Accelerating Inertial CO2 Extraction System

Presentation for:
Successful R&I in Europe 2019
10th European Networking Event
Düsseldorf
Deutschland

GETTY IMAGES

Skolkovo Institute of Science and Technology

Professor **Ighor Uzhinsky**

Ph.D. Student **Ekaterina Masloboeva**

ekaterina.masloboeva@skoltech.ru

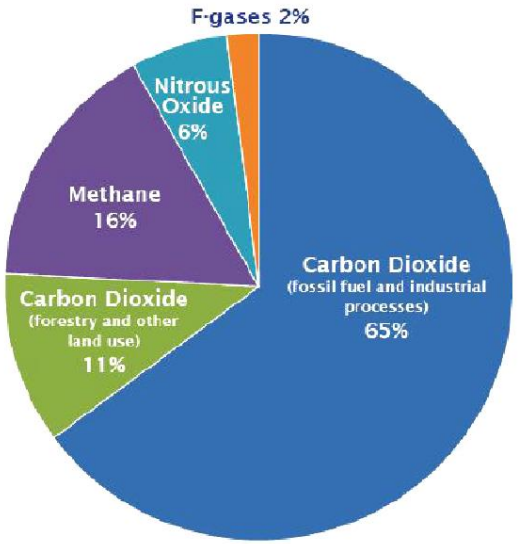
February 14-15, 2019

Skoltech
Skolkovo Institute of Science and Technology

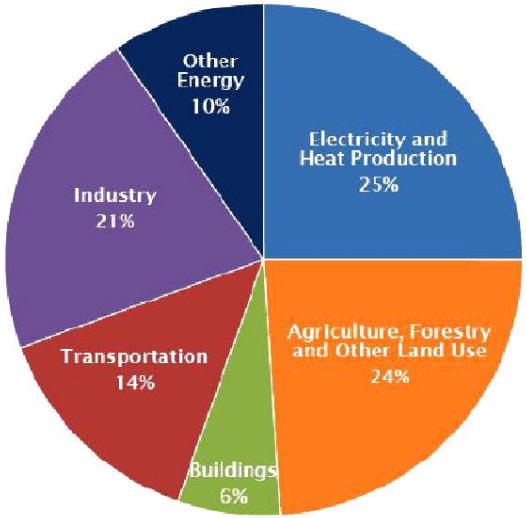
Problem Statement

Skoltech
Skolkovo Institute of Science and Technology

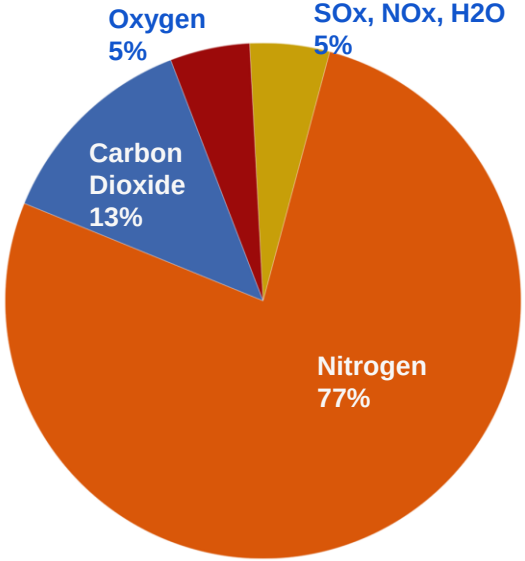
Global Greenhouse Gas Emissions by Gas



Global Greenhouse Gas Emissions by Economic Sector

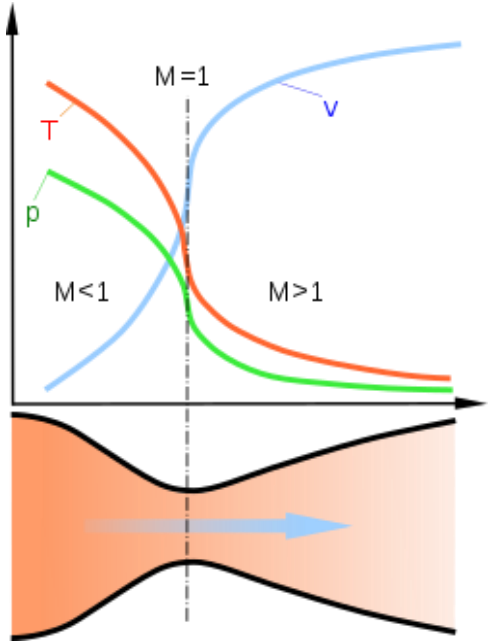


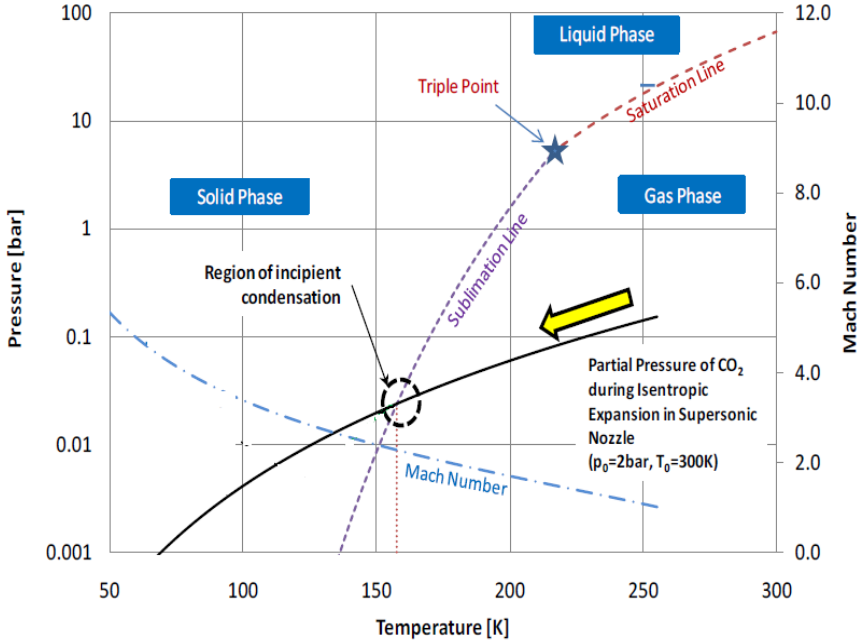
Flue Gas Contents Coal/Air



Credits: Intergovernmental panel on climate change, 2014

Inertial CO2 Extraction System

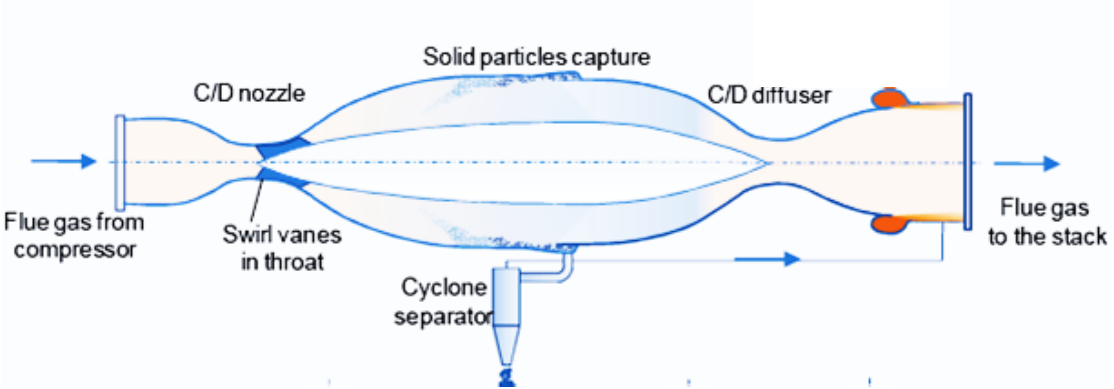


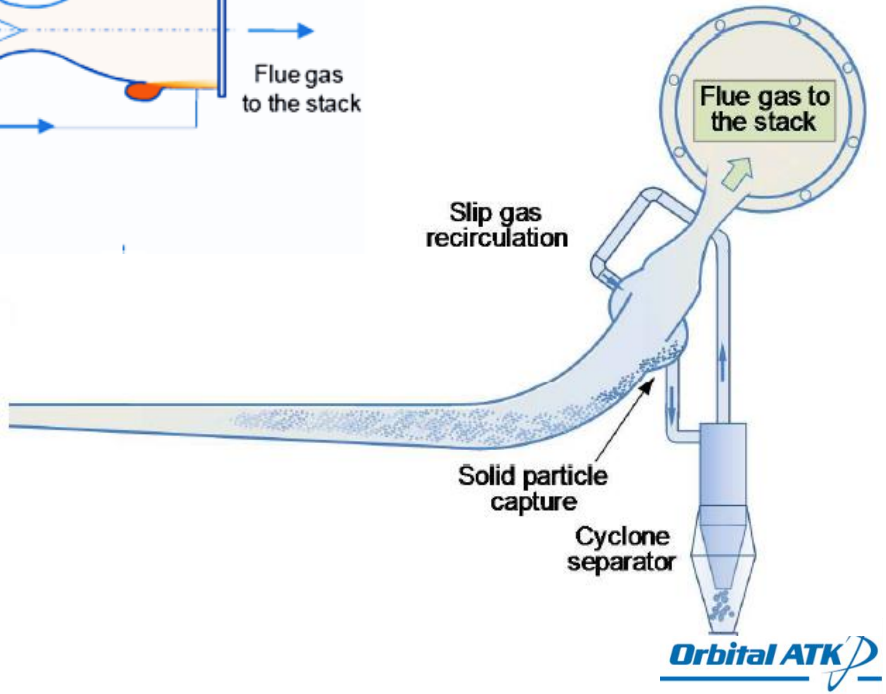


Physics principles behind ICES

Source: Orbital ATK 2016 presentation

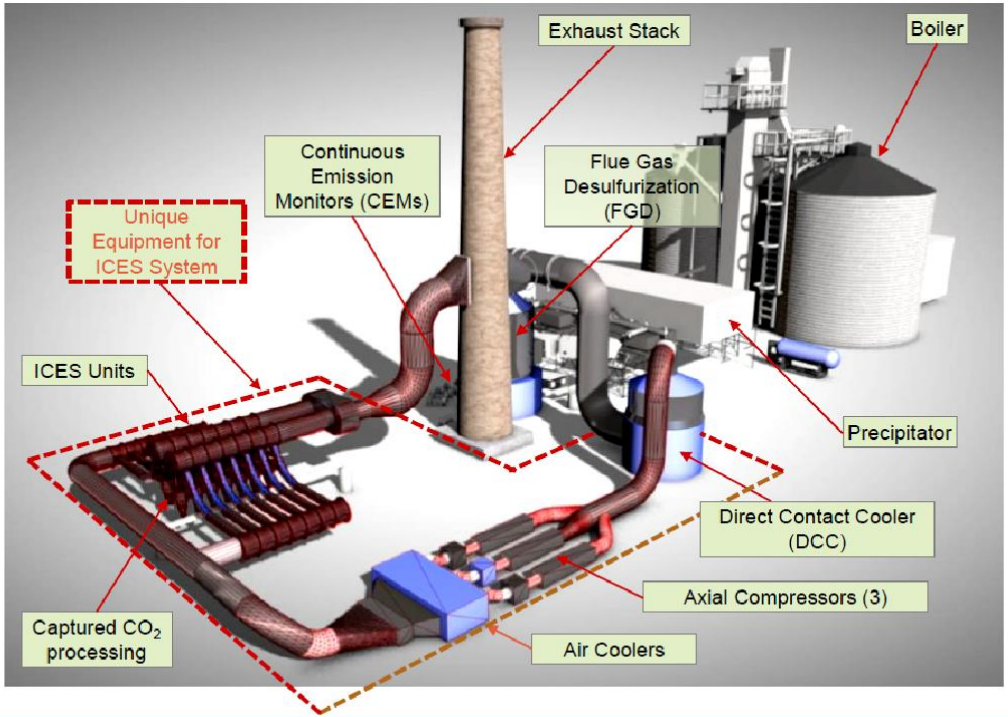
ICES Modification





Source: Orbital ATK 2016 presentation

ICES Plant Layout and Footprint



ICES footprint of ~8k m^2 compares to 20k to 30k m^2 for an amine plant of similar capacity. ICES nozzle and compressor stacking can further reduce footprint by 30-40%.

Source: Orbital ATK 2016 presentation

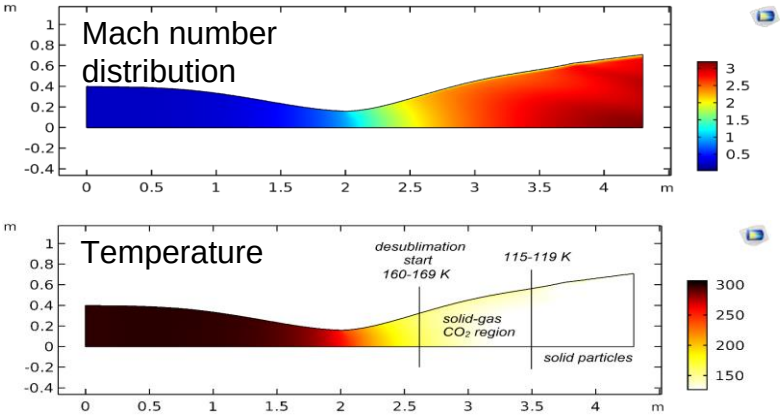
CFD/kinetics model

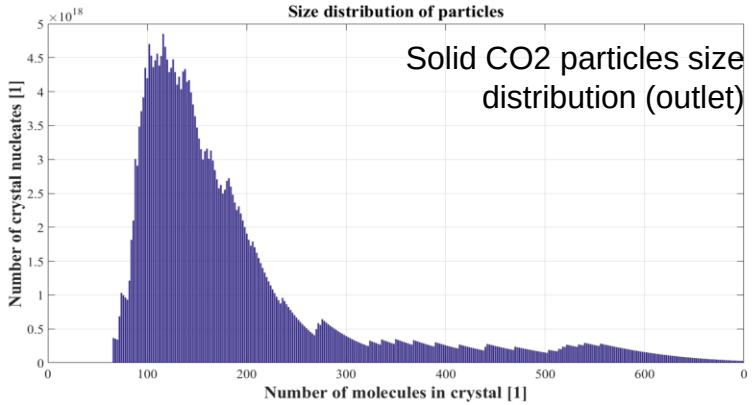
Input:

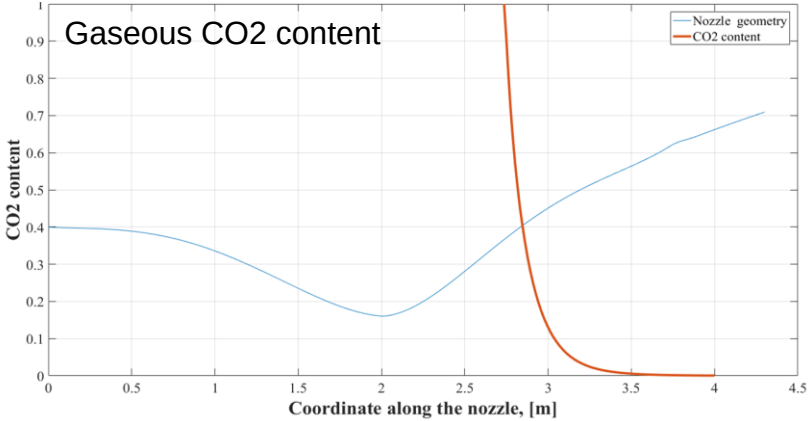
- Share of CO2 =[14mol%];
- T(0)=300[K], P(0)=2,3.5,5 [bar];
- Mass flow=100[kg/s];

Output:

- Velocity field;
- Particle sizes;
- Share of CO2 at outlet coordinate;







Plans in frames of Horizon 2020

Skoltech
Skolkovo Institute of Science and Technology

Interesting topics in frames Horizon 2020:

Carbon Capture, Utilization&Storage

Partners we are seeking:

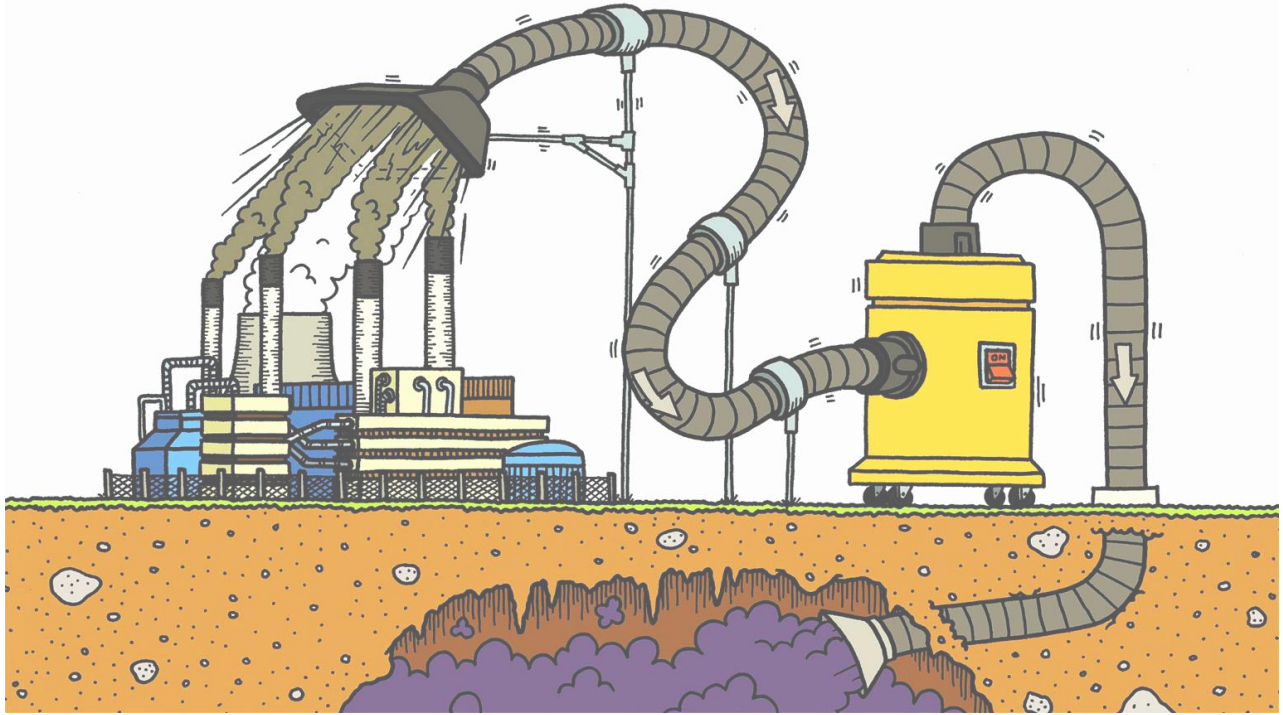
for prototyping, manufacturing and commercialization on European market

Previous scientific and technological expertise:

Ekaterina - fluid dynamic, physical modeling, theoretical physics

Prof.Uzhinsky - Director for Business Development/Senior Manager at Orbital ATK Launch Vehicles Division; Director/VP for International Projects at Thiokol Technologies International, ATK Launch Systems Team Lead for the development of hydrogen storage and generation technologies, International Business Development Manager at ATK Washington D.C.

Thank you for attention!



For details contact ekaterina.masloboeva@skoltech.ru