

## Energy Innovation and Traditional Knowledge<sup>a</sup>

by Kirsty Galloway McLean<sup>b</sup>, Ame Ramos Castillo<sup>c</sup> and Brendan Barrett<sup>d</sup>

### Summary

*Although many countries are looking towards low-carbon and renewable energy sources, it is important to remember that harvesting alternative energies can have impacts on local and indigenous communities. However, many indigenous territories have access to tremendous wind, solar, biomass and geothermal resources, and this can provide access to energy sovereignty through innovative solutions by local communities. This article was originally published in OurWorld 2.0 on 2 November 2012.*

*Contents:* Introduction | Rethinking energy policies | Indigenous peoples and energy alternatives | Energy sovereignty can revitalise communities | Sustainable energy pioneers | Arctic energy independence | A low-carbon future | Acronyms | Accompanying videos | Further reading | Endnotes

### Introduction

Widespread heatwaves. Spiking temperatures. Uncontrollable wildfires. Unforeseen floods. Oppressive droughts. These kinds of extreme events are becoming the norm and, according to a growing body of scientific literature, are obvious signs of ongoing climate change.

This literature includes the “State of the Climate in 2011”<sup>1</sup> report released by the United States’ National Climatic Data Center. The peer-reviewed report, compiled by 378 scientists from 48 countries around the world, notes that back-to-back La Niñas (the build-up of cool waters in the equatorial eastern Pacific as part of the El Niño Southern Oscillation cycle) in 2011 affected regional climates and influenced many of

the world’s significant weather events<sup>2</sup> throughout the year.

These events included historic droughts in East Africa, the southern United States and northern Mexico; an above-average tropical cyclone season in the North Atlantic hurricane basin and a below-average season in the eastern North Pacific; and the wettest two-year period (2010–2011) on record in Australia.

In a recent opinion article published in the Washington Post, the director of the NASA Goddard Institute for Space Studies, James E. Hansen, wrote<sup>3</sup>: “It is no longer enough to say that global warming will increase the likelihood of extreme weather and to repeat the caveat that no individual weather event can be directly

<sup>1</sup><http://www.ncdc.noaa.gov/bams-state-of-the-climate/2011.php>

<sup>2</sup><http://www.climatewatch.noaa.gov/article/2012/state-of-the-climate-in-2011-highlights/2>

<sup>3</sup>[http://www.washingtonpost.com/opinions/climate-change-is-here--and-worse-than-we-thought/2012/08/03/6ae604c2-dd90-11e1-8e43-4a3c4375504a\\_story.html](http://www.washingtonpost.com/opinions/climate-change-is-here--and-worse-than-we-thought/2012/08/03/6ae604c2-dd90-11e1-8e43-4a3c4375504a_story.html)

linked to climate change. To the contrary, our analysis shows that, for the extreme hot weather of the recent past, there is virtually no explanation other than climate change.”

## Rethinking energy policies

The growing awareness of the reality of climate change and its accompanying impacts and risks is causing many to rethink current energy policies and to reconsider the reliance on conventional energy sources that have contributed to creating the global climate crisis. Although many countries are looking toward low-carbon technologies and clean, renewable energy sources to reduce greenhouse gas emissions, fossil fuels are still our primary energy source, as illustrated in BP’s “Statistical Review of World Energy 2012”<sup>4</sup>. To quote from the review:

“Despite high growth rates, renewable energy still represents only a small fraction of today’s global energy consumption. Renewable electricity generation (excluding hydro) is estimated to account for 3.3 percent of global electricity generation. Renewables are, however, starting to play a significant role in the growth of electricity, contributing 8 percent of the growth in global power generation in 2010.”

The definition of renewables includes hydropower, wind and wave power, solar and geothermal energy and combustible renewables and renewable waste (landfill gas, waste incineration, solid biomass and liquid biofuels).

While this growth in renewable energy represents an important breakthrough, it is crucial to remember that the harvesting of these alternatives, if poorly planned and

sited, can have serious environmental and social impacts — particularly on local and indigenous communities. Nevertheless, at the same time, the shift from fossil fuels to renewable energy sources has to be central in our transition to a low carbon society.

## Indigenous peoples and energy alternatives

Many indigenous territories have tremendous wind, solar, biomass and geothermal resources, and there are varying opinions as to whether energy-related climate change mitigation activities are having a positive or negative impact on local and indigenous communities. Research suggests that problems can arise when indigenous peoples are not involved or consulted in the development and implementation of energy alternatives.

In Guatemala, for example, Mayan communities have been displaced from their lands by large-scale hydroelectric projects.

“We know this is clean energy,” says Felipe Marcos Gallego of the Ixil Nation, “but when the resources are not distributed equally, or when people don’t receive any benefits from the hydroelectrics... [in] return for the role that indigenous communities play in the forest protection, water protection and in hydroelectrics downstream... it is an abuse and a mockery to the Ixil people’s dignity.”

The situation is similar in Mexico, says Saul Vicente Vasquez of the International Indian Treaty Council. “The problem is that these renewable energy elements are not being shared with the indigenous communities. They are not part of the process and the resources located in their

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<sup>4</sup><http://www.bp.com/extendedsectiongenericarticle.do?categoryId=9041234&contentId=7075077>

territories are just used with no sharing of benefits.”<sup>5</sup>

In countries such as the Philippines and Malaysia numerous indigenous communities have also been displaced by the expansion of biofuel plantations and villages are fighting to secure sustainable forests<sup>6</sup> and climate-friendly futures.

*Interview with Saul Vincent Vasquez.*

However, if instituted appropriately, renewable energy projects can enhance and maintain traditional livelihoods and also foster local employment. In North America, for example, the increased demand for renewable energy — in the form of wind, hydro and solar power — is making indigenous lands and territories an important resource for such energy. Replacing fossil fuel-derived energy both reduces greenhouse gas emissions and creates economic opportunities for indigenous peoples.

## Energy sovereignty can revitalize communities

The Navajo Nation in the Southwest United States, for example, is conducting feasibility assessments for wind energy generation on tribal lands as a strategy for community revitalization. According to Bob Gough, Secretary of COUP (the Intertribal Council on Utility Policy, representing ten tribes located in three states across the northern Great Plains of North America), tribally-owned renewable energy generation can contribute to social and economic development, while at the same time help reduce carbon emissions.

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<sup>5</sup> <http://youtu.be/sUPc2sF7pwM>

<sup>6</sup> <http://ourworld.unu.edu/en/forbidden-forest-of-the-dayak/>

Historically, the tribal experience with increasing energy demands here has been catastrophic: tribes along the Missouri River were flooded by dams constructed to provide hydropower and flood control benefits for downstream communities.

“Tribes never got the dams, what they got were the reservoirs,” says Gough. “Dams that were built for flood control, if you are an Indian, it means you get the reservoir. You’re permanently flooded.”<sup>7</sup>

But the current development of wind power alternatives provides a great sense of local community control over the next round of energy development across the Great Plains, and many of the tribal representatives consider tribal wind power an environmental justice issue. Since 1995, the Rosebud Sioux and other COUP tribes have committed to the utility-scale development of tribal wind resources on their reservations (estimated in the hundreds of gigawatts of potential), and the integration of large-scale distributed tribal wind generation with diminishing reliance on hydropower from federal transmission grids.

The COUP plan encourages tribally-owned development of significant distributed wind generation on Indian reservations as a viable strategy for building sustainable homeland tribal economies. If you live on an Indian reservation you are 10 times more likely not to have electricity in your home than anywhere else in the United States, so wind power allows tribal communities to meet their own energy needs on the reservation, providing a source of pride and self-reliance as well as clean energy. Further, wind energy brings new, sustainable jobs to 20 high-unemployment reservation communities with tens of thousands of tribal members.

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<sup>7</sup> <http://youtu.be/HL7W3MvBHMq>

There is even a possible revenue stream if power can be sold back to the national grid. In the United States, although native tribal lands cover only 5 percent of the country's land area, they have the potential to create wind power equivalent to 14 percent of the total energy production<sup>8</sup> in the US.

“[Native communities] recognize the value in that kind of energy sovereignty and energy independence,” explains Gough, speaking at a recent conference on Climate Change Mitigation in Cairns, Australia.

“We are excited about the possibility of ‘Green Collar’ jobs for Indian Country. Renewable energy production is labour-intensive, with jobs created in manufacturing, construction, operation and maintenance. For example, one 240 MW wind farm brings 200 6-month long construction jobs and 40 permanent maintenance and operation positions. Over one-half of Indian Country is under 18 years of age. Why not create good jobs building wind turbines and healthy, affordable and energy efficient homes? A sustainable tribal economy could provide quality jobs and healthy housing for growing reservation populations.”

While the use of wind energy is certainly not new, projects such as this promote a novel pooling of resources among geographically dispersed communities. This creates economies of scale that advance clean energy far more than any one community could do individually. This project provides a model that could be replicated beyond the United States, uniting culturally similar communities scattered over broad landscapes with significant wind and other renewable energy resources.

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<sup>8</sup><http://www.unutki.org/downloads/File/Publications/Meetings/CCMLCIP-2012-Crn-3-Report-Final.pdf>

## Sustainable energy pioneers

Although indigenous communities bear the least responsibility for human-induced climate change, they are very active in spearheading renewable energy initiatives in both developing and developed countries as a means of achieving energy self-sufficiency on their lands and territories.

In the Arctic, the Sami have transitioned from using petroleum to using solar light technology in their nomadic reindeer camps. In Indonesia, the Dayak Pasar indigenous peoples developed a project to install clean energy electricity from micro-hydro in an effort to ensure sustainable and community-based development and conservation. And in Mexico, local communities have developed high efficiency wood stoves to reduce their reliance on forest products.

In Rajasthan, India, an extraordinary school is helping rural communities become self-sufficient by teaching rural women and men — many of them illiterate — to become solar engineers. Since 1989, the Barefoot College<sup>9</sup> has been pioneering solar electrification in rural, remote, non-electrified villages. The College demystifies solar technology and decentralizes its application by placing the fabrication, installation, usage, repair and maintenance of sophisticated solar lighting units in the hands of rural, illiterate and semi-literate men and women.

The College trains community members from remote villages to be ‘Barefoot Solar Engineers’<sup>10</sup> (BSEs) during a six-month course in India. In return, the BSEs agree

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<sup>9</sup><http://www.barefootcollege.org/>

<sup>10</sup>[http://www.barefootcollege.org/sol\\_training.asp](http://www.barefootcollege.org/sol_training.asp)

to install, repair and maintain solar lighting units in their communities for a period of at least five years, and many go on to replicate solar technology in other rural communities.

The Barefoot College has worked extensively with communities in India, Africa and Afghanistan with much success, and the Barefoot approach to training and rural solar electrification has been replicated in Asia and South America. The College focuses particularly on training illiterate middle-aged women, such as those who are widows and single mothers with families, who have their roots in the village and will stay and work there for its development rather than migrate to the city soon after training.

“What’s the best way of communicating in the world today?” asks the founder of Barefoot College, Sanjit “Bunker” Roy. “Television? No. Telegraph? No. Telephone? No. Tell a woman.”

The impact of such work in poor communities cannot be underestimated. Speaking at a TEDGlobal conference in 2011, Roy explains<sup>11</sup>: “We went to Ladakh ... and we asked this woman, ‘What was the benefit you had from solar electricity?’ And she thought for a minute and said, ‘It’s the first time I can see my husband’s face in winter’.”

## Arctic energy independence

Initiatives like the Barefoot College mean that the cultural potential of renewable energies and energy independence is increasingly being embraced even by the world’s most isolated communities. These new sources of energy not only help to mitigate climate change, but they also help

keep remote communities alive by encouraging younger people to stay on their traditional lands.

Elena Antipina and Pyotr Kaurgin from The Northern Forum traveled from the harsh and unforgiving environment of the Arctic Tundra to the Cairns workshop in tropical northern Australia, to share their experiences in bringing solar light technology to the nomadic reindeer herders of the Chukchi Nation in Siberia.

“Children are not going into reindeer herding,” says Antipina. “What has to be done? We all agreed and arrived at one important decision, this being the introduction of solar panels.”<sup>12</sup>

To build and sustain the technical capacity needed for this solar venture, the community collaborated with the Barefoot College and Arctic NGO the Snowchange Cooperative. Tero Mustonen from Snowchange elaborates:

“The engine for this process is two grandmothers, who went from Kolmya to India to be trained as solar engineers. And now, after many twists and turns, the panels are in Kolyma finally and the grandmothers are back... The idea is to solar electrify the nomadic camps and nomadic schools in the region.”<sup>13</sup>

The ‘twists and turns’ of this project were many, ranging from health difficulties for the grandmothers acclimating to the high temperatures and altitudes of the Indian training sites, to years of delays in navigating Russian customs requirements to import the solar panels. But the newly trained engineers and partner organizations remained committed to overcoming the obstacles, and the communities continued to prepare by designing special sleds to

<sup>11</sup> [http://www.ted.com/talks/bunker\\_roy.html](http://www.ted.com/talks/bunker_roy.html)

<sup>12</sup> <http://youtu.be/838a-QmRp6g>

<sup>13</sup> <http://youtu.be/mmYVjG5-t4k>



transport the solar panels and experimenting with wrapping fragile objects in reindeer skins to cushion against vibration when moving. Finally, two years after completion of their training, the panels arrived in the Turvaargin community.

“You can turn the kettle on, and kids can watch or listen to music, radio, TV... Lately they started to bring notebooks,” says Kaurgin. “The main thing is that our children are with us, because our traditional way of life must be passed on to them, from generation to generation,” he says.

A similar story is told by Chagat Almashev, who lives in the Golden Mountains of Altai, the major mountain range in western Siberia and home to the endangered snow leopard. Almashev shares how the indigenous and local peoples of the Altai Republic have benefited from projects such as supplying herder families with portable solar panels, empowering these families to migrate appropriately (and comfortably), while maintaining their traditional livelihood which is connected to closely observing their lands and seasonal indicators.

On the high alpine Ukok Plateau, another community were trained and constructed a combined solar-wind generator to supply electricity to the training center located at their mountain farming camp, allowing them to train young unemployed people from surrounding camps and villages. “...We are giving opportunity to traditional cultures to lead their traditional style of life,” says Almashev. “Having new technology and sources for energy, and to have access to Internet, even just

light in their houses... [this is] stimulating young people to stay on their lands.”<sup>14</sup>

## A low-carbon future

When introducing renewable energy technologies to indigenous and local communities a balance must be struck between opening these communities to the modern world in a way that offers social and economic benefits, and choosing appropriate technologies that will not create burdensome financial or technical dependencies.

As the framework for the green energy economy emerges, indigenous and local communities are positioning themselves to assert their rights, attract investment and initiate culturally appropriate energy solutions.

Renewable energies are a popular solution as they promote energy autonomy and reduce dependency on fossil fuels brought in from distant locations. Further, they can even offer potential revenue streams, sustainable ‘green collar’ skills development and employment, while also providing power for devices like computers and televisions that are important to retaining younger people in the communities.

If sensitively implemented, clean energy solutions can reduce pollution, biodiversity loss and other adverse environmental impacts experienced by traditional energy solutions, as well as help to avoid the destructive carbon-intensive development path followed by so many developed countries.



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<sup>14</sup> <http://youtu.be/xX38pCrcl8k>

## Accompanying videos

- Energy innovation and traditional knowledge videobrief:  
<http://youtu.be/dYJC22XnSqw>
- Interview with Saul Vincent Vasquez, Indian Treaty Council on wind farm projects and indigenous peoples:  
<http://youtu.be/sUPc2sF7pwM>
- Interview with Bob Gough, Intertribal Council on Utility Policy, on tribal win and energy efficient housing projects:  
<http://youtu.be/HL7W3MvBHMq>
- Bunker Roy, TEDGlobal 2011 Talk, 'Learning from a barefoot movement':  
<http://youtu.be/6qqqVwM6bMM>
- Interview with Elena Antipina, The Northern Forum, on energy independence for Arctic reindeer herders:  
<http://youtu.be/838a-QmRp6g>
- Interview with Tero Mustonen, Snowchange, on realizing energy self-sufficiency:  
<http://youtu.be/mmYVjG5-t4k>
- Interview with Chagat Almashev on Energy Independence and cultural survival in Altai Mountains:  
<http://youtu.be/xX38pCrcl8k>

## Further reading

- Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation (2012)  
<http://www.ipmccc.org/2012/06/13/weathering-uncertainty-traditional-knowledge-for-climate-change-assessment-and-adaptation/>
- Climate Change Mitigation with Local Communities and Indigenous Peoples: Practices, Lessons Learned and Prospects (2012)  
[http://www.unutki.org/news.php?news\\_id=136&doc\\_id=102](http://www.unutki.org/news.php?news_id=136&doc_id=102)
- Indigenous Peoples, Marginalized Populations and Climate Change: Vulnerability, Adaptation and Traditional Knowledge (2011)  
[http://www.unutki.org/news.php?news\\_id=128&doc\\_id=102](http://www.unutki.org/news.php?news_id=128&doc_id=102)

## Endnotes

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<sup>a</sup> This is one of a series of guest articles and commentaries on topical issues in traditional knowledge running under the Traditional Knowledge Bulletin (a publication of the Traditional Knowledge Initiative of the United Nations University – Institute of Advanced Studies, <http://www.unutki.org/>). Contact [tkbulletin@ias.unu.edu](mailto:tkbulletin@ias.unu.edu) for further details. The article was first published in OurWorld 2.0 on 2 November 2012, with accompanying videos: <http://ourworld.unu.edu/en/energy-innovation-and-traditional-knowledge/>

<sup>b</sup> Kirsty Galloway McLean is a Fellow of the UNU Institute of Advanced Studies where she is working on climate change and traditional knowledge, and Principal of BioChimera Consulting Group where she provides environmental, educational and cultural advice. She has been working in international science policy for over 20 years and holds degrees in science (biochemistry and molecular biology) and arts (cognitive studies and cross-cultural communication) from the Australian National University.

<sup>c</sup> Ame Ramos Castillo is an Adjunct Research Fellow working on the Water Management and Climate Programmes at the UNU-IAS Traditional Knowledge Initiative. Her work focuses on exploring interlinkages between global environmental issues and Indigenous Knowledge systems and on highlighting the role that Traditional Knowledge plays in developing sustainable solutions to pressing global environmental challenges. Before joining the TKI, Ameyali was a consultant and a PhD Fellow on the Science Policy for Development Programme at the UNU-IAS.

<sup>d</sup> Brendan Barrett joined the United Nations University in 1997. His professional career includes work in the private sector, academia and with international organizations. He uses the web and information technologies as a means to communicate, teach and undertake research on issues of environment and human security.