

Jonas Helseth



# **The Role of CCS and EOR-CCS in reducing Greenhouse Gas Emissions from Power Plants**

**Cleaner Electricity Production Workshop and Stakeholder  
Meeting**

UNECE, Geneva, 20 October 2014



# The Bellona Foundation

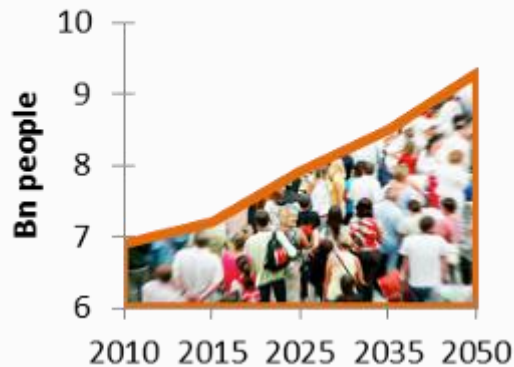




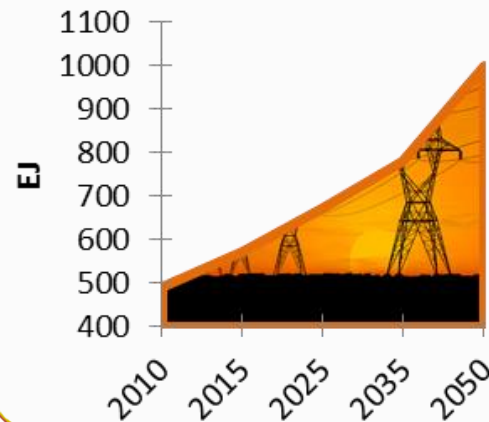
**BELLONA**  
E U R O P A

# Some Global Trends

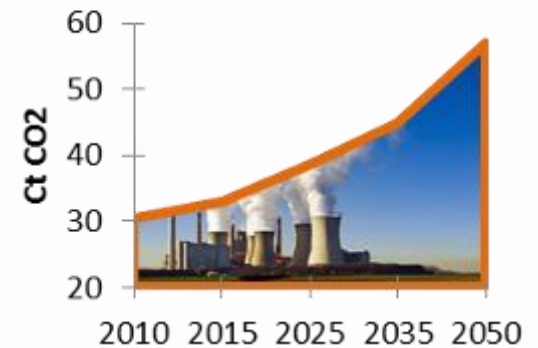
## Population



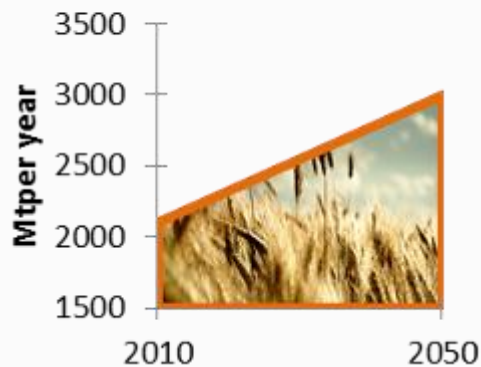
## Energy consumption



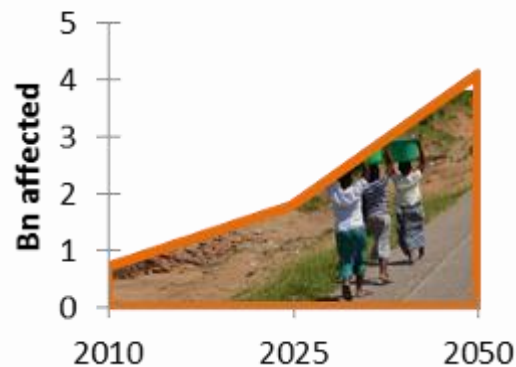
## Energy-related CO2 emissions



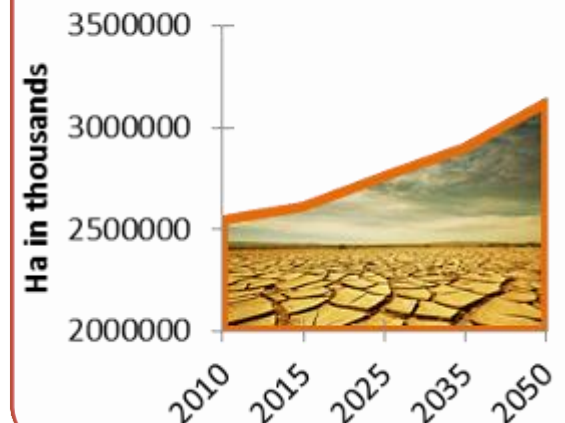
## Demand for cereal



## Water scarcity



## Arid areas



# Why CCS?



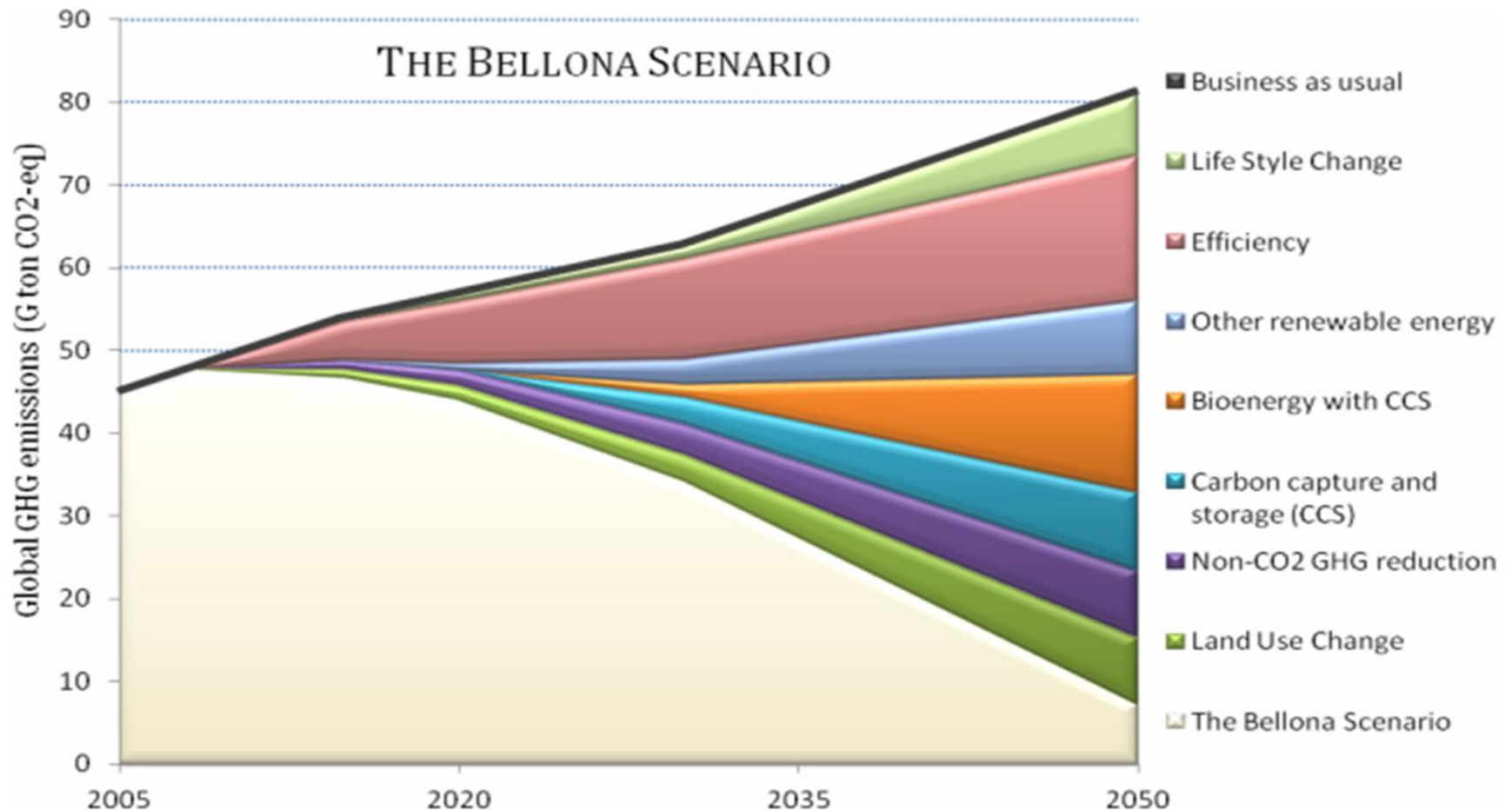
- **EU Energy Roadmap 2050** recognises necessity of CCS
- **IPCC AR5** calls for CCS and negative emissions, attained via Bio-CCS, to keep temperature rise below 2°C.
- **IEA report:** Bio-CCS could remove 800 million tonnes of CO<sub>2</sub> from the atmosphere every year by 2050 using available sustainable biomass.
- Without CCS the cost of mitigation would increase by 138% (AR5).
- Coal and lignite together constitute 80% of EU fossil fuel reserves.



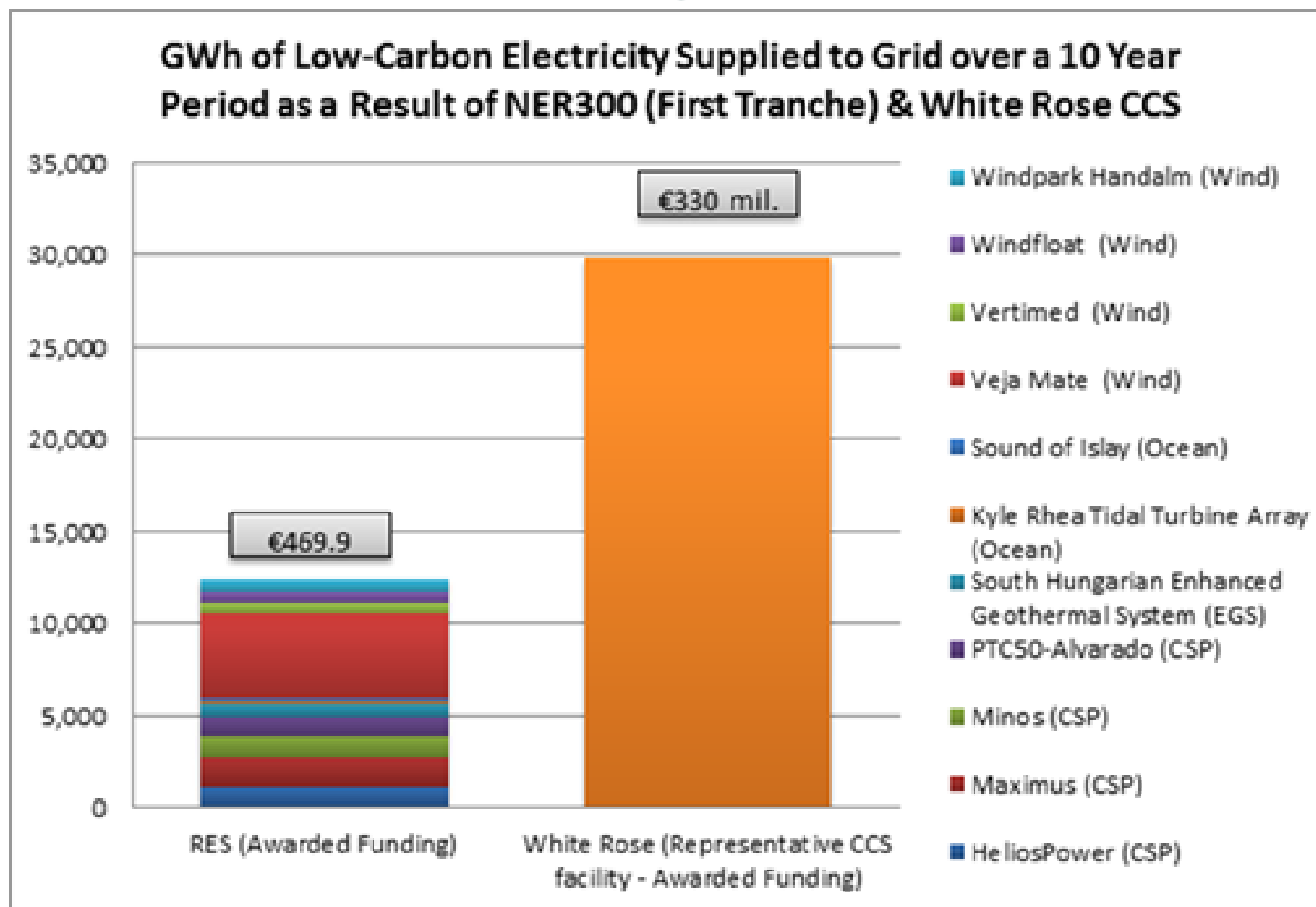
- CCS is the only technology that can deliver sufficiently deep CO<sub>2</sub> cuts in energy-intensive industries



# Need for carbon negative solutions

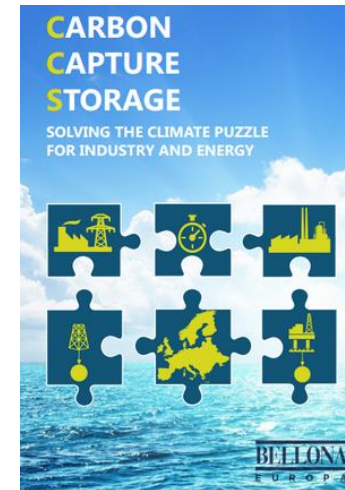


# CCS holds great low-carbon power potential



# Bellona's work on CCS

- Bellona Environmental CCS Team (BEST)
- Vice-Chair European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP)
- Established and Chaired Joint Task Force Bio-CCS with ZEP and European Biofuels Technology Platform (Advisory Board Member)



## Bellona Europa response to the CCS Directive Review Survey

July 2014

The Bellona Foundation is an independent non-profit organisation that aims to meet and fight the climate challenge, through identifying and implementing sustainable environmental solutions. We work towards reaching a greater ecological understanding, protection of nature, the environment and health. Bellona is engaged in a broad spectrum of current national and international environmental questions and issues around the world.

Pollution knows no borders, thus Bellona works with and against anyone and everyone relevant to our work, both nationally and internationally. Bellona has a solution-oriented approach to the environmental challenges, and has since 1986 had extensive cooperation with a number of companies in different industries and businesses. Our approach is that to achieve results one must jointly work out the best social and environmental solutions, and make these financially profitable and viable. Bellona has always been and remains an independent watch dog that investigates, scrutinises and reports any environmental issues we encounter.

The Bellona Foundation was founded in 1986. We are currently 65 employees, working at the main office in Oslo and our three international offices in Brussels (Belgium) / EU, Mursinsk (Russia) and St. Petersburg (Russia). Bellona has been established with an office in Brussels since 1996.



## ENSURING ENERGY SUPPLY SECURITY IN EUROPE WITH CCS

Carbon capture and storage (CCS) is the only available technology that can balance EU Member States' energy security with the limited commitment to climate action by limiting methane gas, methane and gas use internationally, thereby reducing greenhouse gas emissions. CCS is also the only technology that can be used to reduce CO<sub>2</sub> emissions from large industrial facilities and power plants. CCS is also the only technology that can be used to reduce CO<sub>2</sub> emissions from large industrial facilities and power plants. CCS is also the only technology that can be used to reduce CO<sub>2</sub> emissions from large industrial facilities and power plants.

For a Europe meeting its headline commitment, deploying CCS for energy-intensive industries is parallel with fossil fuel power generation will create jobs and attract economies of scale for both CCS transport and storage. Member States with high energy requirements must seek to build an CCS to secure steady and sustainable energy security. CCS is the only means to preserve the use of indigenous fossil fuels, ensuring a strong industrial base and delivering EU climate commitments.

Globalised energy markets have reduced the prevalence of energy security as a major policy concern in many industrialised nations. But the reversal of energy security is dependent on national history and existing industrial relations. Energy security has therefore remained an important national policy objective for the independent of central and Eastern EU Member States.

The current operation of political and energy markets in Europe are creating the EU to boost its energy security. Member States with high energy requirements must seek to build an CCS to secure steady and sustainable energy security. CCS is the only means to preserve the use of indigenous fossil fuels, ensuring a strong industrial base and delivering EU climate commitments.

Kath Whoriskey - May 2014

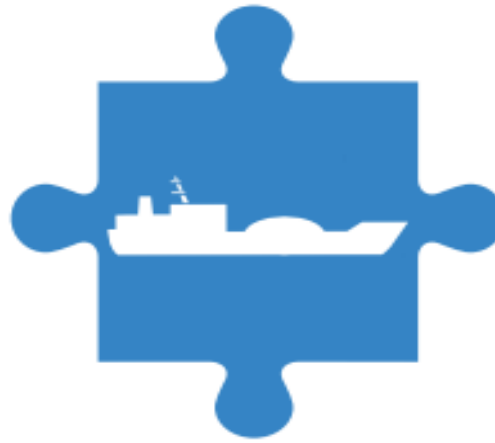




# Where are we today?



Capture of carbon dioxide (CO<sub>2</sub>) from power plants or CO<sub>2</sub> intensive industries.



Transportation of CO<sub>2</sub> via pipeline or ship to a selected storage site.



CO<sub>2</sub> injection into a suitable underground geological formation for permanent storage.

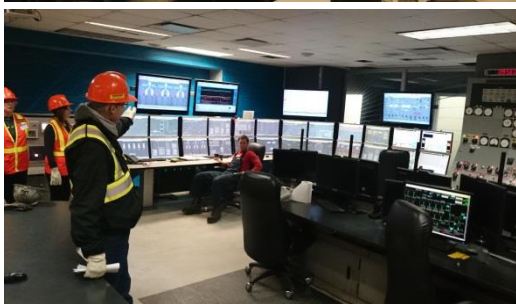
ALL THREE STAGES ARE BEING UNDERTAKEN SUCCESSFULLY IN VARIOUS CAPACITIES ACROSS THE GLOBE.

# World's first full-scale CCS plant is open



Canada wins CCS race with Boundary Dam, Saskatchewan

‘Seeing is believing’



**What does this mean for Europe:**

There are no longer any technological excuses not to deliver CCS – only lack of political will

# What about EOR?



SaskPower's Boundary Dam in Saskatchewan, Canada, is the first EOR-CCS plant to become operational.

	State of EOR Globally
CO <sub>2</sub> EOR Projects	130 +
Location	USA Canadian Hungary Turkey
CO <sub>2</sub> Source	75% Natural CO <sub>2</sub>
	25% Anthropogenic CO <sub>2</sub>

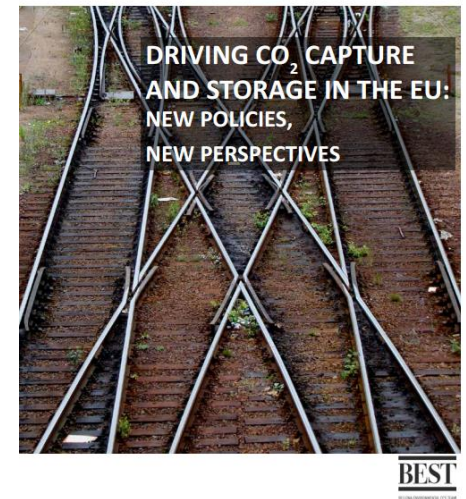


# The way forward



- Integration of CCS in relevant policy, from the CCS Directive to wider policy initiatives such as the 2030 framework, ETS reform and energy security
- Industrial funds
- Feed-in-premia
- CCS certificates
- Emissions Performance Standards (EPS)
- Firm CO<sub>2</sub> pricing (via comprehensive EU ETS reform)
- Expansion of NER300 scheme

**BELLONA**  
Working Paper



# Thank you!



jonas@bellona.org

[www.bellona.org](http://www.bellona.org)

@Bellona\_EU

