

Shell Exploration & Production

CCS: where we are and current challenges

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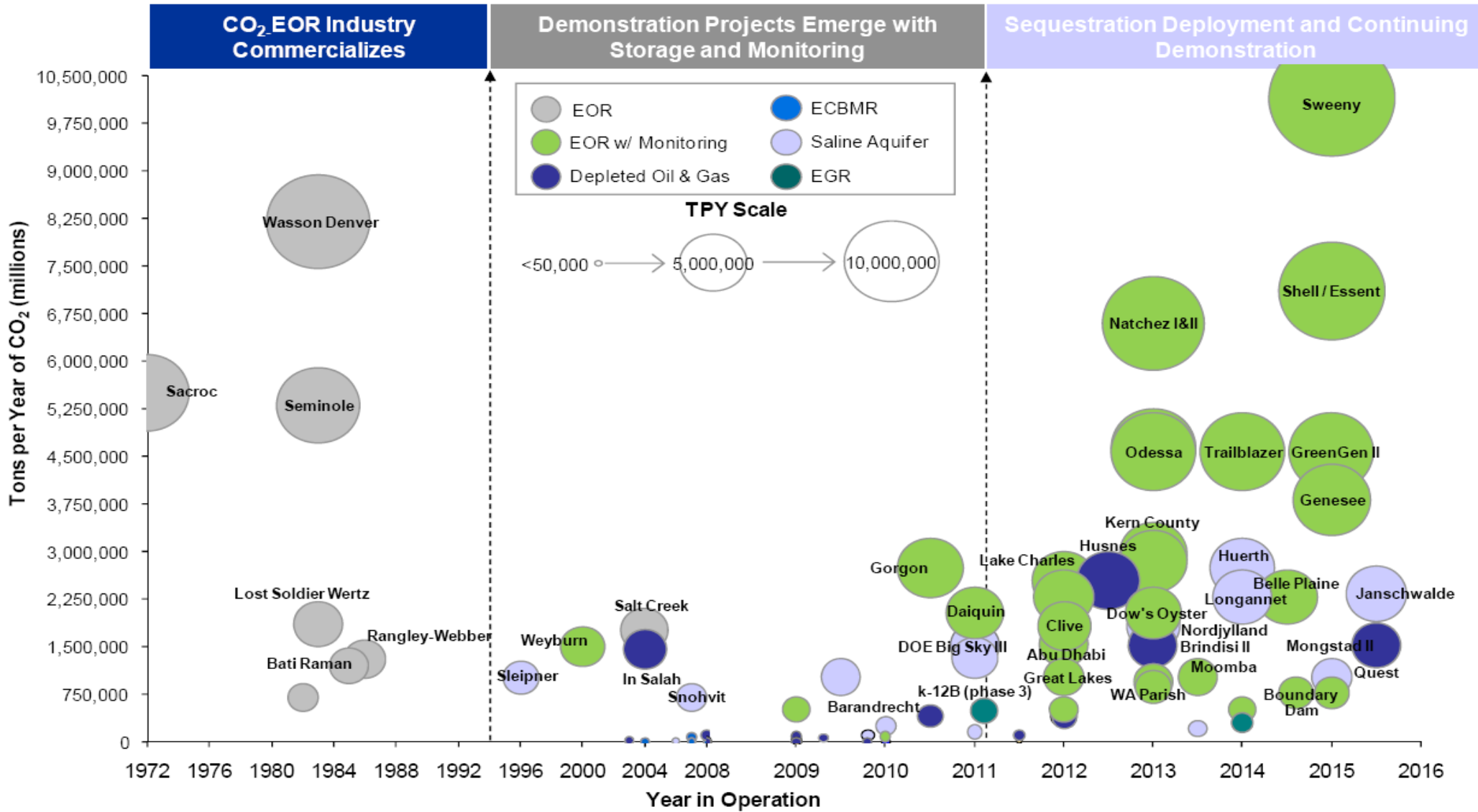
PANEL CONSIDERATIONS

- Achievements and lessons learned
- Progress and developments (technology, policy, regulations)
- Costs challenges
- Impact of the global financial crisis
- Governments – industry collaboration
- Public awareness
- Risks – reality and perception
- Potential for CO₂ storage

An industry perspective on how things are going and what the real barriers to global deployment are



EXISTING/PLANNED CO₂ SEQUESTRATION PROJECTS BY SINK TYPE



Source: Emerging Energy Research



SHELL'S PORTFOLIO OF PROJECTS TO DEPLOY CCS



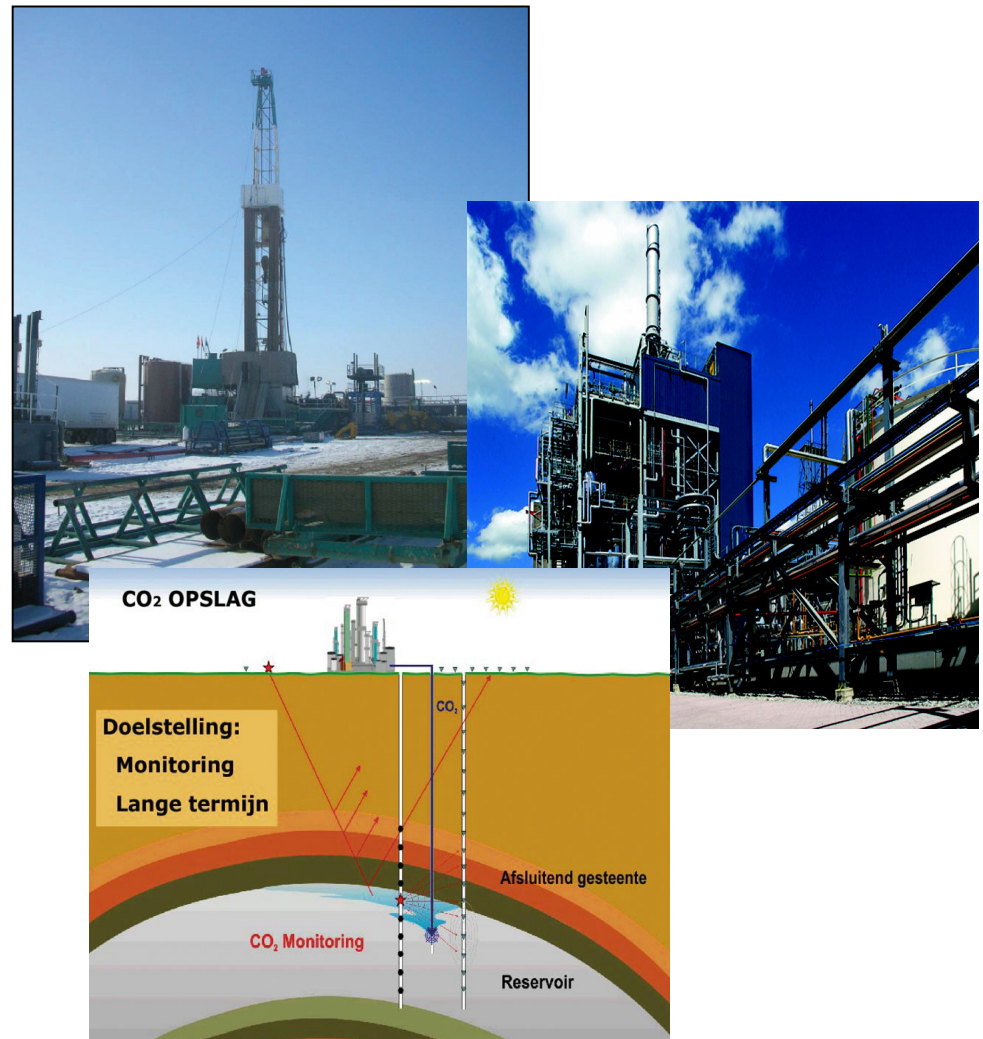
Shell developments and co-operation in Joint Industry Projects;

- CCS Demonstration / research projects (time bound, smaller scale)
- Industrial scale (>100 KTPA) CCS projects under development



YES, THERE ARE TECHNICAL CHALLENGES . . .

- Scaling up capture
- Site selection
- Storage capacity
- Contaminants
- Efficiency
- Monitoring



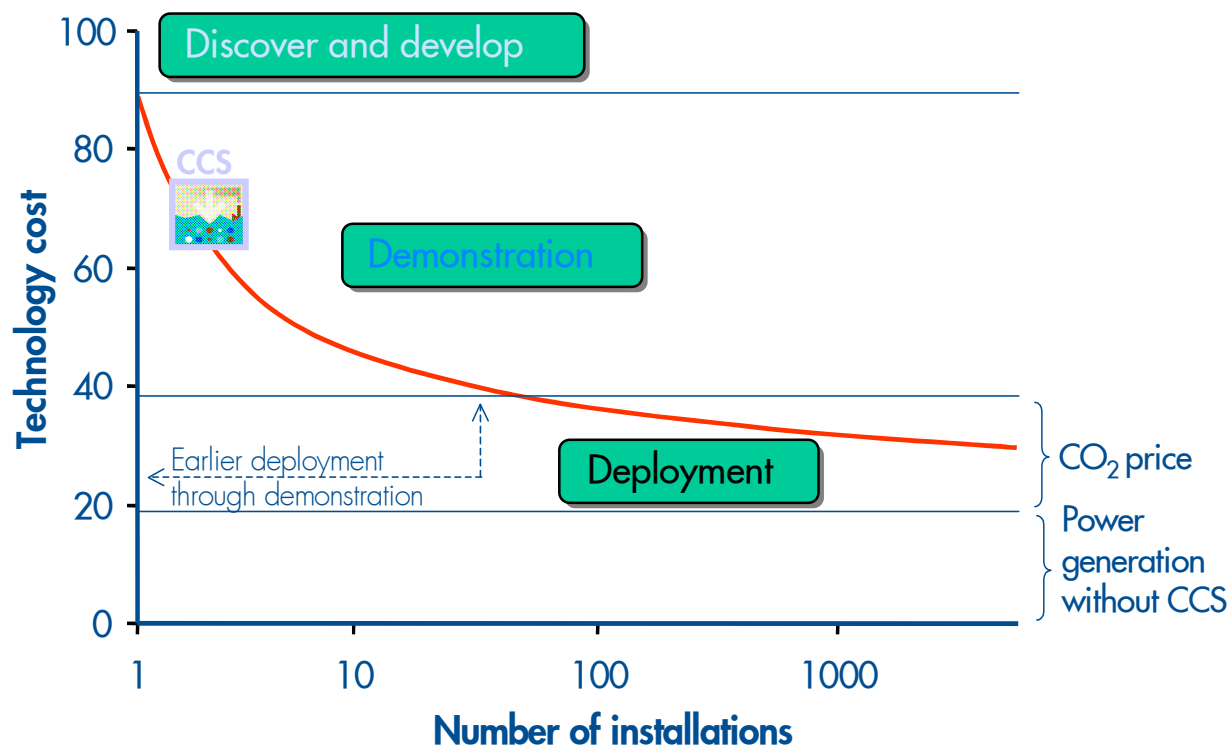
. . . BUT THE REAL CHALLENGES ARE NON-TECHNICAL

- Societal awareness/acceptance
- Commercial framework – covering costs (!!)
- First mover disadvantages/risks
- Regulatory framework for pore space access
- Long-term liability



COST CURVE OF NEW ENERGY TECHNOLOGY

BRINGING CCS DOWN THE COST CURVE



PHASES TO DEPLOYMENT

- **Discover and develop**
Need to refocus and rapidly expand research and development
- **Demonstration**
No early adopters and high start-up costs – this phase needs support
- **Deployment**
Typically driven by the CO₂ market

CCS is driven almost entirely by climate change considerations, therefore requires clear incentives linked to policy goals that gives price signals to the value of emissions avoided



WHAT WILL BE REQUIRED TO DEPLOY CCS AT LARGE SCALE

- Awareness; case for action, what CCS is (not) about and why the world needs it
- Funds or incentives to kick-start CCS
- Long-term frameworks for support
 - CCS into C&T and CDM, storage certificates
 - Sectoral Agreements
- Do projects
 - drive down costs, build capability
 - build confidence with all stakeholders
- Clarity on standards and regulations
- Work on infrastructure challenge
- Co-ordinated support by global institutions, eg IEF, IEA, CSLF, GCCSI, ICAP, ZEPP, others



**Needs support from all stakeholders, incl
Industry, Gvts, NGO's, Public, etc.**

*Above all:
leadership in Copenhagen !*



Thank You

