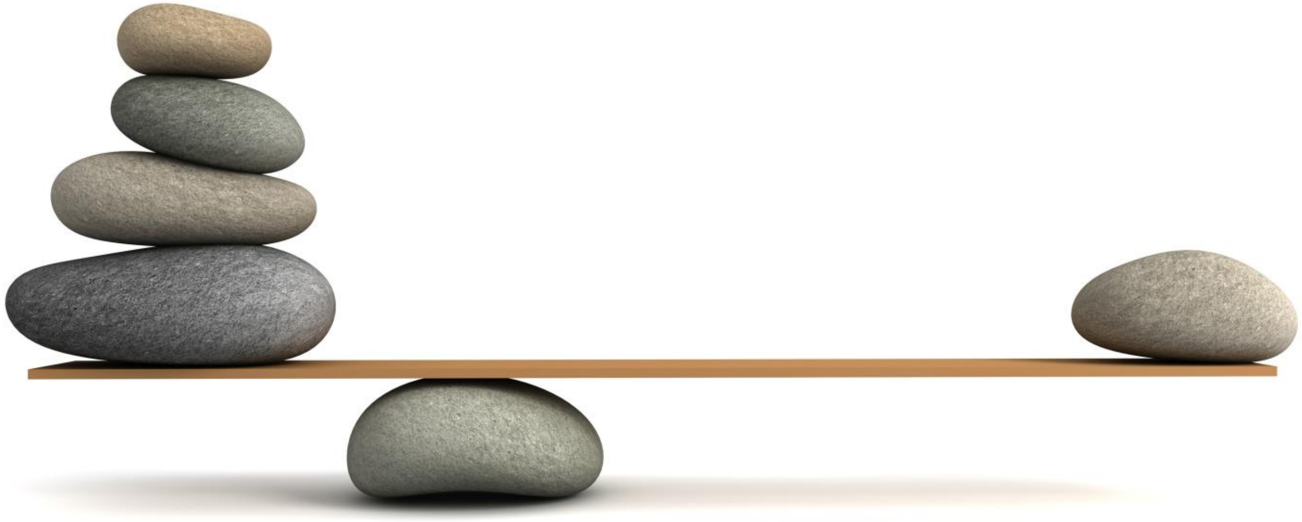
Future carbon credit demand, supply and prices



IETA, 30 June 2020

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Research aims and study team

Research aims	Study team

1. How much demand for carbon credits could materialise between now and 2050?

2. Where would the supply come from?

3. How much will it cost to provide this supply?

4. What are the implications of national climate commitments under the Paris architecture on the availability and prices of carbon credits?

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UCL

Future carbon credit demand

1. Economy-wide scope 1 and 2

+

2. International aviation (CORSIA)

+

3. EU oil company scope 3 emissions

Global carbon credit demand

Future carbon credit demand – (1)

1. Economy-wide scope 1 and 2 emissions – three approaches

a Annual Average Growth Rates

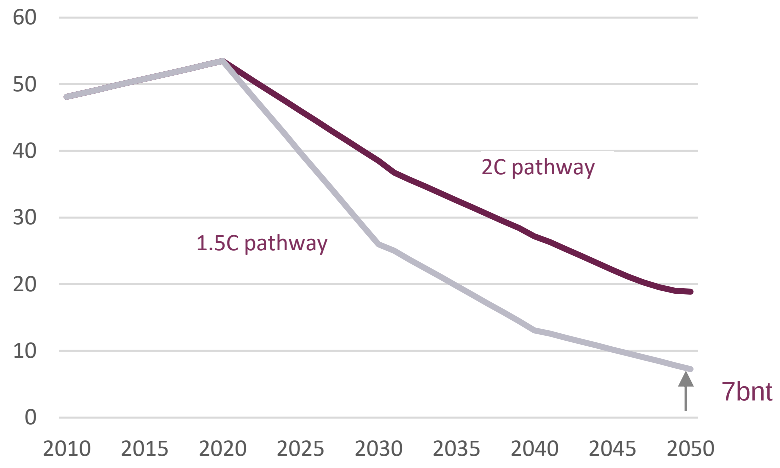
Annual Average Growth Rate (AGGR)

Year	CAGR over following decade	
	Low	High
2020	19%	19%
2030	10%	15%
2040	10%	15%

Source: Trove Research analysis

b Global Residual Emissions

Global GHG emissions pathways consistent with Paris Agreement targets (bntCO$_2$e) [1]



Business sector = 85% global emissions

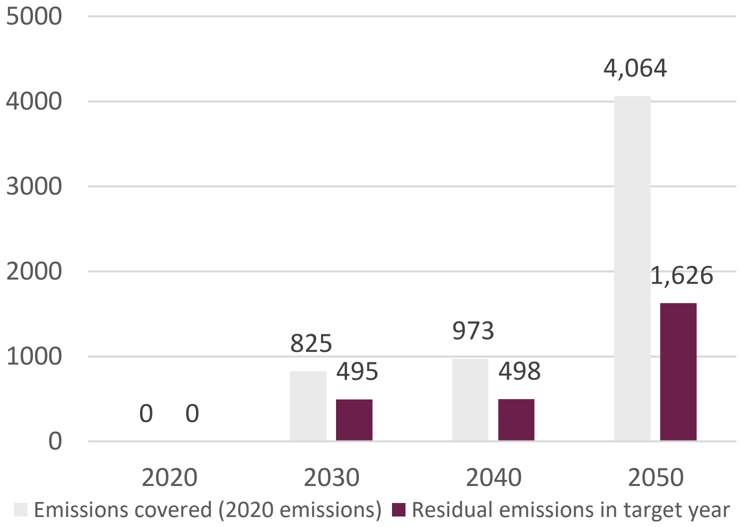
Low: 10% offset by 2050 (1,100Mt)

High: 33% offset by 2050 (3,360Mt)

1. Source: Climate Action Tracker, 2021. Includes all GHGs.

c Residual Emissions from Net Zero Companies

Residual Emissions from Net Zero Companies by Target Year (MtCO2e/yr)



5,600 companies | 368 Net Zero Commitments

Source: Trove Research analysis

Future carbon credit demand - (2)

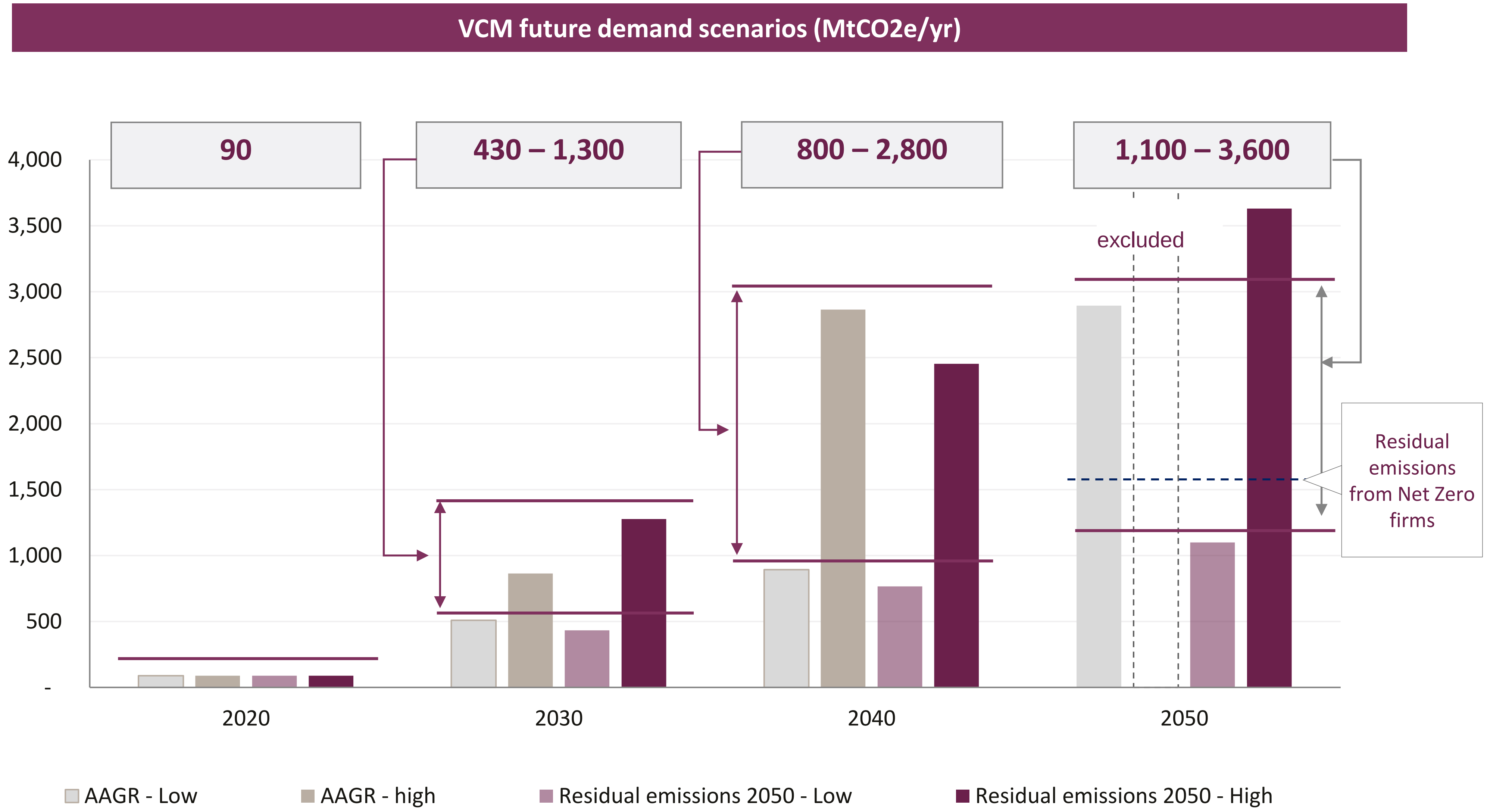
2. International aviation (CORSIA)

		Annual average demand 2020-2050 ($MtCO_2e$)
Low	**Growth in international aviation suffers longer term decline.** Pre-pandemic growth does not resume until 2025, and then follows ICAO Trend Report growth rates	130
High	**Growth in international aviation resumes at the pre-pandemic rate** in 2022 and ICAO Trends Report.	320

3. EU oil company scope 3 emissions

		Annual average demand 2020-2050 ($MtCO_2e$)
BP, Shell, Total, Eni, Equinor, Repsol. **Output of energy products maintained but carbon intensity reduced by 50% by 2050.** **Residual emissions offset.**	Low	310
	High	620

Future carbon credit demand



Source: Trove Research

Forecasting future supply

Global supply curves for average of 2020-2050

Project type
1. Nature based Solutions
(i) Forest restoration
(i) Avoided deforestation (REDD+)
1. Negative emission technologies
(i) Carbon capture & storage (CCS)
(i) Bioenergy with CCS (BECCs)
3 Renewable Energy in Least Developed Countries.

Inputs

Land availability (350x350m)

Carbon uptake of available land

Country allocation

Unit cost calculations

Grassland, shrubland, Open (degraded) forest, Closed degraded forest, Wetlands

Deforestation rates (population driven model)

Land values

Commodity price forecasts to 2050 (60 x 159 countries)

Project MVR costs

CCS development projections

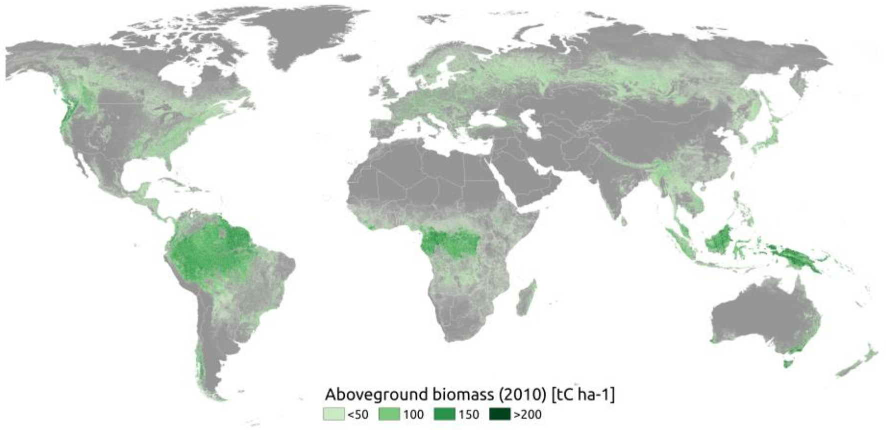
Unit cost calculations

RE potential in LDCs x carbon intensity

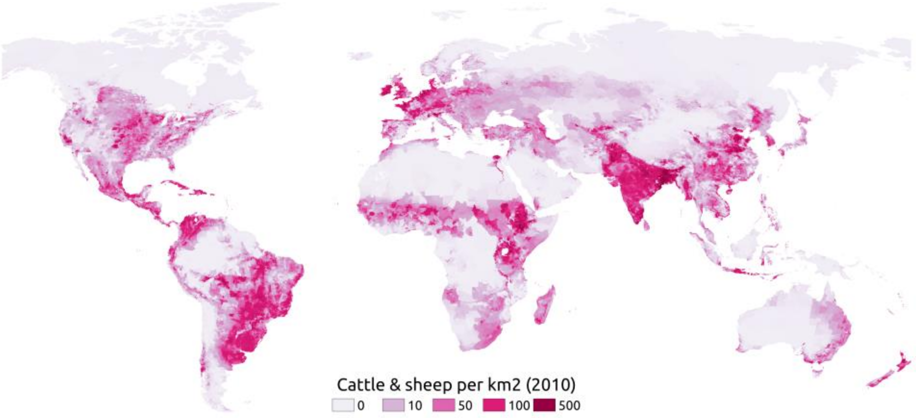
Unit cost calculations

Forecasting future supply – multiple data layers

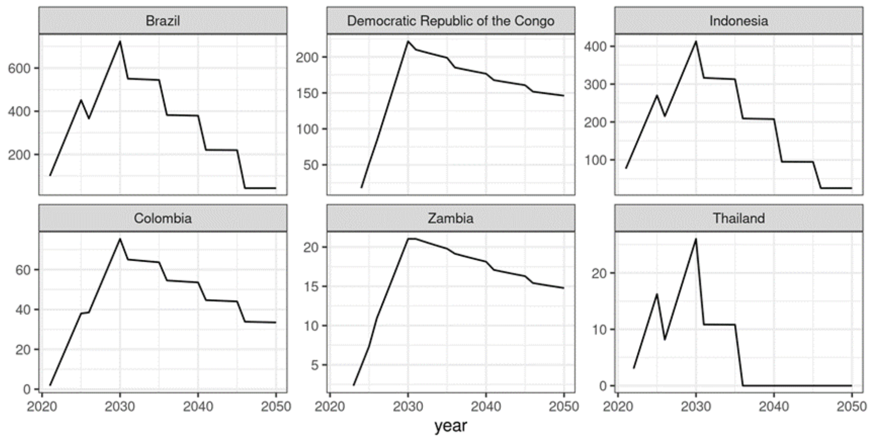
Above ground biomass stocks



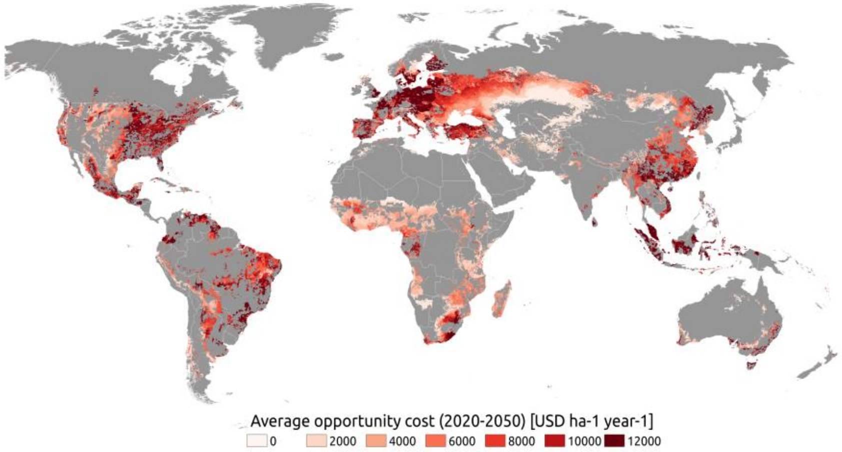
Cattle & sheep per km2



Modelled deforestation rates

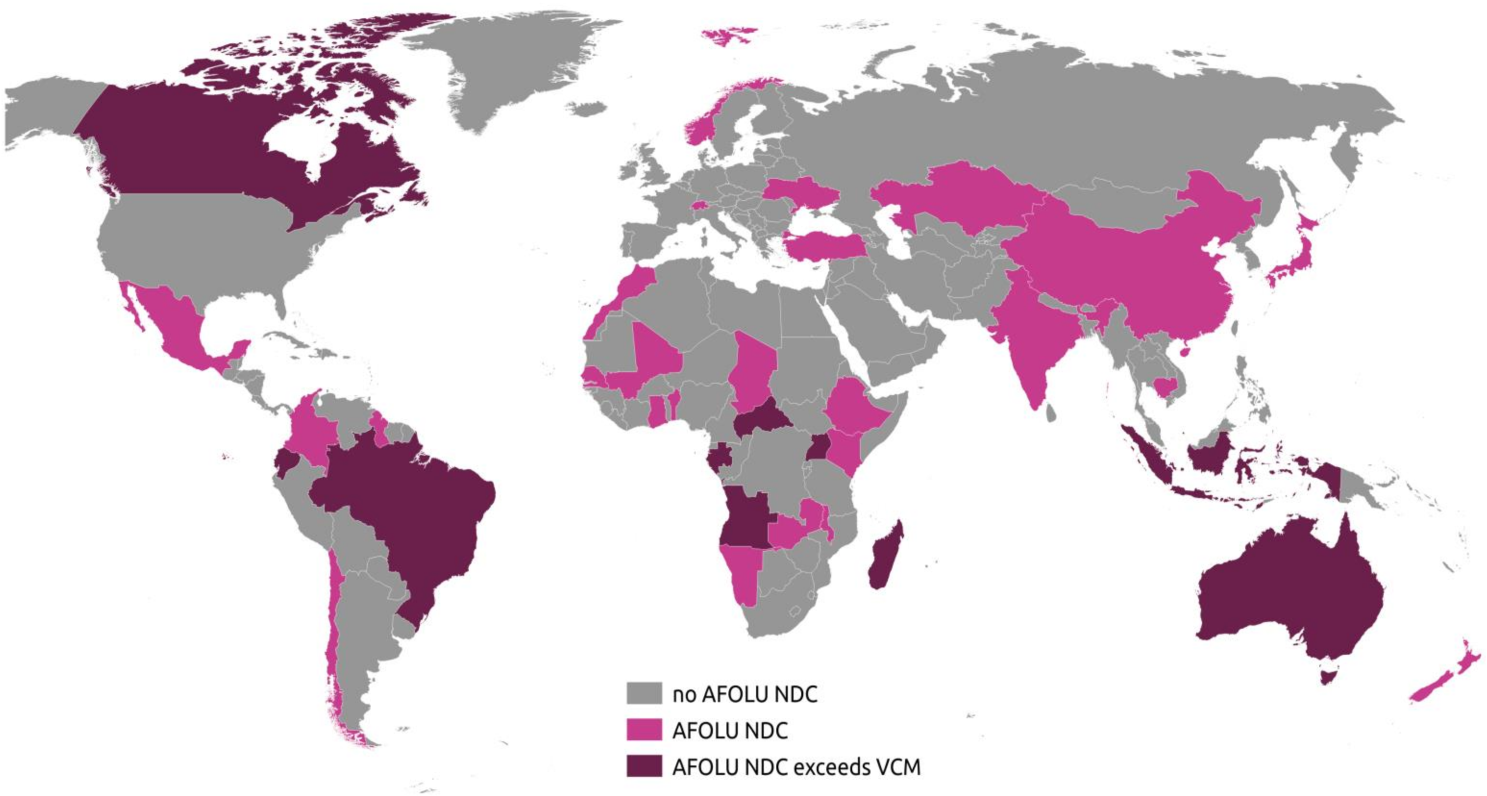


Opportunity cost per ha/yr



Forecasting future supply – Adjusting for AFOLU NDCs

Countries with AFOLU included in NDCs



Source: Trove Research, Grassi et al

Scenario run to see effect of 100% policy additionality for voluntary carbon market projects

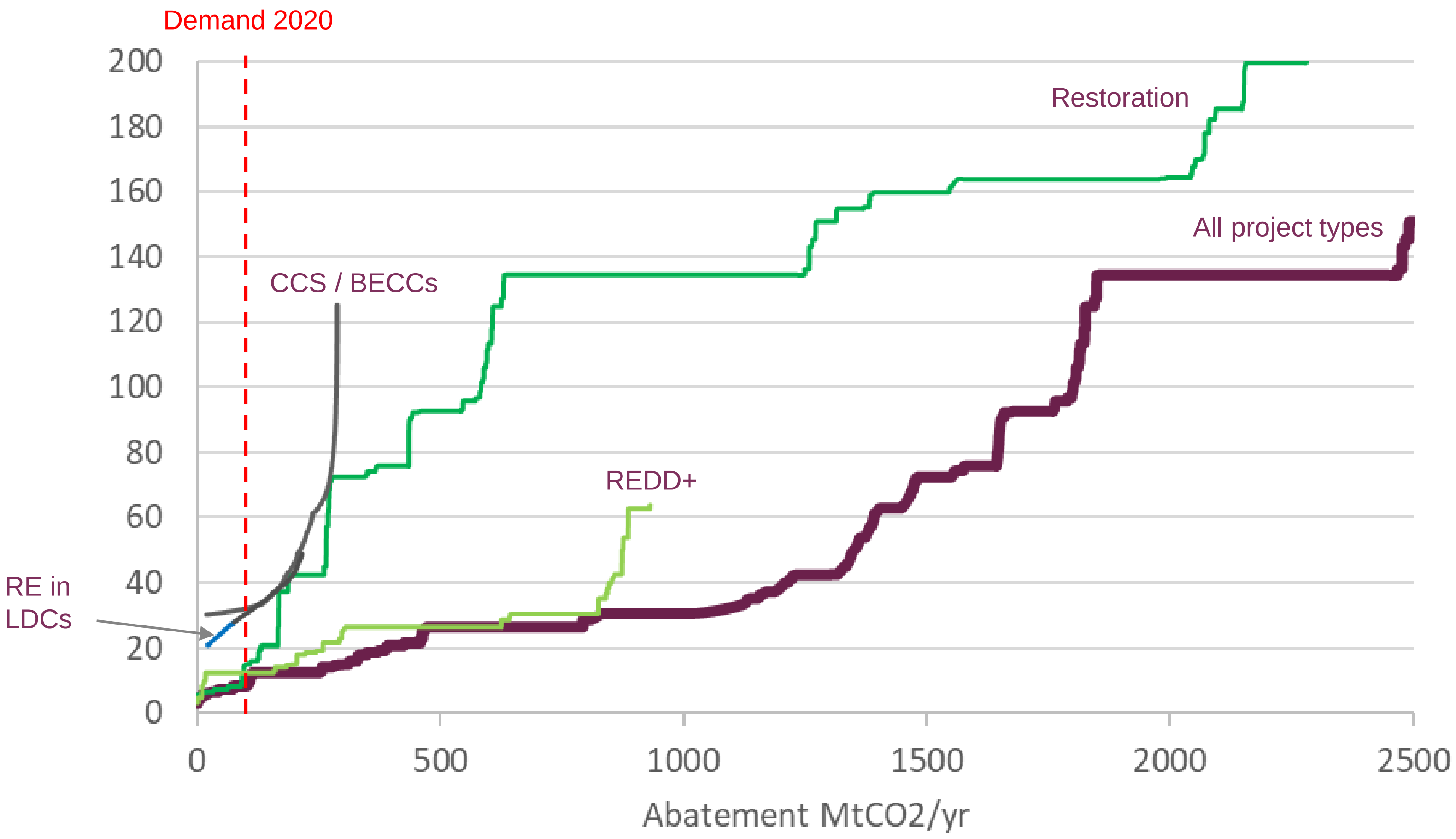
Share of NDCs from AFOLU sectors deducted from supply – assuming governments prioritise least cost projects first.

42 countries covered accounting for 66% of reductions available from land-use sector.

In some countries AFOLU in NDC > modelled supply (differences in modelling approaches and assumptions). These countries assumed to have zero volume available for VCM.

Forecasting future supply

Global carbon credit supply curve (excluding NDC adjustments) – Average over period 2020-2050 ($/tCO$_2$e, 2020 prices)

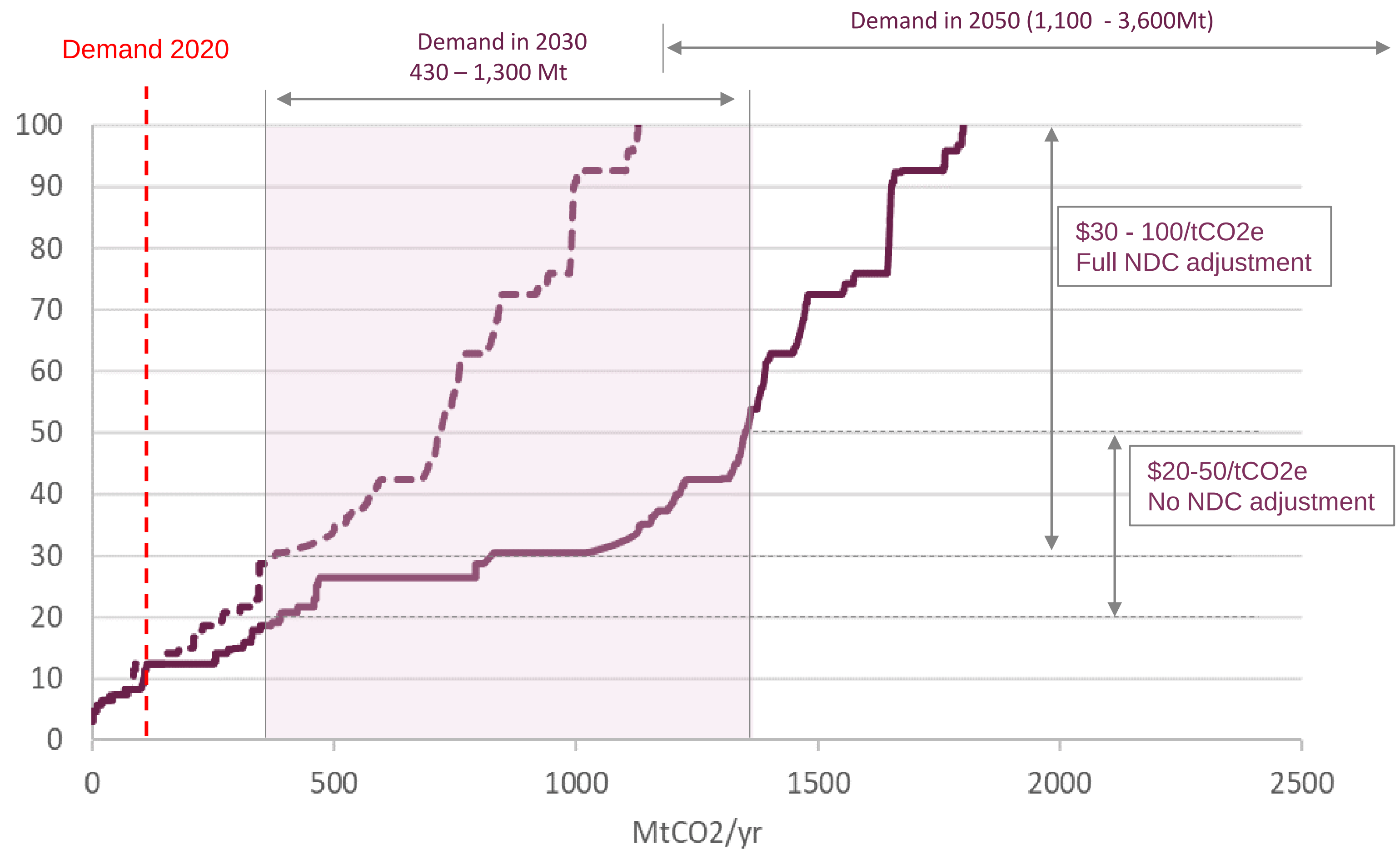


Potential for restoration x3 of that from REDD+, but at higher cost.

Contribution of RE in LDCs and CCS limited compared to REDD+ and restoration.

Forecasting future supply

Global carbon credit price projections – Average over period 2020-2050 ($/tCO$_2$e, 2020 prices)



By 2030

$20 – 50/tCO2e (without NDC adjustment)

$30 – 100t/CO2e (with NDC adjustment)**.**

By 2050

$30 – 100/tCO2e (with NDC adjustment)

Conclusions / Recommendations

1. If average prices (currently \$3-5/tCO2e) remain significantly below the forecast levels (\$30-50/tCO_2e in 2030), the credibility of credits in delivering additional emission reductions should be questioned.	⇦	Opportunities for low cost projects will run out
2. Protecting existing forests and restoring degraded land with above and below ground carbon mass should be prioritised.	⇦	Justified on basis of economics as well as biodiversity and social benefits
3. Impacts of Corresponding Adjustments needs to be carefully considered.	⇦	Requiring host governments to adjust their national emission inventories through the use of Corresponding Adjustments, could increase voluntary carbon credit prices substantially.

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