

# Perspectives on Energy & Meteorology + Climate



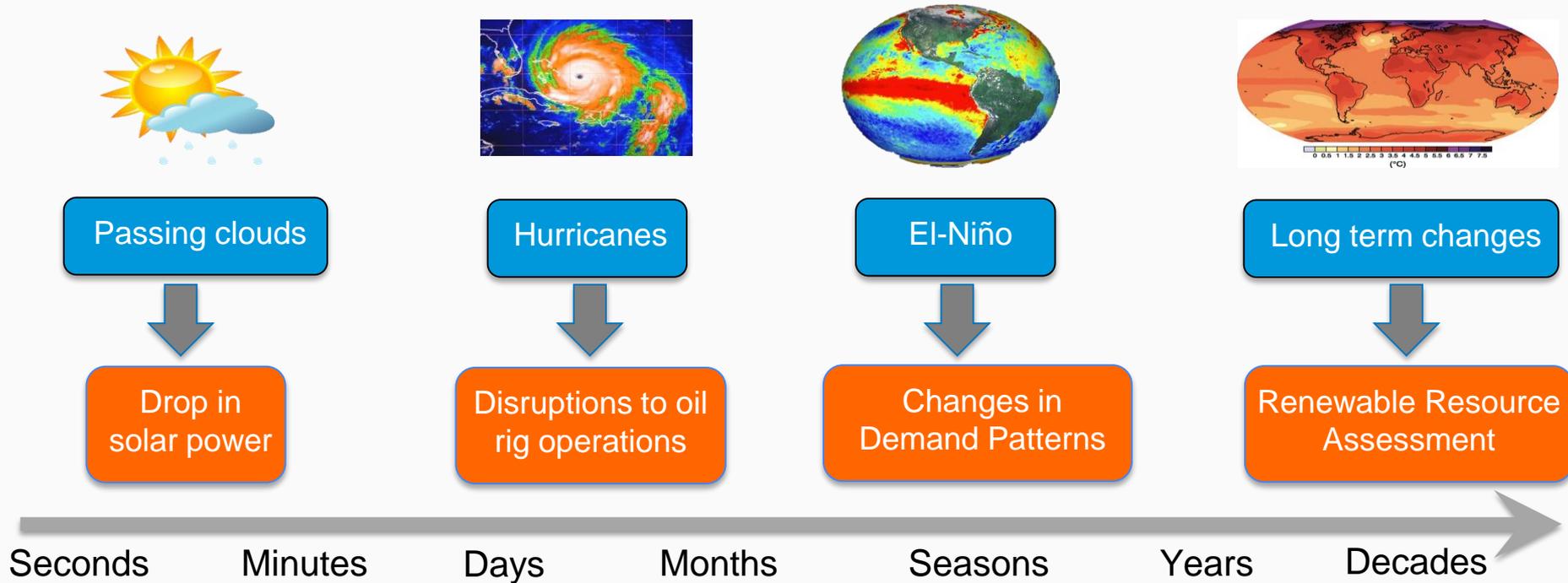
Sue Ellen Haupt, WEMC Director of Education  
UVIG Forecasting Workshop  
June 20, 2017

# Overview

- The evolving relationship between **Energy and Climate**
- How **Weather/Climate** impacts **Energy**



# Energy and meteorology go hand in hand



# World Energy & Meteorology Council (WEMC)

**Our primary goal is to enable improved**

**Sustainable  
energy**

For a low carbon  
economy



**Resilience**

Of energy  
infrastructures



**Efficiency**

Of energy systems



**Under ever changing weather and climate**



**WEMC**  
World Energy &  
Meteorology Council

# WEMC activities are

1. The dissemination of information on products, practices, and experiences in Energy & Meteorology including the promotion of the work of our members
2. The organization and coordination of Special Interest Groups (SIGs) leading to the production of reports, analyses and syntheses on key topics in Energy & Meteorology
3. The development and maintenance of demonstration tools to assist with the uptake of weather, climate and water services by the energy industry and the education of the general public
4. The organization of events such as the International Conference Energy & Meteorology (ICEM), including the development and delivery of professional workshops, seminars and webinars



**The energy industry has a multi-decadal experience in dealing with meteorological variables.**

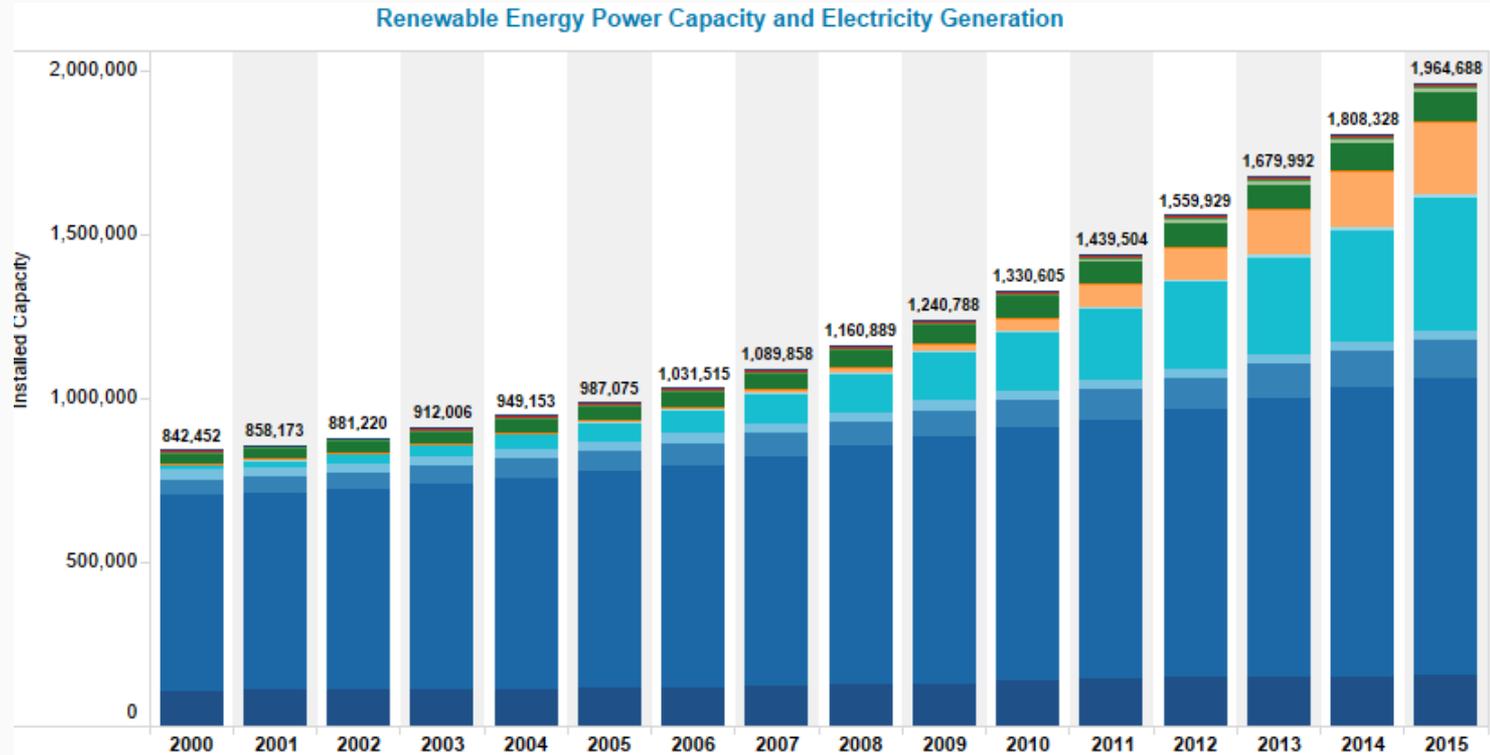
**So, what's the big deal?**

The landscape, in both climate and energy spaces, is changing rapidly.

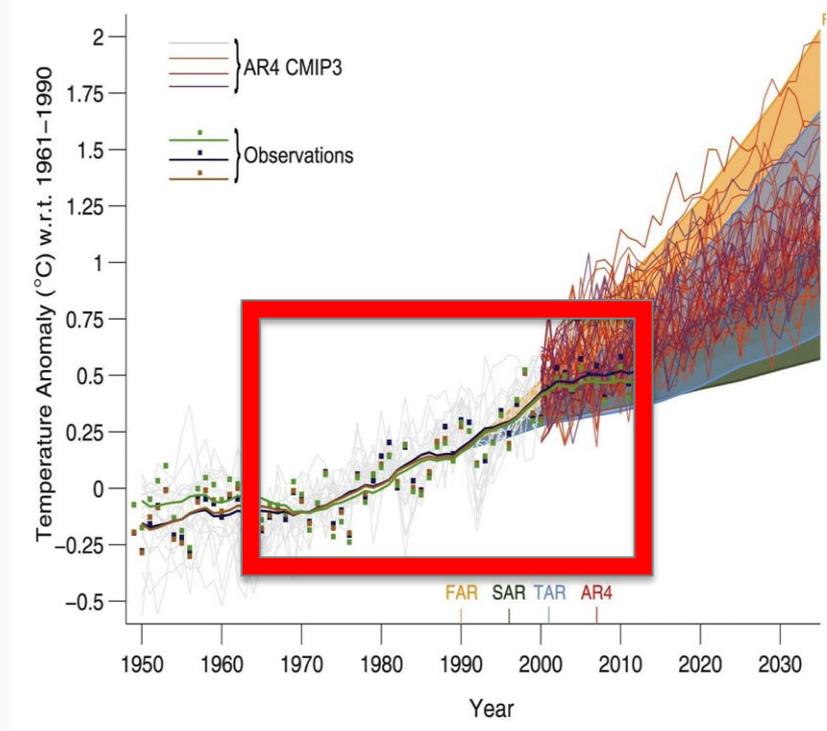
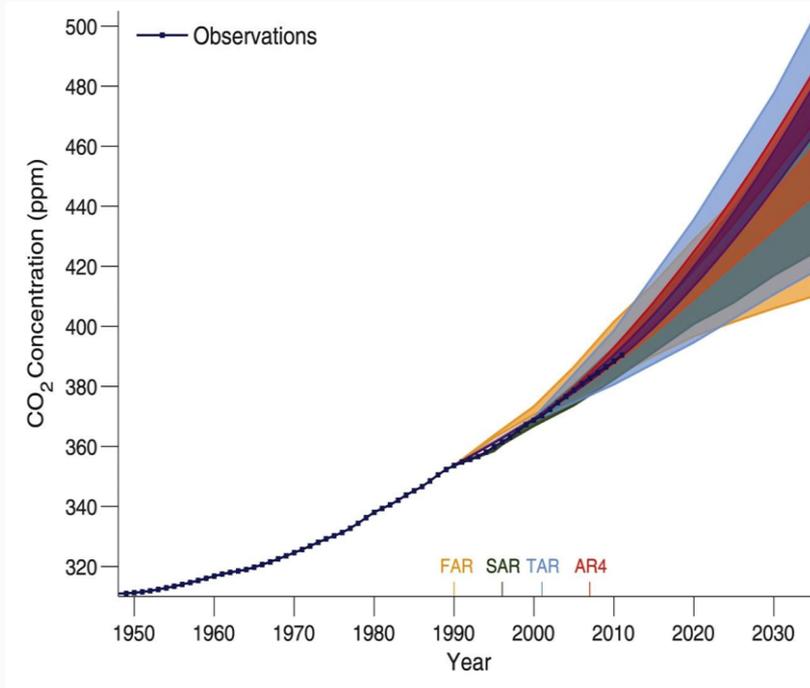
# Energy industry is multi-faceted



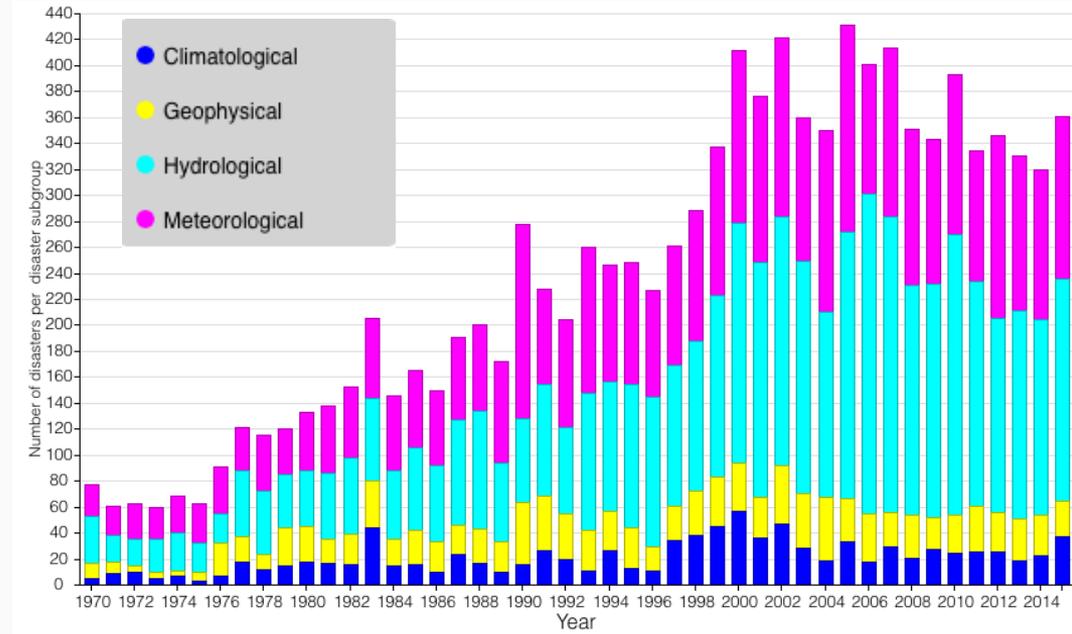
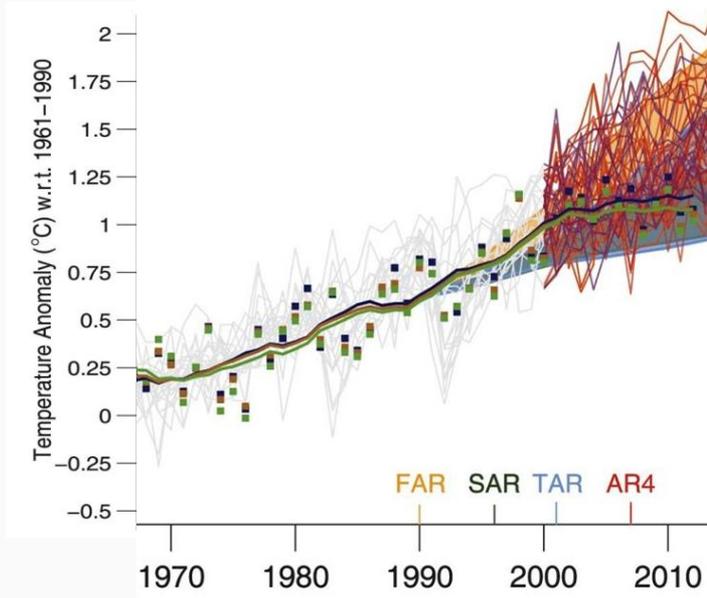
# Strong growth in renewables



# CO<sub>2</sub> emissions and temperature

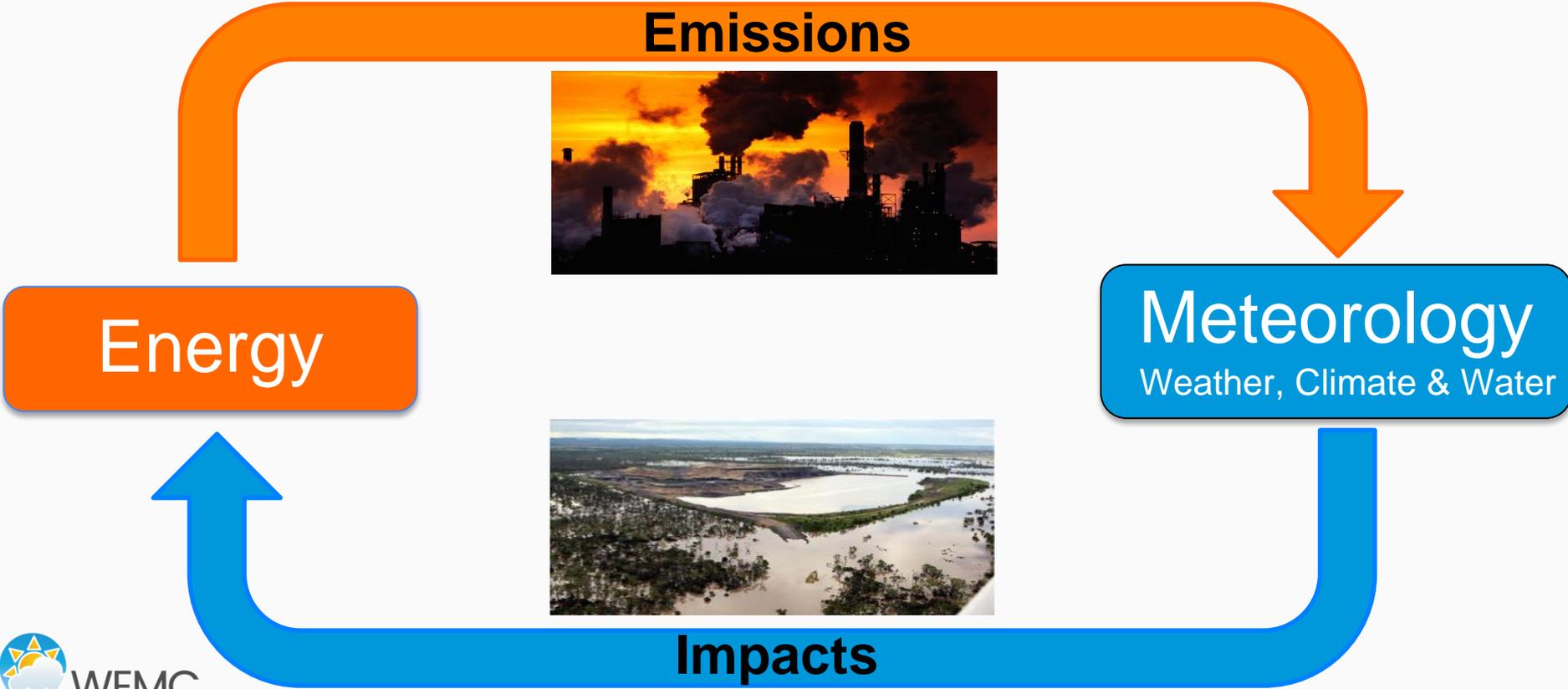


# Disasters due to natural events



EM-DAT (2016)

# Simplified Energy & Climate feedback

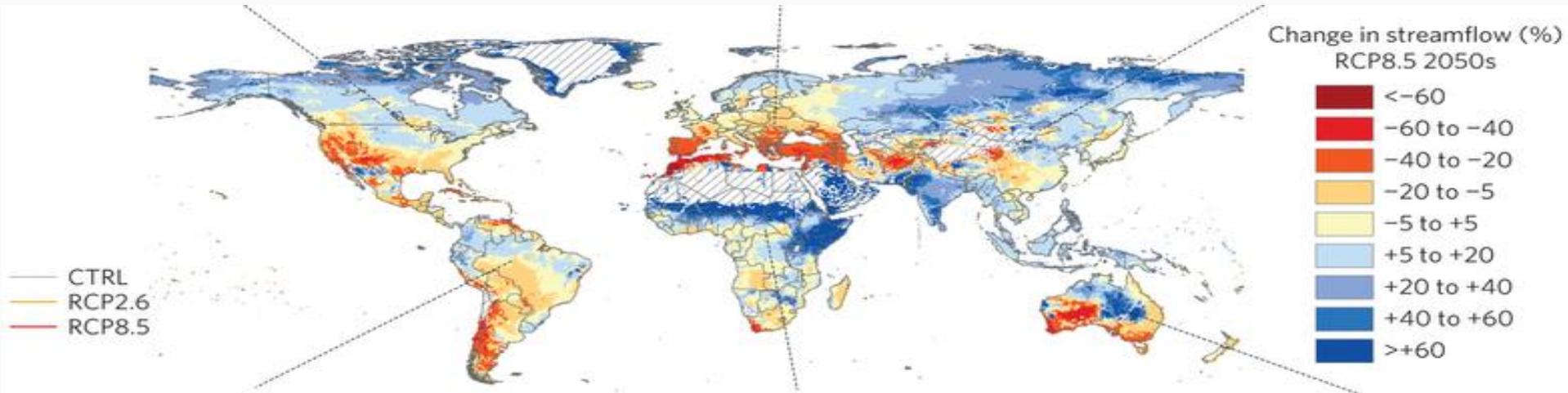


# Climate impact on nuclear power



The 2003 heatwave in France had serious consequences on the cooling of nuclear reactors. The overall cost of the heat wave for EDF was around €330 million

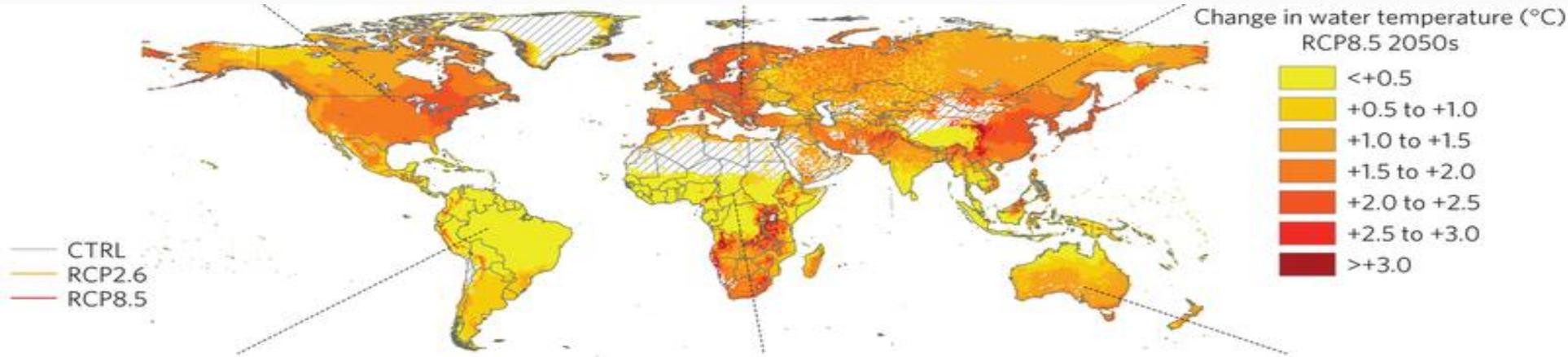
# Global changes in streamflow projections



Change in streamflow for RCP8.5, 2040–2069 (2050s) vs 1971–2000

Reductions in usable capacity for 61–74% of the hydropower plants

# Global changes in water temperature projections

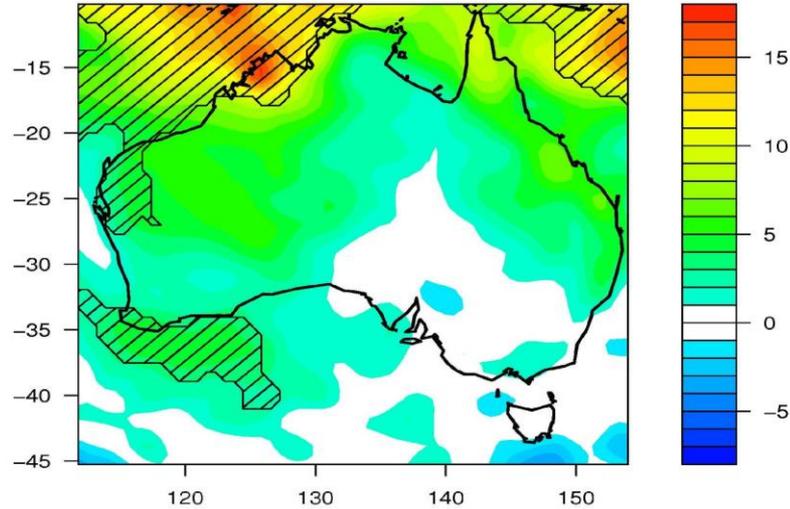


Change in water temperature for RCP8.5, 2040–2069 (2050s) vs 1971–2000

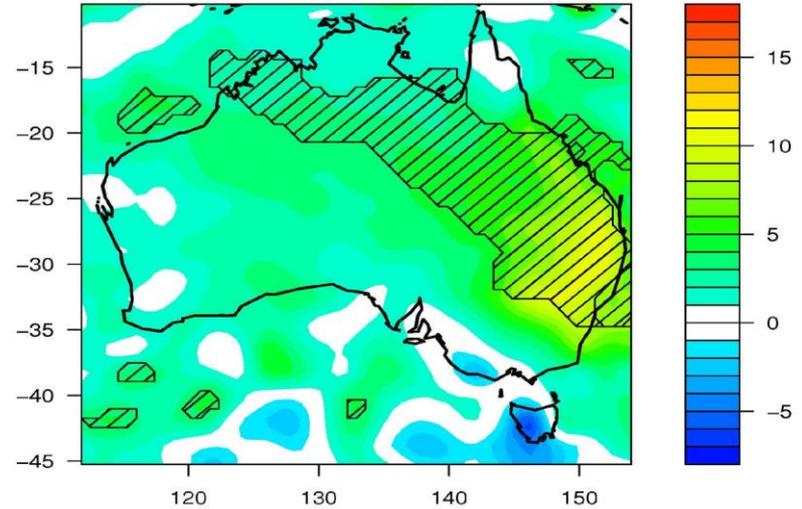
Reductions in usable capacity for 81–86% of the thermoelectric power plants

# Solar Radiation Inter-annual Variability

Winter (JJAS)



Summer (DJFM)

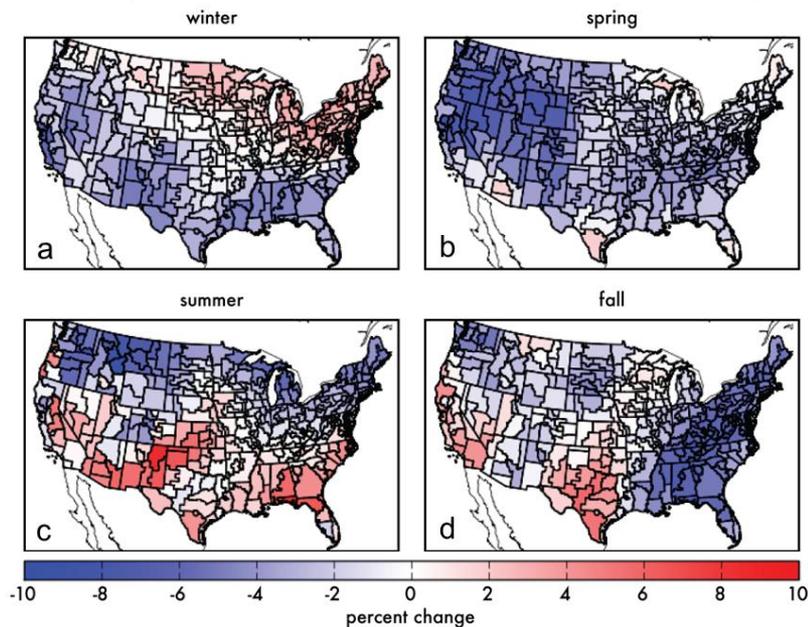


Percentage difference in monthly solar radiation in El Niño relative to La Niña

# Potential Climate Variability of US Renewable Resources

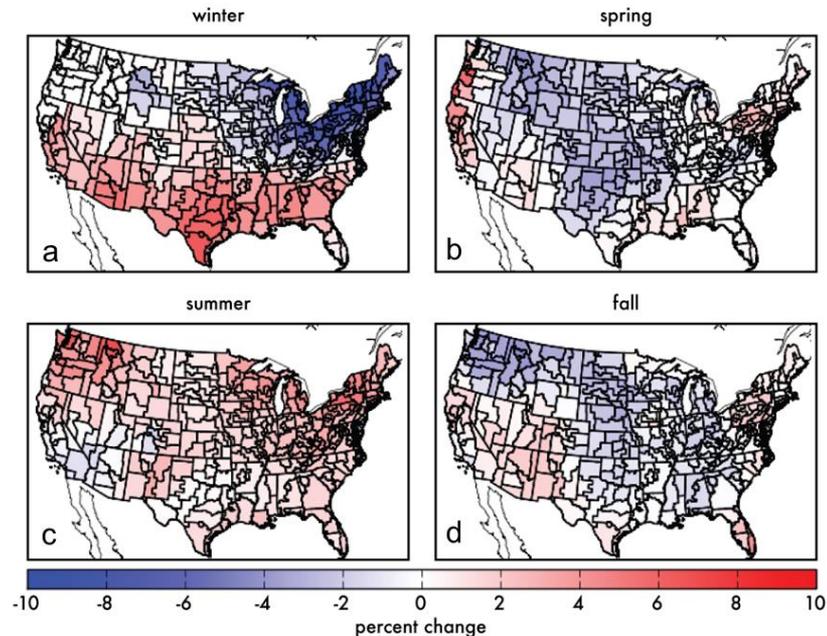
## Wind Speed Changes

Change in regional mean wind speed 1995-2060, morning



## Irradiance Changes

Change in regional mean solar radiation 1995-2060, morning



# Summary

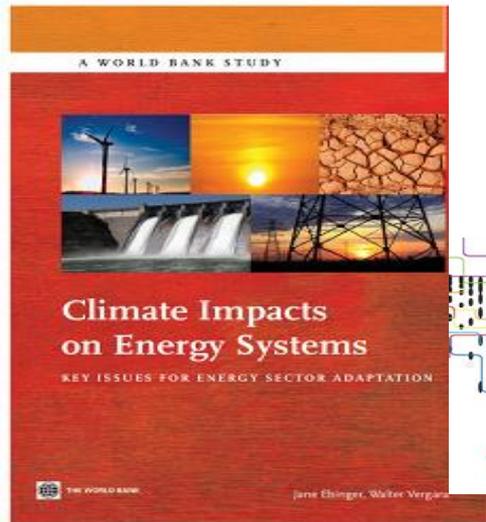
- Energy and Meteorology are closely **connected**
- Energy systems are already experiencing **sizeable impacts**, which are likely to become more severe
- **Climate services** are emerging as robust useful tools for **Energy planning, and operations/maintenance**
- There is a strong need:
  - to **improve knowledge** of meteorological data and processes
  - to **improve access** to meteorological and energy data **for improved products**



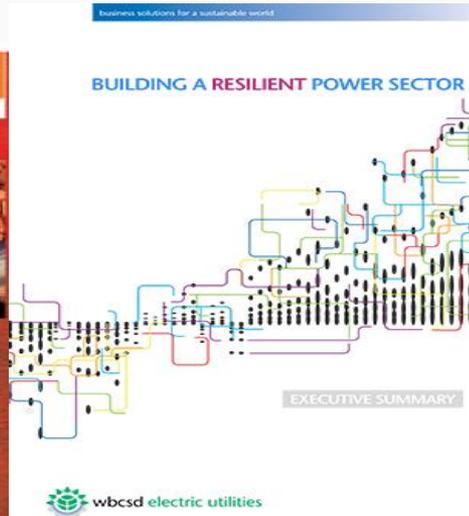
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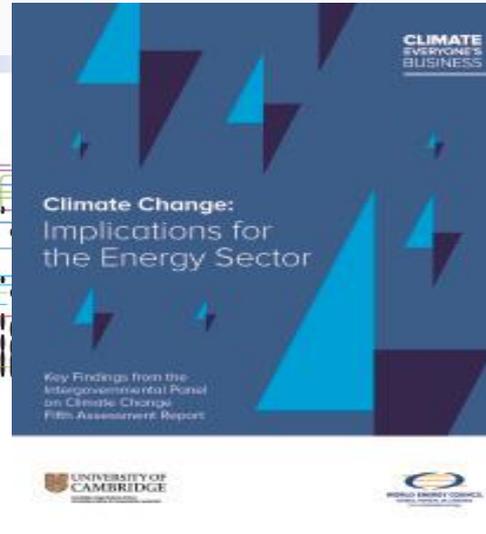
# A selection of publications



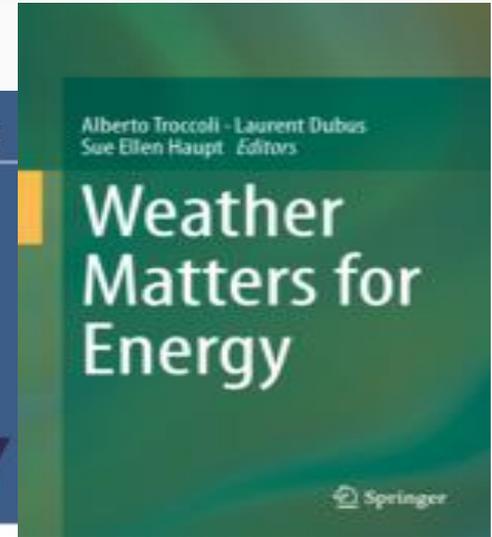
World Bank (2010)



WBCSD (2014)



WEC (2014)



ICEM (2014)



WEMC (2017)



# The Energy & Meteorology Conference Series

2015



3<sup>RD</sup> INTERNATIONAL CONFERENCE

## Energy & Meteorology

WEATHER & CLIMATE FOR THE ENERGY INDUSTRY

22 – 26 June 2015 | Millennium Harvest House, Boulder, Colorado USA

2013



2<sup>ND</sup> INTERNATIONAL CONFERENCE

## Energy & Meteorology

WEATHER & CLIMATE FOR THE ENERGY INDUSTRY

25–28 June 2013, Météo-France International Conference Centre, Toulouse, France

2011



## Energy & Meteorology

WEATHER & CLIMATE FOR THE ENERGY INDUSTRY

8-11 November 2011 Gold Coast, Australia



**WEMC**  
World Energy &  
Meteorology Council

# 4th International Conference Energy & Meteorology

Challenges in Weather, Climate and Water Services for Energy



**JOIN US IN BARI!**

27-29 June 2017  
Villa Romanazzi Carducci  
Bari, Italy

<http://www.wemcouncil.org/>

