

25th Anniversary of PIK

IMPACTS WORLD 2017







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Why climate-impact research? 25 years of PIK - 25 years of impact research



Nobel Prize Winner Mario J. Molina (2017)





- 1) Climate change is real
- 2) Climate change has more negative than positive impacts
- 3) GLOBAL actions are necessary to control the ORIGIN of climate change

Scientists (and Astronauts) are Cosmopolitian



Neil Armstrong: first man on the moon (1966)

...when I saw the earth with a very thin oxygen layer as a small ball floating in the dark universe, I discovered for the first time that the US is not in the center of the universe.

> Now I feel more responsible for the earth as a whole

All leading politicians should be sent on the moon before taking office



Origin of Many Problems



Year

www.futuretimeline.net



Stephen Hawking warns we must escape Earth within 100 years if humans are to survive

- Professor Hawking believes life on Earth is at high risk of being wiped out
- Future generations must forge a new life in space if we want to survive
- As part of a new BBC series Professor Hawking explores human life in space Humans must leave Earth within 100 years if we want to survive, Professor Stephen Hawking has warned.

The renowned theoretical physicist believes that life on Earth is at an ever-increasing risk of being wiped out by a disaster, such as asteroid strikes, epidemics, over-population and climate change.

As our world becomes less suitable for life over the next century, Professor Hawking will warn in a new documentary that future generations must forge a new existence in space.

World Economic Forum: The Global Risks Report 2017 (≈ 750 Experts)



Counting the true costs of climate change

The international conference on climate-change impacts

for scientists & stakeholders

4:00pm Why climate-impacts research?

25 years of the Potsdam Institute - that's 25 years of climate impact research. In this very special session on the occasion of our anniversary we will reflect upon what has been achieved in the past quarter of a century. Yet more importantly we will discuss what sustainability science should do in the future. What are the challenges ahead, what do decision-makers expect from the research community, and how can science inform political processes such as the next UN climate summit in Bonn?

The session will opened by the renowned Orchester des Wandels der Staatskapelle Berlin with a thought-provoking climate concert.

- Welcome note Dietmar Woidke, Ministerpräsident of Brandenburg
- "Avoiding the Unmanageable, Managing the Unavoidable": A Slogan Revisited Hans Joachim Schellnhuber, Director and Founder of PIK
- Key note Patricia Espinosa, Executive Secretary of UNFCCC
- Why the world would urge for a PIK if it would not already exist? Congratulation to the 25th anniversary - Matthias Kleiner, President of the Leibniz Association
- Climate-impacts research and the importance of basic science Klaus von Klitzing, Nobel Laureate

6:00pm Evening reception

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On September 25th 2015, countries adopted a set of goals to **end poverty**, **protect the planet**, and **ensure prosperity for all** as part of a new sustainable development agenda. Each goal has specific targets to be achieved over the next 15 years.





Former UN Secretary-General Ban Ki-moon:

Energy, preferable ELECTRICAL ENERGY, is not only the driving force of economic wealth but also a necessity for a decent living in a world with increasing population





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World Energy Consumption





THIS IS A FACT:

We destroy a reservoir of coal, oil and natural gas within some hundred years which was built-up within more than 70 million years!

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Presentation of Nobel Prize Winner Mario Molina (NP Chemie 1995) (Nobel Laureate Meeting 2017 in Lindau)

Atmospheric Concentration of CO₂ for the past 10,000 years



Atmospheric CO₂ at Mauna Loa Observatory





YEAR

Arctic Ice Extent Decreases Drastically



PERCENTAGE CHANGE in ice extent relative to the average July coverage, 1981–2010.

NATIONAL SNOW AND ICE DATA CENTER, UNIVERSITY OF COLORADO BOULDER

Although it sounds paradoxical, rising temperatures might result in **more snowfall in Antarctica.** Each degree of regional warming could increase snowfall on the ice continent by about 5 percent, an international team of scientists led by the Potsdam Institute for Climate Impact Research now quantified.

Arctic Sea Ice Extent





Year

Atmospheric CO₂ at Mauna Loa Observatory





Fossil Fuels Emission (Germany 798 Mt CO₂, 42% for Energy)

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Our Resources for Energy Production

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All projected PV cumulative installations under-predicted future PV cumulative capacity

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Year





Year

PV Module Experience Curve

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A Positive Outlook



Trump's coal revival plan won't work; clean energy tech is already cheaper

The cost of solar power systems has dropped 30% this year alone



By Lucas Mearian | Follow Senior Writer, Computerworld | Nov 15, 2016 3:13 AM PT



Solar power and wind are the two largest contributors to the increase in world electricity generation from renewable energy sources Credit: NASA





Price of a solar panel per watt **Global solar panel installations** 64,892 MW \$101.05 \$120 70,000 60,000 100 50,000 80 40,000 60 30,000 40 2 MEGAWATTS 20,000 \$0.61 Down to \$ 0.447 20 in August 2016 10,000 0 0 1.1 111111111111111111111111111111 111111 ÷. 0.111 1.1.1.1 1975 1980 1985 1990 1995 2000 2005 2010 2015^{*}

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Best Research-Cell Efficiencies





High-Efficiency III/V Based Triple-Junction Solar Cells







Fraunhofer

Slide: courtesy of F. Dimroth

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Global CO₂ Emissions will Increase

Annual carbon dioxide emissions in billion tonnes (Gt).



Data source: Carbon Dioxide Information Analysis Center (CDIAC); aggregation by world region by Our World In Data. The interactive data visualization is available at OurWorldinData.org. There you find the raw data and more visualizations on this topic.





Nations Unies Conférence sur les Changements Climatiques 2015 COP21/CMP11 Paris France ACTICE PRESIDENT SECRETAIRE "Long live the planet. Long live Humanity. Long live life itself."

Nobel Prize Winner Meeting Lindau (2015)



Mainau Declaration on Climate Change

BEL LAUREATE

NOBEL LAUREATE

S TOM PA

WARVE

Steven Chu Energy Secretary under Obama

Serge Haroche

Mainau Declaration 2015 on Climate Change

We undersigned scientists, who have been awarded Nobel Prizes, have come to the shores of Lake Constance in southern Germany, to share insights with promising young researchers, who like us come from around the world. Nearly 60 years ago, here on Mainau, a similar gathering of Nobel Laureates in science issued a declaration of the dangers inherent in the newly found technology of nuclear weapons—a technology derived from advances in basic science. So far we have avoided nuclear war though the threat remains. We believe that our world today faces another threat of comparable magnitude.

Successive generations of scientists have helped create a more and more prosperous world. This prosperity has come at the cost of a rapid rise in the consumption of the world's resources. If left unchecked, our ever-increasing demand for food, water, and energy will eventually overwhelm the Earth's ability to satisfy humanity's needs, and will lead to wholesale human tragedy. Already, scientists who study Earth's climate are observing the impact of human activity.



OUC

LINDAU



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Meetings

präsident | Honorary President

Lennart Graf Bernadotte af Wisborg (†)

Vorstand | Executive Committee Bettina Gräfin Bernadotte af Wisborg

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Keynote by

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Now more than ever, we need talented youn for a prosperous and sustainable future. We with the technologists to create better policy sustainability an integral part of their busine





"Treat the earth well: it was not given to you by your parents, it was loaned to you by your children."

Ancient Native American saying about how we should care for our planet



Science is an insurance policy for a better future