



# “Global Investment in Renewable Energy”

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**Michael Eckhart**

Managing Director

Global Head of Environmental Finance

Corporate & Investment Banking

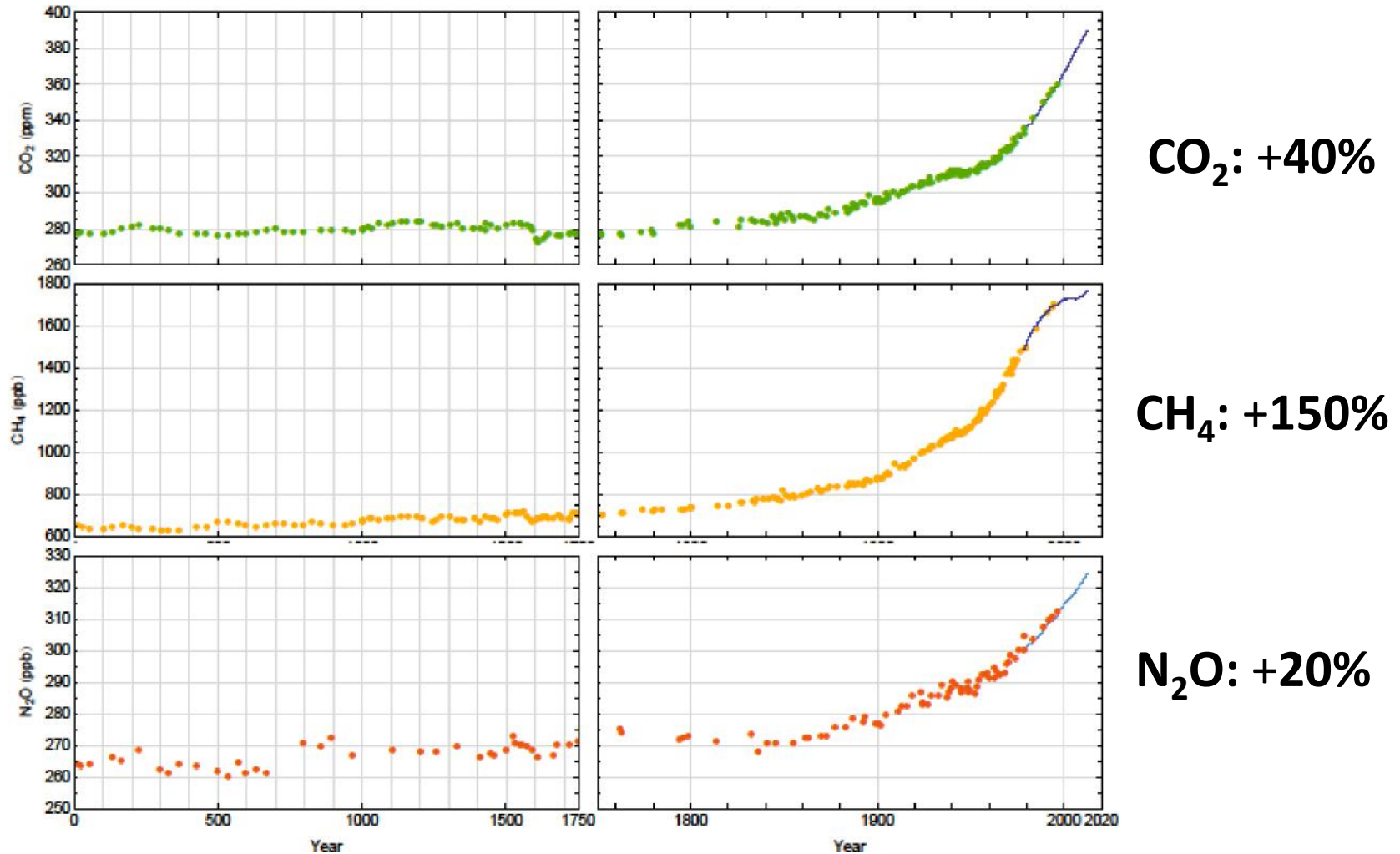
Citigroup Capital Markets, Inc.

[michael.eckhart@citi.com](mailto:michael.eckhart@citi.com)

# PERSPECTIVE

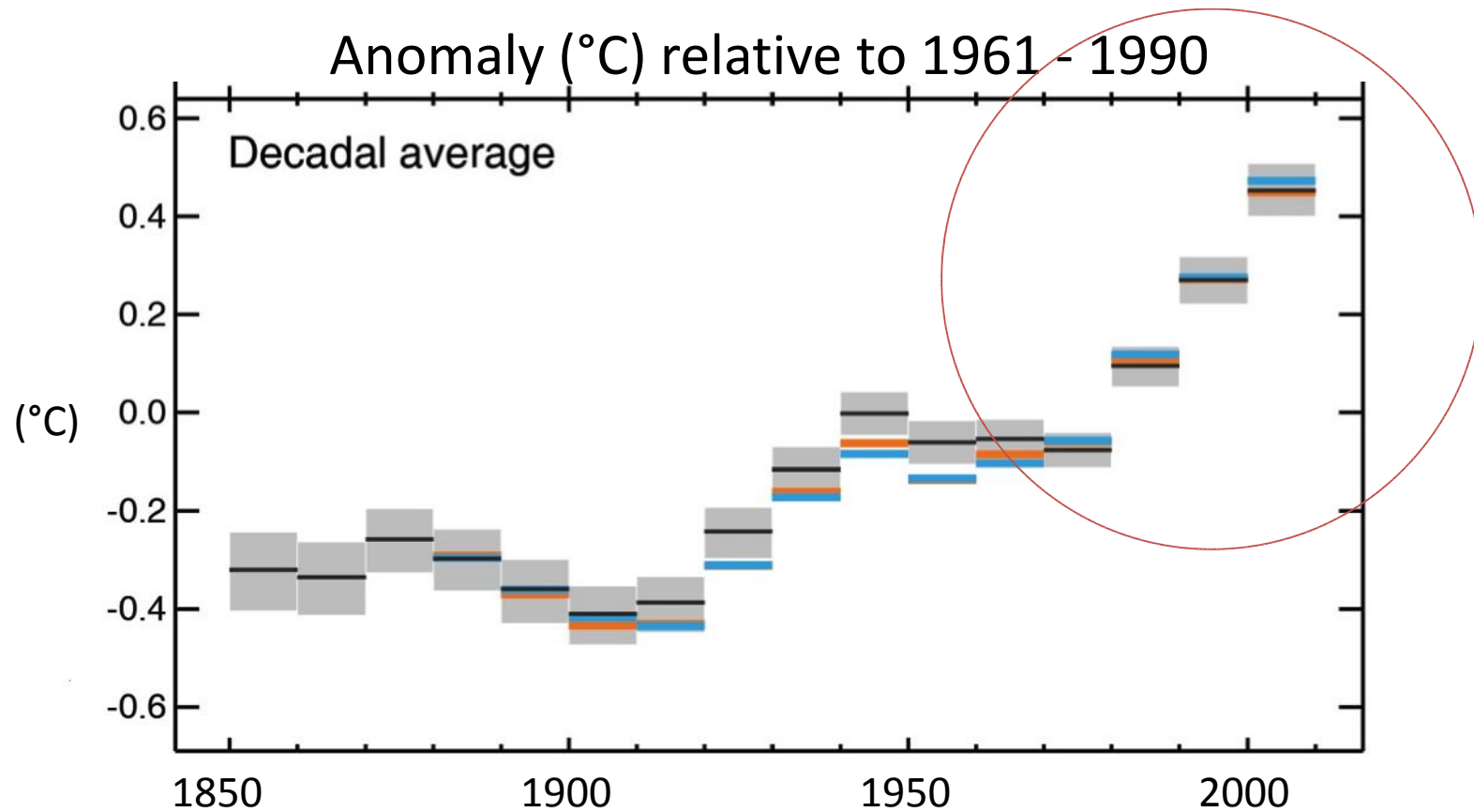


# IPCC 5<sup>th</sup> Report: Atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have all increased since 1750, and especially since mid-1900s



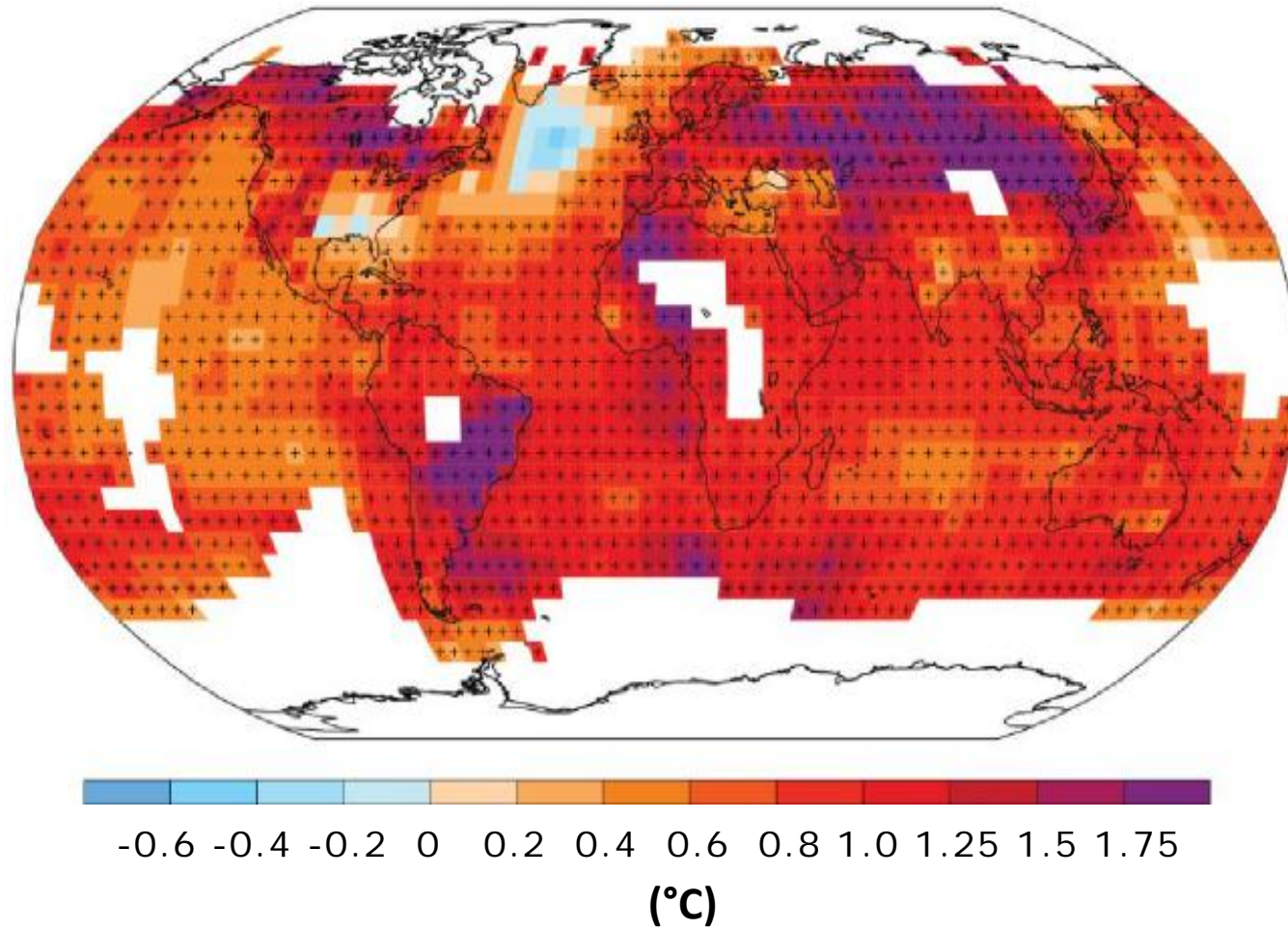
Source: IPCC AR5 Working Group 1: Climate Change 2013: The Physical Science Basis

**Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850**



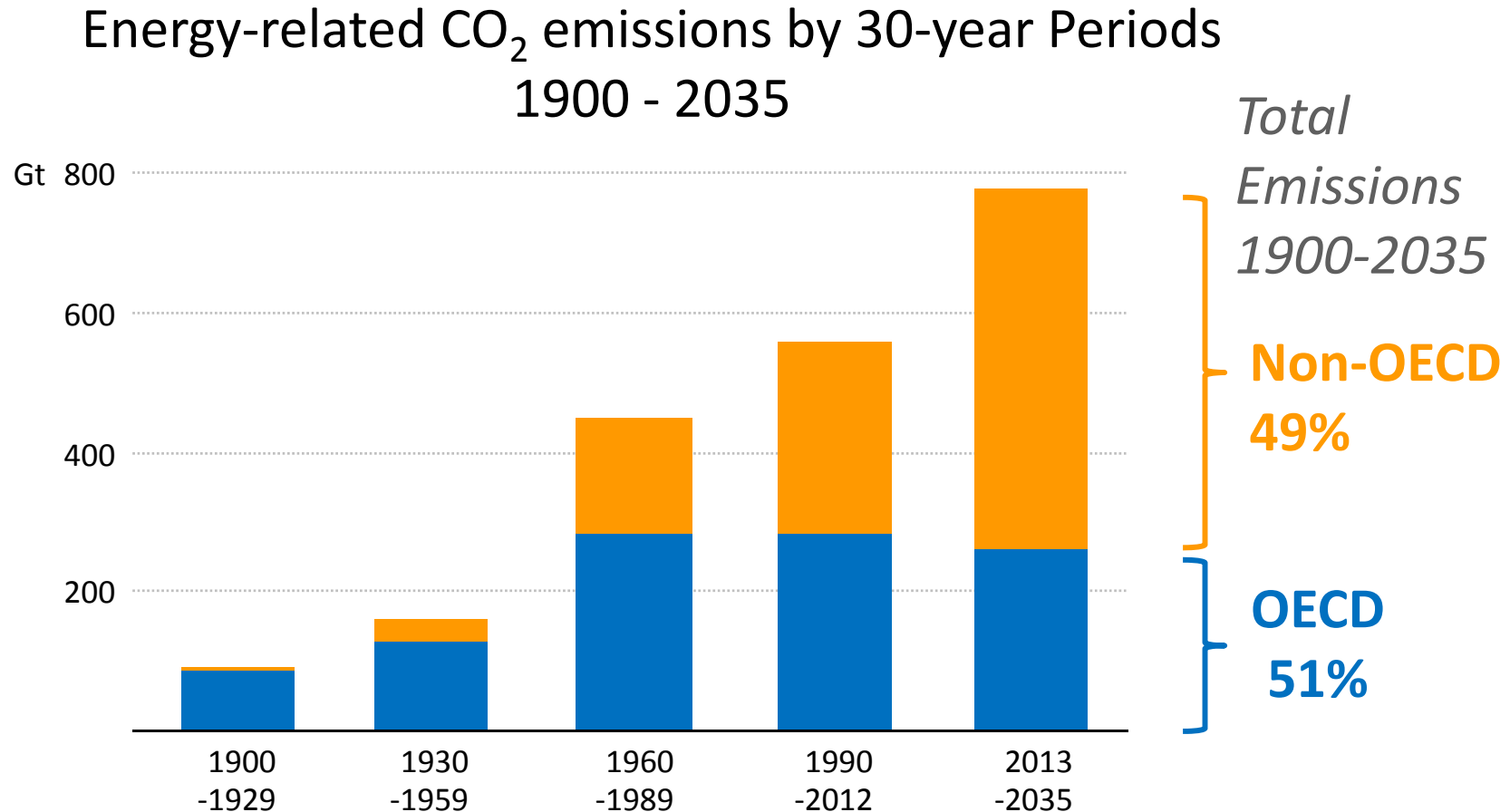
In the Northern Hemisphere, 1983–2012 was *likely* the warmest 30-year period of the last 1400 years (*medium confidence*).

**Warming of the global climate is now unequivocal, and to a level of 90% certainty, it is due to human activity.**



Source: IPCC AR5 Working Group 1: Climate Change 2013: The Physical Science Basis

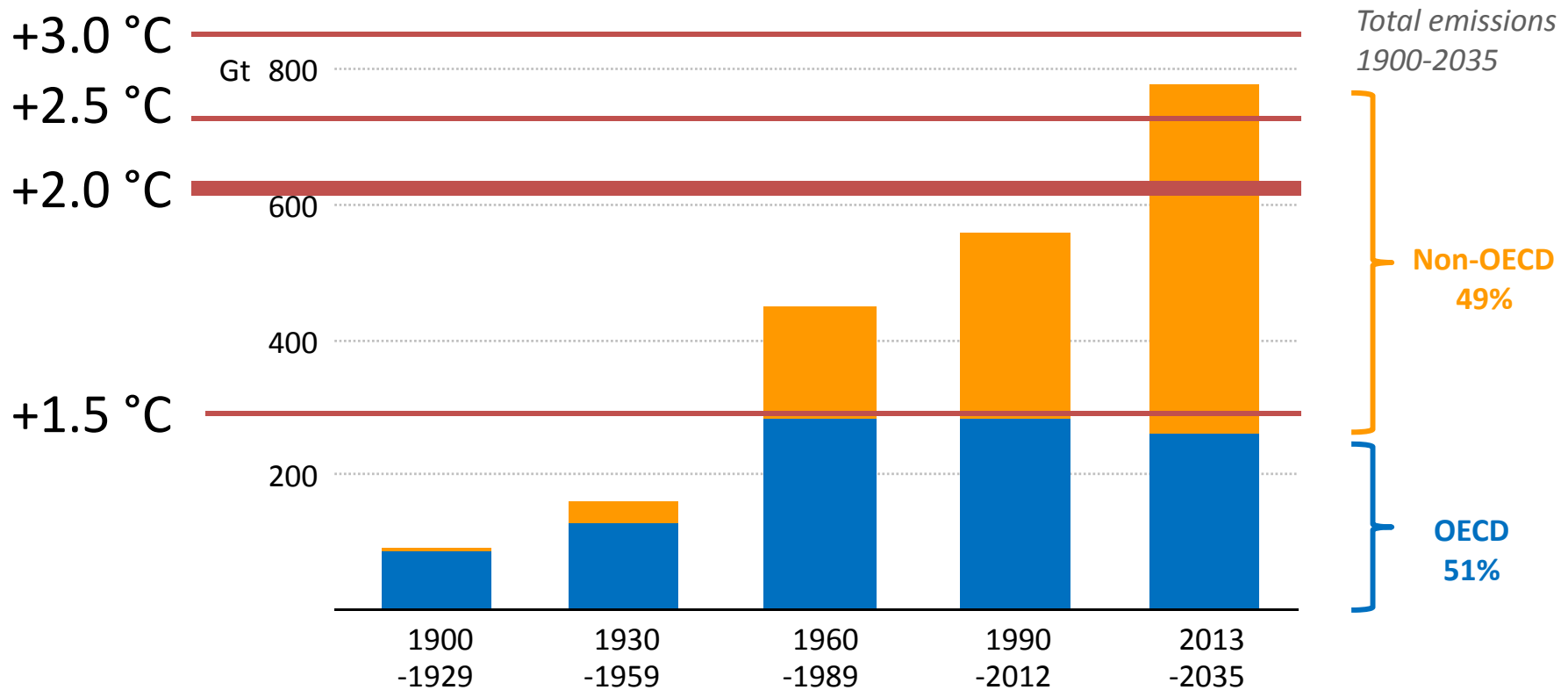
# Cumulative CO2 emissions to reach 800 Gt by 2035, split evenly by OECD and non-OECD...



Source: World Energy Outlook, 2013, IEA

# Projections for 2035 Exceed the “Carbon Budget” for 2.0 °C Suggesting Higher Temperature Increases

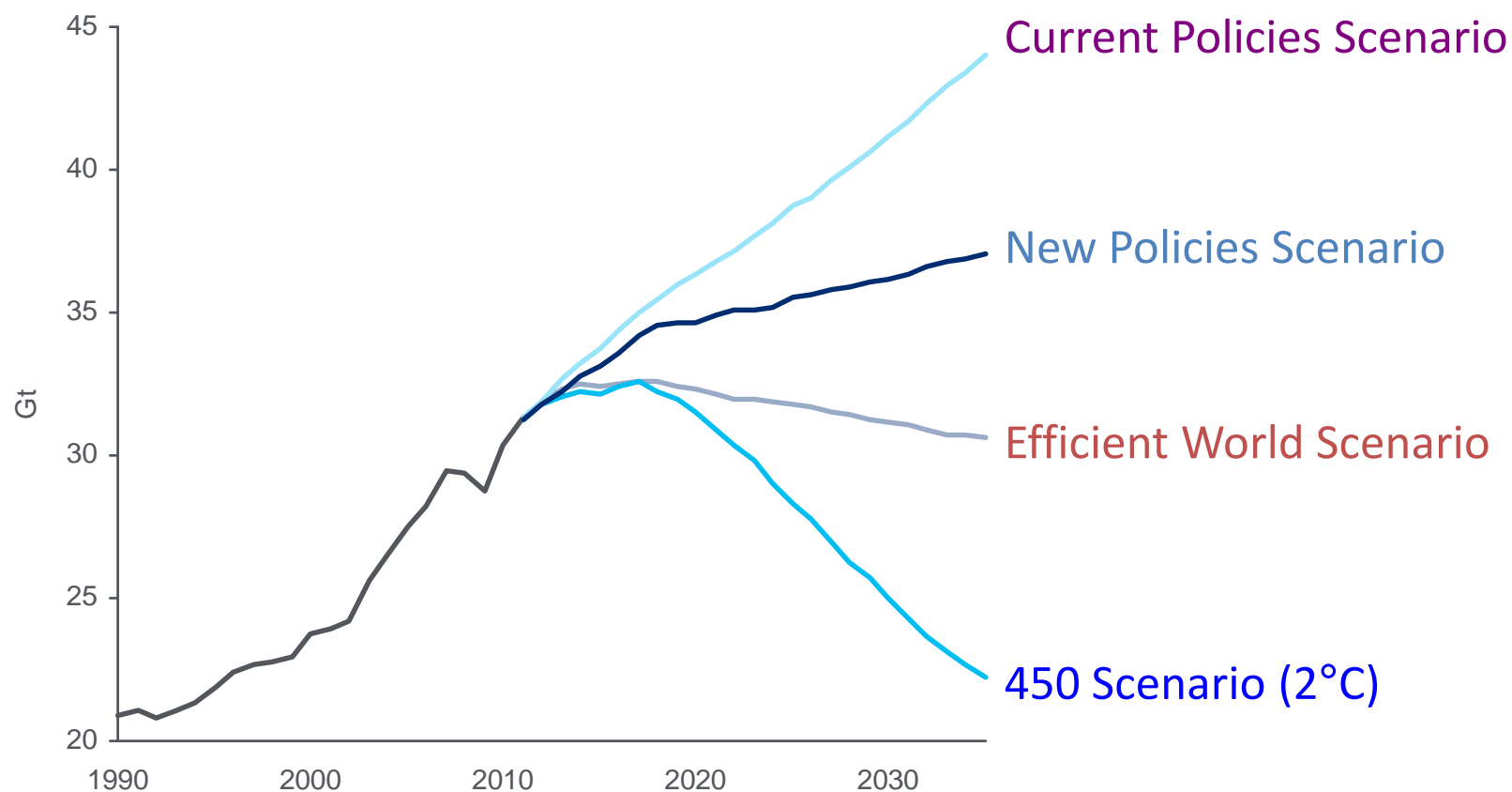
## Cumulative energy-related CO<sub>2</sub> emissions



Source: “Unburnable Carbon 2013”, Carbon Tracker

# The World is Preparing to Act...

## IEA's Global Energy-Related CO<sub>2</sub> Emissions by Scenario



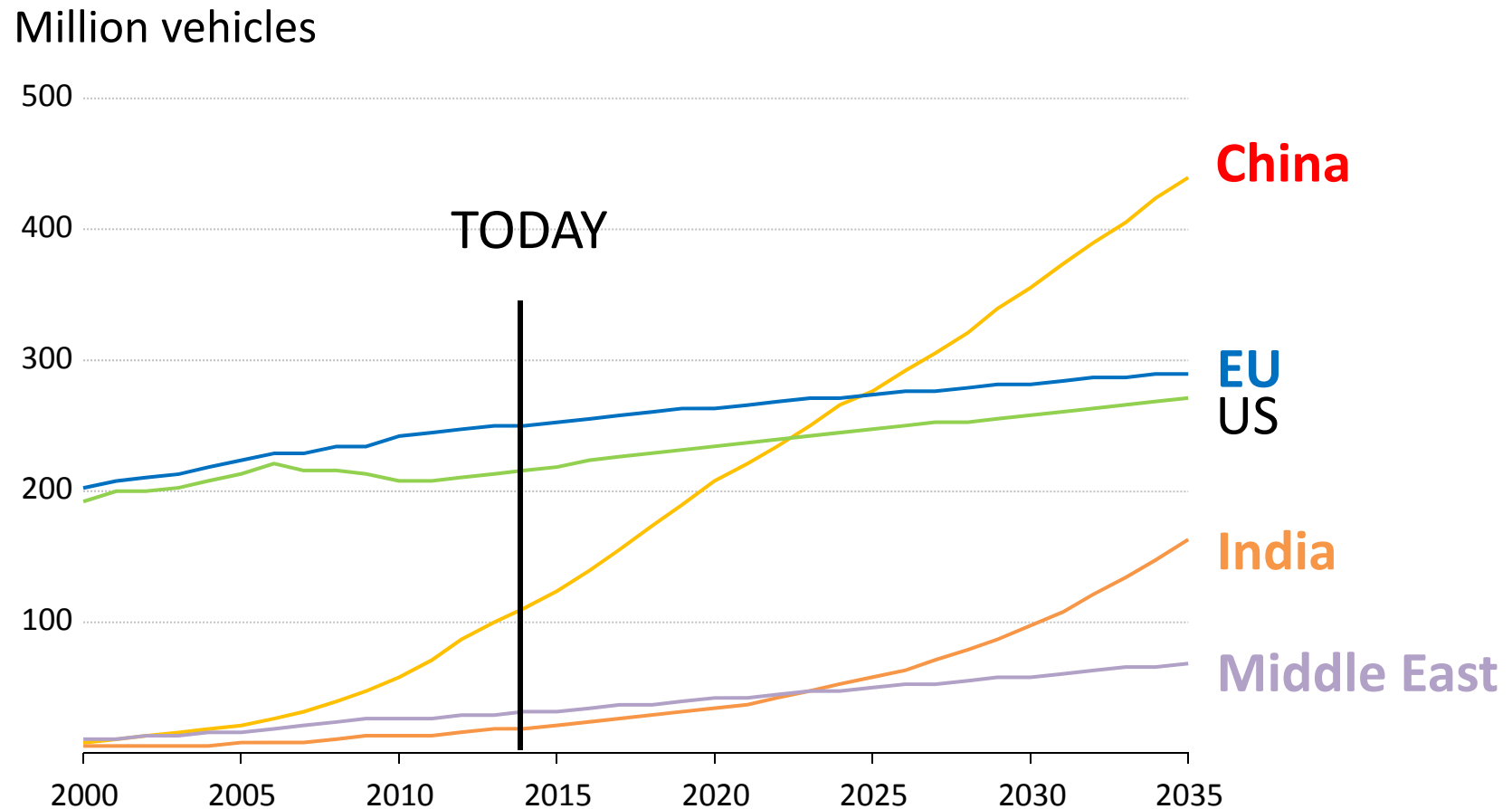
Source: International Energy Agency World Energy Outlook 2012.

(1) Other includes concentrated solar power, geothermal, marine energy, small hydro and wind offshore.



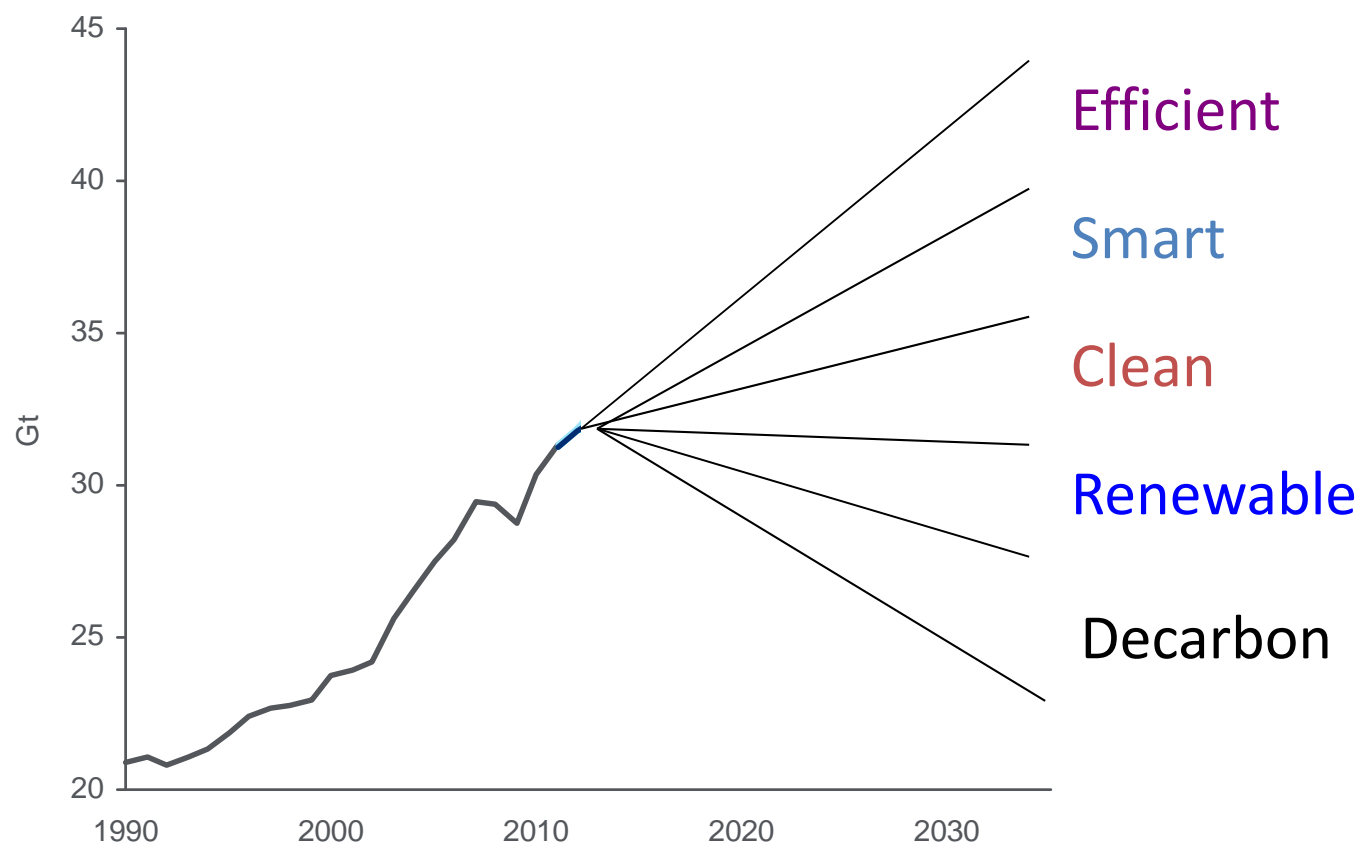
# But the World Faces Growth in Energy Demand and Associated Emissions ... a True Dilemma

For Example: Light-duty vehicle fleet growth by region



# Business Opportunities from Climate Policy

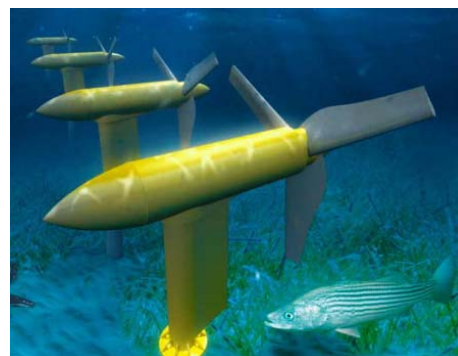
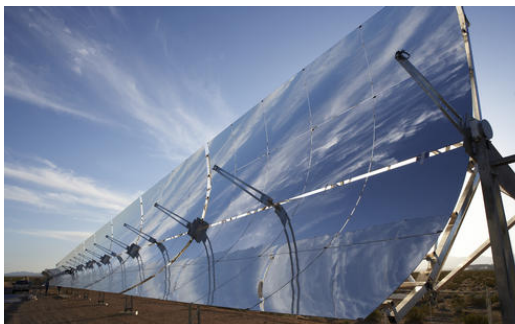
Five key words will guide energy in the next several decades...



Source: International Energy Agency World Energy Outlook 2012.

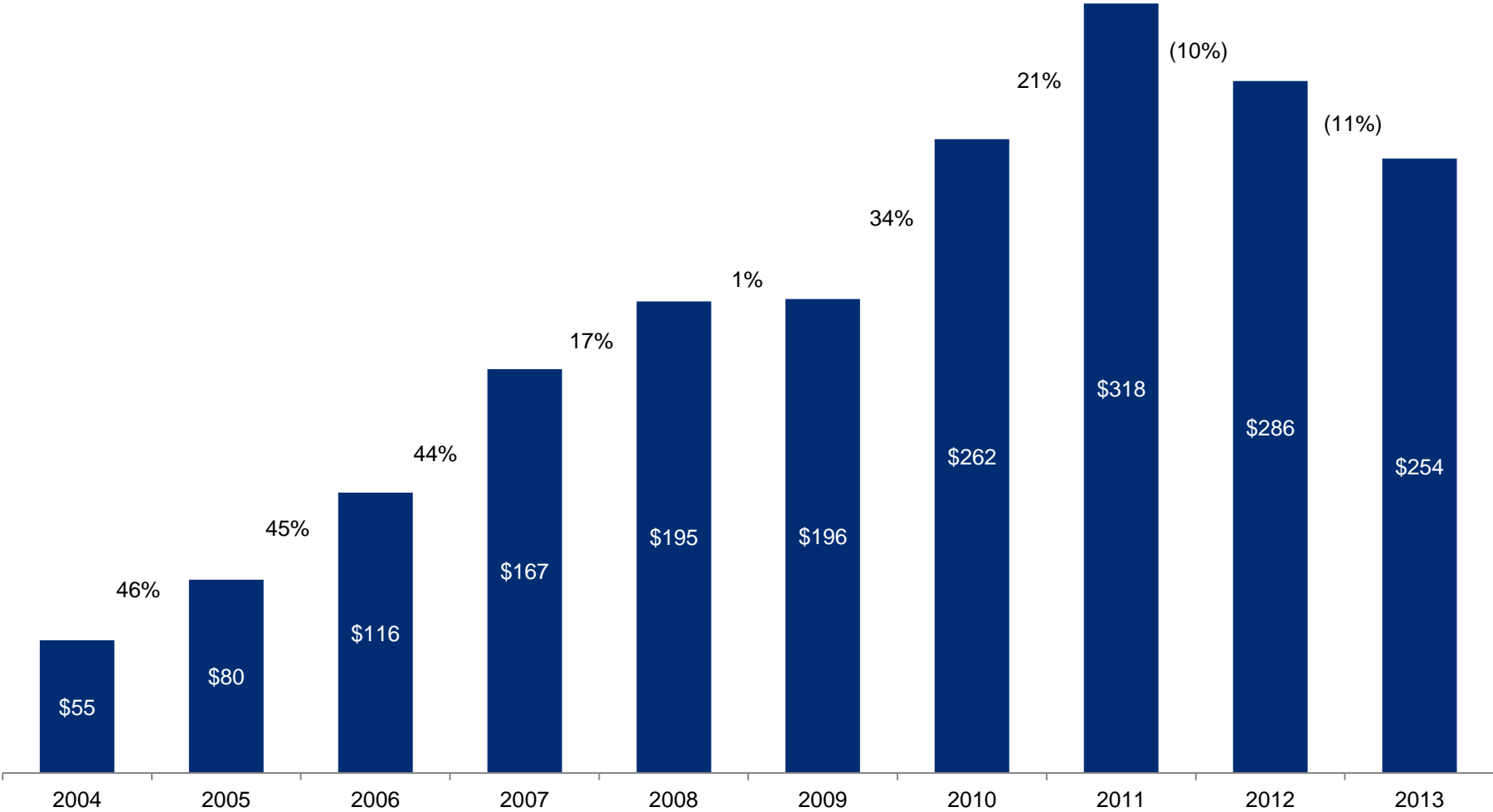
(1) Other includes concentrated solar power, geothermal, marine energy, small hydro and wind offshore.

# 40 YEARS INTO A 100-YEAR TRANSITION TO CLEAN ENERGY



# New Investment in Clean Energy

(\$ in billions)



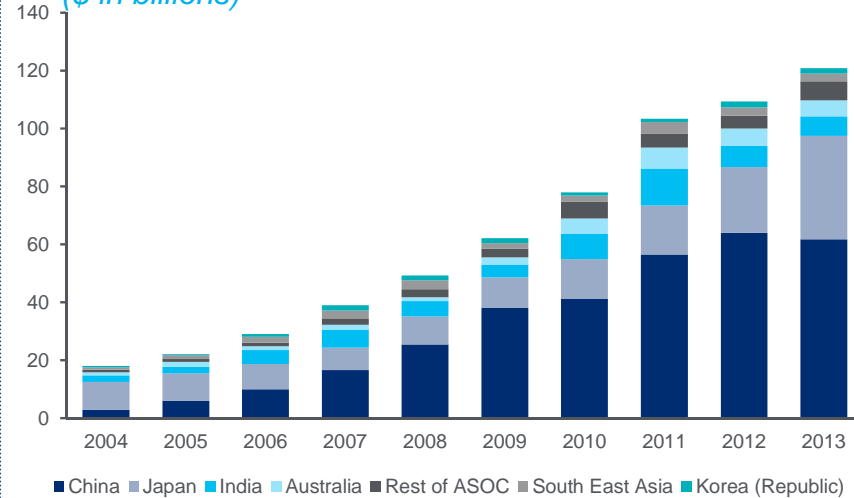
Source: BNEF.  
Note: Total values include estimates for undisclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects.

# New Investment in Clean Energy by Region

- AMER region declined by 8%
- China adding PV to wind
- Japan increased 56%
- EMEA fell 36% due to policy
- ME and Africa emerging

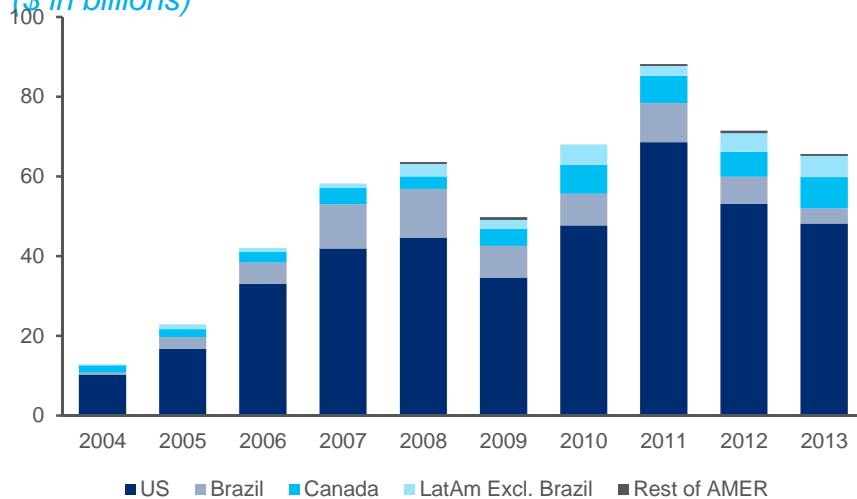
## ASOC Region

(\$ in billions)



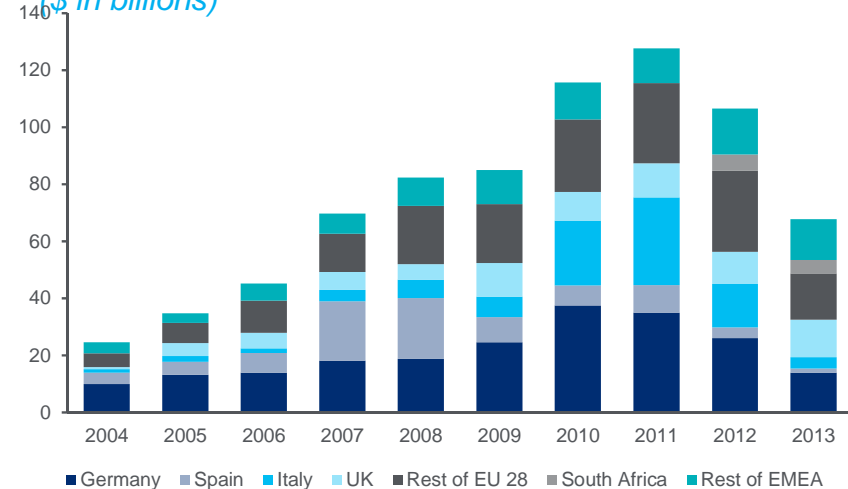
## AMER Region

(\$ in billions)



## EMEA Region

(\$ in billions)

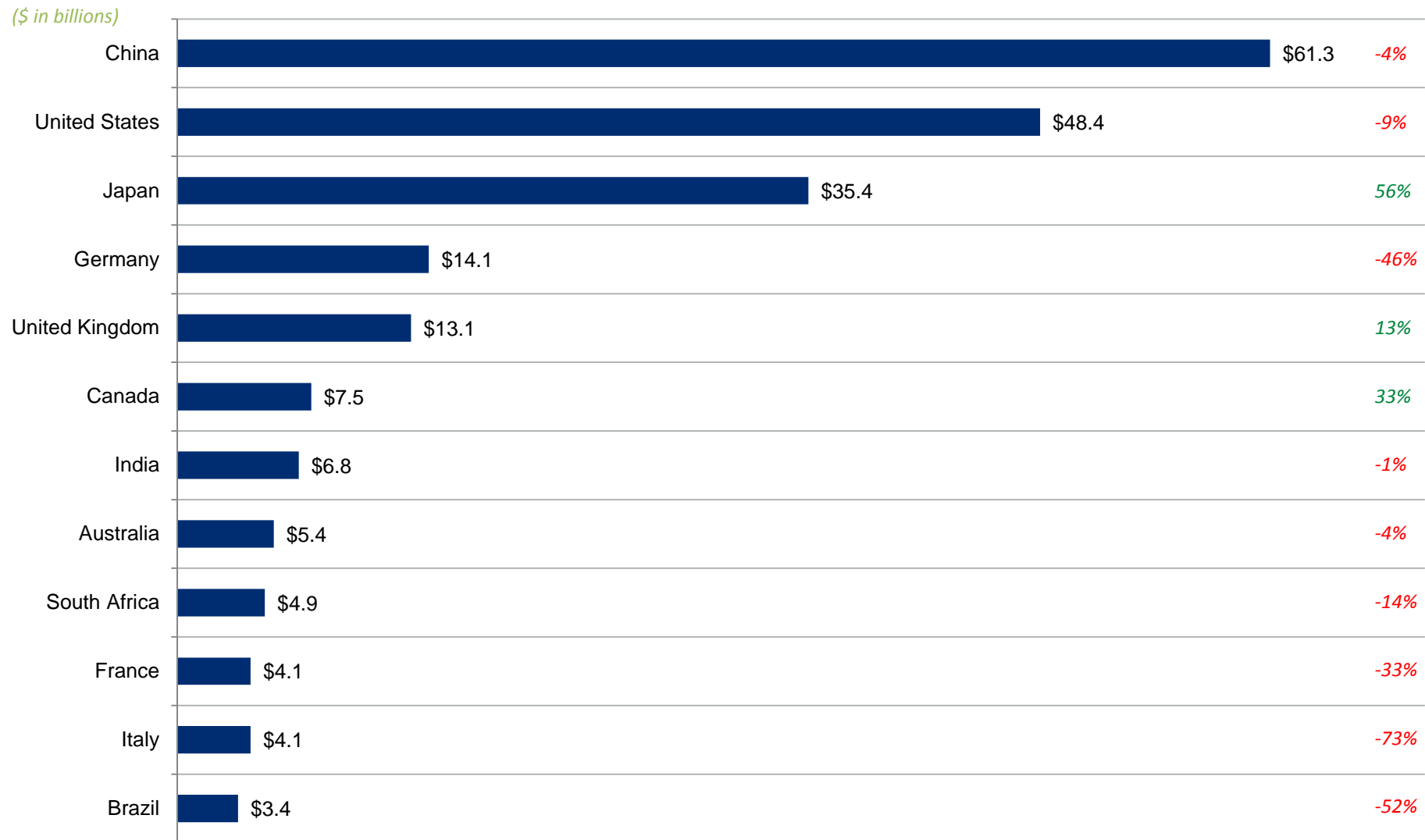


Source: BNEF.

Note: Total values include estimates for undisclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects (not reported in quarterly statistics).

# Top Countries: New Investment in Clean Energy

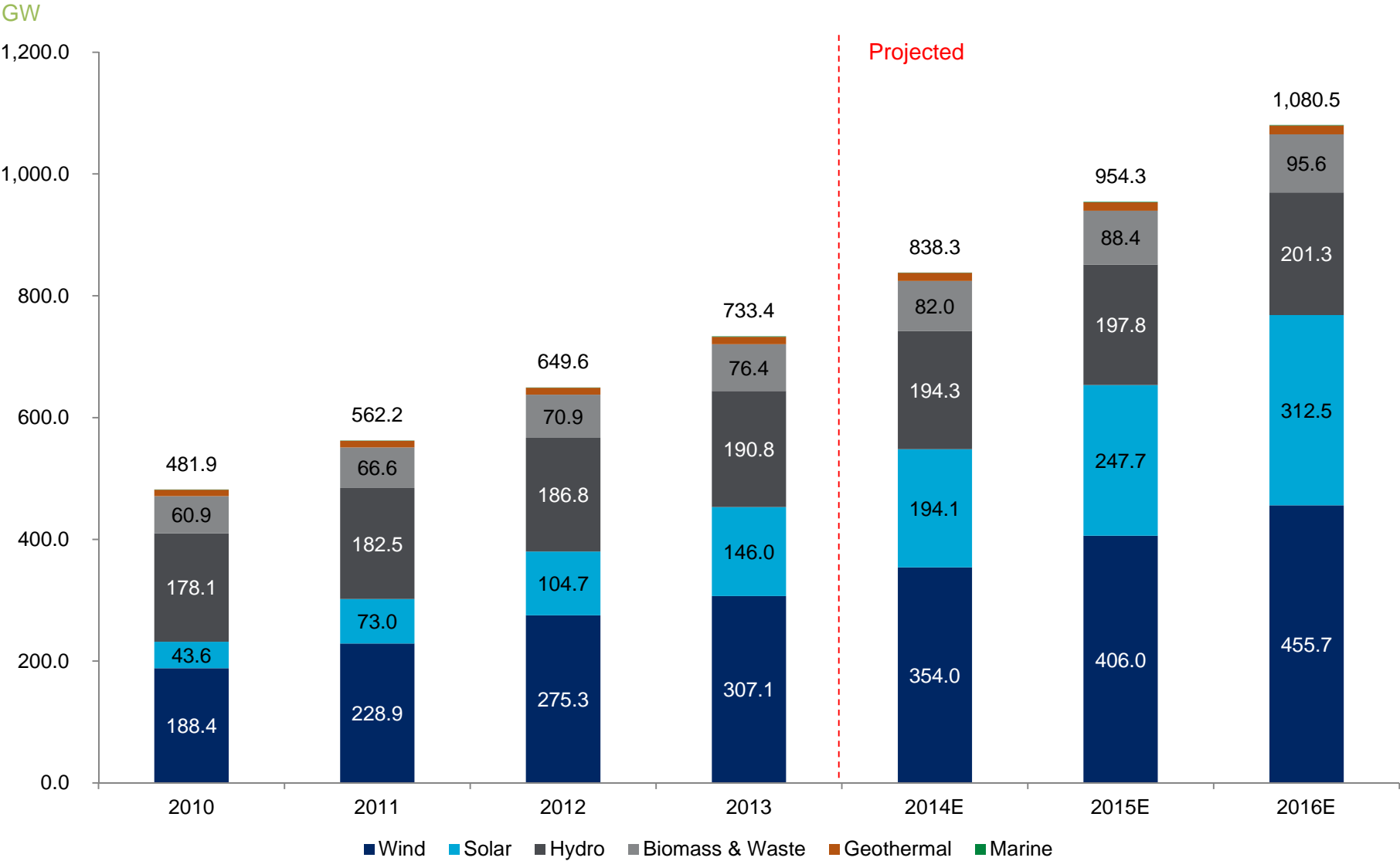
China and US continued to dominate clean energy investments, as activity in Germany, Italy and Brazil declined



Source: BNEF.

Note: Total values include estimates for undisclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects (not reported in quarterly statistics).

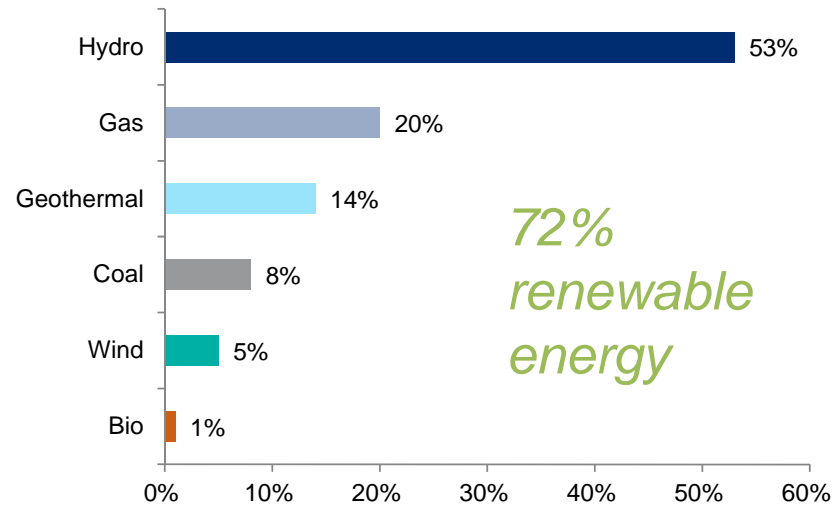
# Historical and Projected Renewable Generation Growth



Source: BNEF.

# New Zealand

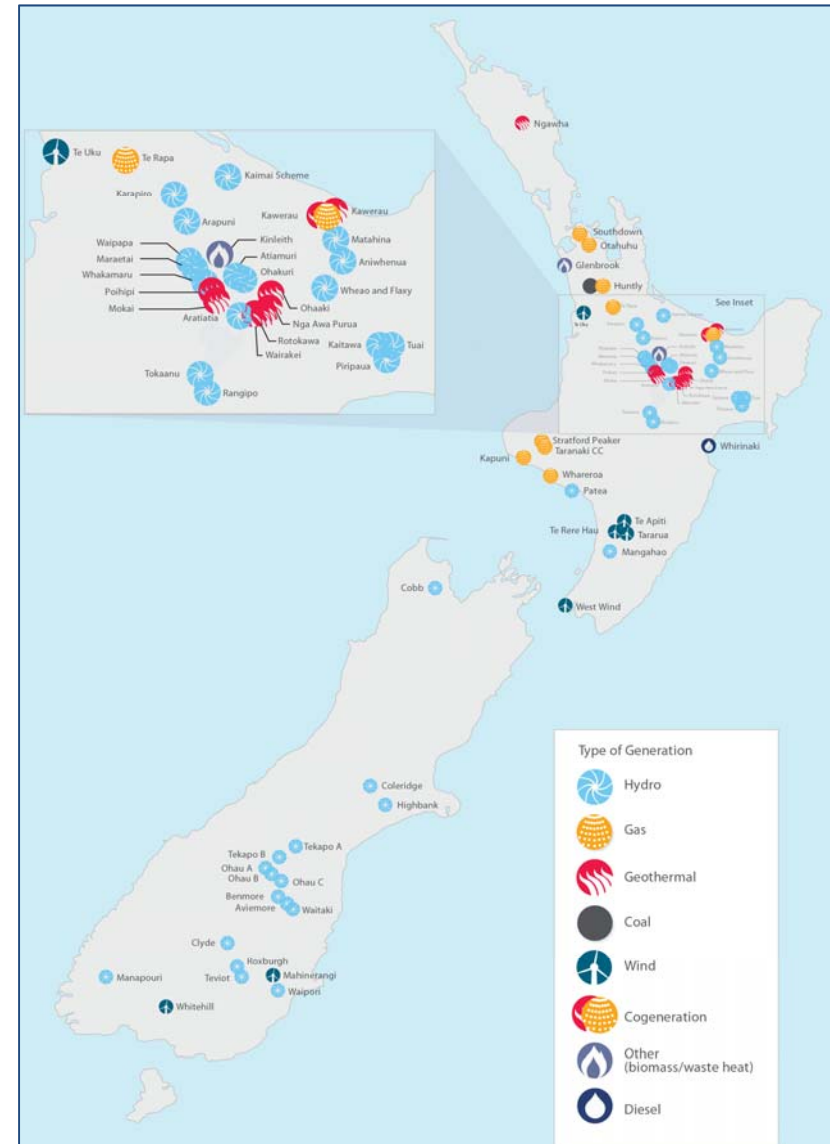
## Electricity Generation by Fuel Type



### Key Policies:

- New Zealand Energy Strategy (NZES)
- National Policy Statement for Renewable Electricity Generation (NPS REG)
- Emissions Trading Scheme (ETS)

## Electricity Generating Assets





# A GOOD REASON TO SUCCEED





Thank You

Michael Eckhart

Managing Director

Global Head of Environmental Finance

Corporate & Investment Banking

Citigroup Capital Markets, Inc.

[michael.eckhart@citi.com](mailto:michael.eckhart@citi.com)

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Citi works with its clients in greenhouse gas intensive industries to evaluate emerging risks from climate change and, where appropriate, to mitigate those risks.

efficiency, renewable energy and mitigation