

The first category decided in the 10th edition of the awards

William Nordhaus, the father of climate change economics, wins the BBVA Foundation Frontiers of Knowledge Award

- The award goes to the Yale University professor for developing a pioneering model that successfully integrates climate science and economics to identify the most effective paths against global warming.
- Nordhaus's models are now widely applied by the scientific community to determine the costs and benefits of reducing CO₂ and other greenhouse gas emissions compared to the costs and benefits of inaction.
- "His models are used worldwide to analyze climate policy options," in the words of the jury's citation, since they serve to estimate the socioeconomic consequences of continuing emissions, and to decide the most effective steps to confront the risk.
- For the new laureate, the best way to alleviate climate change would be to tax carbon emissions at 40 euros per ton, against a current cost in Europe of approximately 7.5 euros.

Madrid, January 9, 2018.- The BBVA Foundation Frontiers of Knowledge Award in the Climate Change category goes, in this tenth edition, to economist William Nordhaus, of Yale University (USA) for founding the field of climate change economics, by "pioneering a framework that integrates climate science, technology and economics to address the critical question: What should the world do to limit climate change?"

Nordhaus (New Mexico, USA, 1941) began studying the economic impact of climate change in 1975, just as climate scientists were issuing their first, tentative warnings about a rise in global temperatures due to greenhouse gas emissions caused by the burning of fossil fuels. He stumbled on the problem quite by chance, through sharing an office with climatologist Allan H. Murphy during a research stay in Vienna. The complexity of the challenge and the dearth of information on the variables involved meant it took Nordhaus over fifteen years to develop his model. By then an active community of climate researchers was already in existence, but the climate change issue had yet to garner the attention of economists.

Today, Nordhaus's DICE (Dynamic Integrated Climate-Economy) model, and its regional variant RICE, are "widely used," the citation affirms, to estimate the costs and benefits of curbing emissions. And numerous economists around the world are constructing and comparing their own assessment models, with similar conclusions. This growing community draws its inspiration from Nordhaus's groundbreaking work, without which, says the jury, we would have no reliable handle on the socioeconomic consequences of continuing emissions or to decide which counter-measures to apply.

"Nordhaus used his models and economic insights to illuminate such considerations as the role of discounting future climate damages, the risk of catastrophic damages, and the role of technological change in the energy system," the citation concludes. "Owing to the transparency and simplicity of his approach, his models are used worldwide to analyze climate policy options."

Nordhaus himself explained these models yesterday after hearing of the award: "They are an attempt to represent all the key linkages between economics and climate in the simplest possible manner: variables like population, GDP, use of carbon fuels and climate change. I had to come up with equations to represent the linkage between, say, population and economic growth, on the one hand, and emissions, on the other, and then on to climate change. It took me a long time to develop DICE because it required finding the different pieces then putting them together in a form that could be operated on a computer to get results."

Among his constant preoccupations has been the quality of statistical information and the integration of data drawn from varied disciplines. And it was this which led him to propose incorporating environmental factors and non-market activities into a new system of national accounts.

More expensive carbon

For Nordhaus, the crux of the matter is to set a realistic price on carbon. This, in his opinion, is the right way to go about limiting climate change: "The key insight of my work was to put a price on carbon in order to hold back climate change. The main recipe to alleviate climate change is to make sure governments, corporations and households face a high price on their carbon emissions. Today it is virtually zero. If the price were higher people would have other choices, like renewable energies. It's not a recipe that tastes very good, but it's the one that will work."

After decades championing the taxation of carbon emissions, Nordhaus has his reservations about the effectiveness of the Paris agreement: "The Paris Accord has good points, but it is purely voluntary, and the measures taken are insufficient to slow emissions of CO₂ and other gases. For a start, the price put on carbon emissions is far too low, I would guess just 10% of what is needed right now if we want to curb emissions. The Paris effort is worthwhile, because it is a good thing to

bring countries together, but is much too little to reach the goal of reducing emissions to contain temperature rises at under 2°C."

Taxing emissions would boost investment in clean technologies and renewable energies. In carbon emission rights trading in the European Union, the price of carbon is around 7.5 euros per ton, when according to Nordhaus it should really stand in the interval of 30 to 40 euros.

In conversation yesterday, he declined to define himself as either optimistic or pessimistic about our ability to limit climate change. He is adamant however, that "we have to be realistic". To denialists and skeptics, "I would say that this is a very important problem that is getting worse, with a major impact in terms of sea level rise, wildfires, the consequences for human health... This is something that is real. If we care about our country, not just today and tomorrow, but in the long run, we have to take this seriously and work with other countries to stop it. Here in the United States, we take all kinds of steps to protect our national security, making investments on a major time scale, and we should do exactly the same with the challenge of climate change. It is not something that will harm our economy, it will help our economy."

For Nordhaus, the skeptics who still cast doubts on the science of climate change are "like the people decades back who refused to accept the evidence that smoking causes cancer. But today all the evidence suggests that climate change, like smoking, is dangerous in the extreme."

The new laureate is aware that his work has yet to translate into practical policy measures: "So far virtually nothing has been done at the global level to slow climate change. We are moving in the right direction, but for every two steps forward we take one step back. This is one of the most difficult political processes we are currently facing, because it forces us to impose costs now in order to protect the distant future, and that is a hard sell."

His latest book, released in 2013 with the title *The Climate Casino*, addresses the risks and socioeconomic uncertainty of a world threatened by climate change. "Climate," he says, "is a casino in the sense that we are taking serious risks with our planet and ourselves. But we don't need to walk into that casino, we can take steps now to mitigate and reduce the risks."

Bio notes

William Nordhaus studied at Yale University then went on to earn a PhD in Economics from the Massachusetts Institute of Technology. On completion of his thesis, in 1967, he joined the faculty at Yale, where he remains to this day. Currently Sterling Professor of Economics, he also holds a professorship in Yale's School of Forestry and Environmental Studies.

A member of President Jimmy Carter's Council of Economic Advisors from 1977 to 1979, he has also served on numerous committees of the U.S. National Academy of Sciences, including the Committee on Nuclear and Alternative Energy Systems, the Panel on Policy Implications of Greenhouse Warming, the Committee on National Statistics, the Committee on Data and Research on Illegal Drugs, and the Committee on the Implications for Science and Society of Abrupt Climate Change. He also chaired a panel of the National Academy of Sciences which produced a report, *Nature's Numbers*, that recommended approaches to integrate environmental and other non-market activity into national accounts.

Co-author since 1985 of Paul Samuelson's classic textbook *Economics*, his many publications include *Invention, Growth and Welfare; Is Growth Obsolete?*, and *The Efficient Use of Energy Resources*. Some of his titles, like *Managing the Global Commons: The Economics of Climate Change* (1994) and *Warming the World* (2000), explored previously uncharted ground. Other well-known works are *A Question of Balance: Weighing the Options on Global Warming Policies* (2008) and, most recently, *The Climate Casino: Risk, Uncertainty, and Economics for a Warming World* (2013).

Nordhaus is on the research staff of the U.S. National Bureau of Economic Research and has been a member and senior advisor of the Brookings Panel on Economic Activity. He is also a member of the Congressional Budget Office Panel of Economic Experts and was the first Chairman of the Advisory Committee for the Bureau of Economic Analysis. In 2014-2015 he served as President of the American Economic Association.

About the BBVA Foundation Frontiers of Knowledge Awards

The promotion of knowledge based on research and artistic and cultural creation, and the interaction of these domains, forms a core strand of **the BBVA Foundation's** action program, along with the recognition of talent and excellence across a broad spectrum of disciplines, from science to the arts and humanities.

In line with these objectives, the **BBVA Foundation Frontiers of Knowledge Awards** were established in 2008 to recognize outstanding contributions in a range of scientific, technological and artistic areas, together with knowledge-based responses to the central challenges of our times. The areas covered by the Frontiers Awards are congruent with the knowledge map of the 21st century, in terms of the disciplines they address and their assertion of the value of cross-disciplinary interaction.

Their **eight categories** span classical areas like Basic Sciences (Physics, Chemistry and Mathematics), Biomedicine and other areas characteristic of our time, like Biomedicine, Information and Communication Technologies, Ecology and Conservation Biology, Climate Change, Economics, Finance and Management

and Development Cooperation, and the particularly innovative realm that is Contemporary Music.

The BBVA Foundation is aided in the evaluation process by the **Spanish National Research Council (CSIC)**, the country's premier public research organization. As well as designating each jury chair, the CSIC is responsible for appointing the technical evaluation committees that undertake an initial assessment of the candidates put forward by eminent institutions from all around the world, and draw up a reasoned shortlist for the consideration of the juries.

Climate Change jury and technical evaluation committee

The rigor, quality and independence of the judging process has earned these awards the attention of the international scientific community and a firm place among the world's foremost prize families.

The jury in this category was chaired by **Bjorn Stevens**, Director of the Max Planck Institute for Meteorology (Hamburg, Germany). The secretary was **Carlos Duarte**, Director of the Red Sea Research Center and holder of the Tarek Ahmed Juffali Chair in Marine Biology at the King Abdullah University of Science and Technology (Thuwal, Saudi Arabia). Remaining members were **Scott Barrett**, Lenfest-Earth Institute Professor of Natural Resource Economics at the School of International and Public Affairs and the Earth Institute at Columbia University (USA); **Sandrine Bony**, senior scientist at the Laboratoire de Météorologie Dynamique/Institute Pierre-Simon Laplace (LMD/IPSL) in Paris (France); **Miquel Canals**, Director of the Department of Earth and Ocean Dynamics at the University of Barcelona (Spain); **Martin Heimann**, Director Emeritus at the Max Planck Institute for Biogeochemistry (Jena, Germany) and a professor at the Friedrich Schiller University, likewise in Jena; **Edward Rubin**, Professor of Engineering and Public Policy and Alumni Chair Professor of Environmental Engineering and Science at Carnegie Mellon University Mellon (Pittsburgh, USA); and **Julie Winkler**, Professor of Geography in the Department of Geography, Environment and Spatial Sciences at Michigan State University (USA).

The **CSIC Technical Committee** was coordinated by **María Victoria Moreno**, the Council's Deputy Vice President for Scientific and Technical Areas, and formed by: **Francisca Martínez**, Scientific Researcher at the Andalusian Earth Sciences Institute (IACT); **Eulalia Moreno**, Coordinator of the CSIC Natural Resources Area and Research Professor at the Arid Zones Experimental Station (EEZA); and **Rafael Simó Martorell**, Research Professor in the Institute of Marine Science (ICM).

LAUREATE'S FIRST DECLARATIONS AND IMAGES

A video recording of the new laureate's first interview on receiving news of the award is available from the Atlas FTP with the following coordinates:

Server: **5.40.40.61**

Username: **AgenciaAtlas4**

Password: **mediaset17**

The name of the video is:

"PREMIO CAMBIO CLIMÁTICO"

In the event of connection difficulties, please contact **Miguel Gil** at production company Atlas:

Mobile: +34 619 30 87 74

E-mail: mgil@mediaset.es

CALENDAR OF UPCOMING AWARD ANNOUNCEMENTS

Information and Communication Technologies (ICT)	Tuesday, January 16, 2018
Basic Sciences	Tuesday, January 23, 2018
Biomedicine	Tuesday, January 30, 2018
Ecology and Conservation Biology	Tuesday, February 6, 2018
Contemporary Music	Tuesday, February 13, 2018
Economics, Finance and Management	Tuesday, February 20, 2018
Development Cooperation	Tuesday, February 27, 2018

Fundación BBVA

For more information, contact the BBVA Foundation Department of Communication and Institutional Relations (+34 91 374 5210; 91 374 3139; 91 374 8173/ comunicacion@bbva.es) or visit www.bbva.es