Demonstrating Secure Storage and Assistance for Developing Countries

Dr. Katherine Romanak
Gulf Coast Carbon Center
Bureau of Economic Geology
The University of Texas at Austin

COP 25 – Chile/Spain

BUREAU OF ECONOMIC GEOLOGY

Gulf Coast Carbon Center

TEXAS
The University of Texas at Austin

- > 15 years experience in geological CO_2 storage
- Develop and implement monitoring programs for geological CO_2 storage sites
  - ✓ Site selection and permitting
  - ✓ Regulatory compliance
  - ✓ Technology transfer and education
- Monitored >9 demonstration projects and over 10 million tonnes of CO_2 stored underground

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Addressing Technical Questions

- Is CO_2 storage a proven technology?
- How is CO_2 stored underground?
- Is it safe?
- How do we ensure safety?
- How likely is it to leak?

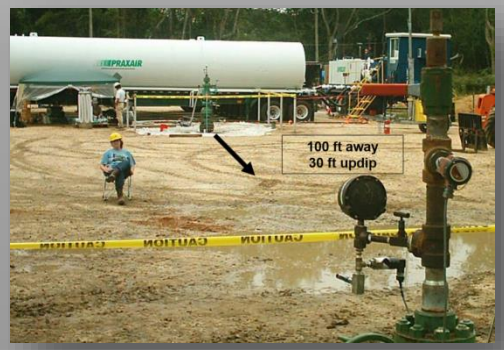
UNFCCC COP-21 Paris – Official Side Event on Carbon Capture and Storage

Photo by IISD

Evolution of Technology Development

Pilots → Demonstrations → Industrial

500 T



Frio Brine Storage Pilot 2004

SECARB Demonstration Project in Mississippi

Hastings Project

NRG Petranova Project

1.6 MMT/year

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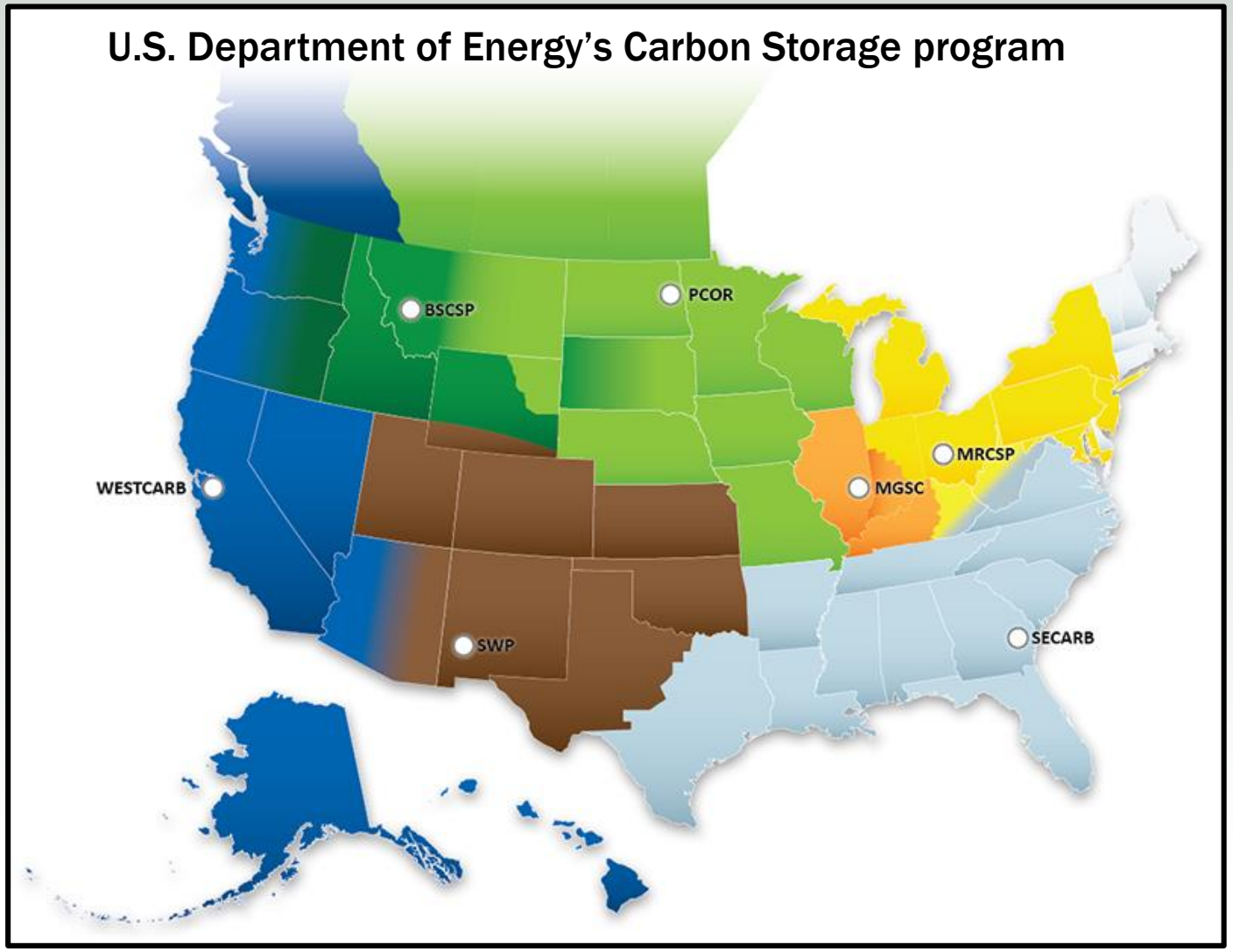
CCS Development in the U.S.

- Since 1997, evolution of testing has been replicated in 7 regions in the U.S.to prove up storage resources in the country



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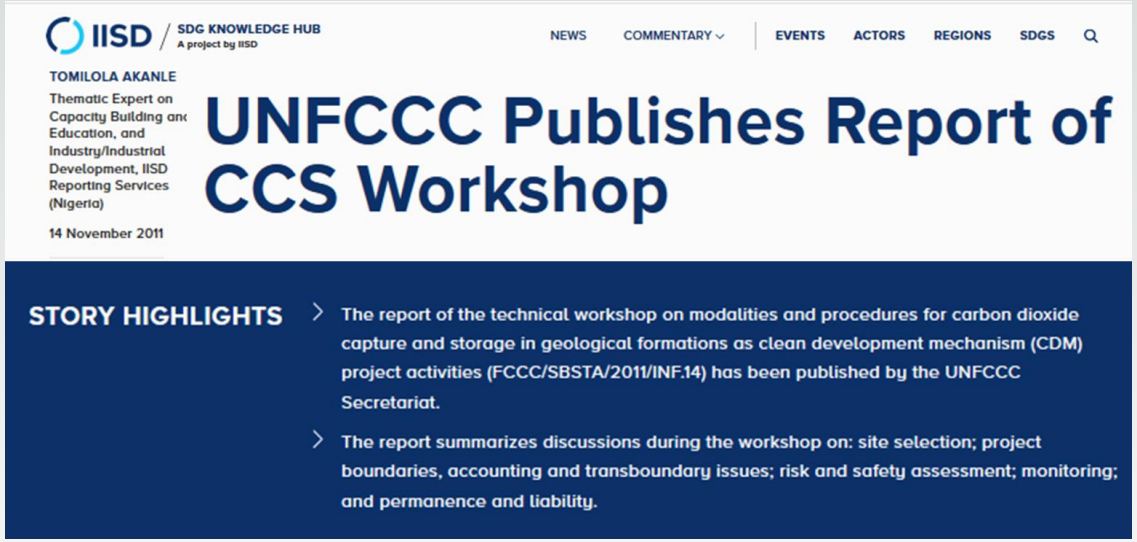
Technical Questions Addressed

- 2011 Technical Workshop on Modalities and Procedures for CCS in Geological Formations as CDM Project Activities
  - Site selection
  - Project boundaries
  - Accounting and transboundary issues
  - Risk and safety assessment
  - Monitoring
  - Permanence and liability


IISD / SDG KNOWLEDGE HUB
A project by IISD

NEWS COMMENTARY EVENTS ACTORS REGIONS SDGS

TOMILOLA AKANLE
Thematic Expert on Capacity Building and Education, and Industry/Industrial Development, IISD Reporting Services (Nigeria)

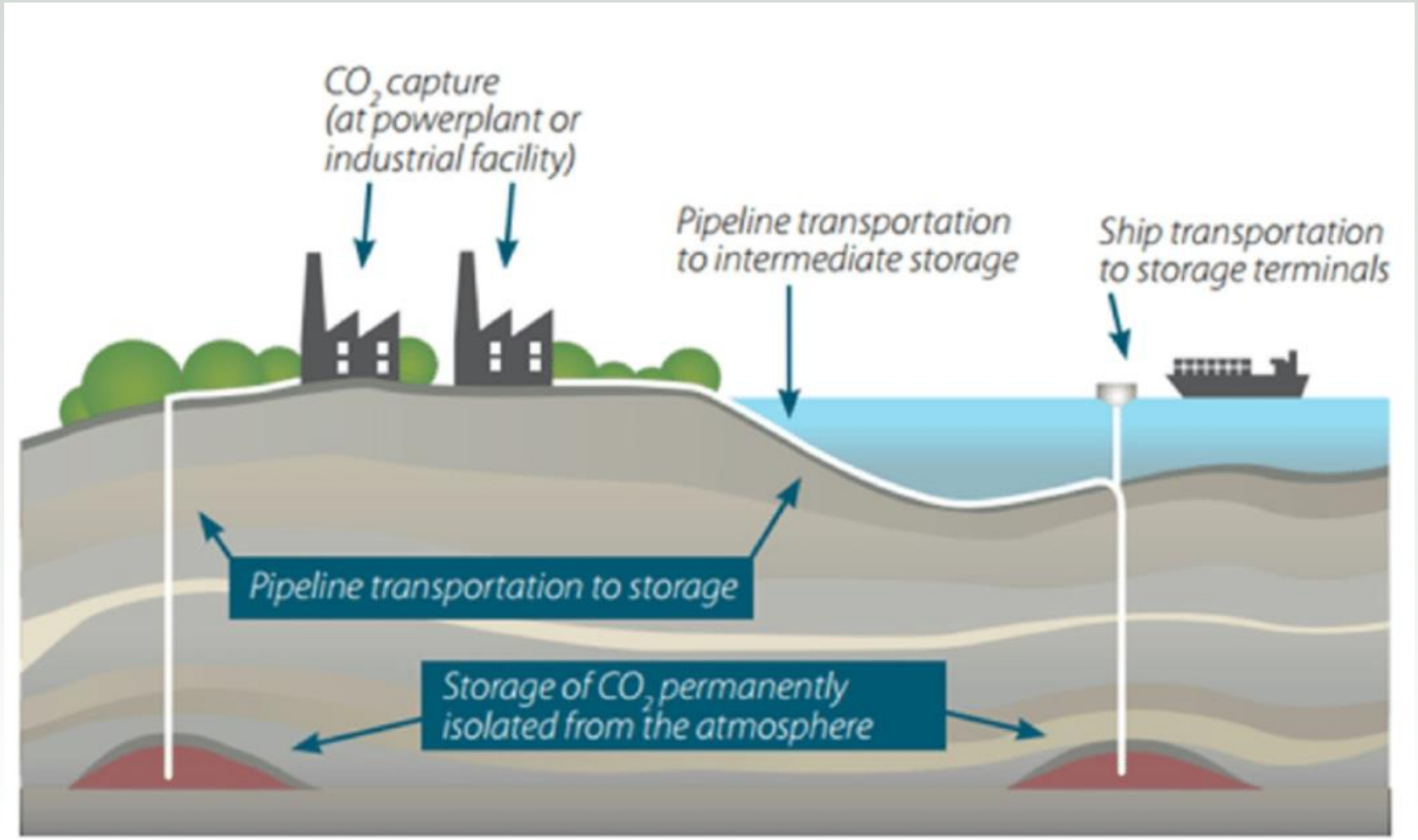
14 November 2011

UNFCCC Publishes Report of CCS Workshop

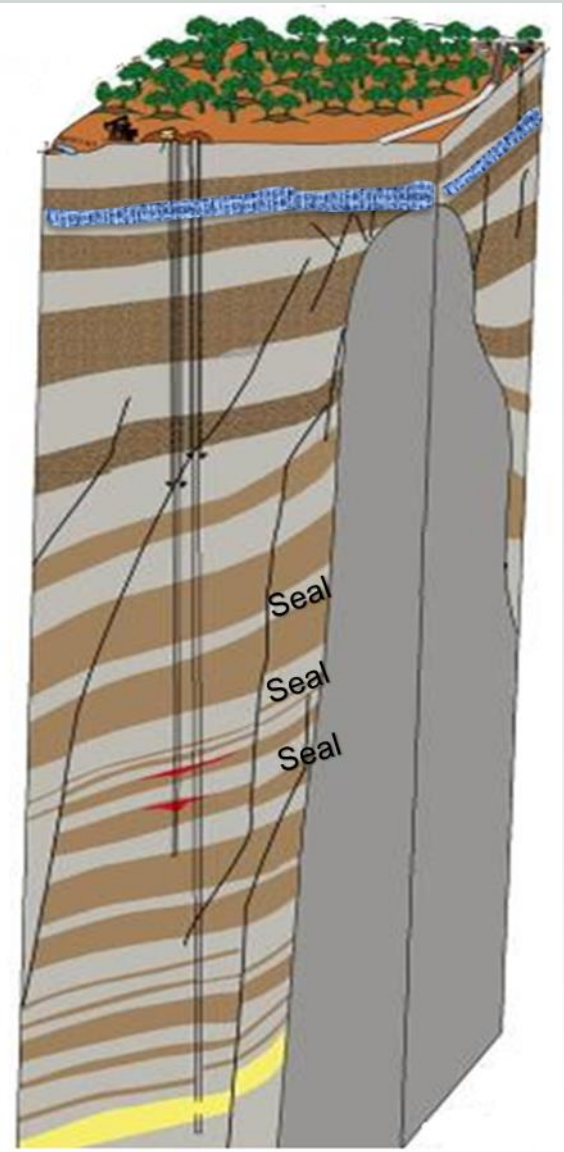
STORY HIGHLIGHTS

- The report of the technical workshop on modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism (CDM) project activities (FCCC/SBSTA/2011/INF.14) has been published by the UNFCCC Secretariat.
- The report summarizes discussions during the workshop on: site selection; project boundaries, accounting and transboundary issues; risk and safety assessment; monitoring; and permanence and liability.

Understanding Scale and Process

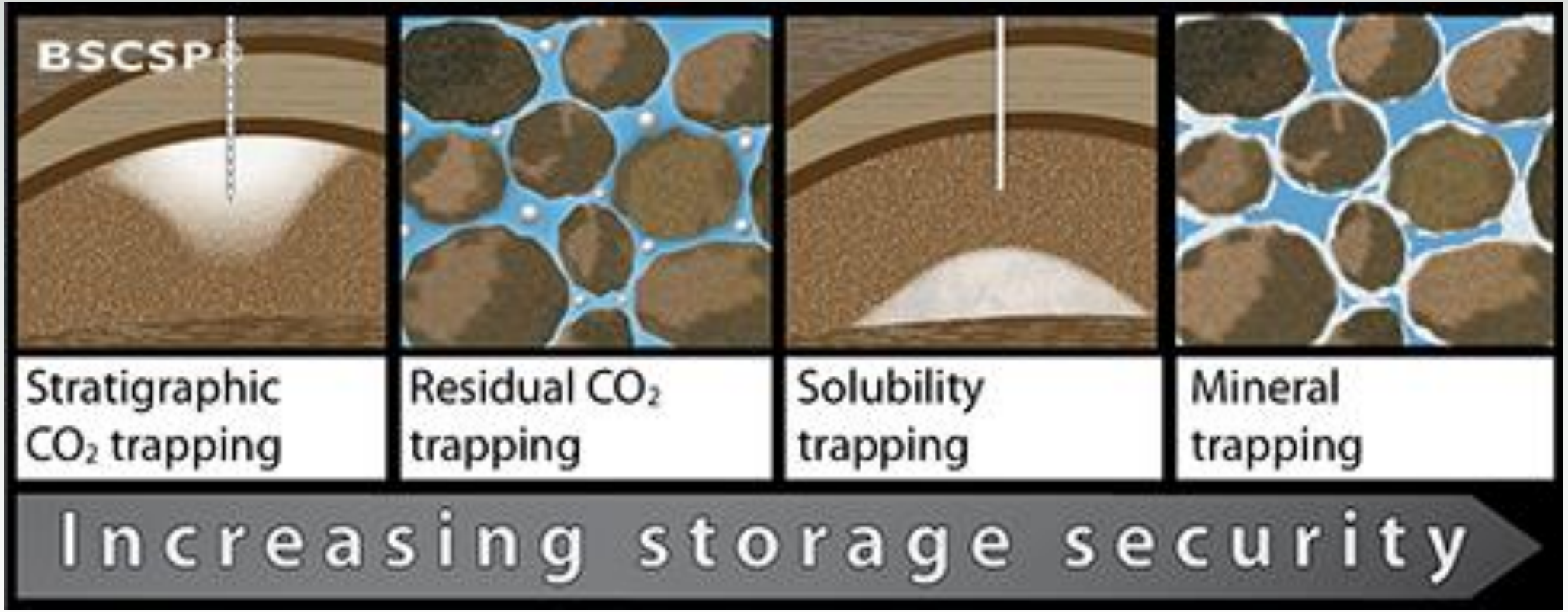


Choudhary, Piyush. (2016)



Susan Hovorka

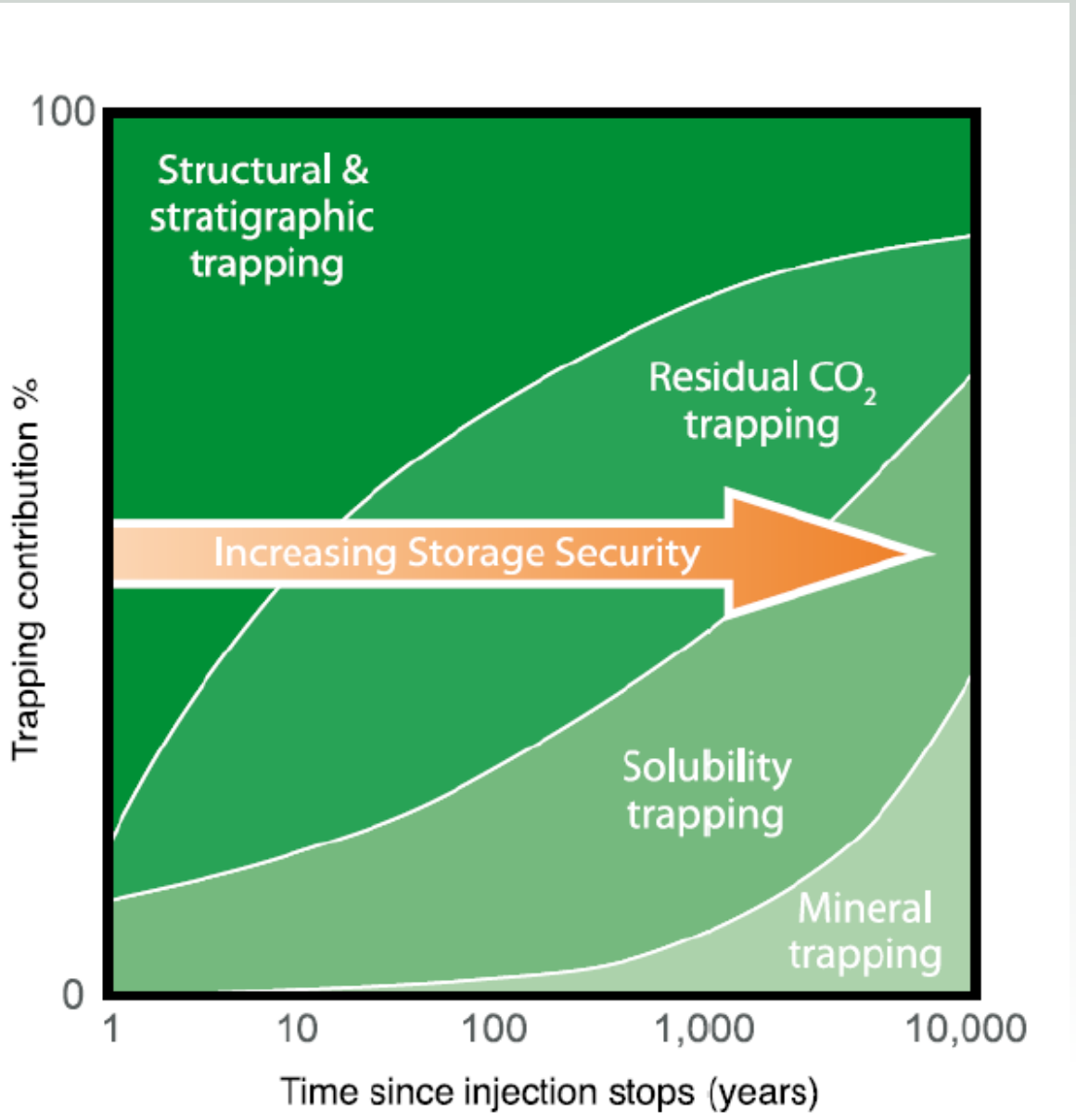
The many ways that CO_2 is trapped permanently



Montana State University
https://www.bigskyco2.org/node/127

Increasing Storage Security Over Time

- Structural and stratigraphic trapping
- Residual trapping
- Solubility trapping
- Mineral trapping



IPCC Special report 2005

Geologic CO_2 Storage - Safe By Design

1. Site Characterization – Permitting requires high level of assurance
2. Risk Assessment- Modeling identifies potential unwanted outcomes
3. Project Design - to minimize potential risk
4. Monitoring Plan

<u>Deep Subsurface – Verification</u>
Behavior conforms to predictions?

<u>Shallow Subsurface - Assurance</u>
No unwanted outcomes to environment

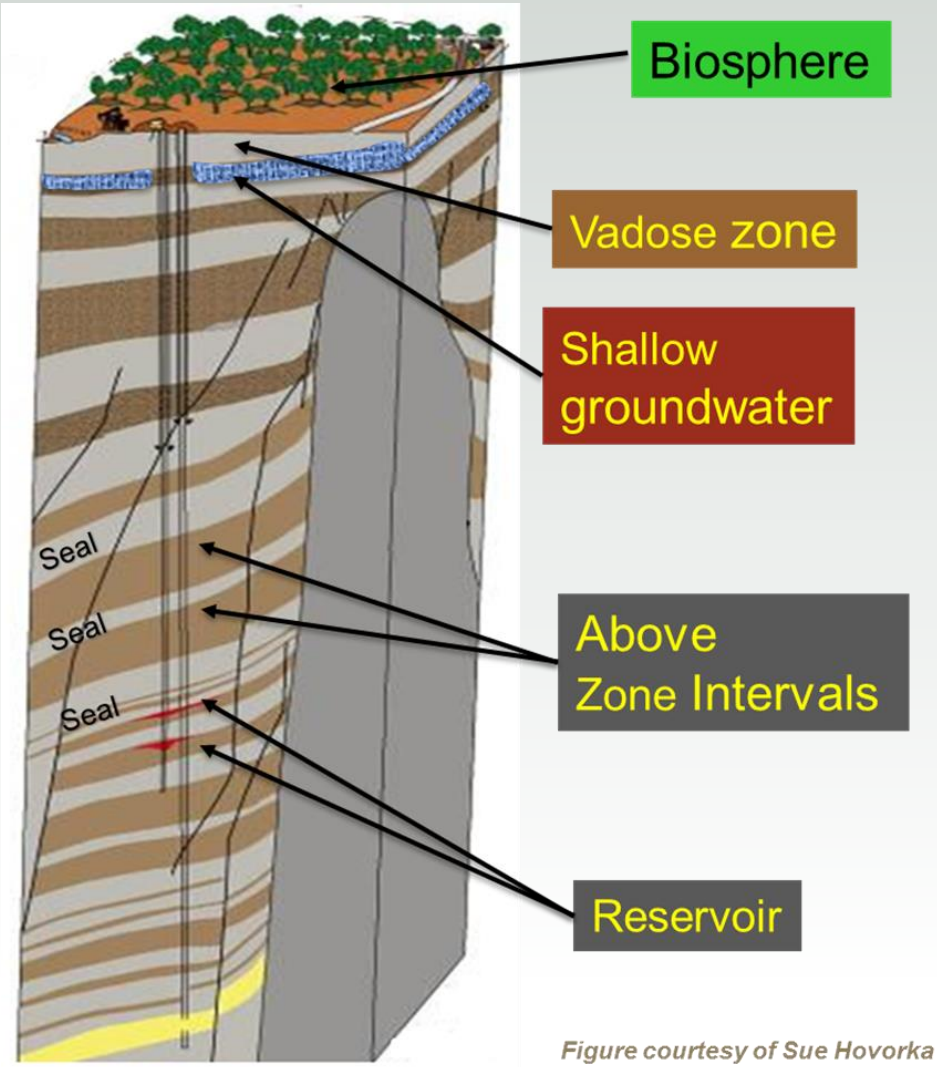


Figure courtesy of Sue Hovorka

Summary of Scientific Evidence Base on Geological CO_2 Storage

- CCS is not new- the technology has been methodically developed over the past 20 years
- CCS is a fully recognized viable technology within the UNFCCC
- Concerns about CCS were addressed within a UNFCCC technical workshop in 2011. Report is available.
- CO_2 is easily stored and trapped underground by a number of processes which work to increase storage security over time.
- CO_2 storage is safe by design
  - Permitting, site selection and monitoring ensure safety
  - No adverse environmental outcomes have been observed
- Its proven - CCS is ready for deployment now

CCS Needs Upscaling

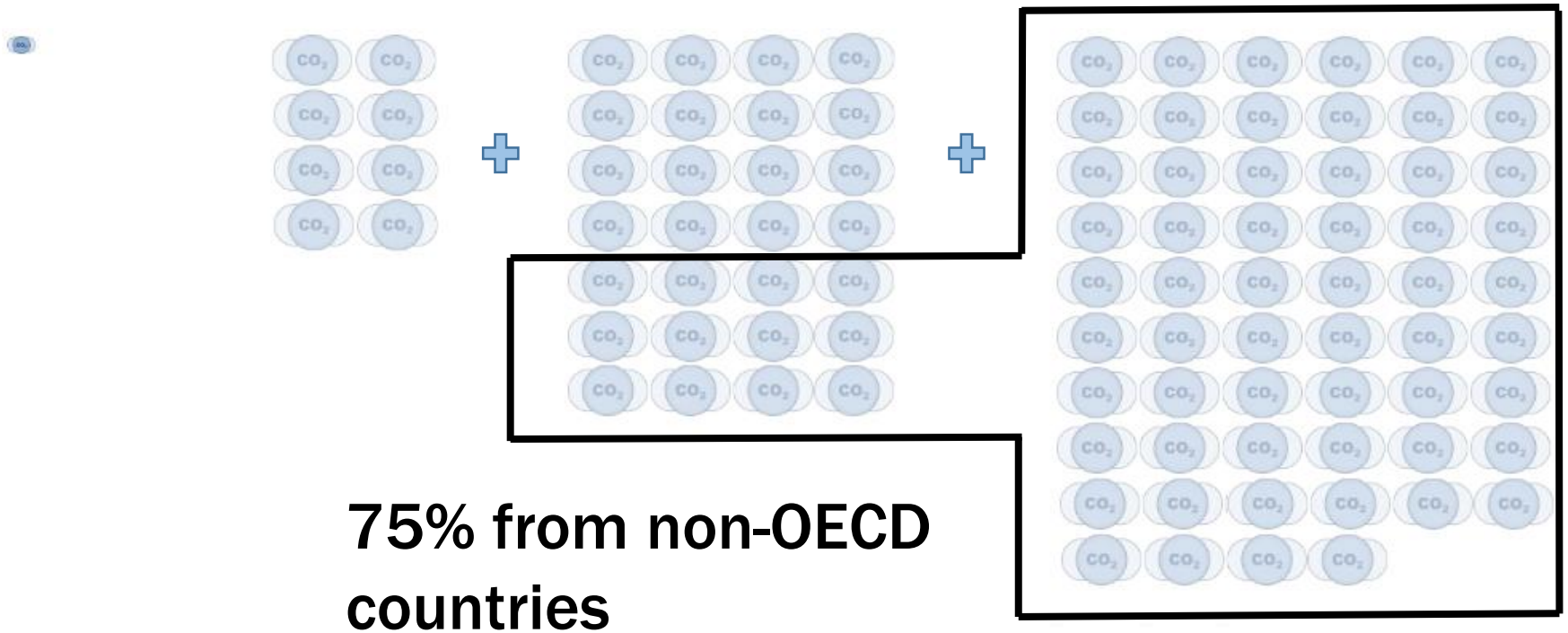
A total of 94Gt captured and stored through 2050 in IEA 2DS

1996-2016:
< 1 Gt
verifiably stored

2017-2030:
8 Gt

2031-2040:
28 Gt

2041-2050:
58 Gt



75% from non-OECD countries

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1 Gt = 1 billion tonnes

Modified from Jean-François Gagné, IEA, 2016 GHGT-13

An Invitation to Countries

- Opportunities are available at all levels for "getting on the path" to CCS.
- Explore your potential for geological storage of CO_2
- Utilize funding mechanisms to build your capacity in CCS – e.g. CTCN and GCF
- Attend capacity building workshops
- Become involved in the Carbon Sequestration Leadership Forum
  - Ministerial-level international initiative supporting CCS development
- Explore memberships with experienced organizations

carbon sequestration leadership forum

http://www.cslforum.org/publications/documents/OffshoreStorageTaskForce_FinalCombinedReport.pdf

Thank you

Katherine Romanak
Gulf Coast Carbon Center
Bureau of Economic Geology
The University of Texas at Austin

katherine.romanak@beg.utexas.edu

http://www.beg.utexas.edu/gccc/