



***Natural Gas Prospects in an Environment  
of Lower Fossil Fuel Use (Impacts of COP  
21 in Gas sector)***  
***Suzana Kahn***

# ***COP 21- Background***

*Conference of Parties - UNFCCC*

- COP 3 – Kyoto ( 1997)
- COP 15 – Copenhagen ( 2009 )
- COP 21 – Paris (2015)

# ***COP 21- Background***

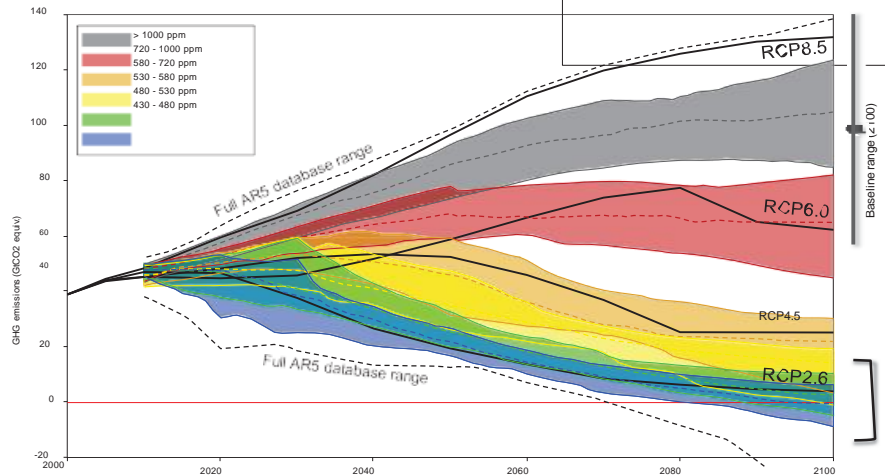
*Intergovernmental Panel on Climate Change – IPCC*

- FAR (1990)
- SAR (1995)
- TAR (2001)
- AR4 (2007)
- AR5 (2014)

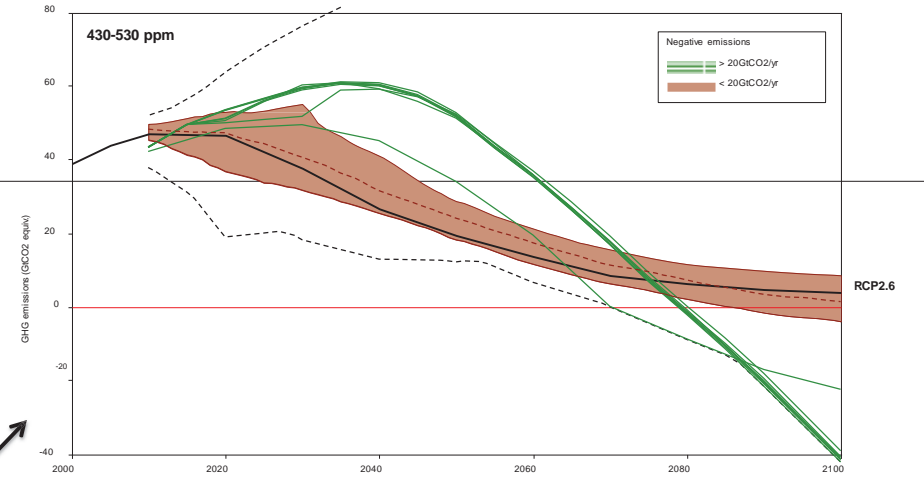
# What Science Says

## AR5

All scenarios in the AR5 database



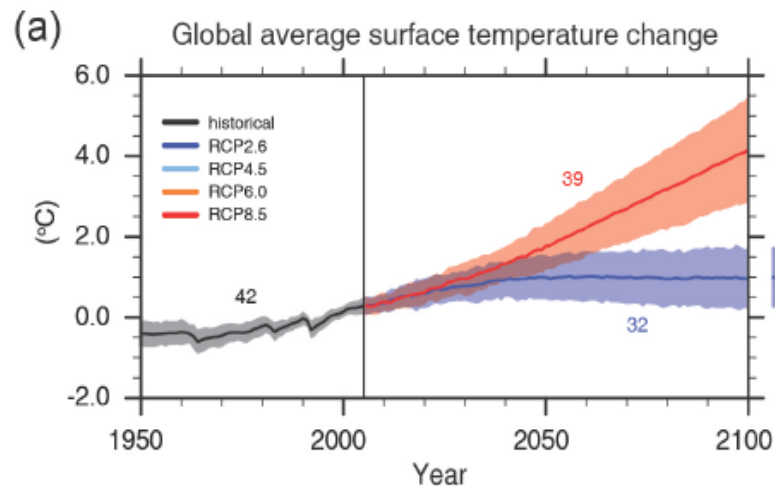
Scenarios reaching 430-530 ppm CO<sub>2</sub>-e by 2100 with and without large-scale deployment of CDR



# What Science Says

## AR5

Variable	Scenario	2046–2065		2081–2100	
		mean	likely range <sup>c</sup>	mean	likely range <sup>c</sup>
Global Mean Surface Temperature Change (°C) <sup>a</sup>	RCP2.6	1.0	0.4 to 1.6	1.0	0.3 to 1.7
	RCP4.5	1.4	0.9 to 2.0	1.8	1.1 to 2.6
	RCP6.0	1.3	0.8 to 1.8	2.2	1.4 to 3.1
	RCP8.5	2.0	1.4 to 2.6	3.7	2.6 to 4.8
		mean	likely range <sup>d</sup>	mean	likely range <sup>d</sup>
Global Mean Sea Level Rise (m) <sup>b</sup>	RCP2.6	0.24	0.17 to 0.31	0.40	0.26 to 0.54
	RCP4.5	0.26	0.19 to 0.33	0.47	0.32 to 0.62
	RCP6.0	0.25	0.18 to 0.32	0.47	0.33 to 0.62
	RCP8.5	0.29	0.22 to 0.37	0.62	0.45 to 0.81

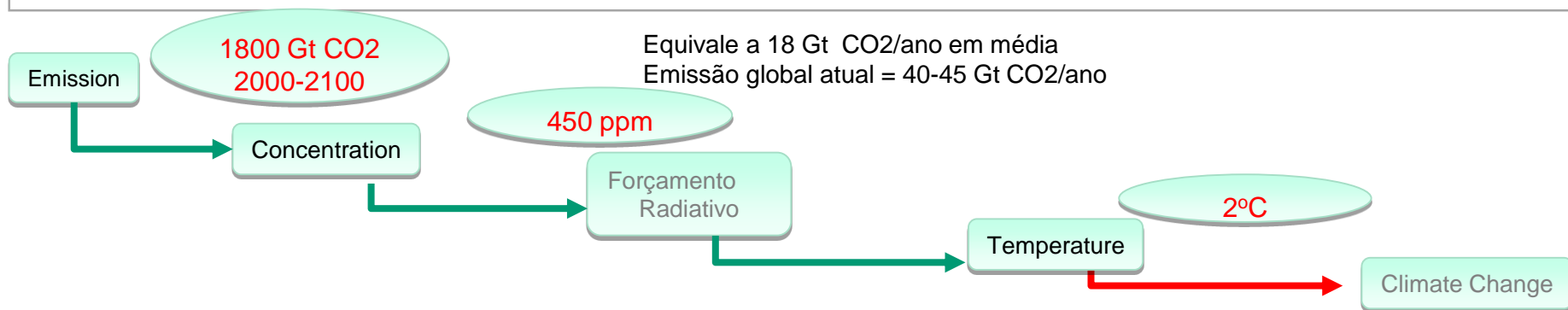


# What Science And Countries Say

## Long Term Vision : COP 15- COP21

Modelos sugerem que, para se estabilizar em 450 ppm de dióxido de carbono, seria necessário que as **emissões cumulativas de dióxido de carbono ao longo do século XXI fossem reduzidas de uma média de aproximadamente 2460 Gt CO2 para aproximadamente 1800 [1370 a 2200] Gt CO2.**

**IPCC, AR5** : Evidencia que nas ultimas décadas foram as emissões antropogenicas responsáveis pelo aumento da concentração de CO2



# What UNFCCC Says – COP21

## Paris Agreement

Parties aim to reach **global peaking of greenhouse gas emissions as soon as possible**, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to **achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century**, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.

**Developed country Parties** shall provide **financial resources** to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention.

As part of a global effort, **developed country Parties** should continue to take the **lead in mobilizing climate finance** from a wide variety of sources.

# *Signs of Paris Agreement*

- *Low carbon economy is inevitable;*
- *Carbon mitigation has social and economic value;*
- *Large financing support is needed*
- **Decarbonizing** (i.e. reducing the carbon intensity of) electricity generation is a key component of cost-effective mitigation strategies in achieving low stabilization levels (about 430 and 530 ppm CO<sub>2</sub>eq)



# Fossil Fuel in World Energy Supply

## Relevant Role

Figure 1. Estimated Renewable Energy Share of Global Final Energy Consumption, 2013

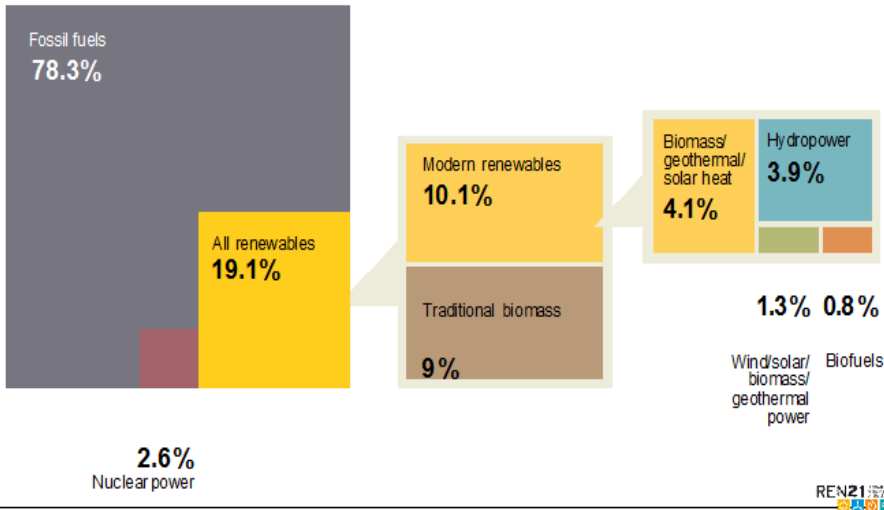
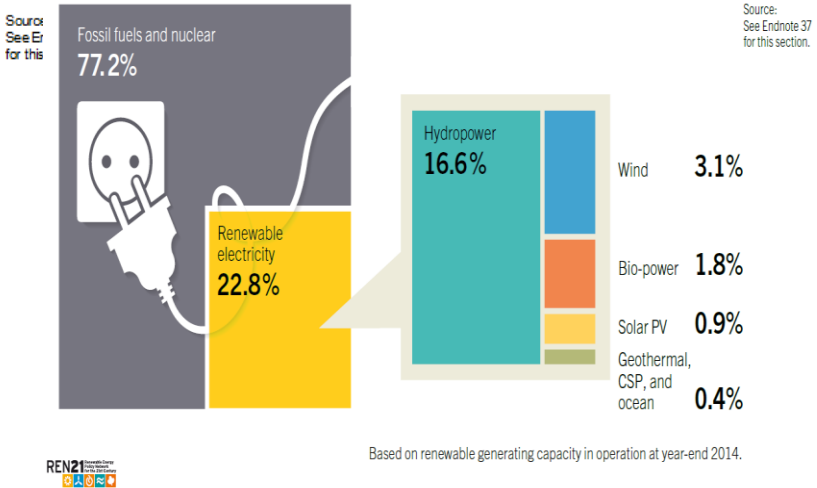


Figure 3. Estimated Renewable Energy Share of Global Electricity Production, End-2014

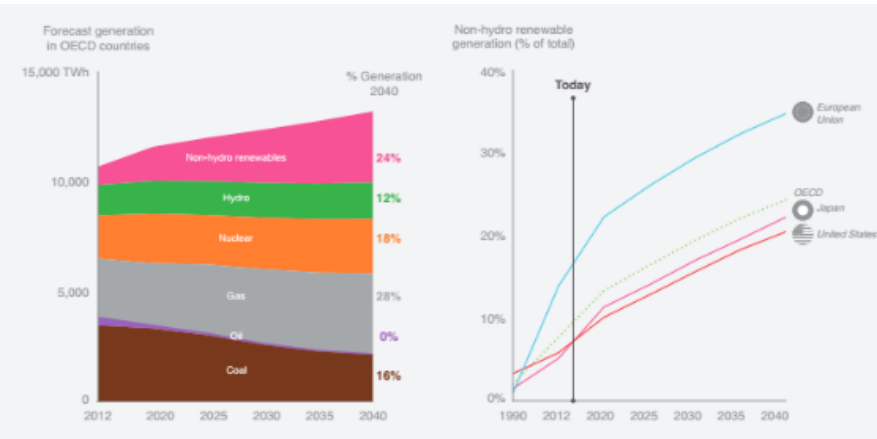


i- An estimated 1.2 billion people worldwide lack access to electricity, and 2.8 billion people rely on traditional biomass for cooking and heating. See United Nations Sustainable Energy for All (SE4ALL), "United Nations Decade of Sustainable Energy for All 2014-2024," <http://www.se4all.org/decade/>, viewed 10 April 2015.

ii - SE4ALL has three interlinked objectives: ensuring universal access to modern energy services, doubling the global rate of improvement in energy efficiency, and doubling the share of renewable energy in the global energy mix. See SE4ALL, "Our Objectives," <http://www.se4all.org/our-vision/our-objectives/>, viewed 10 April 2015.

# Natural Gas Role

## Transition Effort

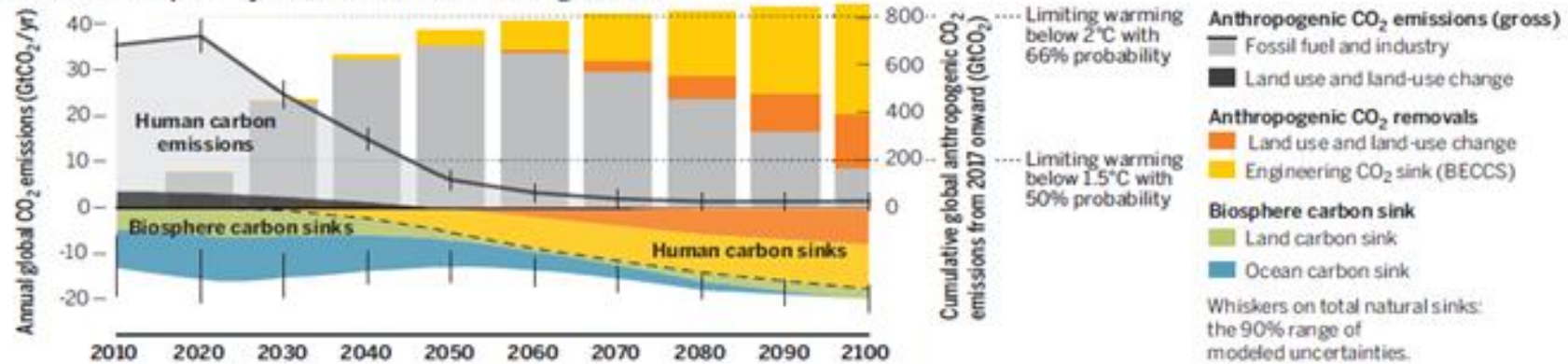


The electricity sector is undergoing an unprecedented transition. Renewable Technologies combined with natural gas have offered the opportunity to simultaneously decarbonize the electricity sector

# Natural Gas Role

## A global carbon law and roadmap to make Paris goals a reality

Decarbonization pathway consistent with the Paris agreement



# ***Natural Gas Role***

## ***Decarbonizing Effort***

- The importance of reducing energy-related CO2 emissions and achieving the goal of limiting climate change is at the heart of energy transition ;
- Fossil fuels will continue to play a role in the energy transition with natural gas being a “ bridge” to greater use of renewables;

# ***Word Decarbonizing Effort***

## ***Accomplishment Paris Agreement***

- Carbon emissions need to fall to zero by 2060 in order to stay around the 2 degree target. A significant effort will be required including the use of costly technologies to remove carbon from the atmosphere, such as CCS and also negative emission such as BioCCS.
- Land use emissions have to be below zero
- Disruptive Technologies and innovation efforts will need to be complemented by new market designs, new policies and by new financing and business models.

# Natural Gas End Use Market

Systemic Risks	Technology Adoption
Transport	<ul style="list-style-type: none"><li>• EV penetration in transport</li><li>• Biofuels penetration in transport</li><li>• Natural gas transport in heavy freight and marine</li></ul>
Industry and Power	<ul style="list-style-type: none"><li>• Natural gas penetration in power and industry</li><li>• Concentrated Solar, PV and storage solutions</li><li>• Electrification of processes and heating</li></ul>
Commercial and Residential	<ul style="list-style-type: none"><li>• Connected homes, offices and commercial spaces that are more energy efficient</li><li>• Distributed energy systems</li><li>• Electrification of heating and cooking</li></ul>
Non-energy use	<ul style="list-style-type: none"><li>• Natural gas as a chemical feedstock</li></ul>