



NATIONAL ACADEMY OF SCIENCES

# Researching Unintended Consequences of Sustainability Solutions

**Marcia McNutt**  
President, National  
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**7** AFFORDABLE AND  
CLEAN ENERGY



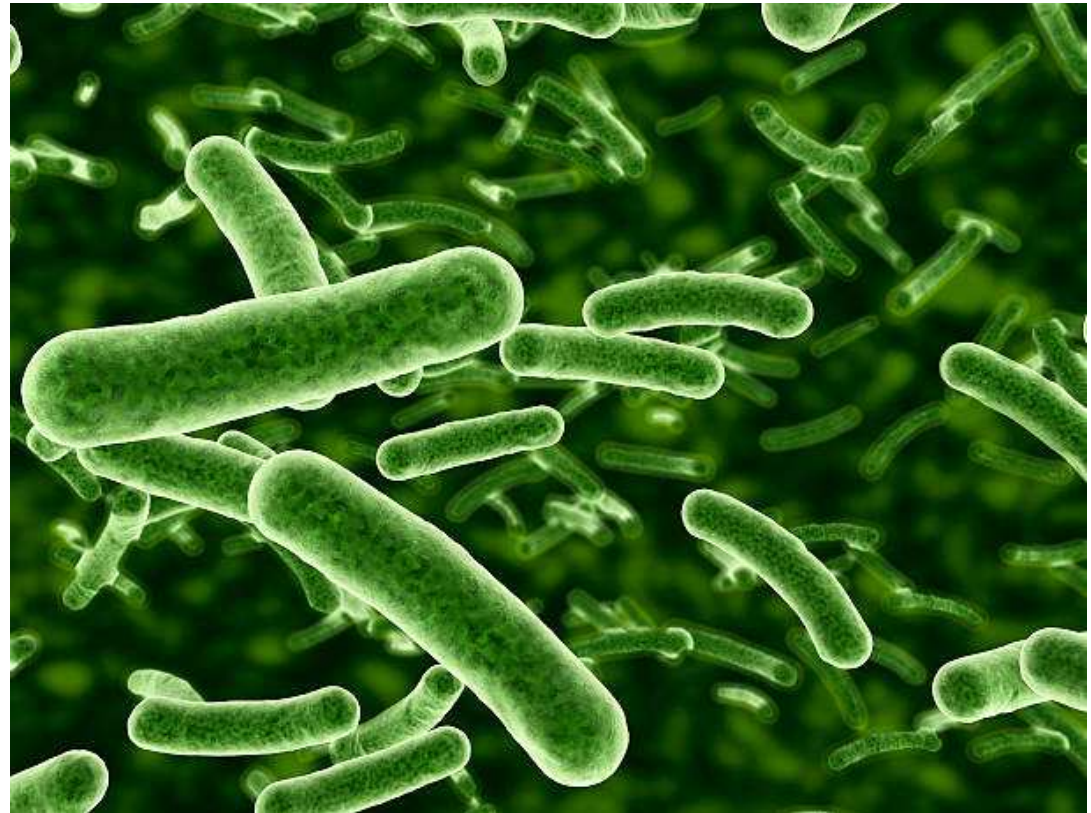
**13** CLIMATE  
ACTION



**6** CLEAN WATER  
AND SANITATION



**3** GOOD HEALTH  
AND WELL-BEING



# 4 QUALITY EDUCATION



# 8 DECENT WORK AND ECONOMIC GROWTH

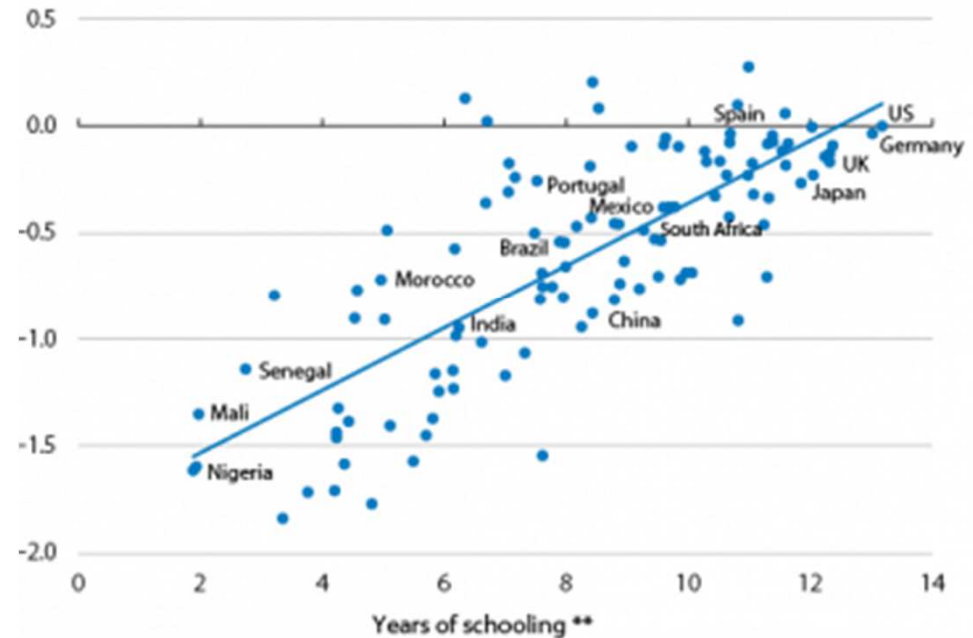


# 10 REDUCED INEQUALITIES



## Growth and education: relationship between productivity and training

GDP per worker (difference compared with US) \*



Notes: \* Log of GDP per worker in a certain country minus the log per worker in the US (2010).

\*\* Average years of schooling for total population (2010).

Source: CaixaBank Research, based on data from the World Bank and Barro-Lee (2016).

**But too often our approaches to  
the SDGs conflict**

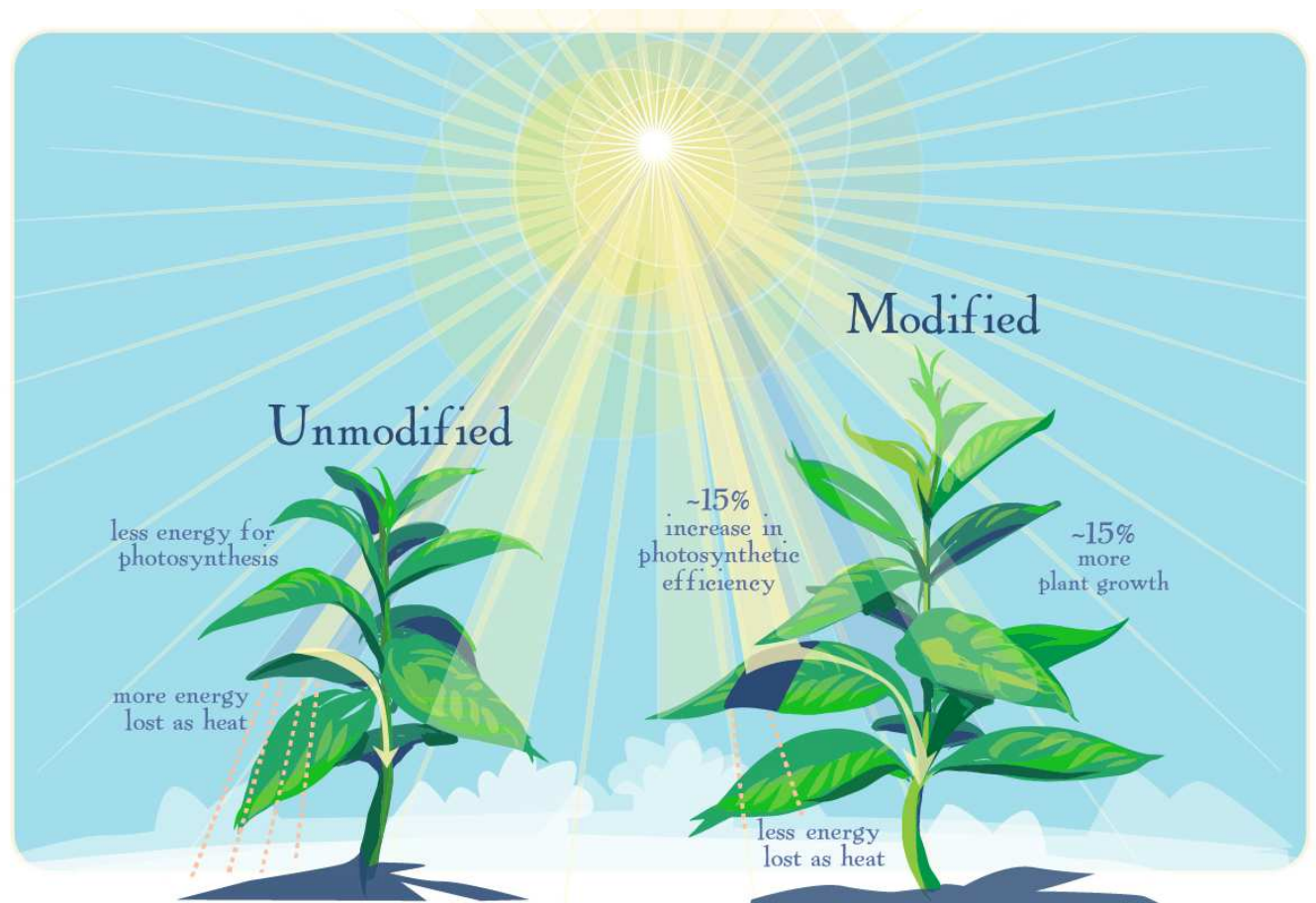


# Innovation can create win-win scenarios

2 ZERO HUNGER



15 LIFE ON LAND





**8** DECENT WORK AND  
ECONOMIC GROWTH



**13** CLIMATE  
ACTION

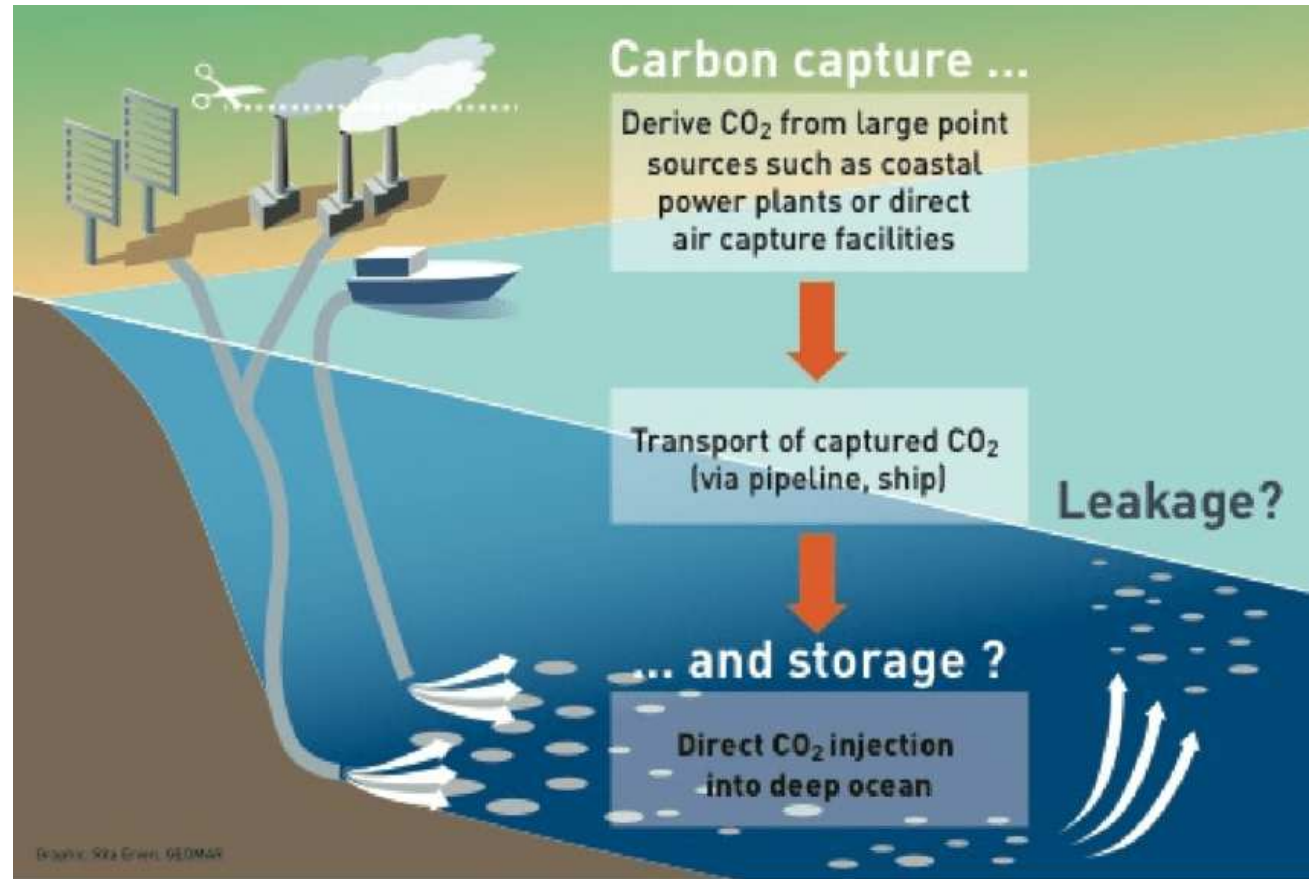


**More research is needed to  
anticipate negative  
repercussions**

# 13 CLIMATE ACTION



# 14 LIFE BELOW WATER



# MBARI Experiments on CO<sub>2</sub> in Deep Sea

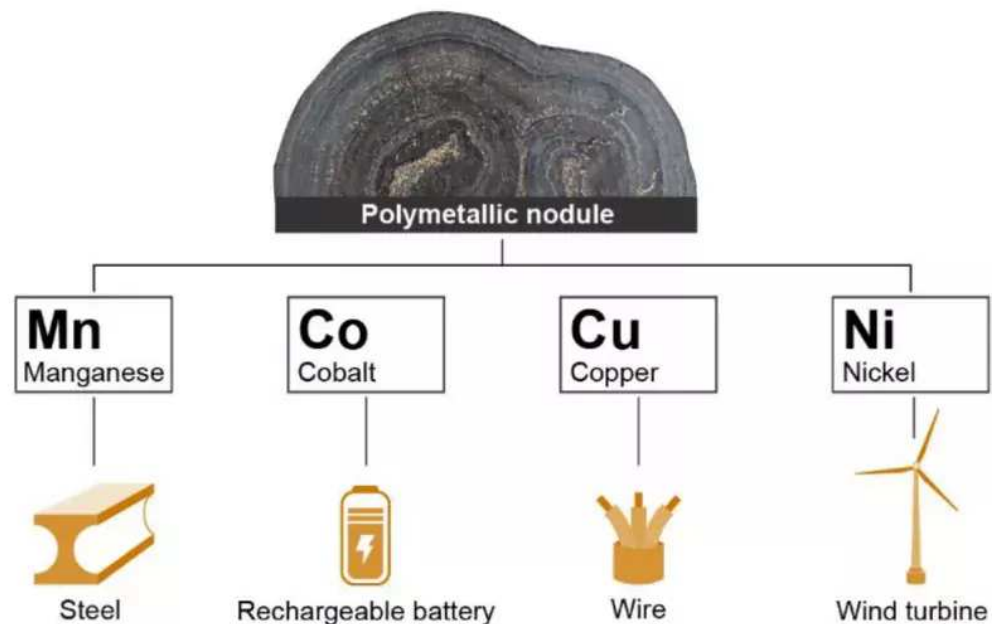


- Phase diagram for CO<sub>2</sub> at ocean pressures and temperatures was unknown
- Brewer and Barry deployed an ROV to inject small quantities of CO<sub>2</sub> at 4-km depth
- Developed a deep-sea Raman laser system to probe the phases
- Discovered that CO<sub>2</sub> does not form stable ponds on ocean floor

# 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



# 14 LIFE BELOW WATER



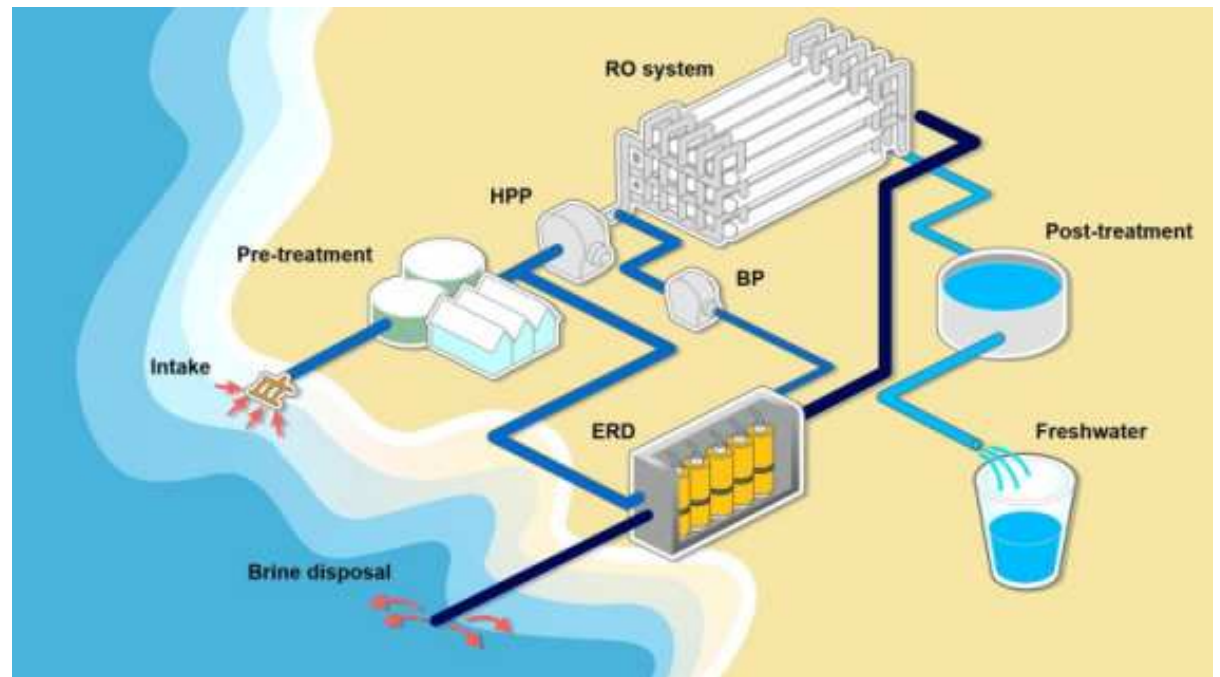
Sources: GAO; Smithsonian (image); United States Geological Survey. | GAO-22-105507

Figure 1. Cross-section of a polymetallic nodule, approximately 1 to 4 inches in diameter, showing the critical minerals that can be found within the nodule, and their applications.

# 6 CLEAN WATER AND SANITATION

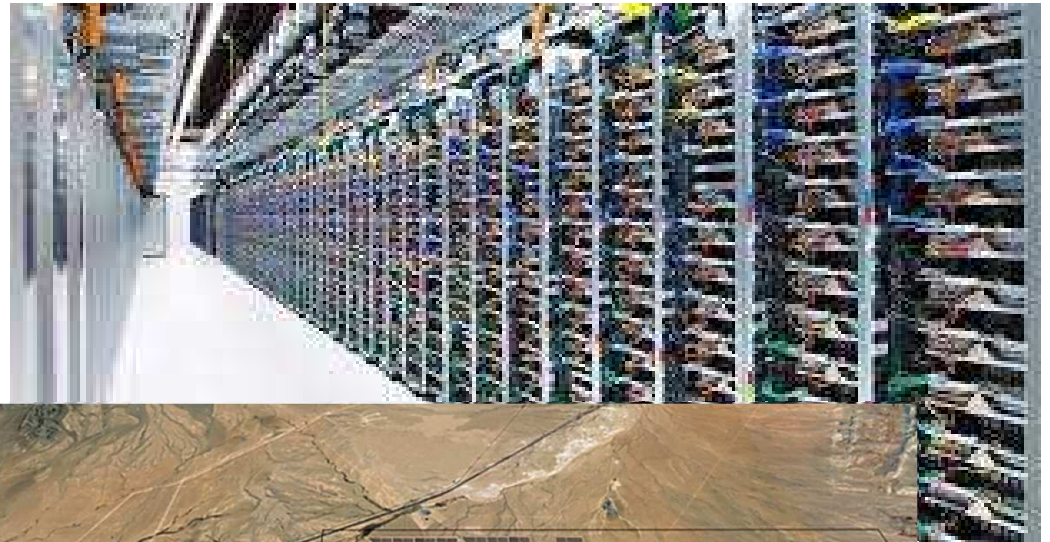


# 14 LIFE BELOW WATER



# And what about AI?

- Poised to become the most disruptive technology since the internet
- Many advantages for human health, economic growth, more judicious use of resources, climate prediction, and other applications.
- But what about energy usage?  
Job loses/displacement?  
Increasing inequality?



It is easy to dodge our responsibilities, but we cannot dodge the consequences of dodging our responsibilities.

Josiah Stamp