


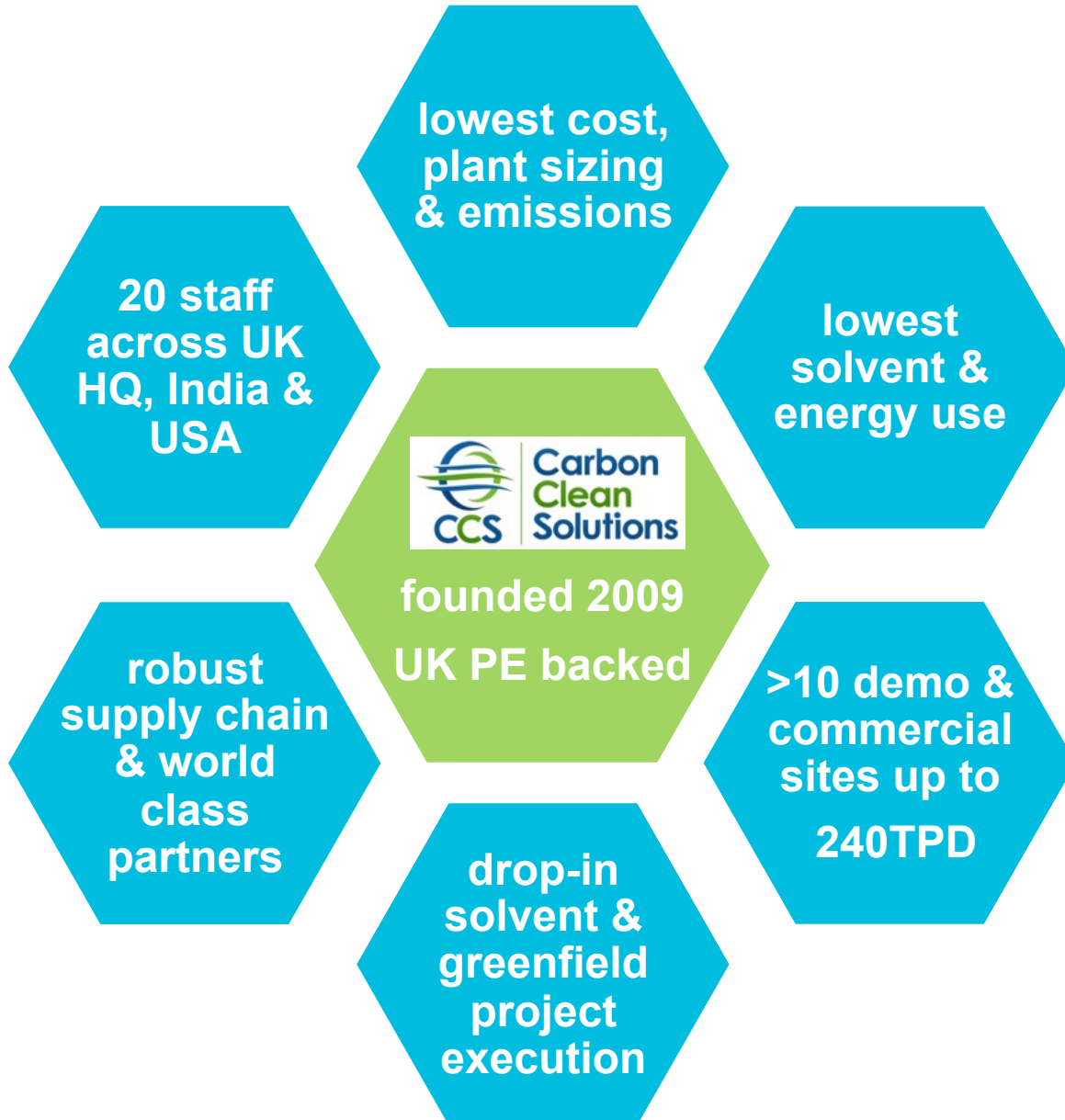


CO<sub>2</sub> TECHNOLOGY  
CENTRE  
MONGSTAD



**Advancing Breakthrough  
CO<sub>2</sub> Capture Technology to  
Commercial Scale**

# Carbon Clean Solutions at a glance.....



In association with:

**TNO**

**Imperial College  
London**



Department  
of Energy &  
Climate Change

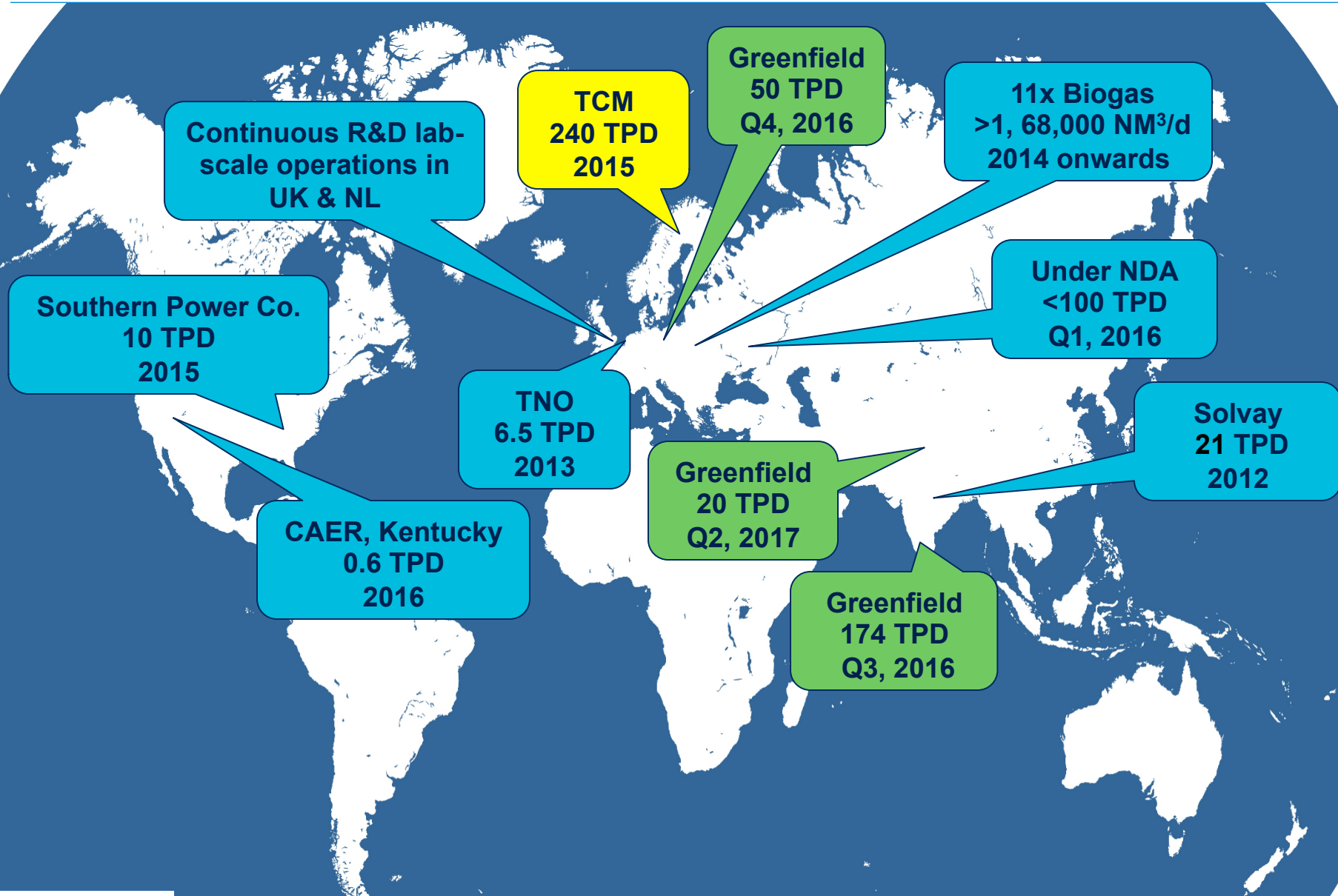
U.S. Department of Energy

**National Carbon Capture Center**

WORLD  
ECONOMIC  
FORUM

Technology Pioneer

# Key CO2 Capture Projects



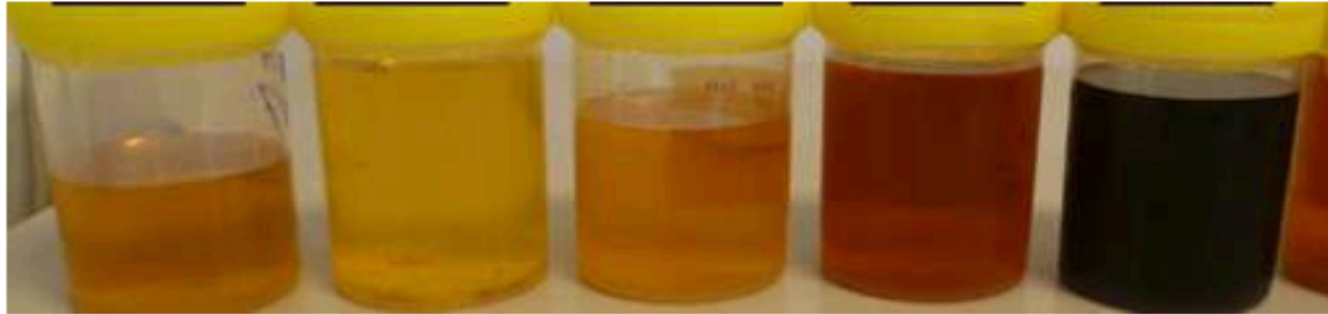
TPD – tons per day

# Results from Mongstad Demo

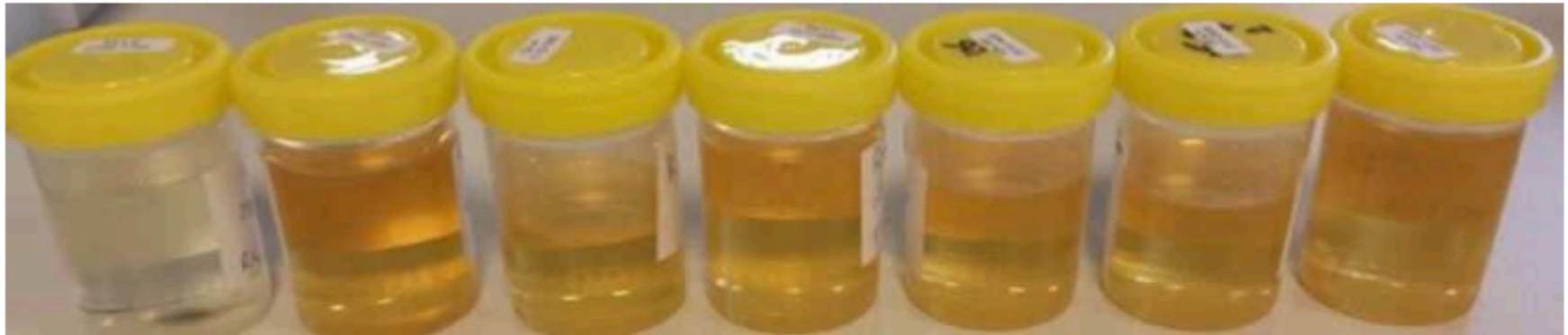
- **25,000 tons CO<sub>2</sub> captured via two campaigns**
  - Zero downtime → 100% reliable operations
- **Less corrosion; cheaper material of construction (S235) for 50% of the plant**
  - Use of cheaper steel → CAPEX saving ~ 25%
- **Parts per billion (ppb) level ammonia emissions**
  - 165x times less solvent degradation into ammonia
- **Well below permissible limit of solvent emissions**
  - 80x times less aerosols emissions

# Superior Solvent Stability

## MEA visual change in 1000 operating hours

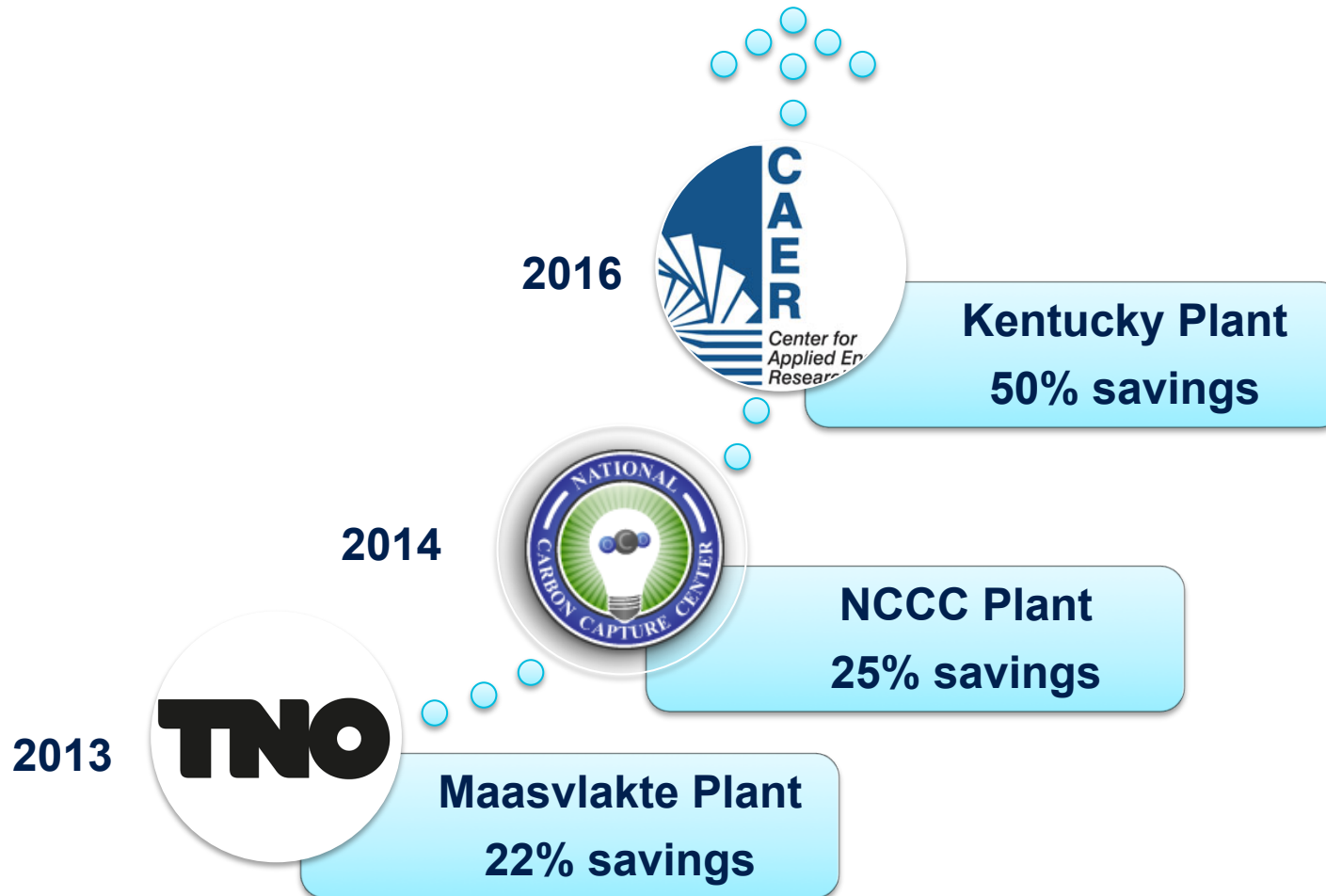


## APBS visual change in 1000 operating hours



Validation E.ON Maasklavte plant

## Energy comparison to MEA (Coal fired post combustion CO<sub>2</sub> capture plant)



# Industrial scale project in India



- 174 Tons/Day of CO<sub>2</sub> capture from 10MW coal-fired boiler
- Captured CO<sub>2</sub> will be purified to food grade
- Based on CCSL design and patented chemical
- Commissioning in Q2 of 2016
- 40% smaller footprint, major carbon steel use

# Key Benefits of our APBS Solvent

- Demonstrated patented technology
- **CAPEX saving ~ 25% va MEA;**
- **Energy savings upto 50% vs MEA;**
- Lower vapor pressure → less corrosive → less degradation
- **REACH and GHS** compliant solvent material safety datasheet;
- Building first of it's kind CO2 capture from power plant project in India. Captured CO2 to be used for chemical production
- Looking for partners to execute future industrial carbon capture (iCCU) projects



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