

A low-angle photograph of two men working on a wooden utility pole. The man in the foreground is standing on a crossarm, wearing a blue tank top and dark shorts, looking towards the camera. The second man is positioned lower on the pole, wearing a green shirt and a red headband, working on the electrical equipment. The pole is covered with various electrical components, including insulators and wires. The background shows a clear blue sky and the fronds of palm trees, suggesting a tropical environment.

100% renewable energy worldwide

People empowering change

Hivos
people unlimited

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Hivos is a development organisation guided by humanist values. Together with civil society organisations in developing countries, Hivos contributes to a free, fair and sustainable world. A world in which women, men and children have equal access to opportunities and resources for development. Our projects are aimed at enabling people to participate actively and equally in the decision-making processes that determine their lives and their society. In this way, Hivos gives people a voice.

Hivos trusts in the creativity and capacity of people. Quality, cooperation and innovation are core values in Hivos' business philosophy. Hivos is committed to poor and marginalised people in Africa, Asia and Latin America. A structural and lasting improvement in these people's lives is the ultimate measure for the work and efforts of Hivos. One of the guiding principles of our philosophy is strengthening the social position of women.

Renewable energy in the hands of people

A few years ago Hivos published a revolutionary message for a development organisation: we choose 100% renewable energy worldwide. It is the only solution to the current climate crisis and at the same time it is a motor for development for millions of poor people who have no access to energy.

We still stand fully behind our choice, and fortunately we are no longer alone in advocating a rapid transition to renewable energy. Even the United Nations is now committed to providing all world citizens with renewable energy. The IMF, World Bank, OESO and the International Energy Agency (IEA) are calling loudly for more investments in renewable energy and less subsidisation of fossil fuels.

When we look at the situation in practice, however, it is not so optimistic. CO₂ emissions have reached the critical threshold of 400 ppm and the average global temperature is projected to rise by 4°C over the course of this century. Most energy investments are still made in large-scale fossil fuels. According to the IEA, in 2030 at least 1.3 billion people will have no access to energy, in spite of all the noble targets.

'We only have one earth', Hivos stated in its first energy brochure. This has not changed, and neither have the threats of climate change to people and the environment. Hivos is therefore again sending a message that is quite revolutionary for a development organisation: our goal is a 100% green and sustainable society. After all, robust ecosystems and biodiversity are the fundamental building blocks of our existence; we cannot survive without a healthy earth.

A green society is powered by green energy – everywhere and accessible for everyone. Hivos continues to choose 100% renewable energy and will continue to focus on access to renewable energy for poor people in remote areas. We have many years' experience in this field, we are good at it and therefore it is the best way we can contribute to a truly green society. Our perspective is global, and so Hivos will in future use its experience to reach as wide an audience as possible.

'Access to 100% renewable energy for all' requires a true energy revolution, a shift in how we think about and act on energy. This calls for ambitious plans and an innovative approach – another area Hivos excels in. Large-scale, such as in five African countries where we are helping to build a serious market for biogas, but also in a concentrated geographical area such as on Sumba, where we demonstrate that all energy can be renewably generated and made accessible for everyone. It is an iconic project that enables us to lobby and mobilise governments and international institutions. We involve businesses and civil society organisations in our goal, for a renewable energy solution is only possible if everyone participates.

Sumba combines all the expertise and knowledge Hivos and its partners have accumulated over the years. We help build local energy supply systems run by the people themselves, with the help of governments and businesses. We help embed renewable energy in society by building a green business sector that offers not only access to energy but also employment. Creative minds, a generous dose of courage and the desire to cooperate: these are Hivos' ingredients for a green future. We welcome cooperation with all parties that are interested and willing to contribute to this.

Ben Witjes

Director of Programmes and Projects



100% renewable energy on Sumba

Sumba is one of many thousands of unknown islands in the Indonesian archipelago. It has beautiful beaches and pristine mountains, but also poverty-stricken inhabitants with no prospects of economic or social development. Until, that is, Hivos put the island on the map in 2011 in an ambitious experiment: Iconic Island Sumba.

The Sumbanese are among the billions of people on this planet who do not have access to clean energy, are forced to cook over unhealthy wood fires and whose only source of light is smoking oil lamps. In most of the villages on the island, life stops as soon as the sun goes down. Sumba has two poorly functioning electricity grids that only provide electricity to islanders who live along the main road. If the ship carrying expensive diesel does not arrive in time, the plants' generators remain idle.

An ambitious plan

Sumba's 650,000 inhabitants are mainly small, hard-working farming families who live on what their land can provide. In the dry season, that is next to nothing. Without electricity to pump up water, irrigation is difficult. On Sumba, stones are hewn out of mines and sawn to measure by hand. Clinics cannot refrigerate their vaccines, schools do not have light or computers, and in the evening the village halls are deserted. Every day women and children have to carry drinking water and wood for their fires over the hill, which is heavy and time-consuming.

Sumba was, in other words, ideal for Hivos' daring plan to provide a poor and 'forgotten' island with 100% renewable energy. Our motto is: if it is possible here, it is possible everywhere. *Iconic Island Sumba*, where we put our years of expertise with renewable energy projects to use and asked expert partners to participate, provides an approach that can be applied in other poor, remote areas. We did not have to convince local leaders, as they already knew that renewable energy is the solution for the development of their island.

Bright lights

At night, seen from the air, Sumba is a large dark spot. But thanks to solar panels, small hydropower plants and

a number of windmills along the coast, scattered bright lights can now be seen in that spot. These renewable energy sources carry the promise that it will work: in ten to fifteen years' time Sumba will be fully powered by renewable energy. Research conducted by Hivos showed that Sumba, like many other poor regions, has a wealth of renewables. Wind, solar and hydro power are present in abundance on the island. The two electricity grids could run well on wind and hydro power. Thousands of farming families on the island have sufficient livestock and water to produce biogas. What's more, KEMA, a Dutch energy consultancy, calculated that renewable energy would be cheaper than current fossil fuel options.

Kamanggih: bustling with energy

One of the first remote villages without electricity to experience the benefits of renewable energy is Kamanggih. Residents of this village, together with Hivos partner IBEKA, hewed the foundations for the small hydropower plant from the rocks. IBEKA taught them how to manage the plant communally and everyone contributes to its maintenance. Kamanggih is now bustling with energy in the evenings. The teacher proudly reports that students are getting better results now that they have light at home. The carpenter has taken out a loan for a sanding machine and dreams of expanding his business. A sawing machine will be acquired for the quarry and farmers will be able to process their crops by machine.

Women also benefit from clean power. They make baskets and weave clothes by the light of an electric lamp, and this allows them to generate additional income on the market and strengthen their position in the family. Thanks to TV, radio and mobile phones the islanders now have access to modern entertainment but also information about politics, crop prices and modern farming techniques. Access to energy facilitates economic and social development.



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Elisabeth Hada Rendi recently started cooking on pig manure and thinks it's a great improvement: "The house is no longer filled with smoke, which used to hurt my eyes and give me breathing problems". Cooking with gas is also much faster, and in the evening we now have good light from our biogas lamp." Her husband is particularly pleased with the fertile slurry that remains after fermentation of the pig manure. A year ago he could not have imagined it possible: pig manure as a motor for economic growth of his farming business.

Hivos has helped thousands of farming families in Indonesia acquire their own biodigester and is now doing the same on Sumba. The farmers also contribute, either financially or if they are too poor, in kind. In that case they provide the stones and help with the construction work. More than a hundred biodigesters have now been built on Sumba by local masons who received special training from Hivos.

Innovative approach

For Sumba, Hivos opted for an innovative and pragmatic approach based not on a detailed blueprint but a clear ambition. Hivos invited all stakeholders to actively contribute to Iconic Island Sumba and together they determined how Sumba would be powered by 100% renewable energy. This approach is paying off. Residents and farmers' organisations are participating in this

venture, but also local elected leaders, the state energy company PLN, the Asian Development Bank and the Indonesian Ministry of Energy. Banks and companies are tentatively investing in wind and biogas on Sumba. Hivos wants to make Sumba an icon of development powered fully by renewable energy. This approach appears to be successful, as Sumba is well on its way to a 100% renewable future.



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An energy solution to the climate problem

Hivos chooses 100% renewable energy: it is the best solution to the growing climate crisis and the lack of access to energy for billions of people.

In 2007, the United Nation's Intergovernmental Panel on Climate Change (IPCC) issued its five-yearly report on climate change, in which hundreds of scientists unequivocally stated – for the first time – that the actions of mankind were 'almost certainly' the main cause of global warming. Since the industrial revolution, people have pumped so much carbon dioxide (CO₂) into the atmosphere that the greenhouse that keeps us warm is slowly overheating.

ALARM BELLS

Alarm bells over climate change are sounding worldwide, in all echelons of society. Although predictions vary on just how dire the consequences will be, the experts agree that things will spiral out of control if we do not act immediately. They are concerned about tipping points after which climate change becomes uncontrollable and irreversible, such as the accelerated melting of polar ice caps or die-back of the Amazon rainforest. In 2007 the IPCC predicted a global temperature rise of between 1.8°C and 4°C by the end of this century and warned that the consequences of an increase of more than 2°C would be irreversible. In 2012 the World Bank predicted that we will reach almost 4°C *even if every country met its climate agreements*. That, as the history of climate conferences has shown, is highly unlikely.

HISTORICAL FAILURE

Despite all the warnings and noticeable consequences, Hivos notes that current measures are totally inadequate to counter dangerous climate change. Many had pinned their hopes on the big climate conference in Copenhagen (2009), but this turned out to be a historical failure. Relations between citizens and governments and between rich industrialised countries and developing nations only worsened in subsequent conferences. Emerging economies such as Brazil, Russia, India and China (BRIC) are no longer the natural allies of poor countries, as they too



© Greenpeace/Peter Caton

contribute substantially to the global climate crisis through rapid economic growth that relies heavily on fossil fuels.

MUDSLIDES AND HURRICANES

Farmers in countries like Indonesia and Kenya have been complaining for years that weather patterns are changing. There is either too little rainfall or so much that harvests fail. The farmers were backed by the IPCC, which at



© Greenpeace/Alberto Cesar Araújo

the end of 2011 demonstrated a direct link between climate change and extreme weather. The effects are felt the most by those who are the least able to defend themselves against climate change and who contribute the least to global warming. It is not the rich but the poor of this world who are engulfed by mudslides, rivers bursting their banks, unstoppable forest fires and devastating hurricanes. Their cattle drown or die of thirst and their crops fail because of drought or sustained tropical downpours. Their drinking water becomes saline from rising sea levels or disappears as glaciers retreat further and further.

HIT LIST: PORTS

However, this does not mean that wealthy industrialised nations are exempt from climate threats. For instance, financial news agency Bloomberg has on the basis of OESO data compiled a hit list of the twenty seaport cities most at risk of flooding. Although most of these cities are in developing countries, Amsterdam, Rotterdam and New York are also on this hit list. The Netherlands, too, is preparing for rises in sea level and flooding. The only difference is that it has much better odds of surviving the rising tide than do Bangladesh or Benin.

FOOD SECURITY UNDER THREAT

Climate change is disastrous for global food security, although the effects may vary regionally. A temperature increase of 2°C or even 1°C is already fatal to many crops. In Brazil, one of the largest food producers in the world, that means a decrease in the production of staple foods like beans, corn and soy. Food production in Sub-Saharan Africa will also fall sharply. Yet, according to the FAO, the worldwide demand for food is rising significantly: as much as 60% by 2050. Farmers are clearing more and more forest to make way for fields, but that too increases CO₂ emissions. Lack of food security will, like many other climate effects, lead to a downward spiral.

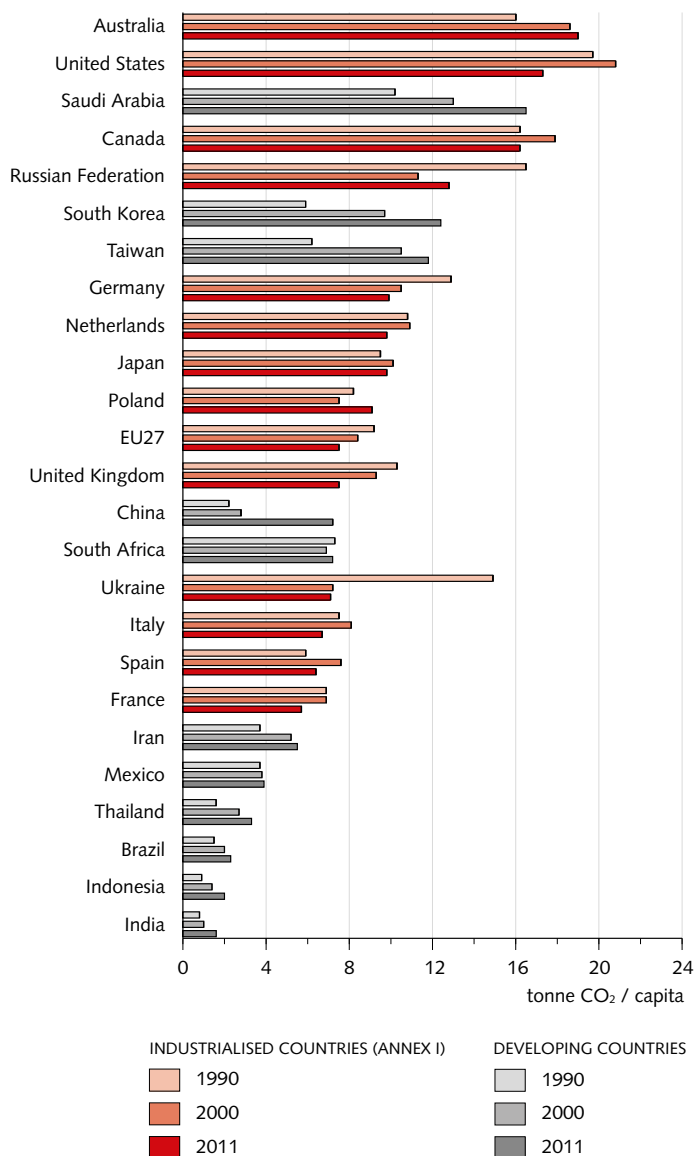
TEARS IN THE CONFERENCE ROOM

Climate conferences often degenerate into talk shows. Sometimes, however, harsh reality enters the conference rooms. In Doha, during the UN climate conference in December 2012, the veteran Philippine negotiator burst into tears. While typhoon Bopha was claiming hundreds of victims in his country, the world was getting no closer to making climate agreements in Doha. In an unprecedented emotional speech he called on the audience to stop the delay tactics and excuses: "As we sit here in these negotiations, [...] the death toll is rising. [...] Hundreds of thousands of people have been rendered without homes. We have never had a typhoon like Bopha, which has wreaked havoc in a part of the country that has never seen a storm like this in half a century. [...] I ask of all of us here, if not us, then who? If not now, then when? If not here, then where?"

LACK OF RESPONSIBILITY

Hivos believes that rich – and increasingly also emerging – industrialised nations are mainly to blame for the current climate crisis. The richest 11% of the world's population is responsible for half of all greenhouse gas emissions and that will only increase. But, as the Philippine negotiator pointed out afterwards: "Rich industrialised countries are not contributing at all to help us." He's right, for nothing changed after Doha, despite the thunderous applause he received from the other delegations. Once again, rich industrialised countries failed to take action. It is unclear where they are going to get the annual 100 billion dollars they committed to climate aid for developing countries. The Netherlands is paying the promised 200 million euro annual contribution, but – contrary to agreement – is taking this from the development budget.

CO₂ EMISSIONS PER CAPITA FROM FOSSIL FUEL USE AND CEMENT PRODUCTION



Source of population data: UNPD, 2010 (WSS Rev. 2010)

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STOP FOSSIL FUELS

If people cause climate change, they can also stop it. A drastic reduction in greenhouse gas emissions can curtail the temperature rise to between 1.3°C and 2.8°C. Today, 80% of our energy is still derived from fossil fuels, even though it is beyond doubt that this is the main cause of global warming. So the key question is whether mankind can continue to develop without oil, coal and gas as energy sources? Yes, of course, says Hivos. Economic growth is absolutely not contingent on fossil fuels. Indeed, the solution for a renewable future lies in a rapid transition to clean energy sources. Oil and coal will inevitably run out and 'alternatives' like tar sand oil and shale gas only pose different but no less urgent problems to people and the environment.



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CLEAN LIVING ENVIRONMENT

Not only do coal and oil cause climate change, they also pollute our environment. The exploitation and burning of these fossil fuels is leaving a trail of destruction across the world: it is bad for human health and for the environment. Of course, renewable energy also has effects on the environment, but these are nothing like the scale of fossil fuels. For example, the total CO₂ emission of a wind turbine is 7-9 g/kWh and that of a coal power plant is 955 g/kWh. Poor people in rural areas are even more dependent on a healthy environment than people in rich industrialised countries. According to the 2013 Human Development Report of the United Nations, global poverty alleviation is meaningless if we do not simultaneously – and urgently – tackle climate change, deforestation and pollution. But even in Europe, coal plants cause 22,000 unnecessary deaths each year. This is another reason why Hivos prefers 100% renewable energy. Renewable energy sources are clean and spare the forests, air, soil and water that we, as a planet, depend on.

SIDE-LINED

Hivos believes that our current energy system is unsustainable and unfair. The global preference of policymakers and financiers for large-scale, fossil energy supply has side-lined billions of people. It is also the view of the IEA, which calls it "shameful and unacceptable". The population of Sub-Saharan Africa and poor Asian countries, rural residents and women are over-represented among global citizens who are resigned to living in total darkness at night and do not have electrical appliances or clean cooking stoves.

Renewable energy sources are ready; now it's up to us

"Sustainable energy for all" is both feasible and affordable. However, it requires a complete shift in thinking about energy.

The United Nations, which forgot 'energy' when establishing the millennium development goals, now realise that development without access to energy is virtually impossible. At the end of 2012 they set the ambitious goal that by 2030 every citizen of the world should have access to sustainable energy. However, another important multilateral organisation, the IEA, laid bare the weak spot in the UN's plan: financing. Governments and financial institutions like the World Bank invest billions in giving citizens of developing countries access to energy, but they tend to finance large-scale fossil power stations and centralised electricity networks that do not reach poor people in remote areas. If that does not change, according to the IEA, in 2030 there will still be 1.2 billion people without electricity and 2.8 billion people without clean cooking facilities.

COMPLETE TRANSFORMATION

A shift to 100% renewable energy is such an enormous challenge that a complete transformation of the way we

produce, use and distribute energy is needed. Funding and subsidisation must fundamentally shift from large-scale fossil energy to local and renewable energy. Nevertheless, Hivos is convinced it is possible, for various energy scenarios have clearly and demonstrably shown that the world could be running on virtually 100% renewable energy by 2050. However, to achieve this we must act quickly and prioritise the installation of renewable energy facilities worldwide. We should not build new coal plants but invest in renewables: solar, wind, hydro and geothermal energy.

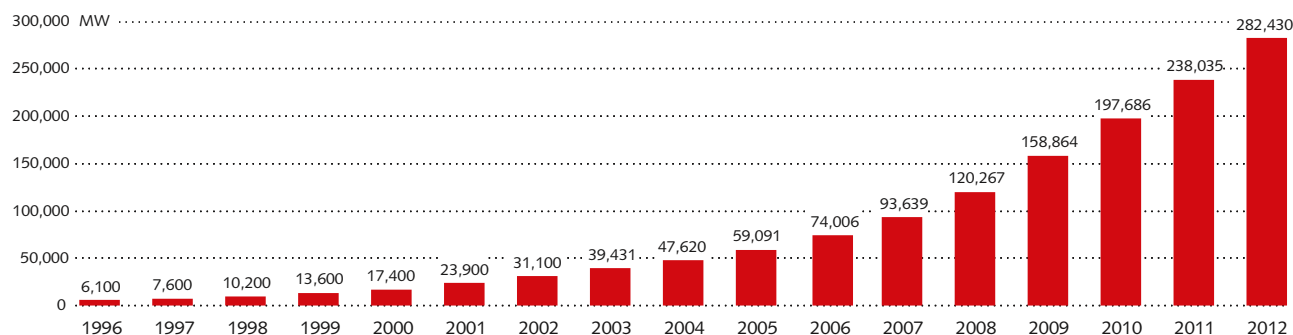
WE HAVE AN ENERGY SURPLUS

The days of cheap oil and gas are over and the world's supply of uranium for nuclear power plants is also shrinking rapidly, according to the IPCC in 2011. But the good news is that we have a potentially infinite supply of alternative energy. Renewables can provide us with 40 times as much energy as we need worldwide, forever and ever. This is just from the energy sources we can already tap into with our current technological capabilities. Moreover, the costs of solar panels and wind turbines are dropping at an unprecedented rate while energy efficiency is increasing thanks to rapid technological developments.



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GLOBAL CUMULATIVE INSTALLED WIND CAPACITY



© GWEC

SPECTACULAR GROWTH OF SOLAR AND WIND POWER

International consulting firm McKinsey is advising companies that solar energy is on the brink of dramatic price decreases and tremendous growth. Independent, off-grid solar systems and small networks that run on solar energy are already profitable in developing countries. Wind farms would immediately be competitive with coal-fired plants in the Netherlands if the government were to stop heavily subsidising fossil fuels. According to the Energy [R]evolution Scenario prepared by the German Aerospace Institute (DRL) in commission to Greenpeace, by 2030 wind energy would, with the current techniques, be able to generate 21% of global energy demand. The IEA too believes that by 2035 wind, solar and hydro power will have replaced coal as the most important energy sources.

WHAT DOES A RENEWABLE ENERGY FUTURE COST?

A rapid transition to clean energy is initially very costly, but if you look ahead a few decades the financial balance shifts in favour of renewable energy. How is this possible? Today we have a large number of coal plants that have already been paid for and will last for another 30 to 40 years. Compared to this a wind turbine that has yet to be built is, of course, more expensive. But a coal plant needs a lot of fuel, whereas wind turbines and solar power plants run on inexhaustible, free energy sources. Once the initial costs have been recuperated, profits through fuel savings will quickly increase, and thanks to smart technology we can also save a lot of energy worldwide. These two factors make a renewable energy future very affordable.

RENEWABLE ENERGY SCENARIOS

In addition to Greenpeace, WWF has also published a global renewable energy scenario prepared by research consultancy Ecofys. Both scenarios showcase in detail how by 2050 the world will be able to generate all of its energy from renewables. A renewable energy future is also possible in the Netherlands, as was demonstrated by the broad-based energy proposal 'New energy for the Netherlands'. Sustainability specialists from seven political parties emphasise in this proposal that the Netherlands could run fully on clean energy by 2050.

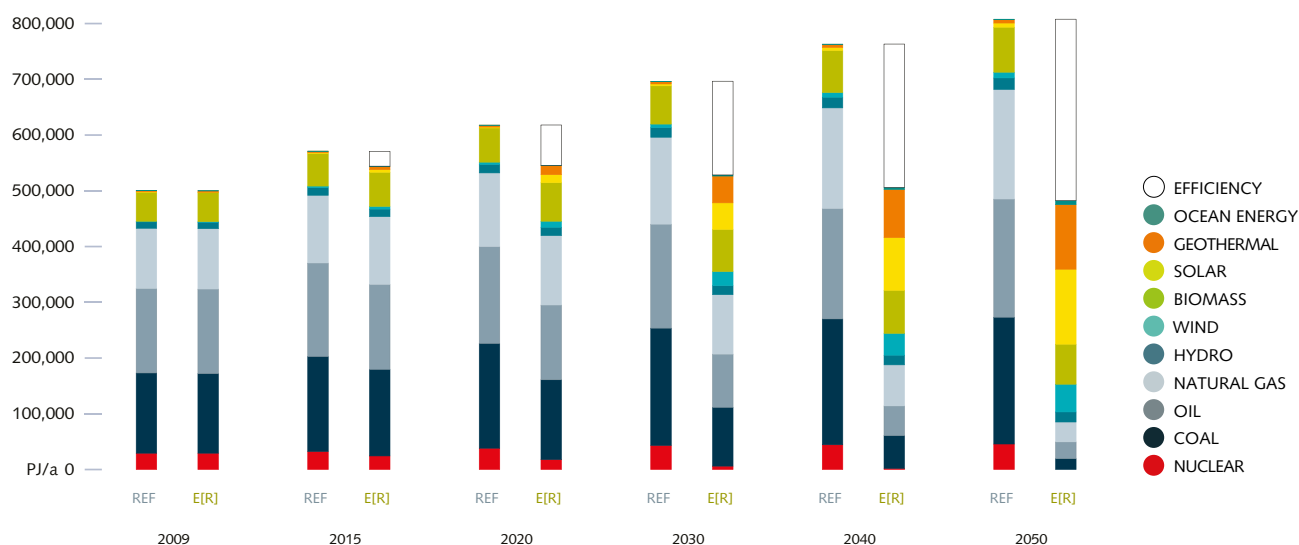
What these scenarios have in common is that:

- » by 2050, the world could be powered for 95-100% by renewable energy;
- » they rely only on proven technologies (e.g. wind turbines, solar plants);
- » not only are the scenarios feasible, they are also affordable;
- » locally generated energy is crucial.



© Greenpeace/Markel Redondo

GLOBAL: PRIMARY ENERGY CONSUMPTION



ERS: the impact of the Energy [R]evolution Scenario | REF: if we continue to do what we have always done

© Energy [R]evolution 2012, Greenpeace International

JOINT GOAL OF 100% RENEWABLE ENERGY

A renewable energy revolution that is a true motor for development entails more than having energy-efficient light bulbs or appliances in the home. Renewable energy should also stimulate economic activity and lead to better health care, clean water and good education. In a green society, one is not possible without the other. Hivos therefore advocates the approach already put into practice on Sumba. Ideally, all stakeholders are involved, play their respective roles and coordinate their activities and policies. Governments ensure appropriate regulations and an attractive investment climate. Companies make good use of this and invest in the local growth market of renewable energy, and financial institutions put money in these initiatives. Civil society organisations involve energy users directly in this process and residents' groups set up energy cooperatives. They all have the same goal on Sumba: 100% renewable energy for all.



© Markel Redondo/Greenpeace

Hivos is working towards 100% renewable energy

100% renewable energy is the way forward to green and inclusive societies across the world, as envisaged by Hivos.

Large-scale wind farms and solar power stations are needed to provide the whole world with 100% renewable energy, but small-scale local networks and independent systems like solar home systems also have a part to play. Citizens from India to the Netherlands also choose local energy sources, as this gives them control over their own energy. But for the poor, access to energy means a lot more: the difference between poverty and development. This is yet another reason why Hivos advocates a renewable energy future on all fronts. Together with our partner organisations we support clean energy projects, initiate the development of green energy sectors and lobby worldwide for renewable energy policies.

SMALL NETWORKS

Many governments and financial institutions rely on the expansion of existing electricity networks in their aims to give the poor citizens of the world access to energy. This is the wrong approach, says the IEA. To provide everyone with power, 55% of all energy must be generated locally: in small networks and independent energy systems such as solar panels and wind turbines. Hivos wholeheartedly agrees with this. Locally generated energy, preferably

managed by the local community, is the answer to the ambitious UN millennium goal 'sustainable energy for all by 2030'.

THE ADVANTAGES OF LOCAL ENERGY SUPPLY

Local energy supply has many advantages. For the rural poor, the financial advantage is an important argument. Thanks to renewables they no longer depend on expensive diesel, kerosene or lamp oil, or the power supplied by an energy company that regularly falls out because there is no more diesel or the village is situated at the far end of the power line. Local, renewable energy gives communities, households and businesses control over their own energy supply. Together with partner organisations, Hivos has supported numerous local projects that provide electricity to households.

SELLING YOUR OWN ENERGY

In Cinta Mekar, Indonesia, Hivos partner IBEKA built a small hydropower plant with the help of residents and taught them how to run it themselves. Now the residents sell their surplus electricity to the power company. Children get a scholarship from the proceeds and women get starting capital for a small business.



TOXIC FUMES MAKE YOU SICK

According to the World Health Organisation, 3.5 million people die each year from indoor air pollution – more than from malaria. In Asia and Africa it is already one of the leading causes of death. The smoke from wood and petroleum fires causes diseases such as cancer and pneumonia, particularly among women and children. Almost half of the victims are younger than 5 years and among adults, 60% of the victims are women. Furthermore, over 400 million people worldwide use coal in their cooking ovens, especially in China, and this habit is also very unhealthy and polluting.



© Josh Estey

COOKING ON COW DUNG

In cooperation with local organisations, Hivos promotes two techniques that dramatically reduce these deaths: biodigesters and fuel-efficient stoves. In Africa, Indonesia and Cambodia, Hivos and its partner organisations built tens of thousands of biodigesters with and for farming families. All they need is a few head of cattle and a water source nearby. The farmers collect cattle and pig manure in the biodigester and add water, after which the manure ferments into gas which allows the women to cook without smoke or fumes. They save time and energy, as they no longer have to walk for hours to gather firewood. Farming families are pleased with the fertile manure that remains after fermentation and allows them to considerably increase the production of their fields.

A CLEAN STOVE SECTOR

Organisations like TaTEDO, Hivos partner in Tanzania, are involved in R&D for efficient stoves in all shapes and sizes. Women are the main users and are therefore called in as consultants when determining the most efficient and user-friendly designs. In 2009 over 1.1 million people used these clean stoves and more than 2,000 small

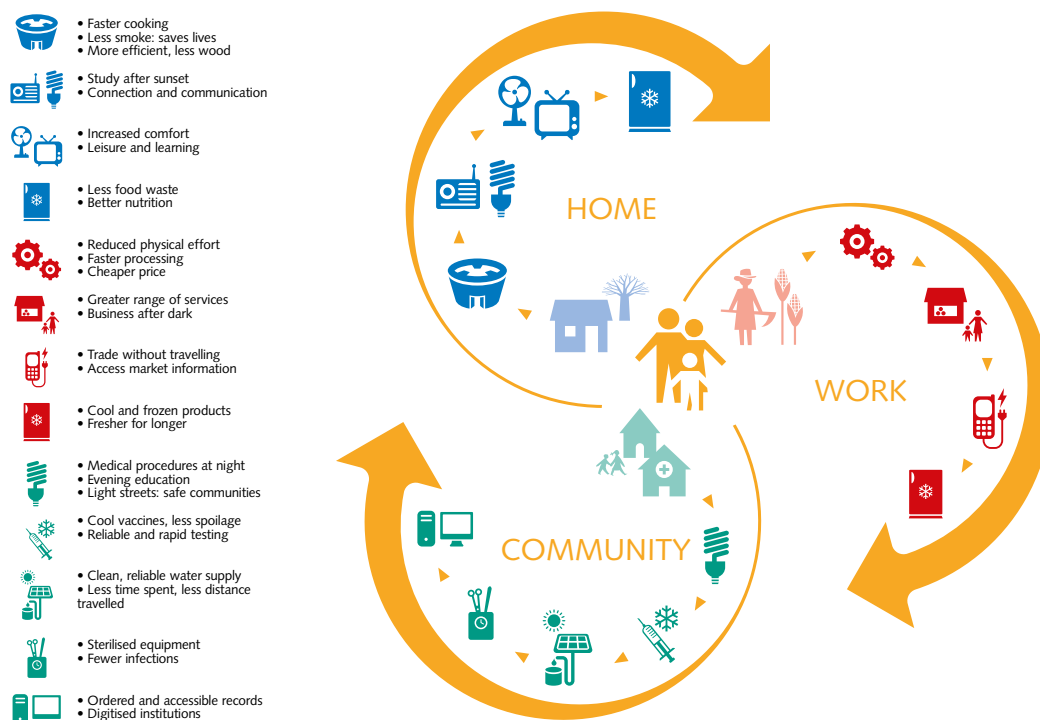
DEFENCE AGAINST CLIMATE CHANGE

Thanks to renewable energy applications, vulnerable communities are better able to defend themselves against the effects of climate change. They are less dependent on natural resources like wood through efficient wood stoves and biodigesters. Water pumps powered by solar or wind energy help people in dry or flooded areas to accommodate a shortage of clean drinking water.

entrepreneurs made a decent profit. TaTEDO provides the technical knowledge which enables others to build and maintain the stoves, but also raises awareness in villages on the benefits of clean cooking: people do not readily change their traditional cooking methods. With the support of Hivos, an entirely new business sector has emerged in Tanzania based on energy-efficient stoves. As this business activity is now standing on its own feet, TaTEDO has cut back its activities around mobile stoves.

TOTAL ENERGY ACCESS IS ACHIEVABLE

Energy Enables Development



The relationship between access to energy for households, businesses and public services as a motor for development.

© Practical Action

PUBLIC SERVICES

Solar panels, a wind turbine and a hydropower plant do more than supply electricity to households. Locally generated energy also means street lights, light in the village hall and computers at school. Radio, television and mobile phones connect rural communities to the global community: they provide a window on the world. Public health is better because clean drinking water is literally within reach. Health clinics are accessible at night because they have light, and vaccines can be refrigerated and equipment sterilised.

RELIABLE ENERGY SUPPLY FOR BUSINESSES

Reliability of power supply is essential for small businesses. How can you meet your commitments to customers if you are never sure when the power will fall out mid-production? What is the point of investing in a sawing machine if it stands idle half the time? Enterprises in Sub-Saharan Africa cite the lack of reliable and affordable energy as the biggest obstacle in their business operations. Countries like Tanzania and Uganda, for example, have two or three blackouts every week. Research by Hivos partners has shown that renewable energy tailored to these entrepreneurs' needs is a good solution: self-managed energy facilities that provide accessible, affordable and reliable electricity.

COFFEE HUSKS AS FUEL

Hivos and its partner organisations constantly seek new, innovative ways to give farmers access to renewable energy, for example fuel from agricultural waste that does not displace food production. In Peru a farmers' cooperative is experimenting with coffee bean husks as fuel for a drying machine used to dry the coffee beans.

FARMERS IMPROVE THEIR PRODUCTION

In developing countries, 45% of the population lives in rural areas: some 2.5 billion people depend on the crops they grow. Modern farming equipment, powered by clean energy, can make the difference between poverty and development. Renewable energy makes farmers less dependent on expensive diesel or LPG. They can irrigate their fields with pumps powered by solar energy or a small windmill, machines help them cultivate their crops and they can preserve their harvest using solar drying machines. This allows farmers to increase their production and improve the quality of their produce: good for their income and for the food security of their environment.



© Thomas Mkunda

WOMEN ARE A SUCCESS FACTOR

Seven out of ten poor people are women, and three are men. Hivos wants to give women a prominent role in achieving access to 100% renewable energy. First, because renewable energy strengthens the position of women. Biogas, energy-efficient stoves and electricity in the home are better for their health and, in addition to time savings, can help them generate an income. Second, and even more important perhaps, is that renewable energy projects are much more effective when women are involved. Their input in the design phase makes energy appliances more user-friendly, which greatly increases their saleability. In many cases it is women who insist on the importance of power for clinics, street lighting or a school computer. Women have proven to be excellent promoters of energy applications they recognise as useful; what's more, they are very successful as green energy entrepreneurs.

GREEN ENTREPRENEURS CONQUER MARKETS

Hivos works on establishing renewable energy markets. Green entrepreneurs are making inroads into these markets as they become a more attractive business proposition. The potential is overwhelming: in Sub-Saharan Africa, only 4% of the population has a clean stove. A huge growth market awaits businesses that have the courage and capacity to unlock it, but this is no easy task. The degree of organisation of consumers and

businesses is low, regulation is not tailored to the market and financing is often extremely difficult. Nevertheless, it is possible so long all stakeholders can participate, as Hivos has shown on Sumba and in five African countries with the African Biogas Partnership Programme (ABPP, see 'A market for biogas').

WHO WILL PAY FOR THIS?

Capital (or rather lack thereof) is the main obstacle to a renewable energy future for poor people. Saving for a bottle of petroleum is manageable, but buying a solar panel is definitely a step too far. Small start-ups also need a boost to get them going, and a loan would be the solution. Like us, people in Kenya or Guatemala would prefer to pay off their own solar panel – which always provides energy – than to continue to pay for expensive fuels like kerosene and charcoal. But financiers willing to grant loans to the poor are few and far between. Hivos and Triodos Bank therefore strengthen local microfinance institutions so that they, in turn, can provide loans to poor households and small businesses.

MAKING MONEY THROUGH CO₂ REDUCTION

Hivos also helps organisations to finance their renewable energy projects through a complex but effective scheme. Businesses and governments in industrialised countries can offset their CO₂ emissions by supporting projects that reduce CO₂ emissions. The most reliable way to reduce CO₂ emissions permanently is through renewable energy projects in developing countries, such as biogas, wind turbines or hydropower plants. Governments and companies can 'buy' CO₂ certificates that represent 'credits' for CO₂ emissions. Hivos links projects set up by local organisations to financiers in rich industrialised countries. We calculate, as precisely as possible, how much CO₂ is saved and then put the projects on the CO₂ emissions market. In 2012 this generated €410,000 for biogas plants that were set up at 15,300 households in rural Cambodia.

HYDROPOWER DRIVES ECONOMIC ACTIVITY

In Chel, a remote Mayan village in Guatemala, inhabitants built a small hydropower plant with the help of Hivos' partner organisation. This reliable, cheap energy has increased economic activity in the village considerably. Small business owners took their chance and now Chel boasts sixty small businesses and even a hotel.



A market for biogas

Renewable energy is a potentially huge growth market that can create jobs and income for many small and medium-sized green entrepreneurs in developing countries. At the same time, it accelerates the pace at which renewable energy applications spread across a country.

Hivos and SNV have for a number of years been involved in a biogas programme, including in five African countries where 30,000 plants have already been built. The objective is to help as many farming families as possible – especially women – to acquire and benefit from their own biodigester. Local organisations play a prominent and enthusiastic role in this programme, for instance in Tanzania, where FIDE succeeded in dramatically increasing production from 35 biodigesters a month in 2012 to 61 in May 2013.

A commercial market

Scaling up effective solutions is a challenge; how do you get from 10 biodigesters in Kenya to 70,000 or more in Africa? Our answer: by building a mature biogas sector that creates its own commercial market. Successful market development is only possible if all parties are involved. Banks must help masons and specialised construction companies to start up and grow. Microfinance institutions should be willing to make loans to farming families so that they can buy a biodigester. Governments, finally, must stimulate the sector through effective regulation, fair tax rates and a level playing field.

"Now that we have biogas we no longer have to cut down trees for firewood and buy petroleum for our lamps. Our energy costs used to be around 245 euros a year and now this is only 95 euros! What's more, the improved yield of our crops has increased our income fourfold. We sell any remaining digested manure to the neighbours."

Seleman family, Arusha, Tanzania

Support in building up the sector

Grants are obviously out of the question in a market-oriented approach. However, a sector being built from the ground up cannot succeed without financial support. Together with local organisations we train hundreds of specialised masons, advise start-ups and teach biogas users how to get the most out of their biodigester. We lobby governments for appropriate regulations and credit providers for financing. Special promoters visit farming families to convince them of the benefits of biodigesters; especially the fertile by-product – digested manure – is often unknown. We also build pilot plants where farmers can see how a biodigester works. Our partner organisations' approach is very efficient: in two years' time the support costs for a biodigester dropped by over 60%.

Financiers are lagging behind

Our experience in Asia is that professionals who build effective biodigesters are convincing farmers to invest in their own biogas system. More and more farmers are able to finance their own biodigester without subsidies, as they have shown to be capable of repaying their loans. Nevertheless, financiers in Africa are still lagging behind, making it very difficult for start-ups and farmers to get a loan. Hivos is trying to overcome this barrier with financing through CO₂ reduction projects in the biogas sector. We also promote the interests of professional associations and help them set up quality labels. This way the sector can grow and become a serious partner for governments and financiers.



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"After working as a regular mason for six years I became a mason in the biogas sector, thanks to a Hivos training course. Six months ago I started my own business and now employ four masons. Together we build around four plants a month, but I want to increase this to between 30 and 40 a month and I also want to expand to other regions. I will be successful, I'm sure, because I deliver quality – just like other builders in the biogas sector here. Otherwise, I will lose my customers. I know other women have doubts about this profession, but I would recommend it to them wholeheartedly!"

Lilian Lelei, Marakwet, Kenya

Women and market development

Women benefit greatly from clean cooking methods, so it is no surprise that they are often the best ambassadors for clean stoves and biodigesters. They know what they are talking about and can convince other consumers of the advantages, and that is exactly what a developing market needs. However, there are still relatively few female masons and quality inspectors. Hivos therefore wants to train women and help them overcome obstacles like getting a loan for their own business. We also encourage them to use the digested manure for fruit and vegetable production, as the higher yield will generate more income for them on the market.



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What are Hivos' global aims?

A global energy revolution can only get off the ground through a serious expansion of scale. Hivos therefore encourages governments and international institutions to make innovative, renewable energy choices. If everyone participates, a green future powered by 100% renewable energy is feasible.

To achieve this it is essential that financiers drastically reform their financing policy. In 2010 the fossil investments of the World Bank rose to a record high of 6.6 billion dollars. Of this, 4.4 billion was intended for coal plants – an increase of no less than 356%. Hivos and dozens of other organisations urge the World Bank to be consistent and take the side of the poor, in other words: a choice for local, renewable energy. On Sumba, Hivos shows that it can be done, together with all stakeholders.

STOP FOSSIL ENERGY SUBSIDIES

In the global energy market, coal and oil have unprecedented competitive advantage thanks to one-sided investments in and subsidies for fossil fuels. This is a major drag on the growth of renewable energy. Despite its one-sided investment policy, the World Bank is also calling for a halt on massive subsidies for fossil fuels.



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The bank is certainly not alone in spreading this message: IMF, OECD, IEA and the EU are advocating exactly the same. According to the IMF, subsidies for fossil fuels cost the world 1,900 billion dollars a year, which includes – surprisingly but justifiably so – the hidden costs of oil and coal, such as climate change, air pollution and damage to health. Unfortunately, the IMF has no information on subsidies for clean energy, as these are so small that they are not relevant. Hivos appreciates the unanimous call for clean energy, but also calls for the necessary steps to be taken: financing policies must change.

INVESTORS ARE HESITANT

Reports like the McKinsey survey (see page 10) show, with hard figures, how lucrative the market for renewable energy is – including the local energy market in developing countries. “Invest now!” is their message to companies, accompanied by profitable predictions, but the private sector is slow to respond. At least, not for renewable energy and especially not in rural areas where most poor people live. Despite the abundance of sunshine, water that in many places flows down from the mountains, windy plains and coastal areas, companies are hesitant in taking the first step in these unfamiliar markets.

WANTED: A CROWBAR

In other words, these businesses need an encouraging nudge, for without market development the necessary expansion of scale remains a fanciful dream. In 2012 social entrepreneurs, along with Hivos and other international organisations, approached the World Bank. They urge the bank to devote public funds to making clean energy accessible to the poor. The largest development bank in the world can provide the crowbar needed to crack open the energy market. This also applies to regional development banks like the ADB and national counterparts such as the Dutch FMO. They can provide loan guarantees, finance technical support and give microfinance institutions the scope needed to finance local renewable initiatives.



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GOVERNMENTS ARE RESPONSIBLE FOR ALL CITIZENS

Besides funding, the lack of adequate regulation is a bottleneck for access to renewable energy for all. Also, many governments in developing countries primarily choose to invest in large-scale energy systems that supply electricity to industry and wealthy city dwellers. Hivos believes that governments in Kenya, El Salvador and India, like any other government, are responsible for access to energy for all their citizens. Subsidising fossil fuel is not an effective instrument to achieve this, for it puts increasing pressure on national budgets and keeps the poor dependent on polluting fuels and fluctuating prices. Governments that want to support their poor citizens should choose subsidies for education, health care, housing, good and renewable public transport and the creation of green jobs.

RENEWABLE ENERGY POLICY

For national governments, too, renewable energy is still new and uncharted territory. Hivos and its partners want to help them create the conditions that will lead to a renewable energy future. This is only possible by looking beyond traditional energy sources. Renewable energy for all is not just a matter for the Ministry of Energy. Government agencies responsible for agriculture, climate change and resource management, for example, can contribute to and benefit from a renewable energy policy. Governments should also invest heavily in education and training that will prepare public officers, businesses, citizens, researchers and civil society organisations for a society that runs on renewable energy.

CONCRETE GOALS

A key success factor is close coordination with all stakeholders, from local organisations to companies. Only then can a government set specific goals and formulate plans and strategies that make sense: how many households, businesses and public services do not have access to clean energy? How best to provide them with electricity, clean cooking facilities and motive power for machines and devices? What is the required budget for local networks and autonomous energy systems

and where do we get that money? In the long term, development through renewable energy means more citizens who consume energy and pay taxes as well as more green businesses that keep the economy going. For governments, in short, clean energy is also an attractive motor for sustainable development without the harmful effects of fossil-fuelled economic growth.

TAILORED ENERGY SUPPLY

Major donors that invest in access to energy often proudly announce how many kWh of electricity they have brought to a developing country. A more important question, however, is whether this energy is actually what people need. Research conducted by Hivos shows, for example, that poor people pay more for their energy than their wealthier fellow citizens, even though they are connected to the same network. This is due to an energy price structure that sustains inequality. Donors and governments should therefore ask this question: is the electricity accessible and affordable for everyone? Does their energy solution truly lighten the workload of women and girls? Cooking on electricity is uncommon, so access to power does not lead to the type of clean cooking that women need. In short, are governments and donors providing tailored energy?

LISTENING TO THOSE WHO HAVE SOLUTIONS

Local civil society organisations play a key role in answering these questions, as they know the situation of the poor people targeted by the donors. They provide sharp analyses of the problems in their country and come up with inventive solutions. Their governments, but also the World Bank and the IMF, should seriously listen to them. Hivos ensures that their voice is heard when and where possible. We facilitate regional cooperation between Hivos partners and encourage the development of joint strategies. We fund research and support innovative pilot projects that enable organisations to lobby their governments. Together, we pave the way for renewable energy solutions at the local, national and international level.



What is the Netherlands doing?

Rich industrialised countries are largely responsible for the current climate crisis. What contribution is the Netherlands making towards a renewable energy solution?

At the moment it seems the energy revolution is not making much headway. Two fifths of the global energy demand is met by coal and what's more, according to the World Resources Institute (WRI), 1,200 new coal plants are set to be built worldwide. Although the majority will be built in China and India, 36 new coal plants are on the list for the United States and 3 for the Netherlands. Each coal plant keeps a country in its grip for 30 to 40 years before this polluting power generator is depreciated. Europe makes a significant monetary contribution to global coal dominance. The European Investment Bank (EIB) is fifth in the WRI's ranking of public institutions that finance coal, for instance, and the Dutch development bank FMO is involved in the construction of a coal plant, according to the WRI report. Yet another Dutch connection is RBS, the principal banker of the government, which ranks number 7 in the top 20 banks that invest the most in coal.

HALF-HEARTED GOVERNMENT POLICY

When it comes to renewable energy, the Netherlands is low on the list (4.3% in 2011). Yet the national energy agreement (August 2013) between the Dutch government, employers' organisation, trade unions and environmental organisations, is encouraging: 16% renewably generated energy by 2023. This stands in stark contrast, however, with heavy subsidies on fossil energy in addition to the construction of three new coal plants. In 2010 the government subsidised fossil energy to a tune of 5.6 billion euros, compared to 1.3 billion euros for renewable energy. Because of the low purchase price of coal and the lack of renewable energy capacity, coal plants outflank the relatively cleaner natural gas plants as energy providers. So despite all the good intentions, CO₂ emissions in the Netherlands are set to increase further. Internationally, the Dutch are responsible for significant CO₂ emissions: 9.8 tonnes per capita, almost the same amount as the Germans (9.9 tonnes per capita) and far more than an average

inhabitant of Indonesia (2 tonnes per capita). According to the WRI, the Netherlands ranks 14th in the countries that subsidise coal projects in other countries with public money.

THE TRUE PRICE OF CO₂

In 2013, TEEB for Business Coalition calculated the environmental costs businesses should take into account worldwide. Rocketing sky-high are greenhouse gas emissions: this costs the world 2,700 billion dollars a year. More and more companies realise that they must limit their CO₂ emissions, but they are still not paying a fair price for this as advocated by the IMF. For many years large companies received 'free' rights to CO₂ emissions from their governments, making the supply on the emissions trading market much greater than the demand. As a result, the price of CO₂ is very low and not a financial incentive to invest in renewable energy.

Moreover, the substantial (indirect) government subsidy on the use of fossil fuels in the Netherlands tips the balance against renewable energy. These subsidies mostly benefit energy-intensive companies like Tata Steel, Dow Chemical and Akzo. In 2010 large industrial users contributed 1.8 billion euros less in energy tax than the true price of their energy – mainly fossil – including the social costs. In contrast, consumers and other small users paid 2.8 billion euros too much.

ICT SECTOR

Hivos believes that companies should not only focus on energy efficiency but also give the renewable energy sector in the Netherlands a boost by purchasing locally generated renewable electricity or producing it themselves. As an example we chose the ICT sector, an industry that is very energy-intensive and therefore responsible for high CO₂ emissions. Based on research by CE Delft, a Dutch research and consultancy organisation, Hivos began a campaign to make power-hungry data centres green, together with the ICT companies, their energy suppliers and local politicians. Hivos urges these companies to significantly reduce their energy consumption and switch to renewable energy generated in the Netherlands.



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Google datacentre in the USA

CITIZENS ARE DOING IT FOR THEMSELVES

Many people were hoping for significantly faster results than delivered by the climate negotiations. 'Copenhagen' was a major turning point, for it signified the moment when confidence in a political solution to the climate problem dropped to an all-time low. People across the world are taking action themselves and putting solar panels on roofs, insulating their homes, collectively purchasing windmills or setting up local energy cooperatives. In the Netherlands there are now hundreds of local energy initiatives, often with the support of local authorities.

Hivos has joined this 'DIY' trend, including by cooperating in the international 10:10 energy campaign that challenges people to save energy in innovative ways. We also actively involve Dutch citizens in the renewable energy solutions on Sumba, for example. Everyone can travel along to Sumba virtually or through social media with the Dutch expedition members to discover the difference between a life with and without renewable energy. Over 2 million citizens in the Netherlands were able to see events unfold on an island in the Indonesian archipelago, where people – just like themselves – are taking their renewable energy future into their own hands.



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COLOPHON

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