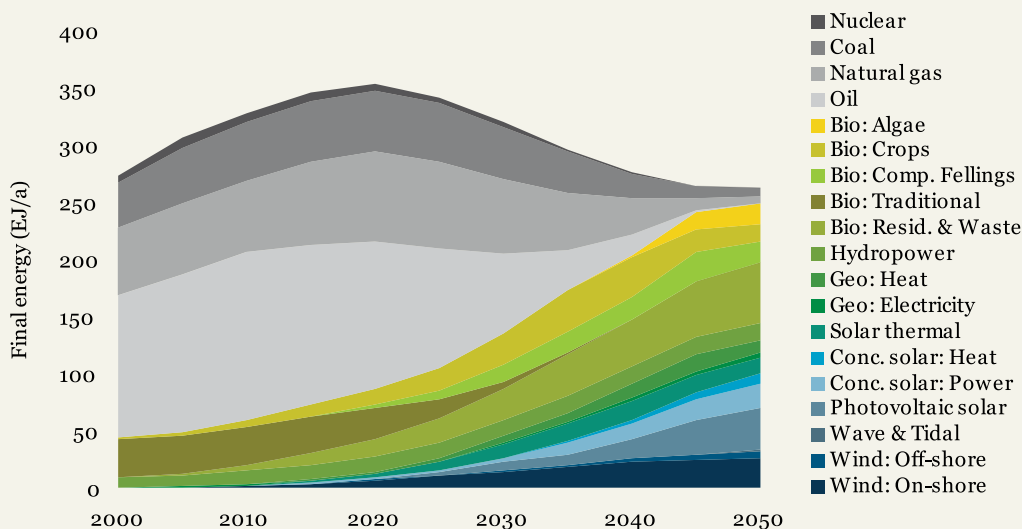
Ecofys envisages a world in 2050 where energy demand is 15 per cent lower than in 2005. Although population, industrial output, economic activity, passenger travel and freight transport continue to rise as predicted, ambitious energy-saving measures allow people to do more with less. Industry uses more recycled and energy-

efficient materials, buildings are constructed or upgraded to need minimal energy for heating and cooling, and there is a shift to more efficient forms of transport.

As far as possible, the world uses electrical energy rather than solid and liquid fuels. Wind, solar, biomass and hydropower are the main sources of electricity, with solar and geothermal sources, as well as heat pumps, providing a large share of heat for buildings and industry. Because supplies of wind and solar power vary, 'smart' electricity grids have been developed to store and deliver energy more efficiently. All of this is delivered using already proven technology and processes.

Bioenergy (liquid biofuels and solid biomass) is used as a last resort where other renewable energy sources are not viable – mainly to provide fuels for aeroplanes, ships and trucks, and in industrial processes that require very high temperatures.

By 2050, the world is saving nearly €4 trillion per year through energy efficiency and reduced fuel costs compared to a "business-as-usual" scenario where everyone carries on using energy in the same way as at present. But big increases in capital expenditure are needed first – to install renewable energy-generating capacity on a massive scale, modernize electricity grids, transform goods and public transport, and improve the energy efficiency of our existing buildings. Investments begin to pay off around 2040, when the savings start to outweigh the costs. If oil prices rise faster than predicted (the scenario uses a conservative estimate of \$87 per barrel in 2030 and \$142 in 2050), and factoring in the costs of climate change and the impact of fossil fuels on public health, the pay-off happens much earlier.



**World Energy Supply by Source**

Source: The Ecofys Energy Scenario, December 2010.

# CRITICAL ISSUES AND RECOMMENDATIONS

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The Ecofys analysis shows that the world can technically meet its energy needs from renewable sources by 2050.

But it throws up some difficult challenges – and not just technical ones. The social, environmental, economic and political issues this report raises are equally pressing. Governments, businesses, communities and individuals across the world all have a role to play.

**The key factors that need to be addressed to enable the world to meet its energy needs from renewable sources are:**

|                     |                                                                                                                                                                                                                                                                                                |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ENERGY CONSERVATION | We need to reduce demand by improving energy efficiency and reducing wasteful use of energy.                                                                                                                                                                                                   |
| ELECTRIFICATION     | Because electricity, as well as heat are the forms of energy most easily generated by renewables, we need to maximize the use of electricity and direct heat, with improvements to electricity grids to support this.                                                                          |
| EQUITY              | A sustainable energy future must be an equitable one. Its impact on people and nature will greatly depend on the way we use our land, seas and water resources. Changes in lifestyle also have a critical role to play.                                                                        |
| LAND AND SEA USE    | Bioenergy but also other renewable energy sources require land or sea space and need careful planning.                                                                                                                                                                                         |
| LIFESTYLE           | Travel modes and meat consumption are two examples for changes that will need to happen.                                                                                                                                                                                                       |
| FINANCE             | Moving to a renewable future will mean rethinking our current finance systems.                                                                                                                                                                                                                 |
| INNOVATION          | Global expenditure on R&D for renewables and efficiency must double over the next ten years.                                                                                                                                                                                                   |
| GOVERNANCE          | Local, national and regional governance will need to be greatly strengthened to secure an equitable energy future. We need international cooperation and collaboration on an unprecedented level to bridge the gap between the energy-rich and energy-poor, both within and between countries. |

These challenges are outlined on the following pages.

# ENERGY CONSERVATION

Under the Ecofys scenario, **global energy demand in 2050 is 15 per cent lower than in 2005**. This is in striking contrast to

“business-as-usual” projections, which predict energy demand will at least double. This difference is not based on any reduction in activity – industrial output, domestic energy use, passenger travel and freight transport continue to grow, particularly in developing countries. Instead, reductions come from using energy as efficiently as possible:

- In manufacturing, using recycled materials greatly reduces energy consumption, and innovative product design improves efficiency.
- By 2030 all new buildings require almost no conventional energy for heating or cooling – using existing architectural and construction expertise. The energy efficiency of existing buildings is radically improved through ambitious retrofit programmes.
- In transport, improvements in fuel efficiency and operations reduce energy use. People also move to more efficient, lower carbon modes of transport.

The more energy saved, the easier moving to a renewable energy future will become. The UK Energy Research Centre recently demonstrated that the UK could reduce energy demand in the residential and transport sectors by 50 per cent compared to “business-as-usual”, reducing the cost of the UK transferring towards a low-carbon energy system by up to £70bn by 2050<sup>4</sup>.



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**ELECTRICITY  
IS THE ENERGY  
CHOICE FOR THE  
FUTURE –  
BUT EFFICIENCY  
IN ITS USE  
IS A CENTRAL  
CONDITION**

## RECOMMENDATIONS IN SHORT

- We must introduce legally binding minimum efficiency standards worldwide for all products that consume energy.
- Energy conservation should be built into every stage of product design. Wherever possible we should use energy-efficient, highly-durable and recyclable materials.
- We need strict energy-efficiency criteria for all new buildings, aiming toward near-zero energy use.
- Energy taxation is a realistic option. Shifting taxes to products and cars that use more energy will help to steer demand toward more efficient alternatives.
- Developing countries must introduce improved biomass cooking stoves, solar cookers and small-scale biogas digesters. Industrialized countries should support this.
- Substantial investment is needed into public transport to provide convenient and affordable energy-efficient alternatives to private cars.
- Individuals, businesses, communities and nations all need to be more aware of the energy they use, and try to save energy wherever possible.

The Energy Report,  
December 2010

<sup>4</sup> UK Energy Research Centre, Making the transition to a secure and low-carbon energy system, UKERC Energy 2050 Project, 2009 [http://www.ukerc.ac.uk/Downloads/PDF/U/UKERC\\_Energy2050/0906UKERC2050.pdf](http://www.ukerc.ac.uk/Downloads/PDF/U/UKERC_Energy2050/0906UKERC2050.pdf), p. 103

# ELECTRIFICATION

The Ecofys scenario depends on using electrical power wherever possible. Under the Ecofys scenario, **electricity accounts for almost half of the world's energy needs by 2050** (currently, it meets less than one-fifth).

This is because electricity, as well as heat, are the forms of energy most easily generated by renewables.

Massively increasing generation from the renewable resources with the least environmental impact will be vital – both in large-scale renewable power plants and at a local level.

Extended and modernised electricity grids are needed to cope with increased loads and different energy sources. A combination of large (“super”) and “smart” grids holds the key. Efficient international networks will help balance variable renewable sources from different regions, while smart meters will enable consumers to manage demand to match variable supply. At least 60 per cent of all electricity could come from weather-dependent variable sources such as wind and solar PV.

## RECOMMENDATIONS IN SHORT

- We need to massively expand our capacity for generating electricity from renewable resources.
- Countries need to work together to extend electricity networks to bring power from centres of production to centres of consumption as efficiently as possible.
- We need urgent investment into smart grids to help manage energy demand and allow for a significantly higher proportion of electricity to come from variable and decentralized sources.
- More research is needed into efficient ways to store energy, including batteries, hydrogen and heat storage for solar power.
- By 2050, all cars, vans and trains globally should run on electricity. We need legislation, investment and incentives to encourage manufacturers and consumers to switch to electric cars.

ALL LARGE SCALE  
ENERGY  
INFRASTRUCTURE  
PROJECTS  
MUST SATISFY  
INDEPENDENT,  
IN-DEPTH,  
SOCIAL AND  
ENVIRONMENTAL  
IMPACT  
ASSESSMENTS



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## EQUITY

A sustainable energy future must be a fair one. The equal right of every person to benefit from the world's energy resources has to be recognized and realized. Historically, the world's energy consumption has not been fairly balanced. Rich countries have built their economies on cheap, plentiful fossil fuels, and continue to consume the vast majority of global energy supplies. Around 1.4 billion people – a fifth of the world's population – have no access to reliable electricity.<sup>5</sup> 2.7 billion people use solid fuels, mostly biomass (mainly wood, crop residues and animal dung) but also coal, for cooking and heating<sup>6</sup>. But the efficiency of using these fuels is no higher than 10 per cent. This has serious impacts on local biodiversity and health. The pollution from traditional cooking fires prematurely kills about two million women and children each year.<sup>7</sup> In the Ecofys scenario, traditional and inefficient biomass is phased out by 2035.

Better alternatives are needed to ensure unsustainable biomass use can end. Efficient cooking stoves are one simple and cost-effective solution. They don't need as much biomass to power them, meaning less deforestation and fewer harmful emissions. Sustainable management of fast-growing tree species for energy production also reduces the need to cut down primary forests.

From solar power across Africa, to geothermal power in Indonesia, developing countries have great potential to fuel economic growth with renewable energy. Large-scale wind, solar and geothermal plants are beginning to appear. Micro-scale renewables used at community or household level also give options to those not connected to an energy grid. Renewables offer hope to the hundreds of millions of people trapped in energy poverty.

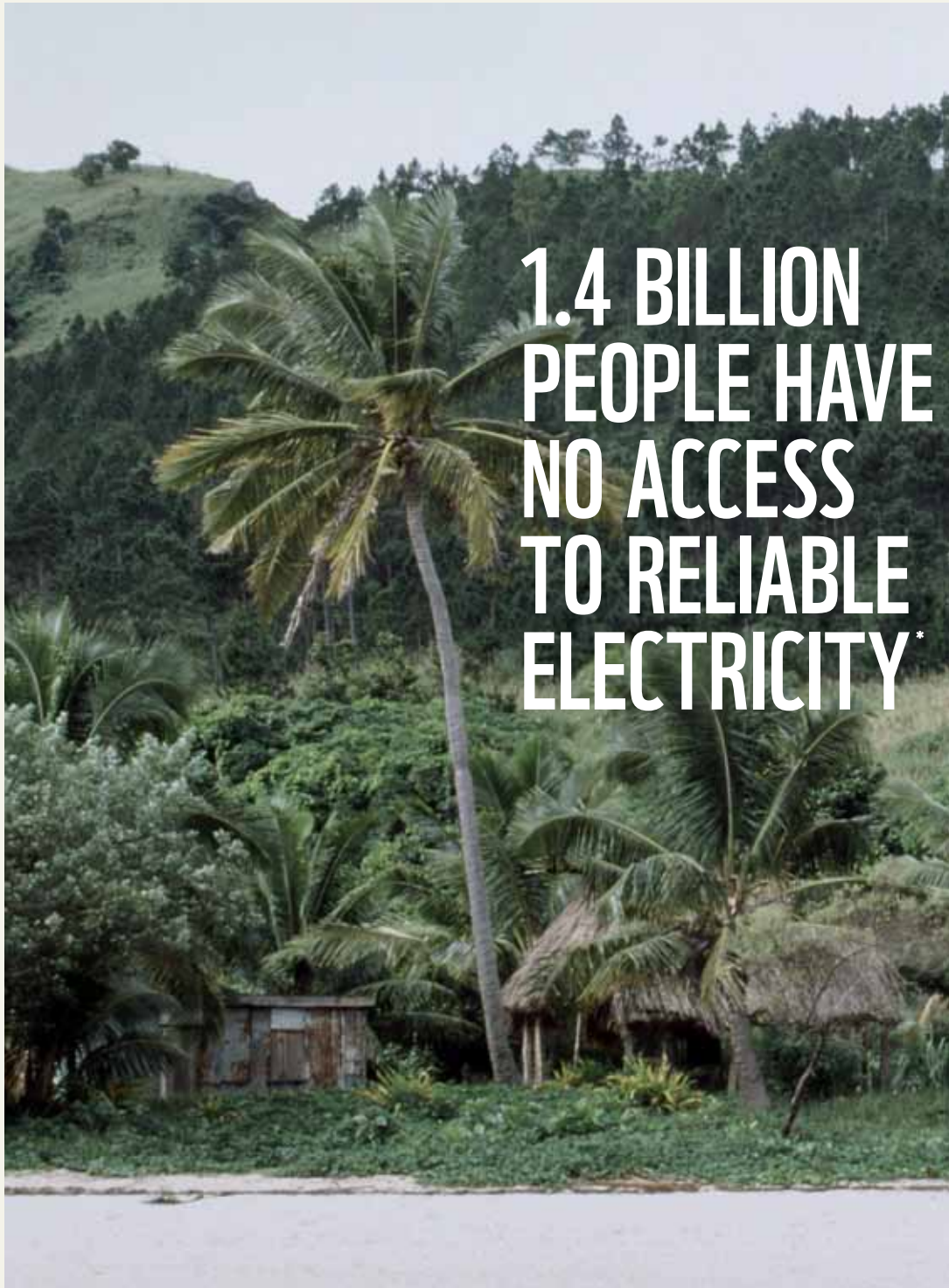
## RECOMMENDATIONS IN SHORT

- Developing countries need investment to develop their own renewable energy capacity. Countries with advanced renewable energy technology need to share their knowledge and expertise with developing countries.
- Communities can successfully generate their own electricity from renewable sources. Governments, aid agencies and investors should provide support to upgrade such approaches to larger scales.
- Where communities still use traditional biomass inefficiently as a source of fuel, they need support to switch to modern clean energy solutions, such as solar cooking, more efficient cook stoves, biogas from digesters and improved charcoal-burning techniques.
- If land in developing countries is used to meet a growing demand for biofuels, we need to tackle the issues of food and water security, land-use planning, governance, provision of ecosystem services, and fair and sustainable trade and investment.
- Multi- and bilateral agreements must include support from richer countries to help poorer countries develop sustainable energy projects.

<sup>5</sup> IEA, World Energy Outlook (WEO) 2010, Paris

<sup>6</sup> IEA, World Energy Outlook (WEO) 2010, Paris

<sup>7</sup> <http://www.iaea.org/Publications/Magazines/Bulletin/Bull442/44204002429.pdf>



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\* The Energy Report, February 2011

# LAND AND SEA USE

The thorniest issue highlighted by *The Energy Report* is the role of bioenergy. The Ecofys scenario foresees very significant improvements in energy efficiency, and

a substantial shift to less polluting forms of transport. Even so, it relies on a substantial increase in bioenergy use, with fuel coming from organic waste, existing forests and biofuel crops on agricultural land. This increase is mainly in sectors which depend on liquid fuels and can't use electricity – notably aviation, shipping, heavy goods vehicles and some high temperature industrial processes.

The key issue is how to make sure that any increase in bioenergy use is sustainable. The Ecofys scenario uses rigorous analysis to assess how much land could be available globally to grow biofuels to meet the demand for liquid fuels. As this is a global assessment, the scenario also highlights the need for further work to identify where exactly this bioenergy should be grown, and how the land is being used at the moment. At a local level, it's important to consider the rights of communities, including indigenous people, the movements of migratory species, the effect on food security and water supplies, the type of infrastructure and governance systems in place, and a host of other constraints.

HOW WE USE  
OUR LAND AND SEA  
AREAS IS KEY  
FOR SECURING  
A RENEWABLE  
ENERGY FUTURE,  
AND MAYBE THE  
HARDEST CHALLENGE  
WE FACE

The Energy Report,  
February 2011



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*The Energy Report* suggests two key ways to minimize the impact of using more bioenergy: reducing meat consumption and constraining the growth in aviation. The Ecofys scenario includes a significant reduction in meat consumption in the developed world (explained further under lifestyle issues) to free up land for biofuels. Even so, the scenario foresees the use of 250 mio ha agricultural land for energy crops and 4.5 bn m<sup>3</sup> of biomass from wood products as necessary if no alternatives are being developed.

Further limiting growth in aviation and shipping and developing renewable hydrogen could also help by reducing the demand for liquid fuels. “Business-as-usual” assumptions project a sharp increase in aviation transport by 2050. Cutting this growth by a third would reduce the land needed for growing crops for transport by 19 million hectares.

We recognise the challenges presented by this issue and favour careful land use planning and measures to address unrestrained growth in demand for biofuels.

## RECOMMENDATIONS IN SHORT

Strict criteria are needed to make sure that any bioenergy used comes from sustainable sources and is directed to the sectors of the economy that need it most.

- All large-scale energy infrastructure developments must satisfy independent, in-depth, social and environmental impact assessments.
- To safeguard habitats, food and water supplies, and ecosystem services, governments must stop the scramble for land for biofuels (“Land-grabbing”).
- Forestry companies, governments and conservationists need to identify areas of idle land (e.g. forests that have been cleared already but are no longer in use) where it may be possible to increase yields of biomass with the least impact on biodiversity. Southeast Asia, Russia and the Americas hold the most potential.
- We need to reduce forest carbon emissions by stopping unsustainable fellings and deforestation through schemes such as REDD (Reducing Emissions from Deforestation and Degradation).
- Bioenergy production has to be based on sustainability criteria with strong legal controls – binding legislation and strict enforcement – at national and international levels.
- As individuals, we need to make more considered choices about the food we eat, the transport we use, and other lifestyle factors that influence global land use. Public policy should help to guide these choices.
- We should limit growth in areas that depend on liquid fuels – notably aviation, shipping and heavy goods vehicles – at least until we have established a secure and sustainable supply of bioenergy and other renewable fuels. That means finding smarter ways to transport goods and people.

# LIFESTYLE

The Ecofys scenario shows that the world can get almost all its energy from renewable sources by 2050 while maintaining rates of economic growth and with people continuing to lead prosperous, healthy lives. Indeed, quality of life for many will improve immeasurably with access to electricity and clean energy. Everyone will, however, need to make wiser choices about the way they use energy.

To grow enough food for a growing global population, while also having enough land to meet potential demand for biofuels, many people will need to change their diets. The Ecofys scenario envisages people **in OECD countries eating half as much meat by 2050, while meat consumption increases by a quarter elsewhere**. Wasting less food, particularly in rich countries, will also save energy and free up more land. More than 1 billion people are undernourished worldwide. Any food and farming strategy needs to focus on securing the basic human rights to adequate food and good health, and on reducing the global environmental impacts of producing and consuming food.

Reducing the distance food and other goods are transported will also reduce the need for biofuels. The Ecofys scenario projects steep rises in freight transport by 2050 if no action is taken. If this growth is cut by a third, it would reduce the land needed for growing crops for transport by around 8 per cent.

Personal mobility is also predicted to rise by 2050. Ecofys suggests the world can manage these increases by moving towards more efficient forms of transport. To achieve this, massive investment in efficient public transport systems is needed, along with fundamental changes in attitudes and behaviour.

## RECOMMENDATIONS IN SHORT

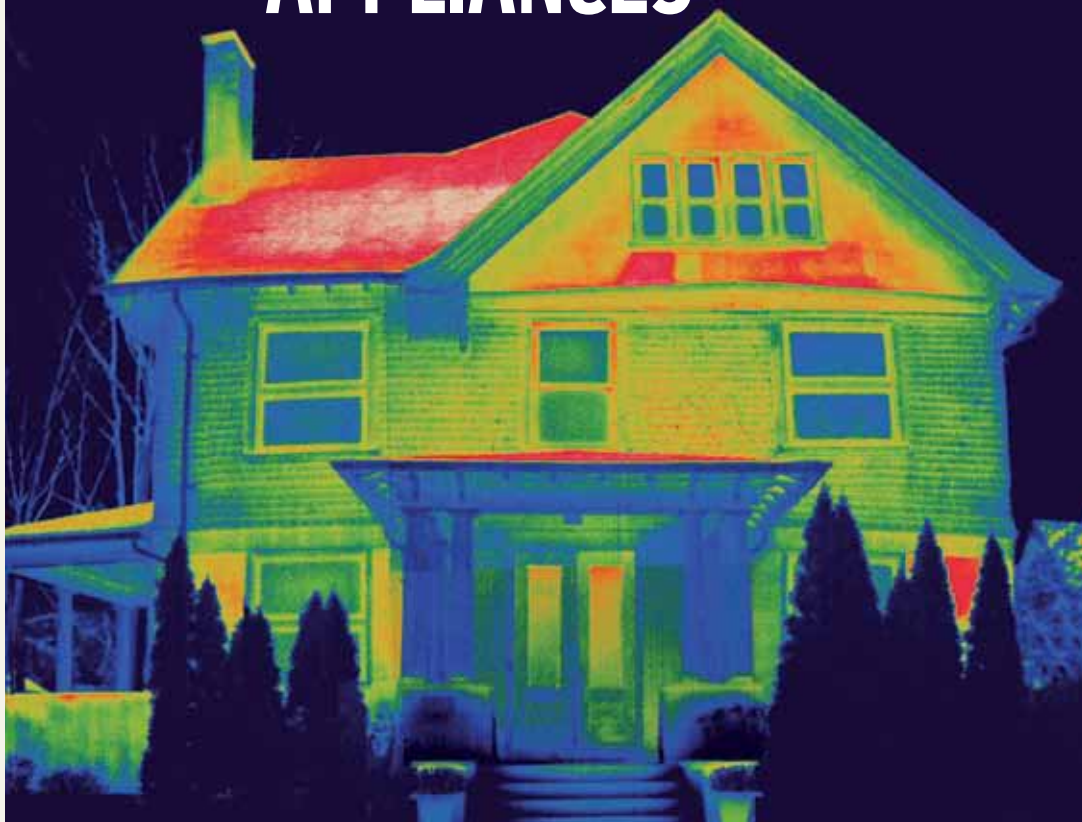
- Every item we buy, all the food we eat, every journey we take uses energy. Every individual needs to be more aware of the impact their lifestyle has, and what they can do about it. Public policy should help direct people to make wiser choices.
- Wealthier people everywhere should eat less meat, as part of a healthy, balanced diet.
- Food waste needs to be minimized (about 50 per cent of all food is wasted and lost worldwide<sup>8</sup>).
- Big investments in public transport systems, particularly in emerging economies where personal mobility is growing fastest, are needed as attractive alternatives.
- Other ways to optimize the distances that people and products travel could mean promoting regional economies, the use of local materials, and internet communications.
- Production and consumption of certified sustainable products needs to be encouraged. The social and environmental benefits for communities producing these products, and associated environmental benefits, are often greater than the environmental impact of the long-distance transport.

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<sup>8</sup> Lundqvist, J., C. de Fraiture and D. Molden. Saving Water: From Field to Fork – Curbing Losses and Wastage in the Food Chain. SIWI Policy Brief. SIWI, 2008.

# WWF HELPED DEVELOP TOPTEN.INFO, AN ONLINE SEARCH ENGINE FOR THE MOST ENERGY EFFICIENT APPLIANCES

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## FINANCE

Renewable energy makes long-term economic sense, **saving nearly €4 trillion a year by 2050** according to the Ecofys scenario.

And that projection doesn't even take into account the costs saved from slowing catastrophic climate change, nor the added value of the millions of jobs created, or health and social benefits like better air quality and well-being.

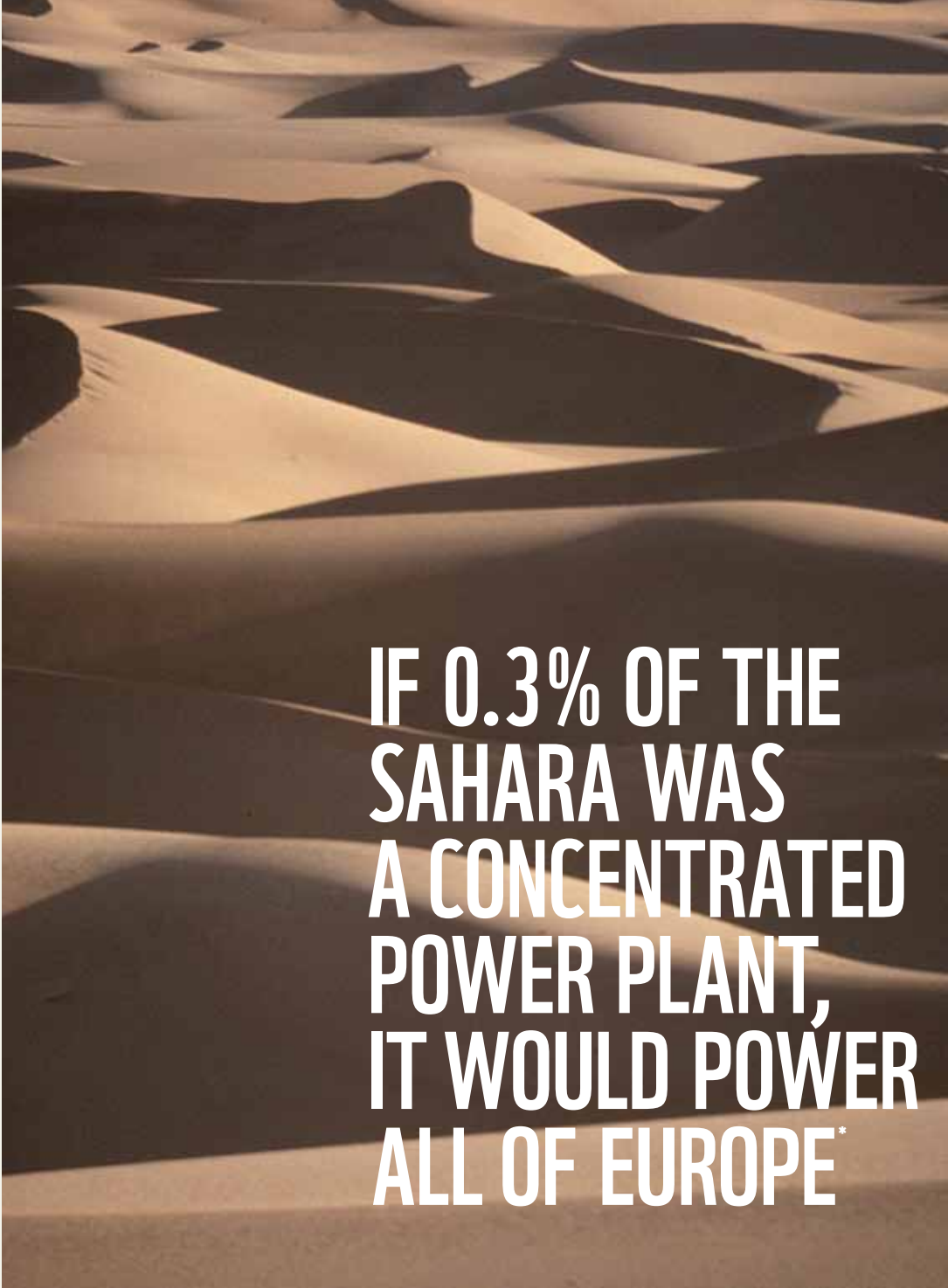
But significant capital investment is needed first. The world needs to install renewable energy on a massive scale, modernise electricity grids, transform public transport infrastructure, and improve the energy efficiency of existing buildings. **Global capital expenditure of €1 trillion a year is needed, growing to around €3.5 trillion a year over the next 25 years.**

To achieve this level of investment, politicians need to clearly support renewable energy and energy efficiency, and create supportive legislation to build investor confidence. New financing models, legislation and stable political frameworks to encourage long-term investment in renewables and energy efficiency are needed.

Such investment could help stimulate economic growth, creating “green collar” jobs. China recently announced plans to invest 5 trillion Yuan (€580 billion) in a new 10-year alternative energy programme that will create 15 million jobs. Energy efficiency savings, especially in industry, can also help spur economic competitiveness and innovation.

## RECOMMENDATIONS IN SHORT

- We urgently need to create a level playing field for sustainable renewable energy, or, even better, one that is tilted in its favour: feed-in tariffs should be extended while subsidies to the fossil fuel and nuclear sectors should be ended.
- Financial support for renewable energies can only be truly effective if it allows open access to the market, to consumers.
- We need ambitious cap-and-trade regimes, nationally and internationally, that cover all large polluters, such as coal-fired power stations and energy-intensive industries.
- Global climate negotiations need a strong focus on providing finance and technology to help developing countries build their capacity for generating renewable energy and improving energy efficiency.
- People everywhere should install any effective micro-generation and energy-efficiency measures they can afford – in their own homes, businesses or communities.
- Policy-makers and financial institutions globally need to develop financial instruments that encourage investment in renewable energy.
- Investors should divest from fossil fuel and nuclear energy firms. Governments need to create supportive legislation to build investor confidence.
- More market incentives could encourage energy efficiency – such as reduced VAT on the most energy-efficient appliances, or varying rates of tax for cars and properties according to their efficiency.



**IF 0.3% OF THE  
SAHARA WAS  
A CONCENTRATED  
POWER PLANT,  
IT WOULD POWER  
ALL OF EUROPE\***

\* Bridgette Meinhold, Desertec Foundation, 2009

# INNOVATION

The Ecofys energy scenario is ambitious and radical. But it is grounded firmly in today's reality. Only technologies and processes that are already proven have been included. This means there's an opportunity to further advance on the Ecofys scenario – to increase the proportion of renewable energy from 95 to 100 per cent, and to reduce the need for biofuels and the pressure this puts on food and water supplies and the natural world.

To achieve this, research and development into renewable energy production and energy efficiency must increase substantially. Current global spending on R&D is around €65 billion a year – this needs to double over the next decade. Economies that invest in clean innovation will be well placed to prosper in the renewable energy future.

Key areas for research and development include reducing energy demand through more efficient materials, processes and technologies; smart grids and appliances; electricity storage; improving the efficiency of biofuels and producing fuels from algae; hydrogen storage and transportation; and alternative energy sources for industrial processes that still rely on coal under the Ecofys scenario.

## RECOMMENDATIONS IN SHORT

- We need to radically increase investments in researching, developing and commercializing technologies that will enable the world to move toward a 100 per cent renewable energy supply.
- At the same time, we should stop pursuing ideas that will lock the world into an unsustainable energy supply, particularly techniques for extracting unconventional fossil fuels.
- Governments need to introduce supportive policies for renewable energy innovation, in close collaboration with representatives from industry and finance.
- We need to educate, train and support the scientists, engineers and other skilled workers who will dream-up, design, build and maintain our new energy infrastructure.
- Developing countries need support in building their own capacity for innovation. All of us will benefit from sharing knowledge within and across borders.
- Because of the potential environmental and social impacts of biofuels, research into alternative fuels – such as algae and hydrogen – should be a priority.



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**1,000,000 MORE WIND TURBINES  
ONSHORE, AND 100,000 OFFSHORE,  
WOULD MEET A QUARTER OF  
THE WORLD'S ELECTRICITY NEEDS  
IN 2050**

The Ecofys Energy Scenario, December 2010

# THE FUTURE IS IN YOUR HANDS

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That the world faces an energy crisis is beyond doubt. There's a pressing need to secure a sustainable energy supply as demand for fossil fuels outstrip environmentally and economically sustainable supplies. A lack of access to energy is one of the main causes of poverty. On top of this, the world needs to start drastically reducing CO<sub>2</sub> emissions within the next few years if we're to have the best chance of avoiding catastrophic climate change.

We – individuals, communities, businesses, investors, politicians – must act immediately, and boldly. Half-hearted solutions are not enough. We must aim for a fully renewable energy supply by the earliest possible date.

It is possible. The Ecofys Energy Scenario – Part 2 of *The Energy Report* – lays out, in unprecedented detail, one way that we can do this. It isn't the definitive solution, and it isn't perfect. As we've seen, it raises many challenges and difficult questions. But it shows that solutions are at hand. We are putting it forward to catalyze debate and to spur action.

We now need to respond to the issues it raises. We need to take it further. But most of all, we need to act on it – each and every one of us. Starting today.

Find-out more,  
or download the full version  
of “The Energy Report” by visiting  
the WWF website at:

[wwf.panda.org/energyreport](http://wwf.panda.org/energyreport)

MANY SPECIES  
STRUGGLE  
AS THE CLIMATE  
STARTS  
TO CHANGE

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The Energy Report,  
February 2011



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# THE ENERGY REPORT

## in numbers

100%  
RECYCLED



80%

We need to cut global greenhouse gas emissions by at least 80% by 2050 (from 1990 levels)

10,000

Nuclear waste will be dangerous for 10,000 years

100%

WWF has a vision of a world powered by 100% renewable energy sources by 2050

1.4 BILLION

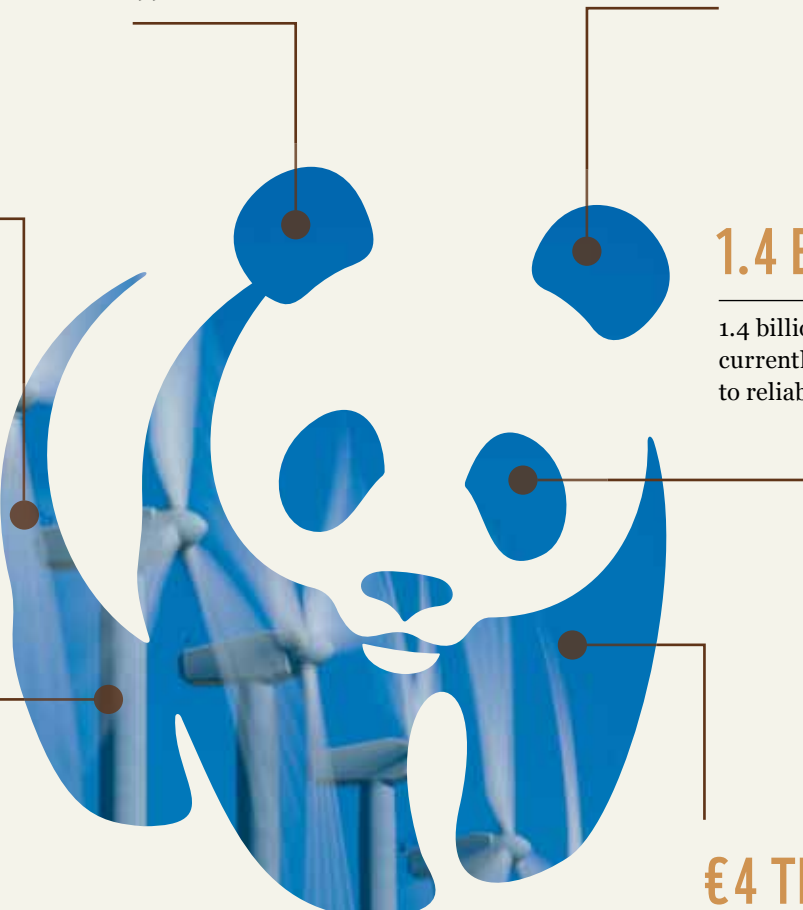
1.4 billion people currently have no access to reliable electricity

15%

In 2050, energy demand could be 15% lower than in 2005

€4 TRILLION

By 2050 we could save nearly €4 trillion a year through energy efficiency and reduced fuel costs



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#### Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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