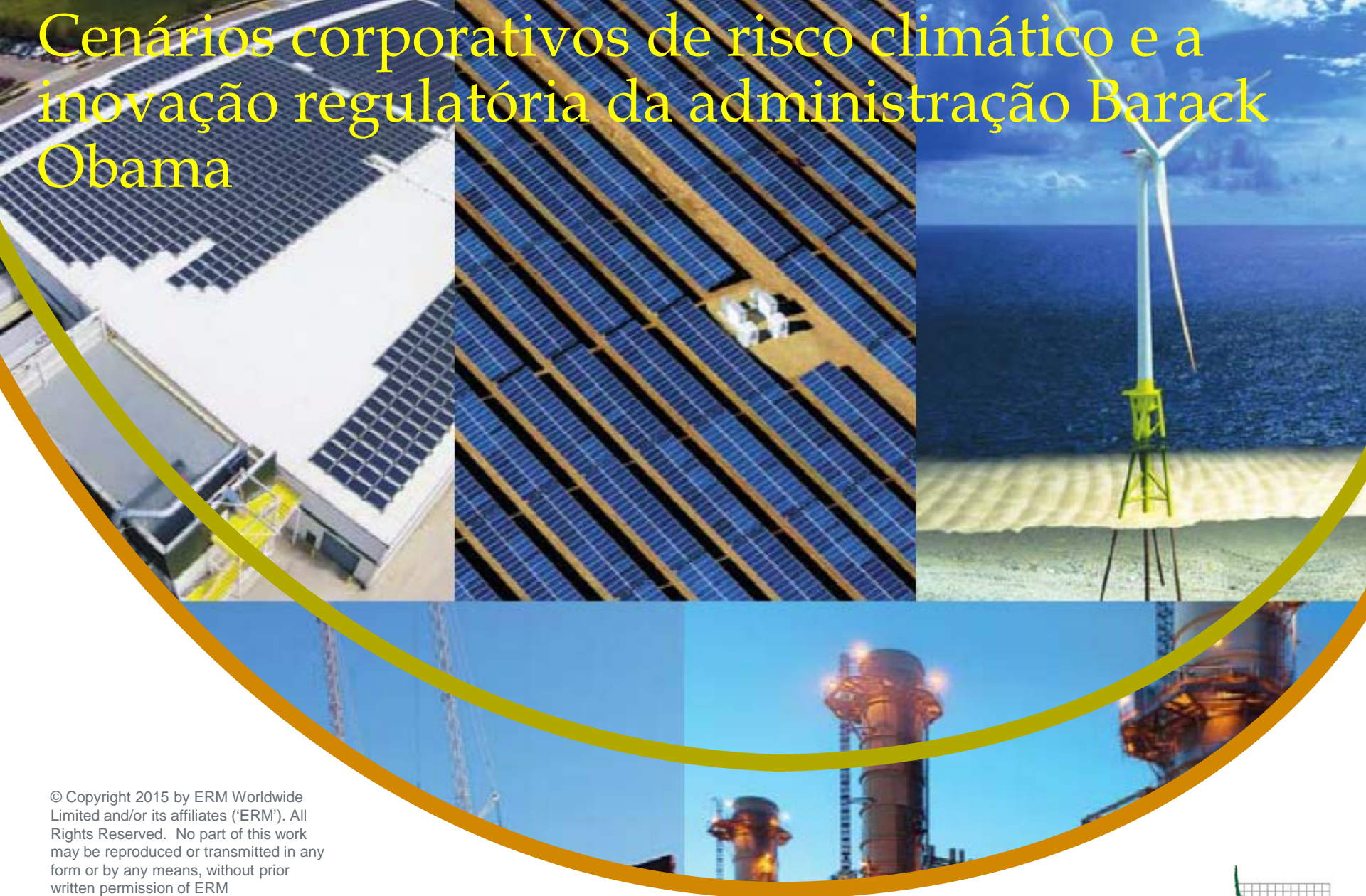


# Cenários corporativos de risco climático e a inovação regulatória da administração Barack Obama



© Copyright 2015 by ERM Worldwide Limited and/or its affiliates ('ERM'). All Rights Reserved. No part of this work may be reproduced or transmitted in any form or by any means, without prior written permission of ERM

# ERM Team: overview



## **Braulio Pikman**– Partner, Washington, DC

- 30 years experience with energy efficiency and climate change
- Methodologies Panel of the CDM Executive Board, UNFCCC
- Expert Group on Fugitive Emissions in the Oil and Gas Sector, IPCC
- Member of the ERM's Sustainability Council



## **Recent Activities:**

Permitting the Nicaragua Canal – Climate Change impacts; mitigation and adaptation

Support in the Preparation of the INDC for Costa Rica

Permitting of a Gas Pipeline in U.S. – Climate Change impacts; mitigation and adaptation

Energy Efficiency in cities with the World Bank

Marginal Abatement Cost Curves with the World Bank

Dow and the Olympics in Rio – Offsetting GHG emissions

Use of Biomass residues from U.S. to produce power and heat in the European Union

# Agenda

---

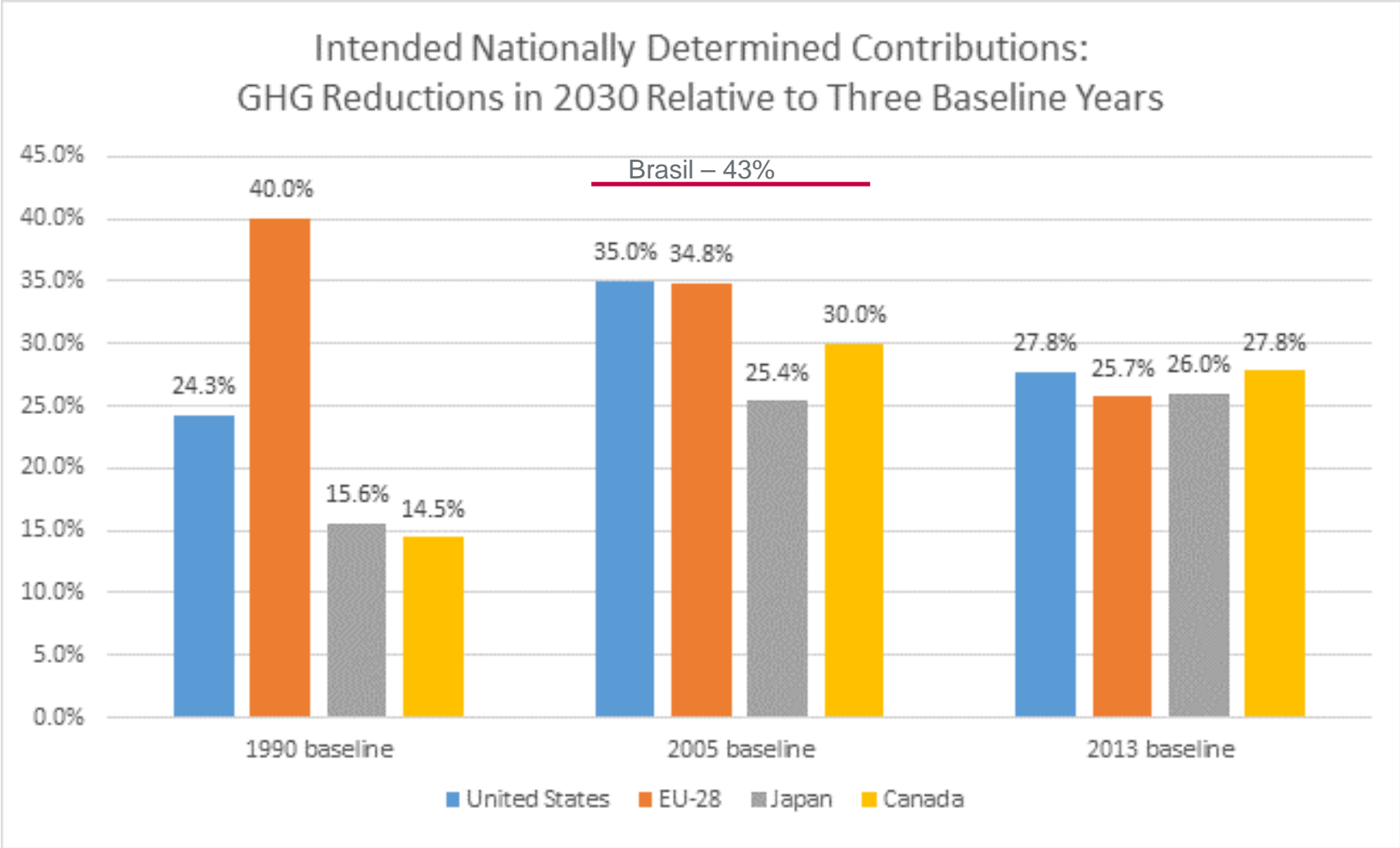
1. The upcoming Conference of the Parties and the U.S. INDC proposal
2. U.S. Economy, Shale Gas and the “Power House in the Americas” – Cheap Energy driving the growth.
3. The environmental regulatory framework as a piece of the Industrial Policy (MRR, CEQ Guidelines e Clean Power Plan)

September 23, 2015



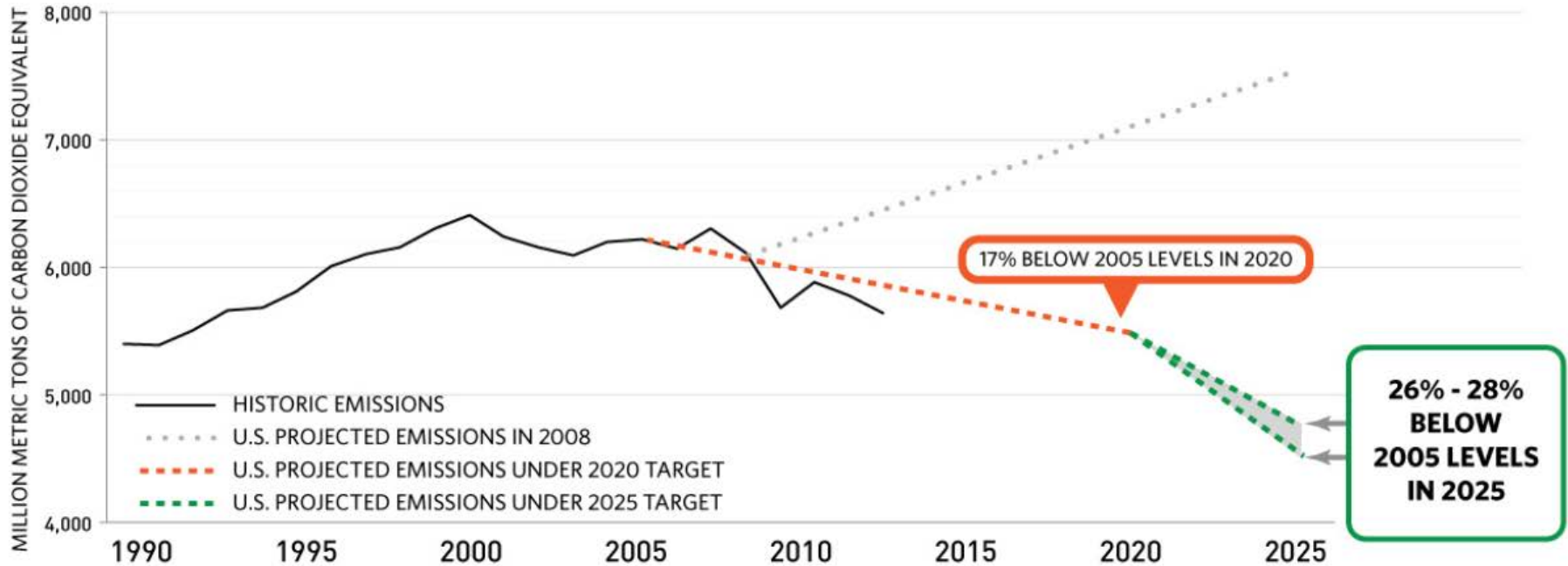
**Submissions to date: 48 ; Parties Represented: 76**

# Unconditional Pledges



# US INDC 2015

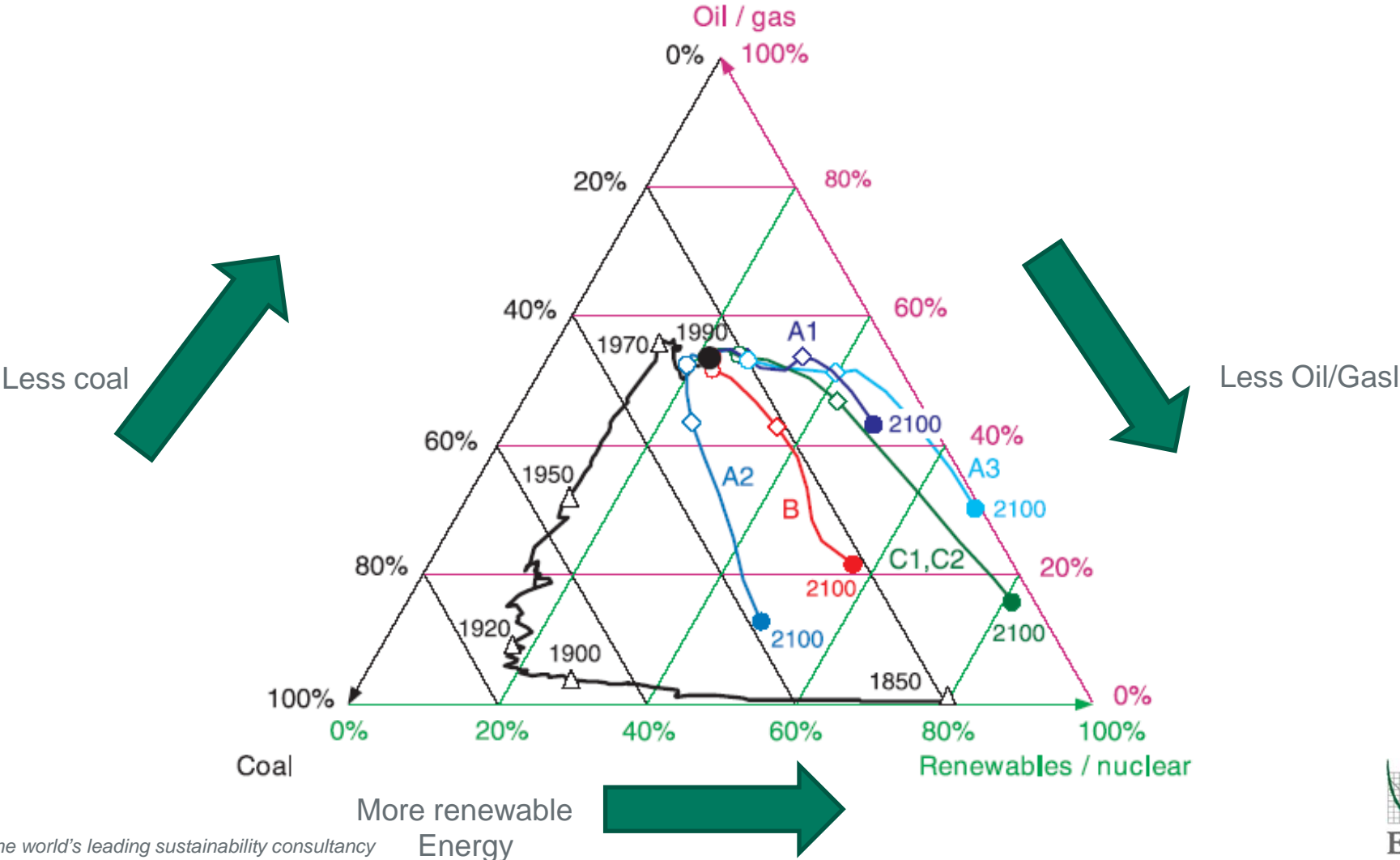
## U.S. EMISSIONS UNDER 2020 AND 2025 TARGETS



Source: US Cover Note INDC and Accompanying Information – [www.whitehouse.gov](http://www.whitehouse.gov)

# Emerging Market for Renewable Energy and Gas

Evolution of Primary Energy Structure, Shares of Oil and Gas, Coal and Non-Fossil Sources, in Percent, Historical development from 1850 to 1990 (triangles) and in scenarios to 2020 (open circles), 2050 (diamonds), and 2100 (closed circles).



# Why is the gas better than oil and both are better than coal?

Fuel	Carbon (% mass)	Hydrogen (%mass)	CO <sub>2</sub> emissions
Coal	93	5	96 kg CO <sub>2</sub> /GJ
Oil	88	8	75 kg CO <sub>2</sub> /GJ
Natural Gas	76	23	56 kg CO <sub>2</sub> /GJ
Biomass (dry)	48	4	110 kg CO <sub>2</sub> /GJ

**Lifecycle greenhouse gas emissions by electricity source.<sup>[1]</sup>**

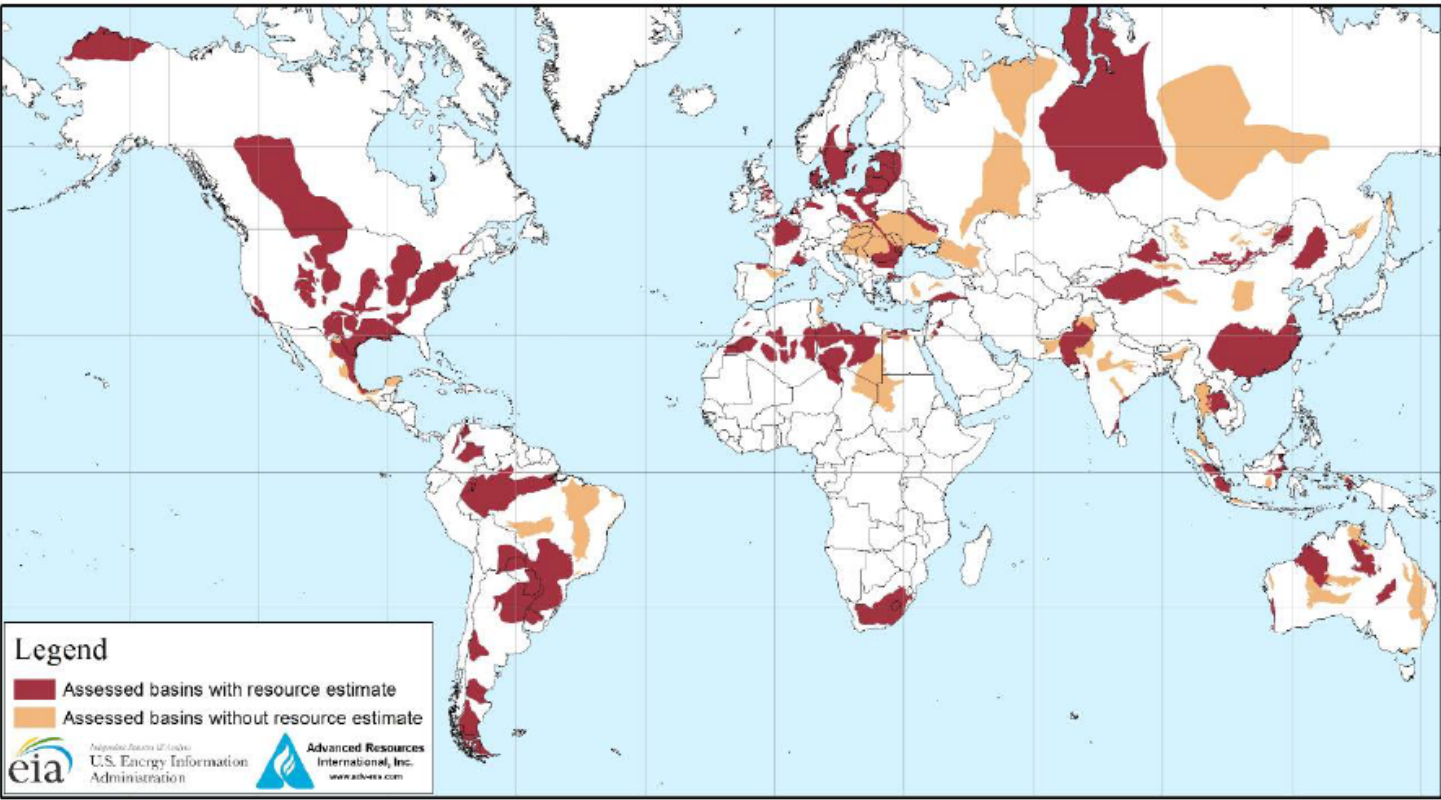
Technology ↕	Description	50th percentile (g CO <sub>2</sub> -eq/kWh <sub>e</sub> ) ↕
Hydroelectric	reservoir	4
Wind	onshore	12
Nuclear	various generation II reactor types	16
Biomass	various	18
Solar thermal	parabolic trough	22
Geothermal	hot dry rock	45
Solar PV	Polycrystalline silicon	46
Natural gas	various combined cycle turbines without scrubbing	469
Coal	various generator types without scrubbing	1001

1. <sup>^ a b</sup> Moomaw, W., P. Burgherr, G. Heath, M. Lenzen, J. Nyboer, A. Verbruggen, 2011: Annex II: Methodology. In IPCC: Special Report on Renewable Energy Sources and Climate Change Mitigation (ref. page 10) 



# Emerging Market for Gas as the transition fuel

Figure 1. Map of basins with assessed shale oil and shale gas formations, as of May 2013



Source: United States basins from U.S. Energy Information Administration and United States Geological Survey; other basins from ARI based on data from various published studies.

# Drivers/pressures for Climate Change Analysis in U.S.

## Emerging Market for Gas Industry

- Development of Shale gas reserves commercially in the US and globally which will replace coal/diesel in some markets
- Emerging technology for upgrading power plants and vehicles

## Environmental Impact

- Future impacts on assets (i.e. infrastructure)
- Potential for emission reductions from using Gas compared to coal/diesel

## Regulations

- Emerging regulations on quantification of GHG and Climate change impacts in infrastructure projects
- Increased focus on reduction of emissions from industries and end users

## Stakeholders

- Increased awareness of emissions and climate change impacts from energy production and use

# Building a regulation that helps to achieve the INDC goal

---

In June 2014, the US Supreme Court ruled greenhouse gases are air pollutant covered by the Clean Air Act

## 1. Regulatory Framework for monitoring GHG emissions

- EPA's Greenhouse Gas Reporting Program (GHGRP) tracks facility-level emissions from the largest sources of greenhouse gas emissions in the United States.

## 2. Regulatory Framework for limiting emissions from existing and new facilities

- EPA's Clean Power Plan and EPA's Carbon Pollution Standard

## 3. Regulatory Framework for permitting new projects

- Council on Environment Quality – Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts 2014

# CEQ and NEPA – Permitting new projects

## ■ CEQ and NEPA

- Draft Guidelines intended to explain and assist agencies in analyzing environmental effects of GHG emissions and Climate change when describing environmental effects of a proposed action in accordance with Section 102 of NEPA and CEQ Regulations for implementing the Procedural Provision of NEPA 40 C.F.R. parts 1500-1508 “
- NEPA Impact assessment shall “provide full and fair discussion of significant environmental impacts and shall inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts for enhance the quality of the human environment”. 40 CFR §1502.1
- NEPA requires Federal agencies to evaluate reasonably foreseeable and environmental impacts of their actions
- Includes discussion of
  - “Direct and indirect effects and cumulative impacts” 40 CFR § 1508.7
  - “Indirect effects include reasonably foreseeable future actions such as induced growth and its effects on air and water and other natural systems and cumulative impacts considering the incremental addition to other past, present, and reasonable foreseeable future actions” 40 CFR § 1508.8

NEPA – National Environmental Policy Act

# CEQ and NEPA

---

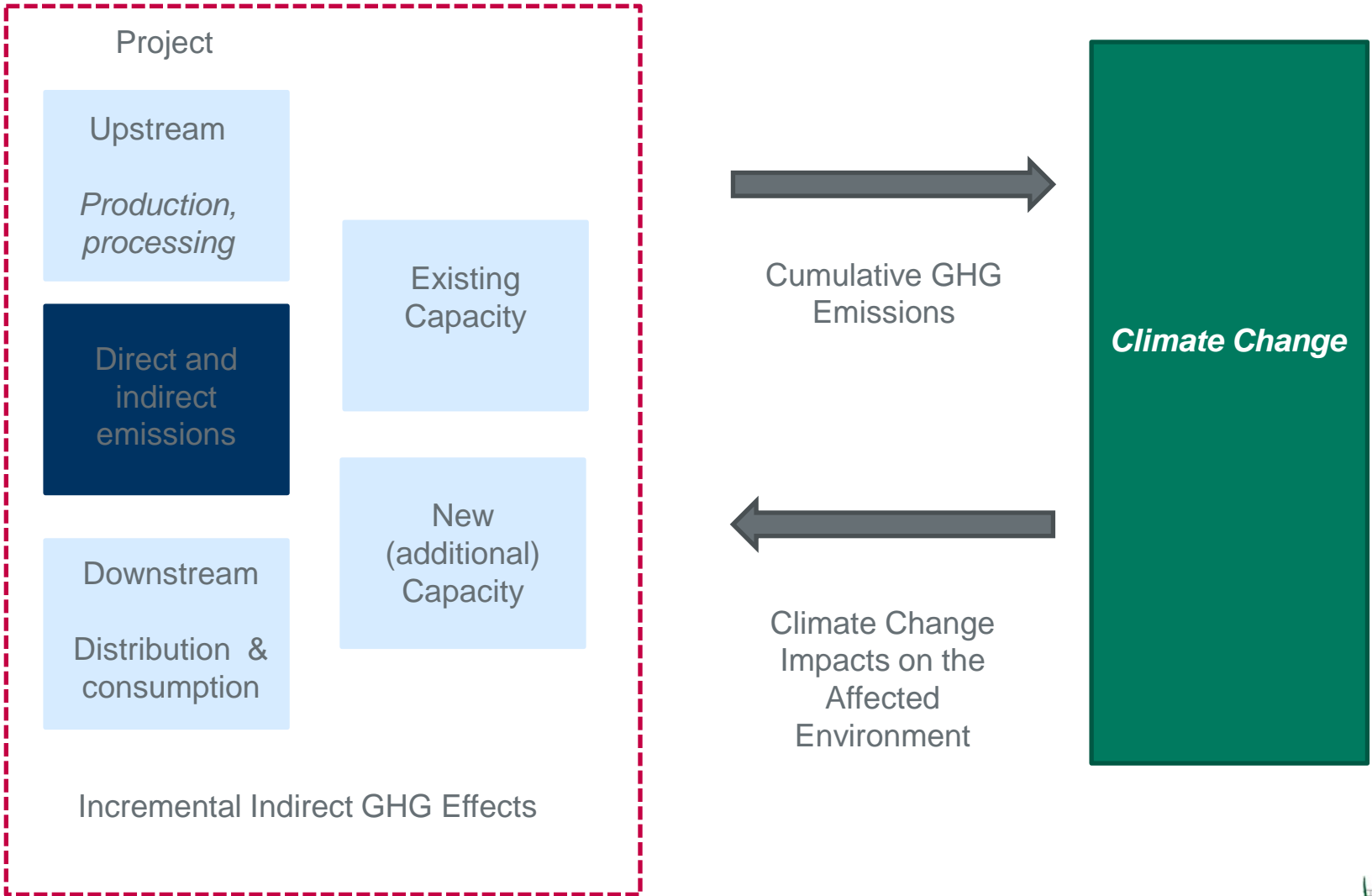
Agencies should consider the following when addressing climate change:

(1) the potential effects of a proposed action on climate change as indicated by its GHG emissions; and

(2) the implications of climate change for the environmental effects of a proposed action.

Agencies continue to have substantial discretion in how they tailor their NEPA processes

# Relationship between Climate Change and New Projects

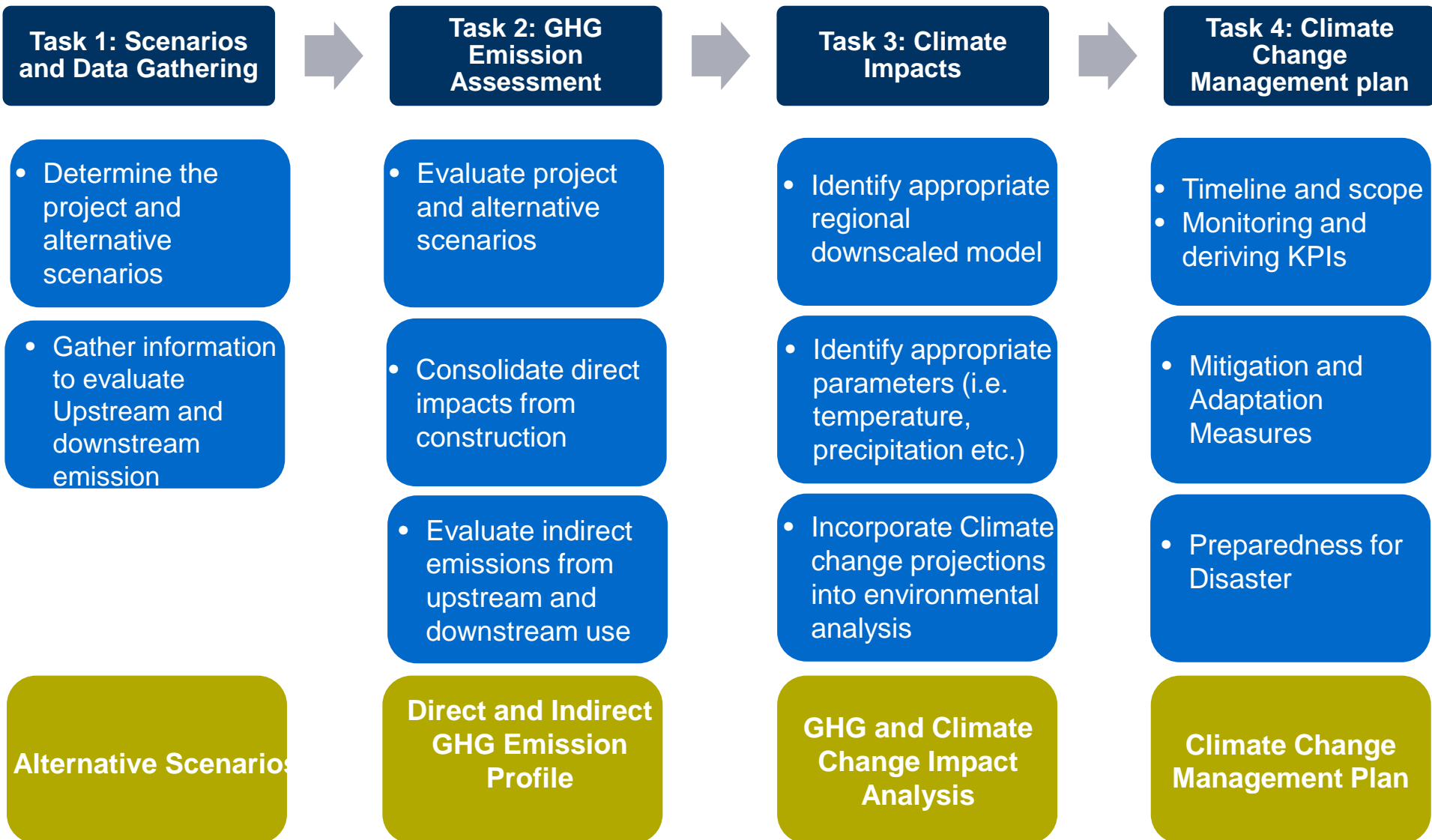


# What are the CEQ Requirements -

---

- GHG Emissions
  - Threshold: >25,000 metric tons for quantitative
  - Direct GHG and climate change effects arising from the project
  - Potential changes in carbon sequestration and storage
  - Indirect GHG emissions caused by the action that are later in time or further removed in distance (may include upstream and downstream)
  - Reference point
  - When appropriate include monetizing costs and benefits
  - Evaluate alternatives
  - Provide mitigation
- Climate Change
  - Evaluate cumulative impacts based on global and regional climate change impacts on the impacts of the project
  - Provide adaptation measures

# ERM's Approach - CEQ Requirements





# Case Studies: Nicaragua Canal



# Case Studies: Natural Gas from Shale Pipeline for power Generation

---



# Case Studies: Biomass from Southern U.S. to for power and heat production in the European Union

---



# Contacts

---

Braulio Pikman

Partner| Washington DC

T| +1 202-471-2121

M| +1 202-603-5260

E| [braulio.pikman@erm.com](mailto:braulio.pikman@erm.com)

[www.erm.com](http://www.erm.com)