



A check-list for science in Africa

David Dickson

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A number of key ideas have emerged from recent debates about Africa's needs for capacity in science and technology. Each should be kept in mind when implementing the conclusions of the G8 summit.

After all the hype and expectation, the final communiqué from last week's G8 summit meeting of the leaders of the world's most industrialised countries was something of a damp squib. No bold new ideas or initiatives were announced. And those that were highlighted by the participants – such as the doubling of aid to Africa by the year 2010 – fell short (in this case by two years) of what many had, in their more optimistic moments, been hoping for.

Scientists were among those sharing this disappointment. Their hopes had been raised by, for example, the language in the report published earlier this year by the Commission for Africa. This had spoken in terms of capacity building in science and technology being an "imperative" for the continent, and for a commitment to an extra US\$5 billion over the next ten years to rebuild Africa's universities.

Neither a broad-brush vision, nor detailed funding commitments, surfaced in the final G8 communiqué. Indeed, the word science is only mentioned once – when the leaders endorse the idea of creating centres of excellence "in science and technology institutions" (see ['G8 leaders give indirect boost for science in Africa'](#)). And even the wording here is cautious; no commitment, for example, to the idea of creating new centres of excellence from scratch (i.e. of creating organisations comparable to the Indian institutes of science and technology, as some are currently urging).

Despite this, the language of the final communiqué does offer a solid framework within which new initiatives (and new funding commitments) can now be conceived. Most of what scientists have been demanding is contained implicitly. The challenge ahead is for Africa itself to come up with these initiatives. They should at least be confident that, with a commitment by the G8 leaders both to new funding, and their acknowledgement of the urgency of the continent's needs, initiatives that successfully meet the criteria outlined in the communiqué will find the support that they need.

These criteria can be set out in a checklist against which new proposals should be assessed. In summary – and accepting that such lists can never been exclusive (indeed suggestions for additional items are welcome) – the most important of these seem to be as follows:

1. Think trade, not aid

The main thrust of the recommendations emerging from the G8 summit was that the best way the developed countries can help the developing world is by providing it with the tools and opportunities to trade its way out of poverty.

Straight aid still has an important role to play (for example, in helping to overcome acute food shortages, or addressing neglected diseases). But in the long run, the most important areas for investment in science and technology are those that will help countries build their own bedrock of scientific and technical skills (including expertise in health and agriculture).

2. Think innovation, not science

Too much thinking about 'science for development' remains locked in what is widely referred to as the 'linear model' of technological progress. Within this model, science is seen as the key determining factor, and strong investment in science therefore the key priority.

This view is misleading (see '[Rethinking science aid](#)'). Progress is achieved by investment not in science alone, but in complete 'systems of innovation'. Within these, a strong scientific base is an essential component. But it is not the only – or perhaps even the most important – one.

3. Think globally

The power of modern communications technology is such that any new research-based initiative must be able to locate itself in a global context. One obvious reason is that there is little justification in carrying out research programmes requiring expensive new equipment if similar research is already being carried out elsewhere.

A further reason is that when (and if) international development banks are prepared to invest in science and technology, it is primarily on the basis that such investment is a prerequisite for engagement in the global knowledge economy. And pragmatically, any patents emerging from this research will only be granted to products or processes that can demonstrate novelty at a global level.

4. Think locally

The requirement for a global perspective on research investment must not be allowed to overshadow a complementary requirement that such investment must also take account of local needs and capacities.

The challenge facing universities and research institutions in developing countries is to marry the global and the local (see '[We need to reinvent the African university](#)'). Too often in the past, an 'ivory tower' mentality has prevented this from happening. But the need to reflect domestic needs should become a precondition of both domestic and international support.

5. Think regionally

Many countries in Africa are too small (and too poor) to justify ambitious science and technology policies; attempts to do so in the past have almost invariably ended in failure. But the continent as a whole is too

large to justify a continent-wide strategy, in anything but the broadest terms.

The solution is to engage in regional activities, which can range from training programmes to the identification of centres of excellence. The strategy has worked in Europe, through the 'framework' programme of research support of the European Commission. The East African community is beginning to move in this direction, and others would do well to follow (for example, under the encouragement of the New Partnership for Africa's Development).

6. Think relevance

One of the most damaging aspects of the intellectual legacy left by colonialism was the idea that social relevance should not be a requirement of high-level research. Most developed countries have already moved away from this philosophy, not by shifting from basic to applied research, but by framing even basic research programmes within long-term technological perspectives (such as those outlined by 'technology foresight' activities).

That does not mean that so-called 'blue skies' research – that whose relevance is not immediately apparent – should be abandoned. But it does mean that the concept of 'pure science' has become outdated; investments in research, particularly in resource poor countries, can only be justified on the basis of the social benefits they will ultimately bring.

7. Think excellence

But an emphasis on relevance in research must not itself be used to avoid a parallel, and equally essential, emphasis on excellence. Again the challenge – as with the global/local dichotomy – is to find a way of embracing the two simultaneously (and also to emphasise that excellence does not mean exclusivity).

International peer review of research proposals is one way of doing this (as is the emphasis that should continue to be given to research appearing in peer reviewed journals, and the use of citations in awarding further research funding). Building 'networks of excellence' between higher education institutions in the North and South, as recommended in the G8 communiqué, is another. In each case, however, excellence and relevance must go hand-in-hand, not be seen as mutually exclusive.

8. Think gender

As has frequently been said, among Africa's most underutilised resources are the brains and skills of its women. The more that a national, regional or continent-wide strategy for science and technology can tap these resources, the more it is likely to succeed.

Part of the solution lies in getting girls into schools in the first place, then making science education more attractive to them (increasing a sense of relevance is certainly one way of doing so). Equally important is addressing the social and cultural factors that create the 'glass ceiling' that is often so difficult for women to break through, in science as in all other areas of social activity.

9. Think sustainably

It has almost become a cliché to state that any major investment programme must today be conceived within a framework of 'sustainable development'. Nevertheless the concept remains an essential one, particularly if the commitment to sustainability is used sufficiently broadly, and is not restricted to the link between social development and environmental impacts.

For example, investment in infrastructure (and scientific and technological capacity can be included in this category) may not produce immediate benefits, and can be difficult to justify on those grounds. But in the long-term, such investment is essential if a country is to successfully make its way out of poverty through strategies that are ultimately self-sustaining.

10. Think holistically

One of the strongest messages to come through preparations for the G8 summit is the urgent need for more 'joined up thinking' when it comes to the area of science, technology and innovation for development.

This is the case where there is a gap between the emphasis that developed countries place on their domestic investment in science and technology, and their willingness to see similar emphasis within their aid policies (see '[A case for more joined-up thinking](#)'). A different gap can also occur when national or international development agencies pursue their own agendas, at the expense of collaborative efforts.

Other gaps have been identified above. There is the need to bridge the global and the local; to combine a commitment to excellence with a commitment to relevance; and to ensure a well-functioning 'systems' approach to the process of technological innovation that integrates a wide range of essential components.

There are two basic requirements for effective holistic thinking. The first is an enhanced flow of information, which means supporting improved channels of communication. The second is the institutional mechanisms necessary to ensure that effective integration takes place on the ground.

All this means putting Africa in charge of its own development strategy — the basic message of the G8 summit. It also means providing the continent with the tools — including those offered by science and technology — that will allow it to do this successfully. The second message was more muffled; as a major international commitment, it still remains to be demonstrated.

SciDev.Net: <http://www.scidev.net/content/editorials/eng/a-check-list-for-science-in-africa.cfm>

G8 leaders told it pays to protect forests

By Edith M. Lederer, Associated Press Writer | July 6, 2005

UNITED NATIONS --The U.N. environment chief has a message for leaders of the world's major industrialized nations: scientists have shown that it pays to preserve forests, coastal waters and marshes.

Klaus Toepfer made the case that investing in the environment will go a long way toward meeting U.N. goals to reduce poverty, supply clean drinking water and fight the spread of infectious diseases.

"Our motto is environment for development," he said in an interview last week.

The Group of Eight meets in Scotland on Wednesday and will address global warming and climate change -- and Toepfer expressed hope that the leaders will see the link between this critical issue and development.

British Prime Minister Tony Blair, who is hosting the summit, wants an agreement among G-8 leaders on the scientific threat posed by global warming and the urgent need for action.

But the United States rejects the Kyoto Protocol, which calls for cutting carbon dioxide and other gas emissions believed to contribute to global warming. President Bush has called for shifting the debate away from limits on greenhouse gas emissions to new technology that would reduce environmental damage without restricting energy use.

Toepfer, who heads the Nairobi-based U.N. Environment Program, said scientific data show that destruction of the environment is a direct cause of many problems faced in the world today -- including poverty, declining health, hunger, undrinkable water, disease, migration from rural to urban areas, and conflict.

"So the environment is not a luxury, not a Gucci accessory bag or a fancy silk tie affordable only when all other issues have been resolved," he told a U.N. ministerial meeting last week. "It is the oxygen breathing life into all the goals. It is the red ribbon running around our common aspirations for a healthier, more stable and just world."

Toepfer said the Millennium Ecosystem Assessment -- a recent study compiled by 1,360 scientists from 95 nations who pored over 16,000 satellite photos from the U.S. National Aeronautics and Space Administration and analyzed statistics and scientific journals -- underscored that the environment is critically important for development.

The study found that humans had depleted 60 percent of the world's grasslands, forests, farmlands, rivers and lakes. It also found that 12 percent of birds, 23 percent of mammals, 25 percent of conifers and 32 percent of amphibians are threatened with extinction -- and that the world's fish stocks have been reduced by 90 percent since the start of industrial fishing.



Developing states to have say on global warming

By Richard McGregor in Beijing and John Reed in Johannesburg
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The five developing countries attending next week's G8 summit in Gleneagles are expected to release a separate statement at the meeting laying out their distinctive world view and position on climate change.

Officials familiar with preparations for the meeting said the five leaders had also arranged to meet separately beforehand as a "group of five" before they meet the G8 members to discuss climate change.

The decision by the five developing countries to meet on their own is aimed at ensuring they are not tied to an agenda laid down by the established developed nations. China has encouraged the five nations, which also include Brazil, Mexico, South Africa and India - to carve out a distinctive position.

But the determination of the five to have their own say at the G8 session will provide support for the view that G8, a club of wealthy nations, plus Russia, is no longer in a position to dominate the global debate.

South African President Thabo Mbeki's spokesman said the five leaders would "raise issues of common interest", but denied any knowledge of a planned joint statement.

Hu Jintao, China's president, comes to Gleneagles as the leader of a country keen to be recognised as a great world power, but also to be treated as a developing nation.

"China is happy to be invited as a great power, but it is still worried about the prospect of joining [an organisation such as the G8]," said Shi Yinong, an international relations expert at Renmin University.

This week's highly structured G8 meeting on global warming is expected to leave little room for talks on other issues such as China's currency and rising trade surplus.

Official Says Efforts to Solve Global Water Crisis Falling Short

June 30, 2005 — By George Gedda, Associated Press

WASHINGTON — Hundreds of billions of dollars investment are needed annually to help resolve water supply and sanitation problems in the developing world, far exceeding the sums that donor countries are capable of providing, a senior State Department official said Wednesday.

Much of the resources needed will have to come from within the countries themselves, said John Turner, a department environmental affairs expert, testifying before the House International Relations Committee.

Turner and other witnesses provided grim testimony as to the depth of water shortages in poorer countries.

Despite gains since 1990 in the provision of water and sanitation facilities, "there are still 2.6 billion people without improved services -- over half the developing world's population -- and 1.1 billion still using water from unimproved sources," said Vanessa Tobin an environmental expert at UNICEF.

She said that even if the 2015 U.N. Millennium Development Goals relating to water services are met, another decade of hard work will be required to achieve global coverage.

Committee chairman Henry Hyde, an Illinois Republican, indicated that he supports legislation

proposed by Rep. Earl Blumenauer, an Oregon Democrat, that would make safe water and adequate sanitation facilities a strategic part of the U.S. foreign assistance program.

He called the global water and sanitation situation "shocking."

Hyde said the solution does not lie in increasing assistance alone. "Attention needs to be paid to the way funds are distributed," he said. "For example, data suggest that the countries most in need of access to safe water and sanitation have received the least amount of donor assistance."

Olav Kjørven, a senior official at the U.N. Development Program, testified that an array of health issues on the list of Millennium Development Goals are linked at water and sanitation.

"We ask ourselves can poverty and hunger be eradicated or maternal health improved or child mortality reduced or gender inequalities addressed without improved access to water and sanitation. The answer is 'No.' " he said. "These goals cannot be met without water and sanitation."

Kjørven said he strongly endorses the Blumenauer legislation.

Washington Post

Greenhouse Hypocrisy

By Robert J. Samuelson

Wednesday, June 29, 2005; Page A21

Almost a decade ago I suggested that global warming would become a "gushing" source of political hypocrisy. So it has. Politicians and scientists constantly warn of the grim outlook, and the subject is on the agenda of the upcoming Group of Eight summit of world economic leaders. But all this sound and fury is mainly exhibitionism -- politicians pretending they're saving the planet. The truth is that, barring major technological advances, they can't (and won't) do much about global warming. It would be nice if they admitted that, though this seems unlikely.

Europe is the citadel of hypocrisy. Considering Europeans' contempt for the United States and George Bush for not embracing the Kyoto Protocol, you'd expect that they would have made major reductions in greenhouse gas emissions -- the purpose of Kyoto. Well, not exactly. From 1990 (Kyoto's base year for measuring changes) to 2002, global emissions of carbon dioxide (CO₂), the main greenhouse gas, increased 16.4 percent, reports the International Energy Agency. The U.S. increase was 16.7 percent, and most of Europe hasn't done much better.

Here are some IEA estimates of the increases: France, 6.9 percent; Italy, 8.3 percent; Greece, 28.2 percent; Ireland, 40.3 percent; the Netherlands, 13.2 percent; Portugal, 59 percent; Spain, 46.9 percent. It's true that Germany (down 13.3 percent) and Britain (a 5.5 percent decline) have made big reductions. But their cuts had nothing to do with Kyoto. After reunification in 1990, Germany closed many inefficient coal-fired plants in eastern Germany; that was a huge one-time saving. In Britain, the government had earlier decided to shift electric utilities from coal (high CO₂ emissions) to plentiful natural gas (lower CO₂ emissions).

On their present courses, many European countries will miss their Kyoto targets for 2008-2012. To reduce emissions significantly, Europeans would have to suppress driving and electricity use; that would depress economic growth and fan popular discontent. It won't happen. Political leaders everywhere deplore global warming -- and then do little. Except for Eastern European nations,

where dirty factories have been shuttered, few countries have cut emissions. Since 1990 Canada's emissions are up 23.6 percent; Japan's, 18.9 percent.

We are seeing similar exhibitionism in the United States. The U.S. Conference of Mayors recently endorsed Kyoto. California and New Mexico have adopted "targets" for emission cuts, reports the Pew Center on Global Climate Change. All this busywork won't much affect global warming, but who cares? The real purpose is for politicians to brandish their environmental credentials. Even if rich countries actually curbed their emissions, it wouldn't matter much. Poor countries would offset the reductions.

"We expect CO2 emissions growth in China between now and 2030 will equal the growth of the United States, Canada, all of Europe, Japan, Australia, New Zealand and Korea combined," says Fatih Birol, the IEA's chief economist. In India, he says, about 500 million people lack electricity; worldwide, the figure is 1.6 billion. Naturally, poor countries haven't signed Kyoto; they won't sacrifice economic gains -- poverty reduction, bigger middle classes -- to combat global warming. By 2030, the IEA predicts, world energy demand and greenhouse gases will increase by roughly 60 percent; poor countries will account for about two-thirds of the growth. China's coal use is projected almost to double; its vehicle fleet could go from 24 million to 130 million.

Like most forecasts, these won't come true. But unless they're wildly unreliable, they demonstrate that greenhouse emissions will still rise. Facing this prospect, we ought to align rhetoric and reality.

First, we should tackle some energy problems. We need to reduce our use of oil, which increasingly comes from unstable or hostile regions (the Middle East, Russia, Central Asia, Africa). This is mainly a security issue, though it would modestly limit greenhouse gases. What should we do? Even with today's high gasoline prices, we ought to adopt a stiff oil tax and tougher fuel economy standards, both to be introduced gradually. We can shift toward smaller vehicles, with more efficient hybrid engines. Unfortunately, Congress's energy bills lack these measures.

Second, we should acknowledge that global warming is an iffy proposition. Yes, it's happening; but, no, we don't know the consequences -- how much warming will occur, what the effects (good or bad) will be or where. If we can't predict the stock market and next year's weather, why does anyone think we can predict the global climate in 75 years? Global warming is not an automatic doomsday. In some regions, warmer weather may be a boon.

Third, we should recognize that improved technology is the only practical way of curbing greenhouse gases. About 80 percent of CO2 emissions originate outside the transportation sector - - from power generation and from fuels for industrial, commercial and residential use. Any technology solution would probably involve some acceptable form of nuclear power or an economic way of removing CO2 from burned fossil fuels. "Renewable" energy (wind, solar, biomass) won't suffice. Without technology gains, adapting to global warming makes more sense than trying to prevent it. Either way, the Bush administration rightly emphasizes research and development.

What we have now is a respectable charade. Politicians and advocates make speeches, convene conferences and formulate plans. They pose as warriors against global warming. The media participate in the resulting deception by treating their gestures seriously. One danger is that some of these measures will harm the economy without producing significant environmental benefits. Policies motivated by political gain will inflict public pain. Why should anyone applaud?

The New York Times

June 29, 2005

Senate Passes Bill That Strives to Balance Oil and Alternatives

By [CARL HULSE](#)

WASHINGTON, June 28 - The Senate overwhelmingly passed broad energy legislation on Tuesday, with its authors hoping the bill strikes a balance between traditional and alternative sources of power that can break a four-year Congressional stalemate over energy policy.

By a bipartisan vote of 85 to 12, the Senate approved a bill that includes \$14 billion in tax incentives for oil and gas production as well as development of wind, solar and other emerging energy sources. It also rewards buyers of energy-efficient appliances and hybrid cars. The measure includes an additional \$36 billion in energy-related projects, though many of them will require additional approval by Congress.

The shape of the Senate measure sets up a clash with the House, which has already passed its own version emphasizing increased domestic oil and gas production. The House also included a controversial plan to grant product liability immunity to producers of the gasoline additive MTBE, which has polluted groundwater around the nation.

The White House also objects to parts of the Senate bill, challenging its cost and its plan to require utilities to use more renewable fuels to generate electricity.

Senator Pete V. Domenici, Republican of New Mexico and chairman of the Energy and Natural Resources Committee, acknowledged the difficulties ahead. But Mr. Domenici said he believed that mounting pressure to produce a new national energy policy after years of impasse would lead to the differences being resolved.

"We have matters that are in disagreement, but I can say they are far less in importance than the matter before us, which is to get an energy bill," he said.

President Bush is pressing Congress to deliver a bill soon. Before the Sept. 11 attacks shifted the focus of the administration, a new energy policy was at the top of the White House's legislative list and remains a priority, particularly with the rising cost of gasoline and natural gas. But fights over MTBE and the emphasis on additional oil and gas production have shadowed the legislation since 2001.

"I urge the House and Senate to resolve their differences quickly and get a good bill to my desk before the August recess," Mr. Bush said in a statement as he lauded the Senate for adopting a measure he said was consistent with the energy policy drafted by an administration task force in his first year in office.

Authors of the bill acknowledge that the new plan will do little immediately to reduce the cost to consumers of either gasoline or natural gas. But they say the push to develop new sources of fuel and diversify the nation's power sources will eventually lower prices as well as reduce pollution from traditional fossil fuels.

"In the long term, it puts in place some good policies that will move us in directions that will be very beneficial to American consumers, American industry and the American economy generally," said

Senator Jeff Bingaman of New Mexico, the senior Democrat on the energy panel, who worked closely with Mr. Domenici.

Critics of the bill say it falls far short of what the nation could accomplish and does nothing to force changes in automotive fuel consumption. The bill does direct the president to find ways to reduce overall consumption by one million barrels of oil a day by 2015, but the Senate rejected a broader goal of reducing oil imports by 40 percent within 20 years. Senators also rejected efforts to require limits on emissions believed to contribute to global warming.

"I voted against the energy bill because it is short on the truly bold action needed to break this country's addiction to foreign oil, and long on the traditional boondoggles that waste taxpayer money and fail to promote energy independence," said Senator Ron Wyden, Democrat of Oregon.

The Senate bill would require gasoline refineries to add at least eight billion gallons of biofuels like corn-based ethanol to the nation's gas supplies by 2012, a provision critical to gaining support from farm-state senators. The bill drew some opposition from coastal state senators who oppose a plan to conduct an inventory of offshore oil and gas reserves, a proposal they see as a prelude to drilling in areas now off limits to rigs.

Both the House and Senate measures also include proposals to strengthen the nation's power grid and prevent blackouts. The Senate bill also seeks to encourage a rebirth in nuclear power, an energy source that is a favorite of Mr. Domenici's. The measure takes no position on drilling in the Arctic National Wildlife Refuge - the House's bill allows drilling - but senators hope to win drilling approval through a separate budget bill later this year.

At a news conference with the Senate sponsors, Energy Secretary Samuel W. Bodman said the administration was ready to play a role in working on a final piece of legislation acceptable to Congress and the White House.

"We have to have a comprehensive bill that will enable our markets to develop, our technologists to work to start developing what I hope will be over time a responsive solution," Mr. Bodman said.

The chairman of the House Energy and Commerce Committee, Representative Joe L. Barton of Texas, said he was eager to achieve a final deal as well.

"Obviously the House and Senate bills have differences to work out, and that is what conference committees are for," Mr. Barton said.

Mr. Barton and Representative Tom DeLay of Texas, the House Republican leader, have been the chief proponents of providing oil companies that produce MTBE with some protection from lawsuits over the cost of cleanup from pollution caused by leaking underground gas tanks. MTBE makes water undrinkable, but there is no conclusive evidence on health risks for low doses.

They say they can find a compromise that would avoid another Senate filibuster over the MTBE provision. Some lawmakers have been exploring the idea of adding the MTBE protection to a pending highway bill, calculating that fewer lawmakers would want to block that popular measure, which contains billions of dollars in local projects.

"We'll do whatever it takes to do this solution, wherever we can put it," Mr. DeLay told reporters.



Insurers sound the alarm on climate change

By Fiona Harvey, Environment Correspondent
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The cost worldwide of storms, expected to become more frequent owing to climate change, is likely to rise by two-thirds to £15bn (\$27bn, €22bn) a year in the next seven decades, the Association of British Insurers will warn on Wednesday.

Nick Starling, the ABI's director of general insurance, urged the leaders of the Group of Eight industrialised nations to take action on greenhouse gas emissions when they meet to discuss climate change next week.

"Governments now have a chance to make rational choices for the future, before it is too late," he said. Making the right decisions based on assessment of the costs of climate change "will ensure lower costs for the public in future".

By 2040, the average annual cost of hurricanes in the US alone would rise from \$9.5bn to \$11.4bn. In a bad year, hurricanes in the US would cost \$71bn in the 2040s and \$104bn in insured costs alone.

Separately, a poll carried out across Europe by the market research group TNS found that seven out of ten people thought governments would take serious action on environmental issues only if there were an environmental catastrophe.

In one of the most detailed estimates seeking to price the effects of climate change, the ABI said that in years with a high number of storms, the cost of Japanese typhoons could reach £19bn a year by 2080.

Though scientists cannot say exactly what will happen as the climate changes under the influence of the increased burning of fossil fuels, they estimate that the incidence of storms, floods, droughts and heatwaves will increase.

Joachim Faber, chief executive of Allianz Global Investors, said climate change was influencing financial markets: "In the interest of our clients and shareholders, we are obligated to take these risks into account when making decisions on insurance underwriting, investments, or credit."

Sebastian Catovsky, adviser to the ABI on natural perils, added that the figures in the report were likely to be an underestimate, because they did not take into account the likely increase in the value of property in future decades. Insurance markets would also become more volatile.

Some of the costs could be avoided by taking preventative measures. Improved coastal defences could reduce the global annual damage from a 0.5m rise in sea level by up to £16bn. In the UK, where insurers have paid out £2.2bn in flood claims in the last five years, effective flood management could save 80 per cent of the costs of flood damage.

The report will be published on Wednesday at an ABI-organised conference on the financial risks of climate change. At the conference, Allianz and the environmental campaigning group WWF will urge financial managers and analysts to evaluate their client portfolios for climate change risk, in an effort to price such risk into the financial markets.

Allianz will pledge to invest between €300m and €500m in renewable energy over the next five years.
