Success Stories: Tomakomai and the Illinois Basin – Decatur Project

Sallie E. Greenberg, Ph.D.

University of Illinois – Illinois State Geological Survey

Japan-Asia CCUS Forum 2020

6 October 2020

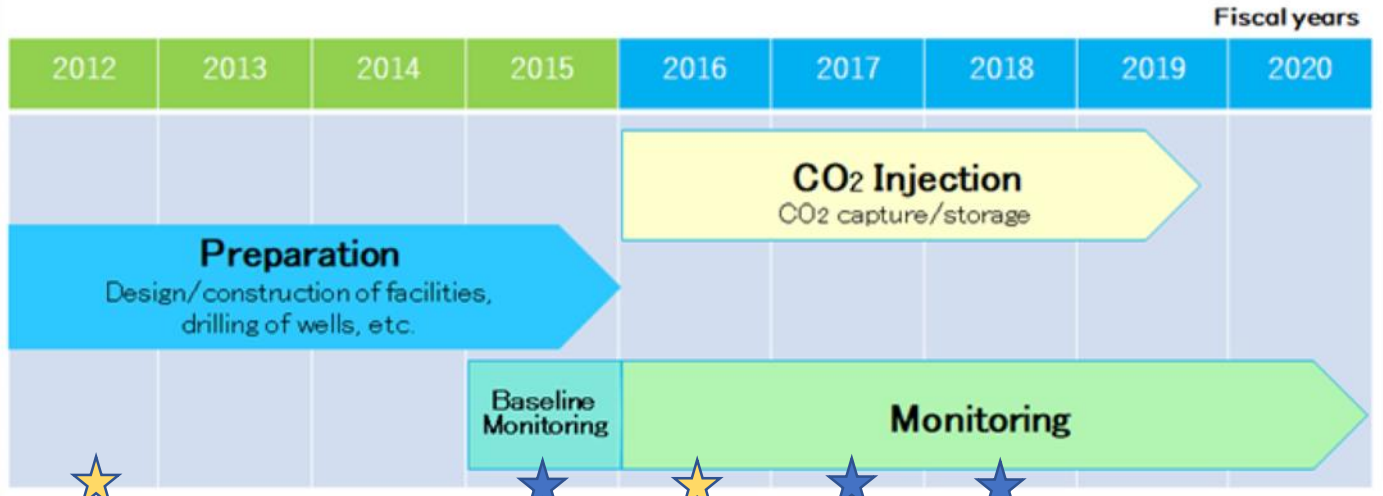
Industrial CCUS Sites

Illinois Industrial Sources CCS

Illinois Basin - Decatur Project

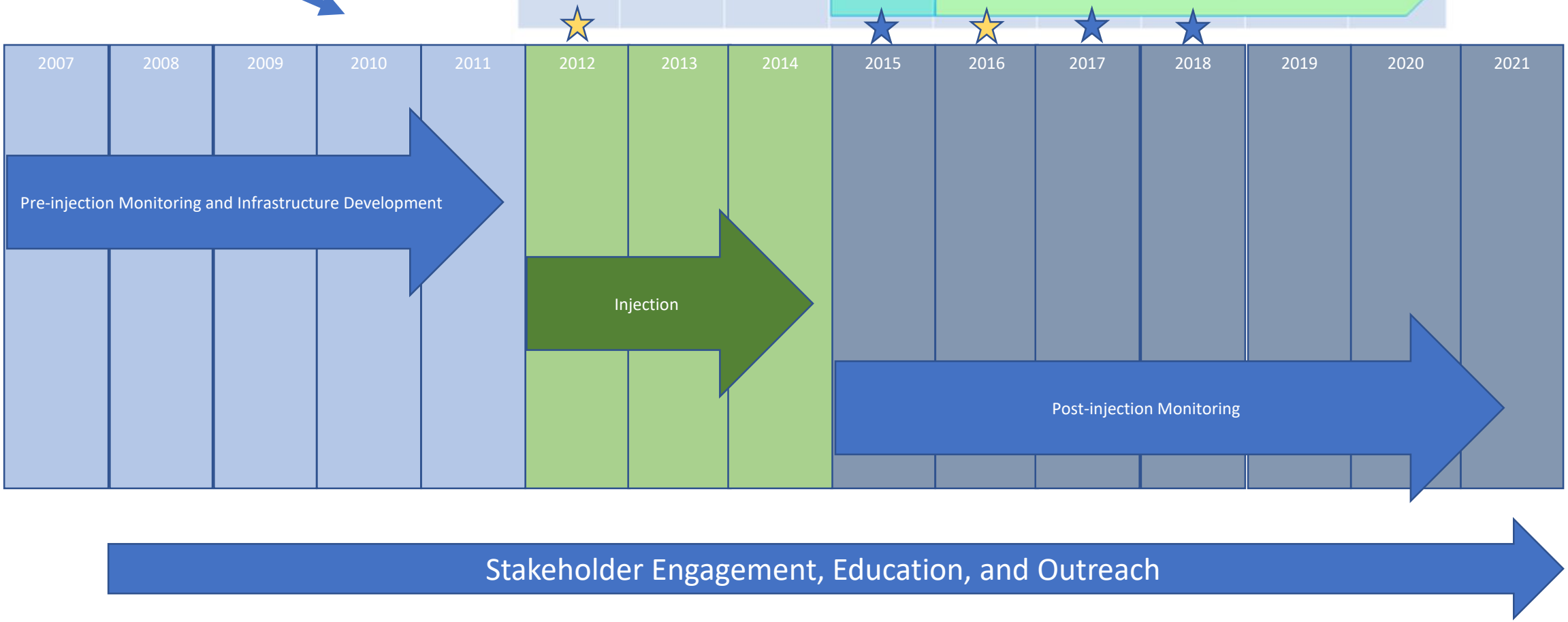
Tomakomai

Illinois Basin – Decatur Project



Collaboration Points

Tomakomai Site visits



Stakeholder Engagement, Education, and Outreach

Project differences

- Tomakomai
  - Onshore to offshore storage
  - CO_2 from hydrogen production
  - Capture with amine process
  - 300,110.3 tonnes stored
  - Directional wells into target formations
  - Injection into 2 formations
  - Injection depth ~1,000 m (Moebetsu Fm) and ~2,400 m (Takinoue FM)
- Illinois Basin – Decatur Project
  - Onshore storage
  - CO_2 from ethanol production
  - Capture direct offtake from ethanol
  - 999,217 tonnes stored
  - Straight wells into target formation
  - Injection into 1 formation
  - Injection depth ~2,000 m (Mt. Simon Sandstone)

Project similarities

- Public/private partnership
- Operated 3 years
- CO_2 stored in sandstone
- Caprock directly overlies injection reservoir
- Extensive public engagement
- Extensive monitoring programs
- Monitoring before, during, and after injection

Areas of Collaboration

Public Engagement

Monitoring

International Knowledge Sharing

JCCS' Approach to Public Outreach

JCCS core principles:

Building trust
Being creative in connecting with individual audiences

Implementing our approach by:

1. ***Sharing accurate information***
2. ***Maintaining cooperation***
3. ***Encouraging conversation***
4. ***Creating a personal connection***
5. ***Considering benefits to communities***

Objective:

Smooth delivery of the Tomakomai CCS Demonstration project
without any opposition from the public

JCCS

Project Stakeholder Engagement

1. Conduct projects to demonstrate safety and address gaps in knowledge or experience.
2. Engage local stakeholders, regulators, and project developers.
3. Provide proof of concept.

Policy Stakeholder Engagement

1. Create effective legal and regulatory mechanisms and policy to support widespread deployment of CCUS.
2. Engage lawmakers, coalitions, policymakers, and industry.
3. Set policy to incentivize CCUS actions and development.
4. Identify common ground and potential opposition points.

Public Stakeholder Engagement

1. Create public engagement programs and opportunities.
2. Engage the public to build trust in carbon management.
3. Increase understanding and support.
4. Connect with the "big picture"— economy, climate, creation of jobs.

Greenberg, 2019. Stakeholder spheres of engagement.

Shared Lessons Drive Advancement

- Geology is site dependent and will always remain key factor
- Pilot and demonstration projects provided critical insights - allows for advancement and economy of scale
- Stakeholder engagement and outreach essential
- Baseline environmental assessments are critical
- Flexible and adaptive monitoring is necessary
- Necessary to incorporate technology changes into life cycle of project
- Scientific and engineering timeframe often not aligned with policy
- Policy drivers are necessary to facilitate commercialization
- Regulatory, legal, and social factors require significant time investment

BUILDING ON SUCCESS

- Connection: Social awareness and recognition connected with
- Detail: Additional Sites for Characterization
- Assurance: Flexible and Adaptive Monitoring Programs
- Infrastructure: Integrating Multiple Projects
- Governance: Regulations, Pore Space

- Systemic Connections for Technical, Regulatory, Social, and Legal

Thank You

For more information:
sallieg@Illinois.edu

IBDP BY THE NUMBERS (IBDP + ICCS):

- 3 million stored from **biofuels**
- More than **5,000 meters** of drilled wells
- More than **245 meters** of collected core
- Near-surface groundwater monitoring efforts have resulted in more than **50,000 analyses**
- For basin-scale modeling, we will use **1,020,000 CPU-hours** of XSEDE supercomputing resources.
- More than **1,000 visitors from 29 countries** have been to IBDP and ICCS
- More than **100 people from at least 10 organizations** have worked together to make these projects a success

XSEDE is an NSF-sponsored supercomputer network

Major IBDP Accomplishments

- Conducted successful large-scale storage demonstration at an active industrial site
- Conversion of Illinois EPA Class I permit to US EPA Class VI permit
- Stakeholder engagement strategy built trusted relationships
- Met and exceeded technical and non-technical challenges
- Extensive site characterization & modeling leading to injection, monitoring, and increased understanding of microseismic reservoir response
- Extensive regional, national, and international partnerships and collaboration

REGULATORY FRAMEWORK