

Colloquium on Forests and Climate

*New thinking for
transformational change*

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Energy



John Holdren

US President Obama's
science advisor

This document is an edited transcript of a talk that **Dr. John Holdren** delivered at the “Colloquium on Forests and Climate: New Thinking for Transformational Change”, held at Columbia University, New York, on 24 September 2014, the day after the 2014 UN Climate Summit. A video of the presentation is available at cifor.org/colloquium/energy.

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Thank you very much. I really appreciate the opportunity to talk with you today about how the Obama Administration sees the challenges and the opportunities in the domain of energy, climate, forests, and sustainable landscapes. I proposed to describe at least a few of the big ideas in this space that the President has been pursuing, in order to put the United States on a fundamentally different trajectory than the one it was on before he took office – a trajectory that will achieve a more sustainable future for both the United States and the world.

I think we all know that, throughout history, energy has been an essential determinant of how we do across a wide range of global challenges. And, in this century, energy traces are going to be key in that respect. Those challenges include building economic prosperity for all, producing and delivering adequate supplies of food and water, promoting global health, and of course protecting the climate and the ecosystems that are so essential to societal well-being. Today, 1.3 billion people worldwide still lack access to electricity, and at least 2.7 billion people don't have clean and safe cooking facilities. The exposure of that 2.7 billion to smoke as a consequence of their using wood, coal, charcoal, and animal waste to cook their food and to heat their homes, damages their health; it results in nearly two million extra deaths per year. Expanded access to clean energy has to be at the heart of any international development agenda.

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Of course, we all know our current patterns of energy use are the principal driver of global climate change. Of the carbon dioxide emitted to the atmosphere by human activity since the beginning of the industrial age, about two-thirds have come from the combustion of fossil fuels. And we're now observing the changes that those rapidly increasing emissions have set in motion: longer and hotter summers, more extremely hot days, more rain coming in heavier downpours, worse droughts and wildfires in regions prone to those, and some dramatic changes in the distribution and abundance of species – species we love, species we hate, and species on which we depend. Although energy production and use are the largest source of carbon dioxide emissions that are altering the climate system, much of the remainder, much of the balance of anthropogenic CO₂ emissions has been, of course, from changes in land use – including, above all, deforestation.

Back around 1750, the sort of official baseline against which we measure these modern changes, something like 7.5 to 9 million square kilometers of the Earth's surface were used for cropland and pasture. Since then, land-use changes driven by population growth and rising incomes have increased that area to about 50 million square kilometers, or nearly 40 percent of the world's ice-free land area.

The global greenhouse gas sink, represented by the part of the terrestrial ecosystem that has not been drastically altered by land-use change, is considerable. It's been estimated that since 1750, that sink has sequestered about 160 billion tons of carbon dioxide. An interesting number is that, in the United States, forests and associated wood products are estimated to have captured and stored about 833 million tons of CO₂ in 2011, which was about 16 percent of all the CO₂ emitted that year by fossil fuel burning in the United States.

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These numbers underscore both the importance of maintaining forests as a carbon sink, and the opportunity to enhance that sink as part of a comprehensive global strategy to mitigate the causes of global climate change. Of course, we know that the connections between climate change and energy, and between climate change and forests, are complex. Energy emissions, as I said, are a principal driver of anthropogenic climate change,

but that climate change also affects our ability to produce and deliver energy. Much of America's energy infrastructure is vulnerable to extreme weather events. Consequences of climate change, such as extended periods of hot weather, more heavy downpours, and sea-level rise, are going to affect those energy infrastructures as well as energy demand.

Land-use changes drive anthropogenic climate change, as we've also seen. But climate change, in turn, affects our forests. Climate change increases the vulnerability of many forest ecosystem changes and tree mortality through fire, pests, drought and disease. In the United States, we've seen climate change impacts on the timing of critical events for plant life, such as bud burst and emergence from overwintering. And impacts on insect infestation, such as those of the pine bark beetle, which has killed western conifer forests over an enormous area of land.

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Apart from the back-and-forth interactions between energy and climate, and forests and climate, there are other interconnections among energy, water, and land use. Energy production and delivery require varying amounts of water and land. Water projects – water supply and irrigation - require energy and land. Agriculture and forestry depend on energy and water. Increasing

population, a growing economy, and in many cases climate change, intensify all of these interactions.

The complex nature of those interactions means that there are no simple solutions. But the Obama Administration has had some big ideas that I think are going to make a big difference in our ability to address these issues, both in the United States and worldwide. I want to mention a few of those, starting with advancing clean energy.

The President has made advancing clean energy a priority in a way that his predecessors did not, with the largest investment in clean energy R&D in American history, and several major initiatives in his Climate Action Plan to advance clean energy deployment. Since he took office, the United States has increased solar electricity generation by more than tenfold, and tripled electricity production from wind. Under the President's Climate Action Plan, the US government is on track to meet its goals of installing 100 megawatts of renewable capacity across federal subsidized housing by 2020; permitting 10 gigawatts of renewable projects on public lands by 2020; deploying three gigawatts of renewable energy on military installations by 2025; and doubling wind and solar electricity generation from 2013 levels by 2025.

The President has also put a lot of effort into driving down the cost of advanced energy technologies to speed their introduction into the market. Four years ago, President Obama announced SunShot, a goal to make solar energy cost-competitive with traditional energy sources by the end of the decade. Today, US solar energy is more than 60 percent of the way there. The cost of geothermal and advanced biofuels is also dropping. And, since 2008, the cost of manufacturing advanced electric vehicle batteries has dropped by more than 65 percent.

The administration has also made a major push to advance energy efficiency in our vehicles and homes and factories. In vehicles, we have pushed through historic increases in fuel economy standards for cars, light trucks and heavy-

duty vehicles. The administration has also partnered with Rural Electric Cooperatives, home efficiency advocates, and private-sector partnerships to improve building energy efficiency.

The President's Climate Action Plan also, of course, recognizes the critical role of forests in mitigating climate change. It encourages new approaches to conservation and sustainable management, to ensure that US forests continue to remove carbon from the atmosphere. The President has directed public land agencies in the United States government to develop and implement climate adaptation strategies that promote resilience in forests and other plant communities – including an expansion of forest and rangeland restoration efforts, in order to make natural areas and communities less vulnerable to catastrophic fire.

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Building on the existing network of federal climate science research and action centers, the Department of Agriculture is creating seven new regional climate hubs to deliver tailored, science-based knowledge to farmers, ranchers and forest landowners. By providing relevant and authoritative advice on better managing biomass resources on forest lands, that program is aimed at meeting the identified need for managing forests' biomass energy as a component of an overall bio-energy strategy to reduce emissions from carbon from fossil fuels, while also improving water quality and maintaining lands for timber production as an alternative to other socioeconomic options.

The President's Climate Action Plan also recognizes the need to address the issues at the nexus of energy and forests internationally. In some developing countries, as much as 80 percent of greenhouse gas emissions come from land-use change. To meet that challenge, the Obama Administration is working with partner countries to put in place the systems and institutions necessary to significantly reduce global land-use-related emissions, creating new models for rural development that generate climate benefits, while conserving biodiversity, protecting watersheds and improving livelihoods.

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In 2012 alone, the US Agency for International Development’s bilateral and regional forestry programs contributed to reducing more than 140 million tons of CO₂ emissions, including through support for such multilateral initiatives as the Forest Investment Program and the Forest Carbon Partnership Facility. The Obama Administration is also working to address agriculture-driven deforestation through initiatives such as the Tropical Forest Alliance 2020, which brings together governments, the private sector and civil society to reduce tropical deforestation related to key agricultural commodities.

This week, the President built on this past work with some additional initiatives, ones that he announced just yesterday at the UN. First, he signed an executive order, a new executive order, that requires all US government agencies undertaking international development work to factor climate change resilience systematically into that work, and to promote a similar

approach in their efforts with multilateral development entities. Making climate resilience a key element of all US international development work is a really big change.

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Second, with respect to expanding clean energy access in developing countries, the United States has announced new links between its Power Africa Beyond the Grid program and the UN- and World Bank-led Sustainable Energy for All program. Under the US Power Africa program, President Obama had already announced, in July, aggregate goals to add 60 million new electricity connections and 30,000 megawatts of clean energy generation in Africa. In collaborating more closely with Sustainable Energy for All, the US government hopes to give high priority to working with African countries on investment strategies and reducing barriers to clean energy projects.

Third, the United States has joined other governments, the private sector, civil society and indigenous peoples’ organizations in signing the **New York Declaration on Forests**, which lays out high-level goals to address deforestation and promote restoration. In connection with supporting this declaration, the United States government has announced some additional, specific commitments. We have pledged to restore 15 million hectares of forest land domestically as our contribution to the Bonn Challenge global goal to restore 150 million hectares of forests and degraded lands by 2020. Collaborative forest landscape restoration program partners, including the federal government, have already committed over \$300 million for 23

landscape-scale forest and watershed restoration projects. The United States government has committed over \$1.3 billion to support REDD+. This funding has helped support efforts to reduce greenhouse gas emissions and protect forests in dozens of countries. The United States, as a co-founder of the BioCarbon Fund Initiative for Sustainable Forest Landscapes, will continue to promote reduced greenhouse gas emissions from the land sector, including REDD+ and emissions from agriculture as well as smarter land use planning policies and practices.

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Finally, the United States government is looking forward to working with the signatories of this week's Indonesia Palm Oil Pledge to promote its implementation. The pledge goes beyond the participating companies' existing sustainability policies, and included industry leading commitments, such as proactive government engagement on policy reform, and a principle of no planting on peatland.

As a closing note, let me emphasize the role that the wider scientific, technological and civil society communities have played in the accomplishments to date in the areas of sustainable energy and forestry. The academic and non-profit research centers, and the civil society groups represented in this room, and the governmental and philanthropic organizations that have supported them, have been immensely important in this space.

There is, of course, a lot left to do. The challenges that still face us are huge, and we will continue to need, as President Obama has emphasized, all hands on deck if we are to succeed.

Thank you very much.





John Holdren

US President Obama's science advisor

Dr. John P. Holdren is Assistant to the President for Science and Technology, Director of the White House Office of Science and Technology Policy, and Co-Chair of the President's Council of Advisors on Science and Technology (PCAST).

Prior to joining the Obama administration Dr. Holdren was Teresa and John Heinz Professor of Environmental Policy and Director of the Program on Science, Technology, and Public Policy at Harvard University's Kennedy School of Government, as well as professor in Harvard's Department of Earth and Planetary Sciences and Director of the independent, nonprofit Woods Hole Research Center. Previously he was on the faculty of the University of California, Berkeley, where he co-founded in 1973 and co-led until 1996 the interdisciplinary graduate-degree program in energy and resources.

During the Clinton administration Dr. Holdren served as a member of PCAST through both terms and in that capacity chaired studies requested by President Clinton on preventing theft of nuclear materials, disposition of surplus weapon plutonium, the prospects of fusion energy, U.S. energy R&D strategy, and international cooperation on energy-technology innovation.

Dr. Holdren holds advanced degrees in aerospace engineering and theoretical plasma physics from MIT and Stanford. He is a member of the National Academy of Sciences, the National Academy of Engineering, and the American Academy of Arts and Sciences, as well as a foreign member of the Royal Society of London and former president of the American Association for the Advancement of Science.

He served as a member of the MacArthur Foundation's Board of Trustees from 1991 to 2005, as Chair of the National Academy of Sciences Committee on International Security and Arms Control from 1994 to 2005, and as Co-Chair of the independent, bipartisan National Commission on Energy Policy from 2002 to 2009. His awards include a MacArthur Foundation Prize Fellowship, the John Heinz Prize in Public Policy, the Tyler Prize for Environmental Achievement, and the Volvo Environment Prize.

In December 1995 he gave the acceptance lecture for the Nobel Peace Prize on behalf of the Pugwash Conferences on Science and World Affairs, an international organization of scientists and public figures in which he held leadership positions from 1982 to 1997.

Colloquium on Forests and Climate

cifor.org/colloquium

The Colloquium on Forests and Climate was jointly organized by the Center for International Forestry Research (CIFOR) and two centers within the Earth Institute at Columbia University: the International Research Institute on Climate and Society (IRI) and the Earth Institute Center for Environmental Sustainability (EICES).

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Transcripts and videos are also available for the other speakers at the Colloquium on Forests and Climate:



Eduardo Brondízio

Professor of Anthropology at
Indiana University Bloomington,
on governance



Pushpam Kumar

Chief of UNEP's Ecosystem
Services Economics Unit,
on green economy



Daniel Nepstad

Executive Director of the Earth
Innovation Institute, on land use



Cheryl Palm

Director of Research, Agriculture
and Food Security Center, Columbia
University, on agriculture



Carlos Nobre

National Secretary for
R&D Policies, MCTI, Brazil,
on climate variability