

Permanent CO₂ sequestration into basalt: the Hellisheidi, Iceland project

**Sigurður Reynir Gíslason⁽¹⁾, Einar Gunnlaugsson⁽²⁾, Wallace S. Broecker⁽³⁾,
Eric H. Oelkers⁽⁴⁾, Juerg M. Matter⁽³⁾, Andri Stefánsson⁽¹⁾ and Grímur
Björnsson⁽²⁾**

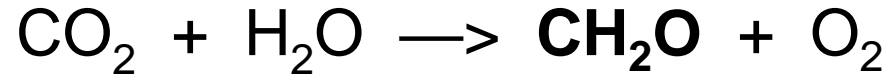
(1) Institute of Earth Sciences, University of Iceland, Iceland,

(2) Reykjavik Energy, Iceland,

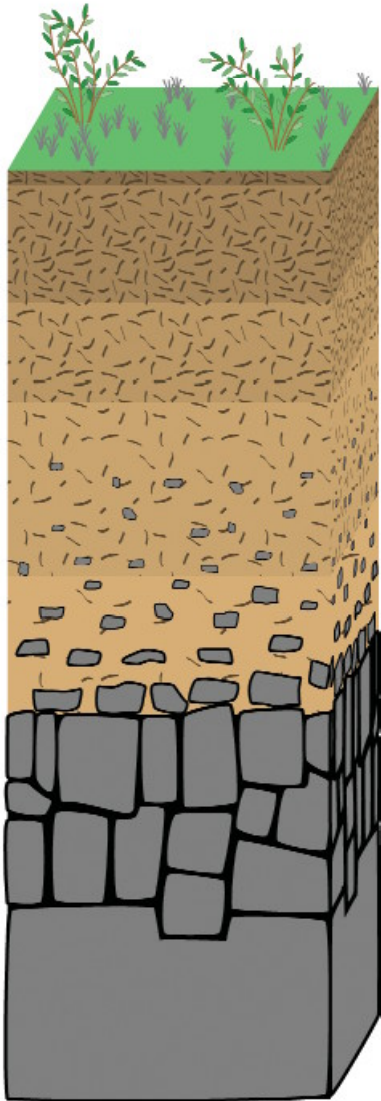
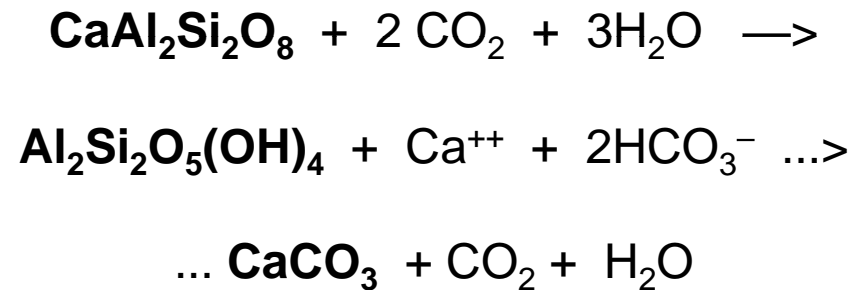
(3) Earth Institute, Columbia University, USA,

(4) CNRS, Université Paul Sabatier, France,

CO₂ fixation by photosynthesis



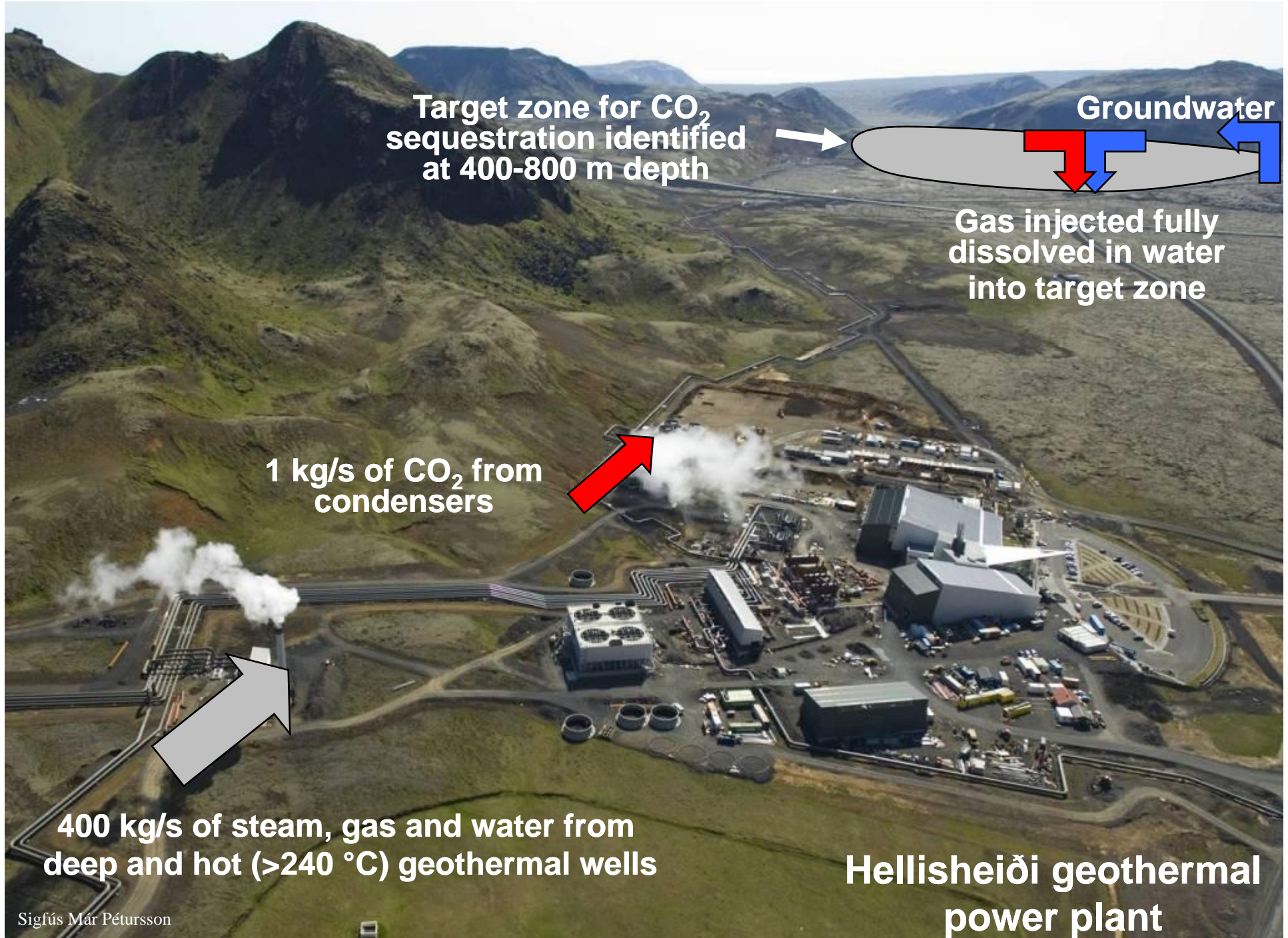
CO₂ fixation by chemical weathering of basalt



Project Goals

- **Optimize industrial methods for storing CO₂ in basaltic rocks through a combined program consisting of:**
 - field scale injection of CO₂ charged water
 - laboratory based experiments
 - large scale plug flow experiments
 - study of natural CO₂ waters and natural carbonation of basaltic rocks
 - state of the art geochemical modeling
- **Generate the human capital and expertise to apply the advances made in this project in the future**





Target zone for CO₂ sequestration identified at 400-800 m depth

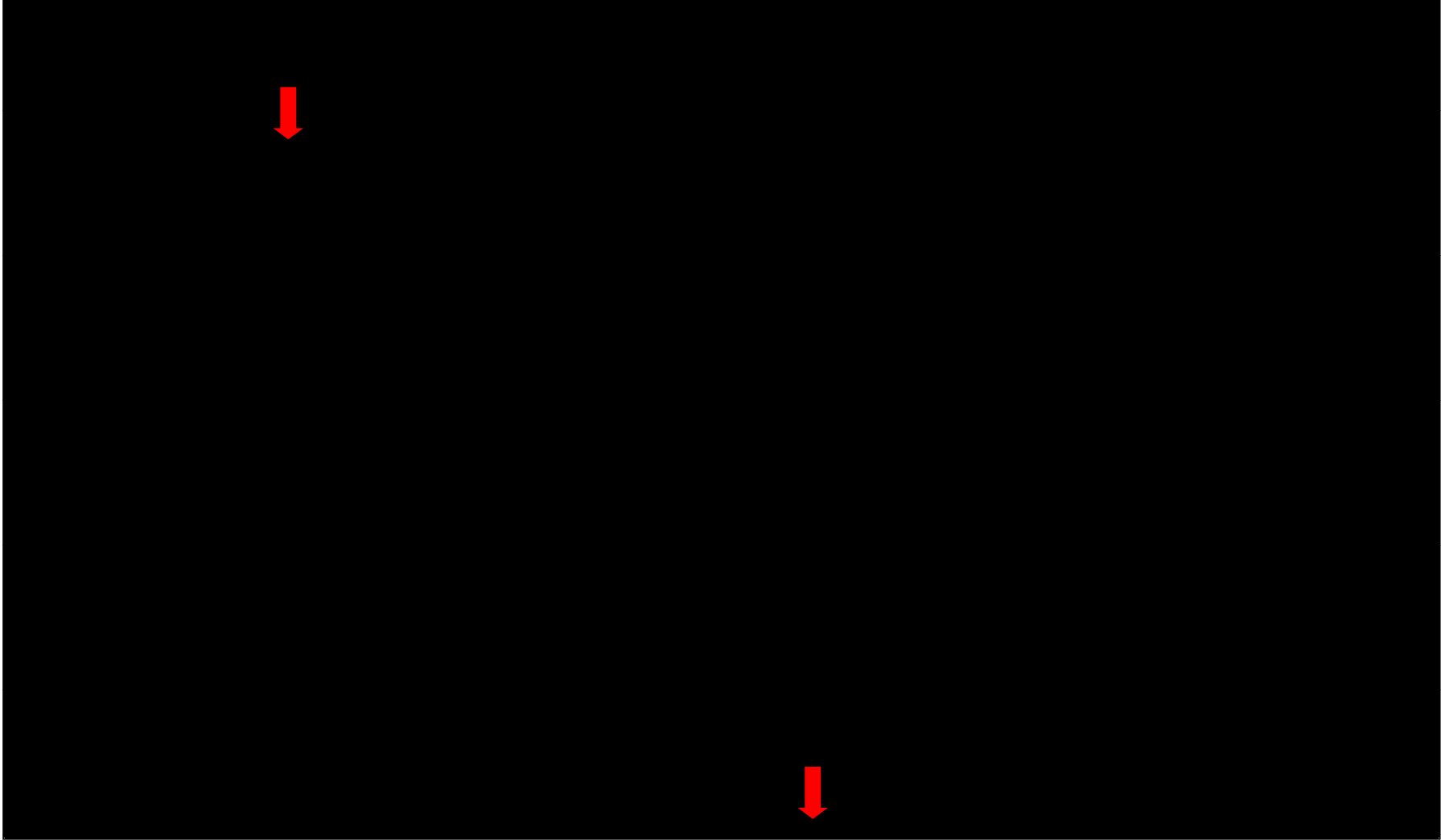
Groundwater

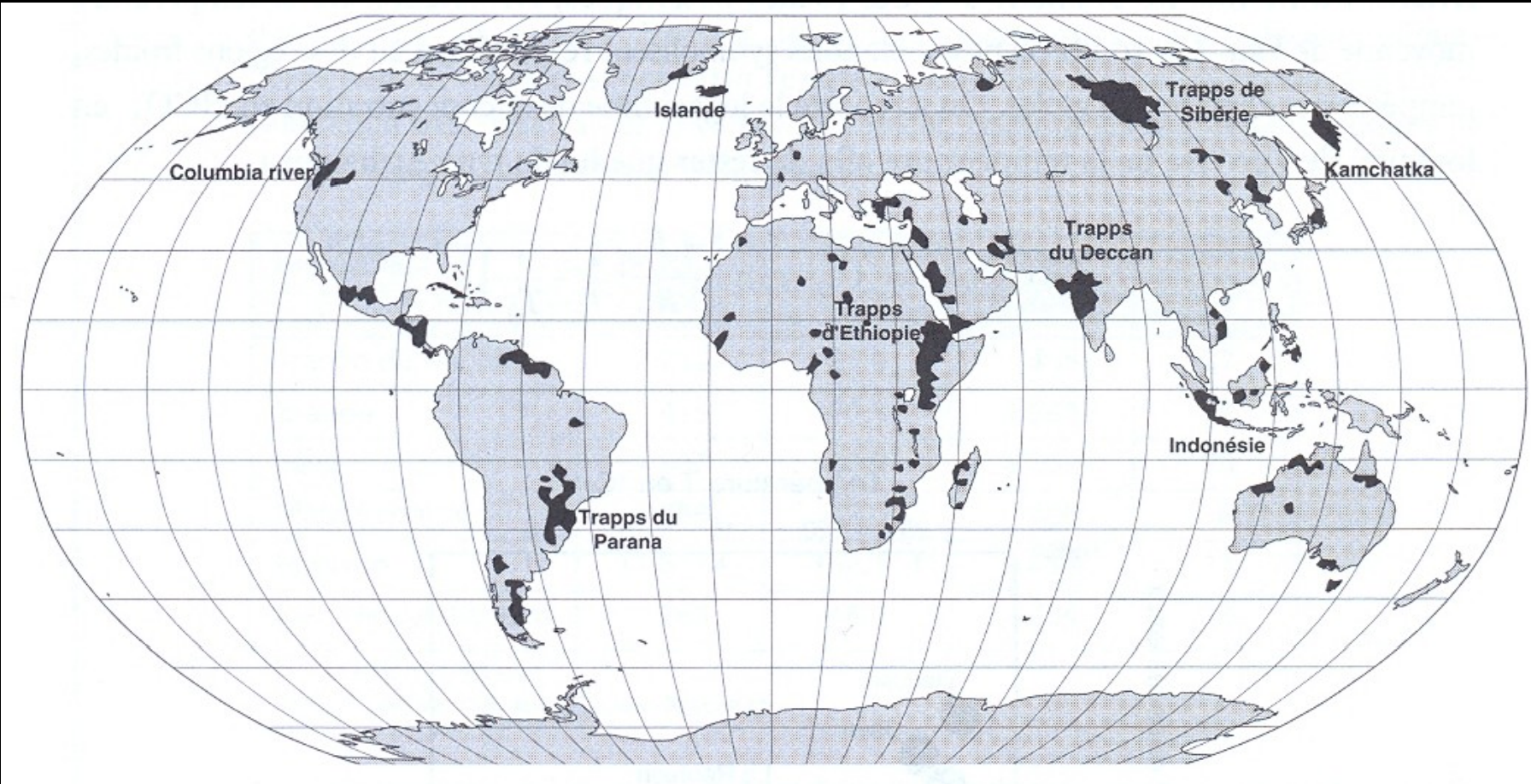
Gas injected fully dissolved in water into target zone

1 kg/s of CO₂ from condensers

400 kg/s of steam, gas and water from deep and hot (>240 °C) geothermal wells

Hellisheiði geothermal power plant





ATLANTIC OCEAN FLOOR

BY THE NATIONAL GEOGRAPHIC MAGAZINE
REPRODUCED BY THE NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

GREENLAND

NORTH
AMERICA

EUROPE

AFRICA

