

Carbon TakeBack Obligation

How to ensure CO₂ production is balanced by storage 2020-2050

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Carbon production by humans >> atmosphere limit

Atmosphere
870–1,240 Gt CO₂

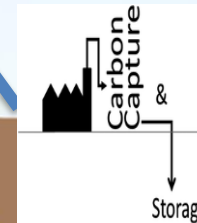
1750 to 2020
Already 1°C of
average global
warming

Need Carbon
TakeBack

Biomass
harvest

Soil
use

Industry
processes



Produced just 10%
1500 Gt CO₂

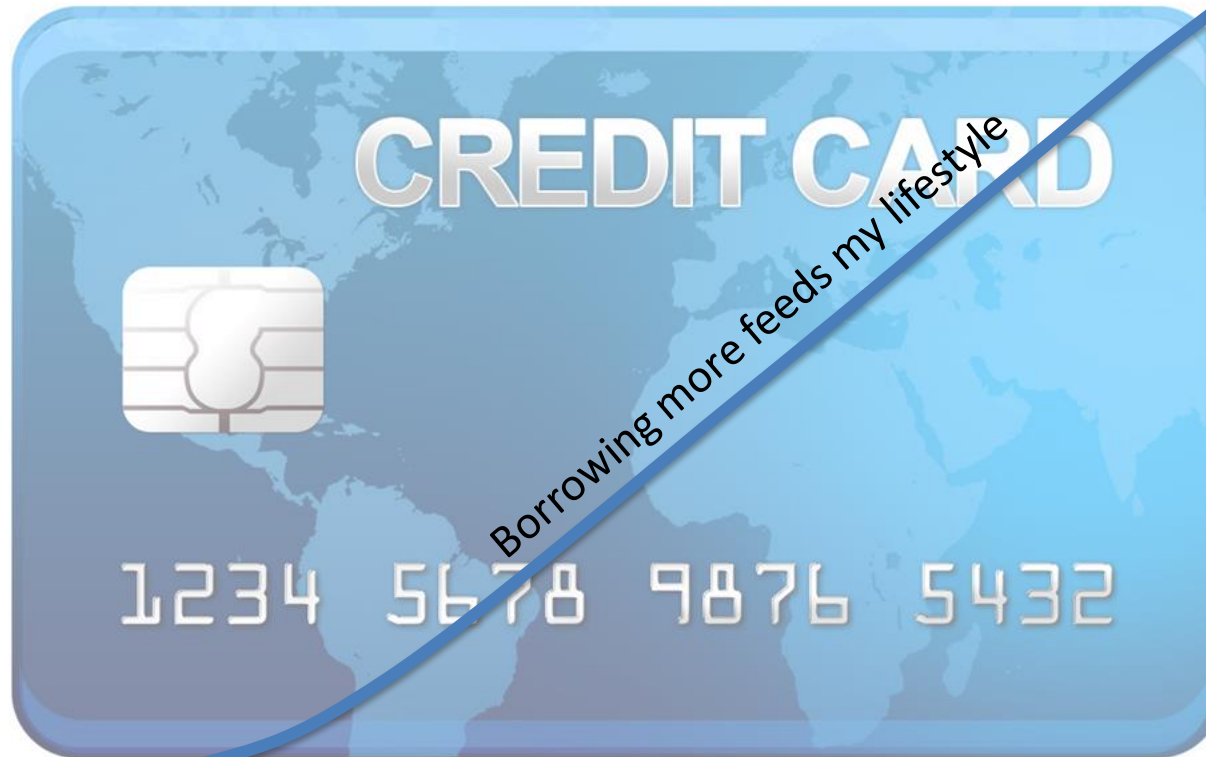
Fossil resources
11,000 Gt CO₂

Edenhofer, Jakob 2015 Nature

Carbon on credit

Credit limit for climate and earth service damage. permanently

Cumulative billions of tonnes carbon dioxide



Reduce expenditure (efficiency)

Insulate the building (CCS)

Cleaner stuff (renewable)

Pay the debt (CTO)

Borrowing less each month does not pay the debt

Compulsory payments
flooding, hurricane, fire

Long duration carbon storage >1,000 - 10,000 yr

Capture is not STORAGE

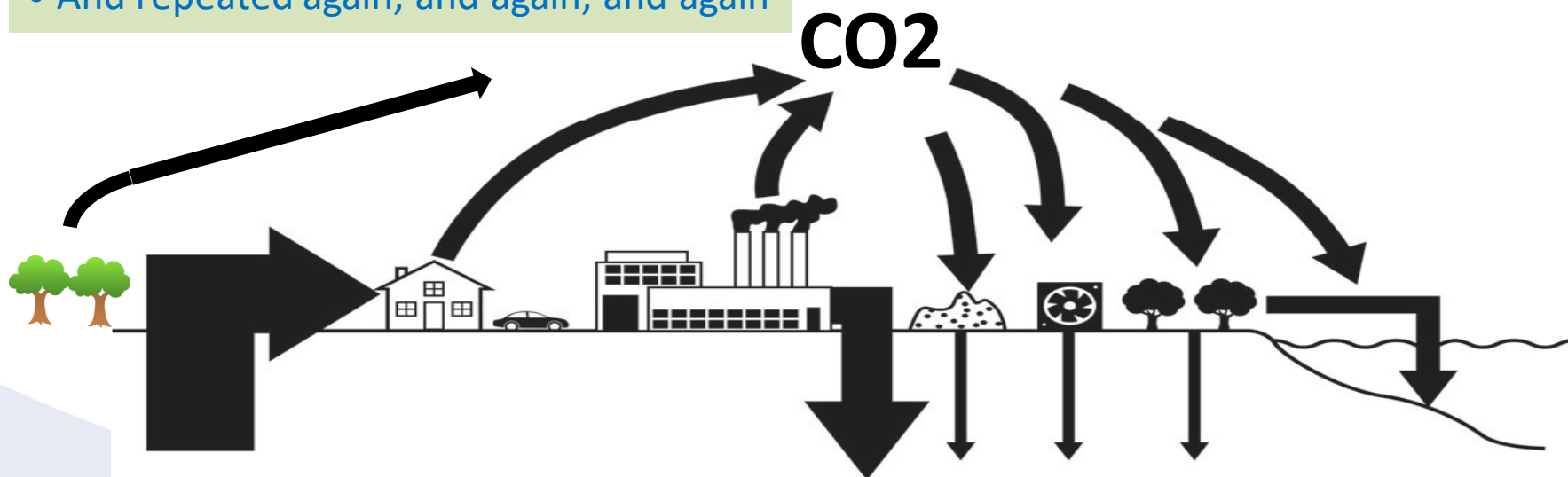
Nature Solutions

- Peat restoration, tree planting and growth, soil re-carbonization
- ALL require 10 to 100 years of carbon growth to be verifiably stored
- And repeated again, and again, and again

STORAGE is forever

Technology solutions

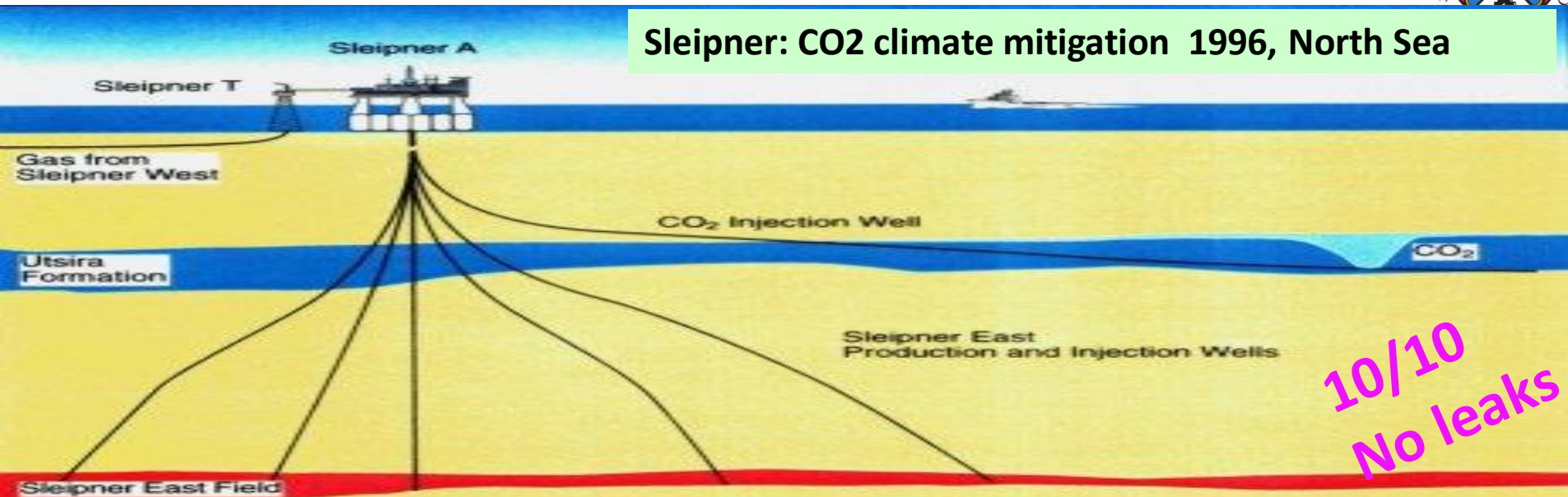
- CCS - to reduce emissions
- BECCS - biomass energy and store carbon
- DACCS - air recapture already emitted CO₂
- ALL can store carbon geologically, with minimal intervention, for **10,000 yr**



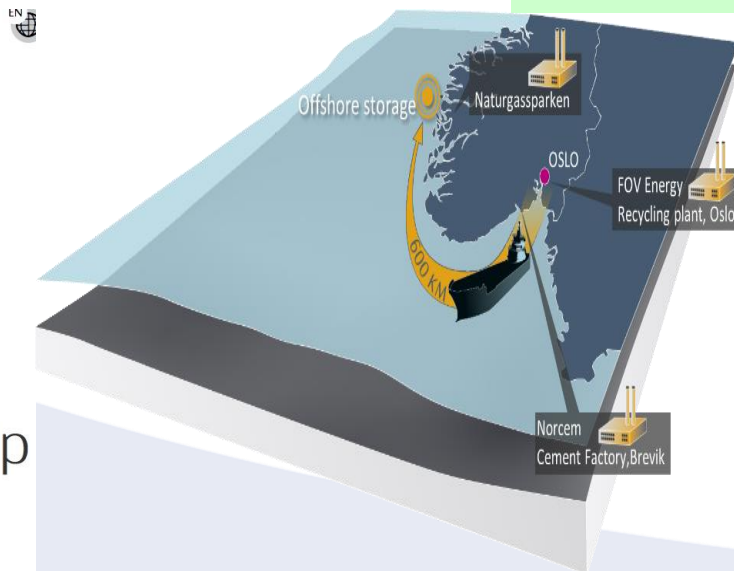
Paying for capture does not repay the debt

Ensuring storage repays the debt

CCS exists : decades of injection & monitoring

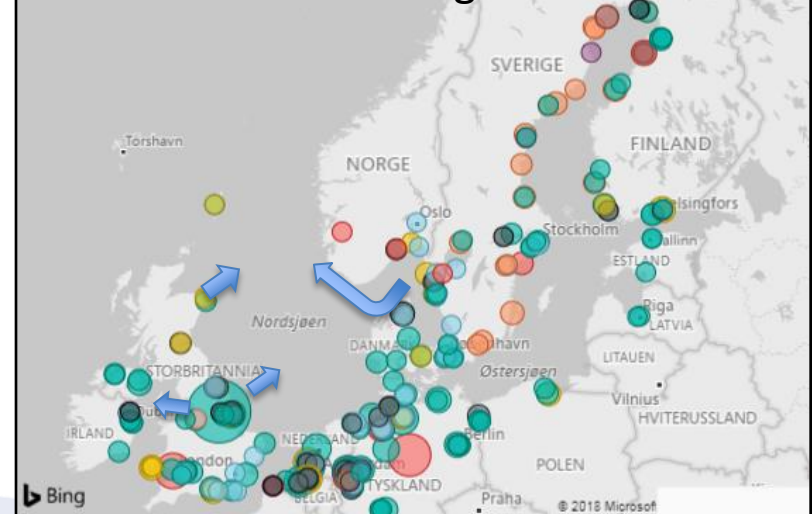


Statoil,
Shell
and
Total
enter
CO₂
storage
partnership



Northern Lights, Equinor : CO2 business 2020, North Sea

Sources of CO2 seeking CarbonTakeback

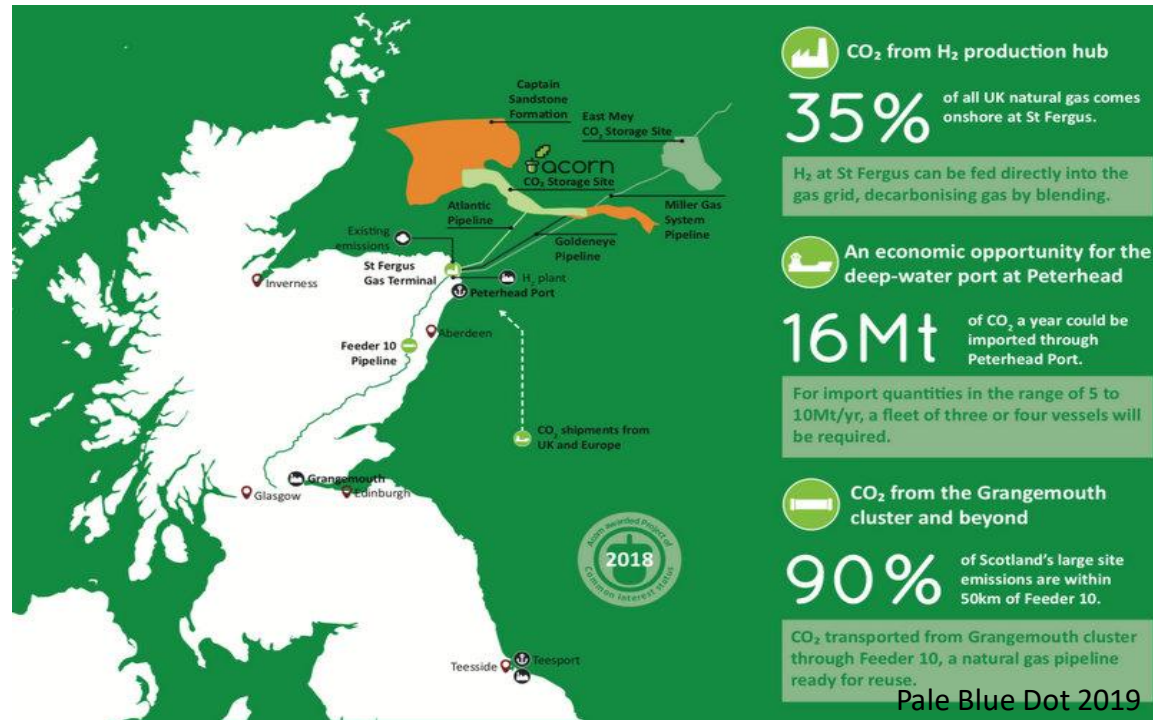
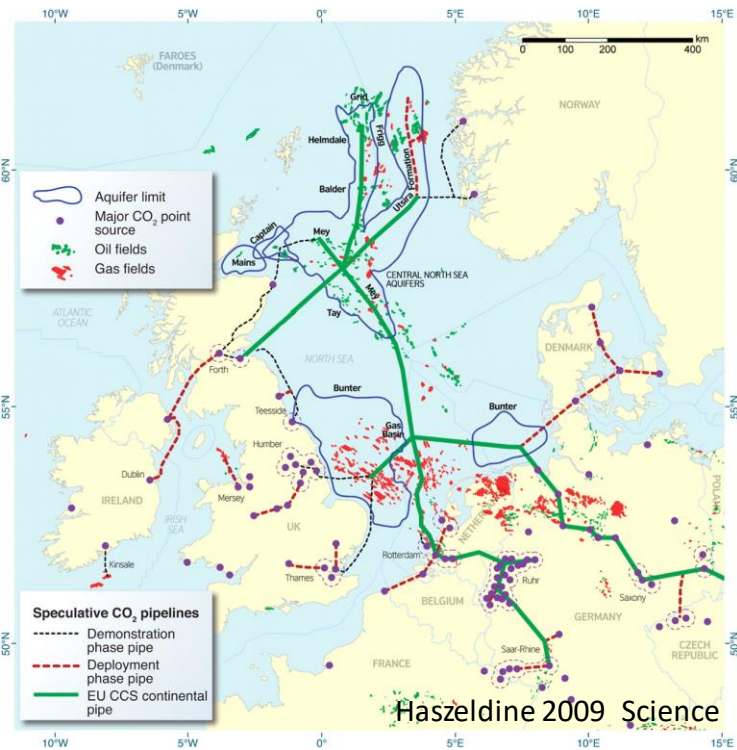


North Sea CO2 network: pipes & ships



Re-skilling coastal industries

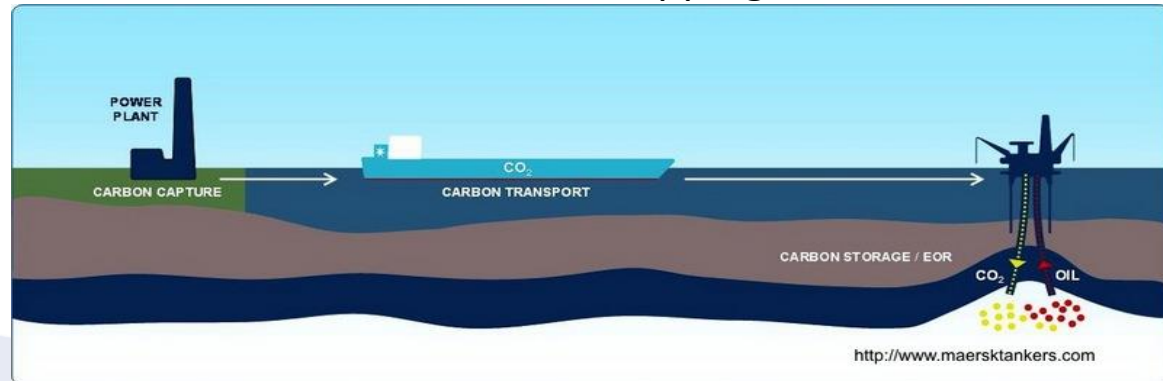
Re-inventing offshore engineering



Infrastructure pipes



Infrastructure shipping



CERTIFICATES : create CO2 storage market



CTO: Carbon Takeback Obligation

ENVIRONMENTAL carbon certificate GIVEN at border – fuels (and goods)

NO MONEY : develop CO2 storage - at low cost - competition

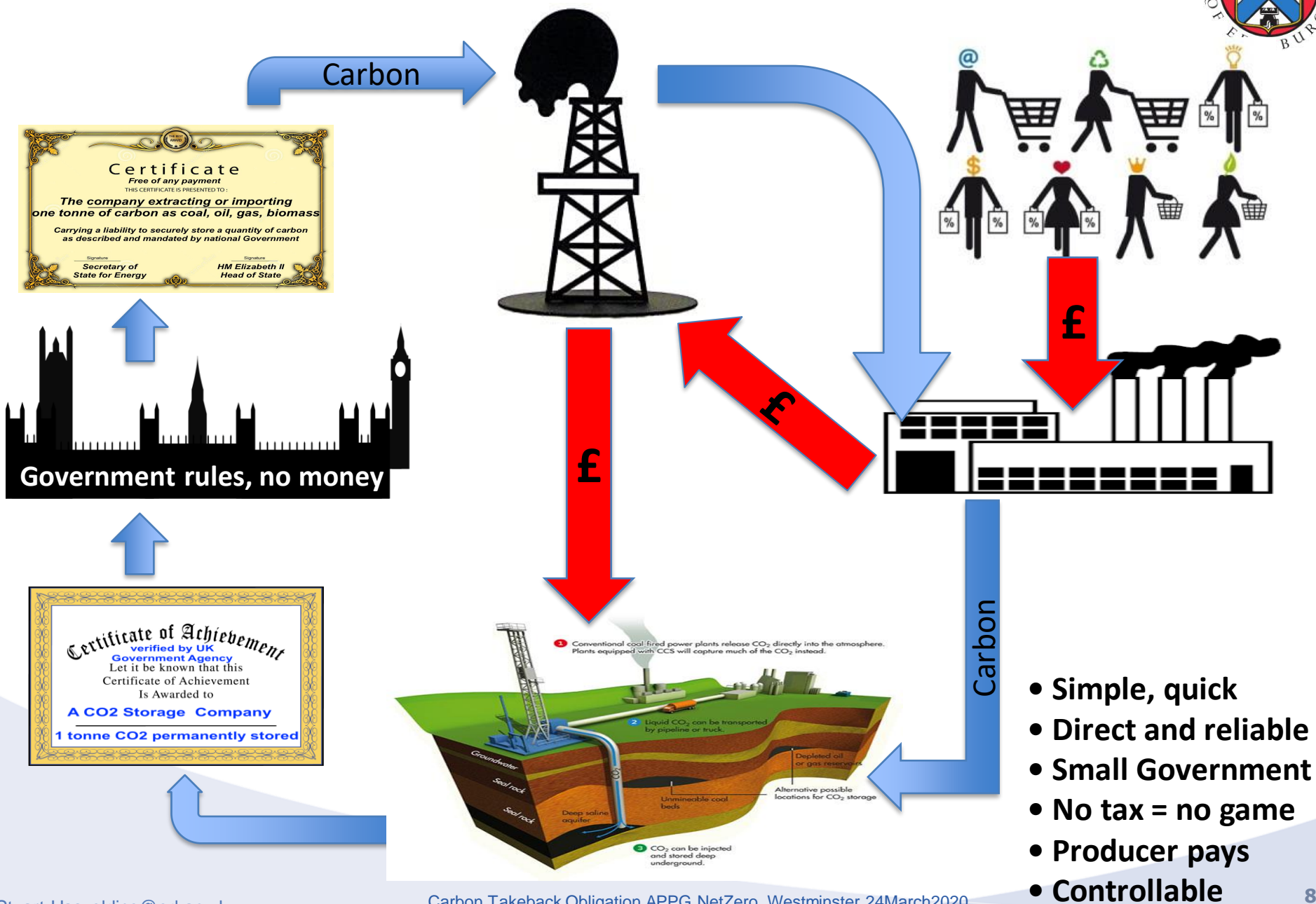
OBLIGATION cancelled on PROOF of storage. Flexible and direct

Similar to: Extended Producer Responsibility Obligation : Circular

Haszeldine
2016 Oxford Rev
Economic Policy,
32, 304–322

Allen, Haszeldine,
Hepburn,
Certificates for
CCS at reduced
public cost:
Energy Bill 2015
<http://hdl.handle.net/1842/15698>

Carbon TakeBack Obligation, and Storage Certificate



CoP26, Glasgow: needs a Big Idea



CoP Paris Agreement 2015

Hold warming to significantly less than 2 C

Best efforts to keep warming less than 1.5C

Net zero by mid-century

CoP Marrakech 2016, Bonn 2017, Katowice 2018, Madrid 2019

Implementing Paris Agreement, sustainability, UN climate goals

Article 4 - NDC pledges to reduce domestic emissions - **TO REPORT**

Article 6 - rules for carbon markets and international co-operation - **TO AGREE**

2020

122 nations considering Net-Zero targets: 30% global GDP, 19% energy CO₂. (IEA, Paris)

6 transnational oil companies seeking full mitigation of ALL emissions

FTSE 100 global companies seeking practical actions to mitigate carbon disclosure

Proposal 2020

- UK awards **Carbon Certificates**, creates **TakeBack Obligation** to store
- Uses existing £320M Industry fund to capture existing 1 M ton/yr at industry Tees & Mersey
- Uses existing £800M infrastructure fund to create 3 Shipping, pipeline and storage regions
- **Forms global CarbonTakeBack Alliance** - like “Powering Past Coal” in 2018

END