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Voluntary Confusion:

A Simple Comparison of Carbon Credits

Carbon reduction

D — **Community-based energy efficiency**

$ USD 5-20 / ton CO_2 eq.

Additionality	●●○
Permanence	N/A
Measurability	●●●
Scalability	●○○

D — **Renewable energy**

$ USD 2-20 / ton CO_2 eq.

Additionality	●○○
Permanence	N/A
Measurability	●●●
Scalability	●●○

D — **Forestry-based avoidance (REDD+)**

$ USD 5-30 / ton CO_2 eq.

Additionality	●●○
Permanence	N/A
Measurability	●●○
Scalability	●○○

Nature-based removal and storage / use

C — **Afforestation and reforestation**

$ USD 20-30 / ton CO_2 eq.

Additionality	●●○
Permanence	●○○
Measurability	●●○
Scalability	●○○

C — **Soil carbon sequestration**

$ USD 30-60 / ton CO_2 eq.

Additionality	●●○
Permanence	●○○
Measurability	●●○
Scalability	●○○

B — **"Blue carbon" habitat restoration**

? No data available yet

Additionality	●●●
Permanence	●●○
Measurability	●●○
Scalability	●●●

B — **Enhanced ocean productivity**

? No data available yet

Additionality	●●●
Permanence	●●○
Measurability	●○○
Scalability	●●●

B — **Seaweed and algae cultivation and burial**

? No data available yet

Additionality	●●●
Permanence	●●○
Measurability	●○○
Scalability	●●●

Technological removal and storage / use

A — **Direct air capture (DAC) and storage/use**

$$$ USD 600-1200 / ton CO_2 eq.

Additionality	●●●
Permanence	●●●
Measurability	●●●
Scalability	●●●

B — **Enhanced weathering**

$$ USD 20-1000 / ton CO_2 eq.

Additionality	●●●
Permanence	●●●
Measurability	●○○
Scalability	●●○

A — **Concrete building materials**

$$ USD 70-300 / ton CO_2 eq.

Additionality	●●●
Permanence	●●●
Measurability	●●●
Scalability	●●○

B — **Hydro-carbon fuels**

$$ USD 150-670 / ton CO_2 eq.

Additionality	●●●
Permanence	●○○
Measurability	●●●
Scalability	●●○

D — **CO_2-enhanced oil recovery (EOR)**

? Depends on capture tech

Additionality	●○○
Permanence	●●●
Measurability	●○○
Scalability	●○○

B — **CO_2-chemicals**

? Depends on capture tech

Additionality	●●●
Permanence	●○○
Measurability	●●●
Scalability	●●●

Hybrid removal and storage / use

A — **Biochar (incl. low energy production and cert. storage)**

$$ USD 60-150 / ton CO_2 eq.

Additionality	●●○
Permanence	●●●
Measurability	●●●
Scalability	●●●

B — **Bioenergy with carbon capture and storage (BECCS)**

$$ USD 60-160 / ton CO_2 eq.

Additionality	●●●
Permanence	●●○
Measurability	●●●
Scalability	●●○

B — **Building with biomass**

? No data available yet

Additionality	●●○
Permanence	●●○
Measurability	●●●
Scalability	●●●

Overall quality score

D — **Low quality**
Performs poorly on several of additionality, permanence, measurability, or scalability

C — **Moderate quality**
Performs poorly in either additionality, permanence, measurability, or scalability

B — **High quality**
Moderate to high additionality, permanence, measurability, and scalability

A — **Premium quality**
High additionality, permanence, measurability, and scalability

Evaluation criteria

We apply the following evaluation criteria to assess the quality of different carbon reduction and removal pathways.

Additionality

Does the market for carbon credits make this reduction / removal possible in the first place?

● **No additionality**
The project would have been realized even without the carbon credit

●● **Low additionality likelihood**
The likelihood that the project would have been realized without the credit is significant

●●● **High additionality likelihood**
Without the carbon credit, the project would have probably not been realized

Permanence

Can CO_2 be stored for 100+ years with low / no risk of leakage?

● **Temporary**
Less than 100 years, high risk of leakage

●● **Permanent**
More than 100 years, moderate risk of leakage

●●● **Highly permanent**
More than 100 years, low / no risk of leakage

Measurability

Do we have high quality and verified project data available?

● **Poor measurability (no verification)**
No project data available and hence no verification of carbon impact

●● **Moderate measurability (no verification)**
While some project data is available, there are no generally accepted verification protocols in place

●●● **Good measurability (verified)**
High-quality project data is widely available and verified through renowned and standardized processes

Scalability

Can the solution be scaled now and in the future?

● **Scalable in the short-run only**
Scalable in the short-term due to availability of natural resources and readiness of technology

●● **Scalable in the long-run only**
Not scalable in the short-term but once in the medium and long-run

●●● **Highly scalable**
Scalable short and long-run

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We are investors, not scientists: This is work in progress and our current view on this topic. Fight us in the comments :)

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