Vulnerability of CDM projects for discontinuation of mitigation activities

Innovate 4 Climate, Barcelona

Thomas Day, NewClimate Institute

22 May 2017

CDM status and prospects

- Registered CDM projects face substantial challenges due to record low CER prices
  - Implemented projects may no longer be able to cover their operational costs and/or transaction costs
  - Projects might not be implemented, shut down or modified for continuation outside the CDM
- Future of CDM post 2020 unclear
- Prospects for demand pre/post 2020 uncertain
  - ICAO‘s CORSIA (eligibility, vintage?)
  - some Parties proposed CER recognition towards achieving NDCs
  - Acceptance under ETSs
  - Purchase facilities, RBF, GCF Support?

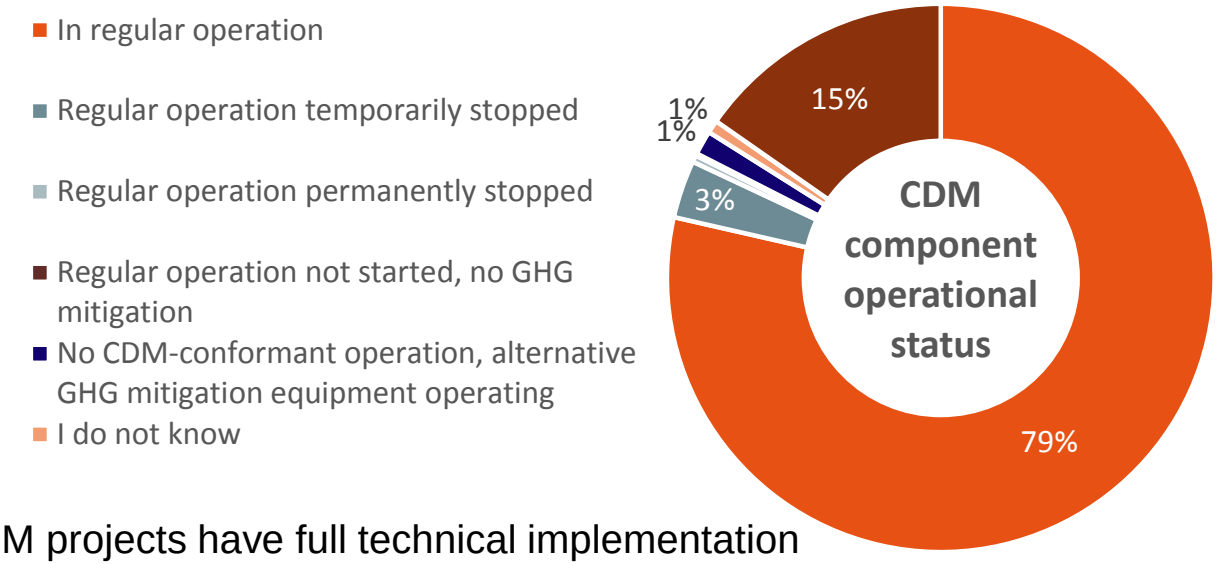
CDM portfolio analysis

- Solid up-to-date information required to design tailored approaches for efficient and effective support
- Empirical analysis of the situation of CDM project activities on different levels: globally, project types and host countries
- Creation of a database with great value for tailor-made recommendations and support

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Study insights

What is the operational status of the CDM component of the GHG mitigation activity?



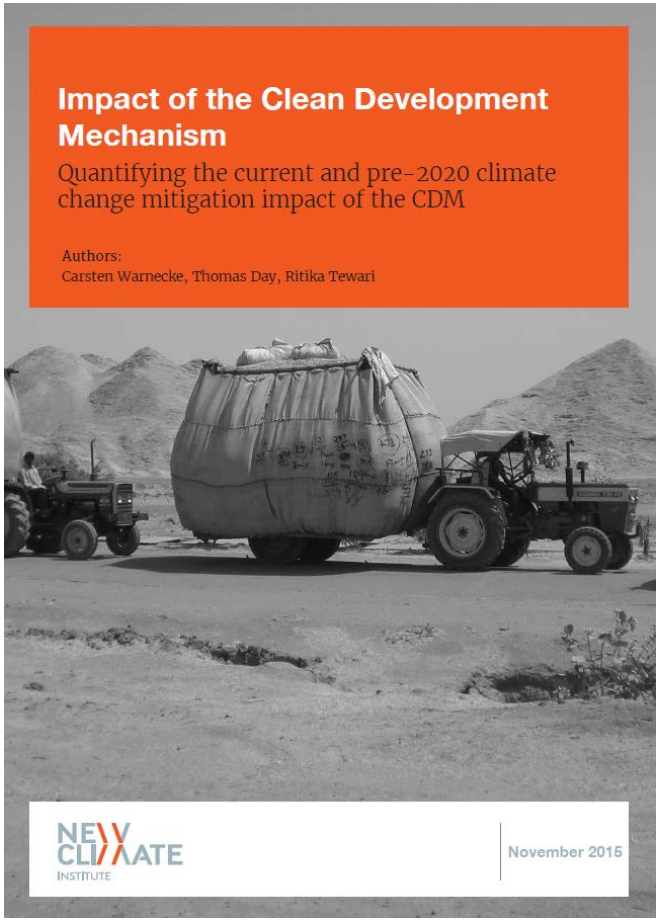
- Up to 85% of registered CDM projects have full technical implementation (68% excl. China and India)
- Up to 79% of registered CDM projects are in regular operation (53% excl. China and India)
- Between 39% and 67% of CDM projects regularly operate their CDM monitoring system
- CER revenues are sufficient for fewer than 3% of implemented projects
- High rate of irreversible investments (N_2O lowest, nitric and adipic acid)

Study insights

- Significant variations between project types and countries
- Substantial risk that loss in capacity, institutions and investor confidence becomes irreversible
- Short-term demand and long-term ambition equally important to build a perspective for mitigation activities
- CDM's positive impact for the climate still continues but significant risk of reduction in mitigation activity
- Some low "hanging fruits" are at high risk to emit again

CDM‘s climate impact

- Status of CDM projects, relative to emission reductions
- Quantification of net-mitigation impact of the CDM
- Unintended - CDM is designed as a zero-sum offsetting mechanism
- Undesirable - Unintentional net-mitigation comes with a enormous cost in terms of disenfranchised private investors



Study insights

3. Projected net mitigation impact	2014	
	Study population	Entire CDM (indicative)
Projected emission reductions MINUS Projected credit supply	275 MtCO2e	480 MtCO2e

Overview of net mitigation impact

Net mitigation impact 2014

480 MtCO2e

64% of all CDM emission reduction activity
~1% of global GHG emissions

- Higher CER prices will slash the net-mitigation impact, restoring investor confidence.

Research outlook

- Which CDM projects are most at risk of discontinuing mitigation?
- What is the potential mitigation impact from supporting (vulnerable) projects?
- What options exist for supporting (vulnerable) projects?
- What is the actual CER supply up to 2020 if project owners would have economic incentives from new demand?
- What is the distribution of this potential over project types and vulnerable/non-vulnerable projects?

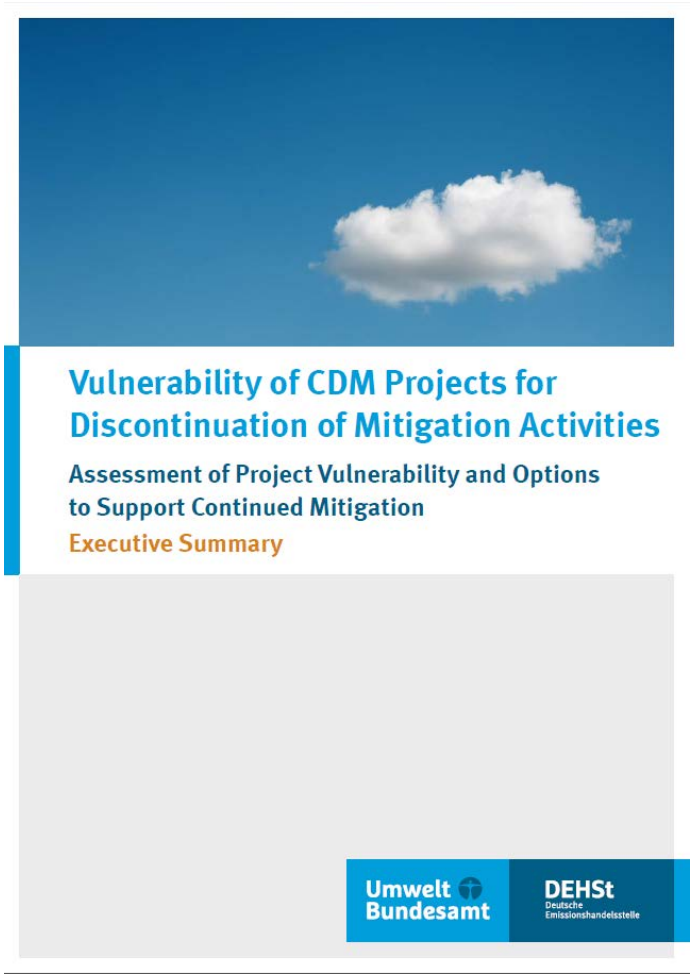
Report release May 2017

Project executed by:

- NewClimate Institute
- Öko-Institut
- Lambert Schneider

Supported by the German Emissions Trading Authority (DEHSt)

Download: **newclimate.org/publications**



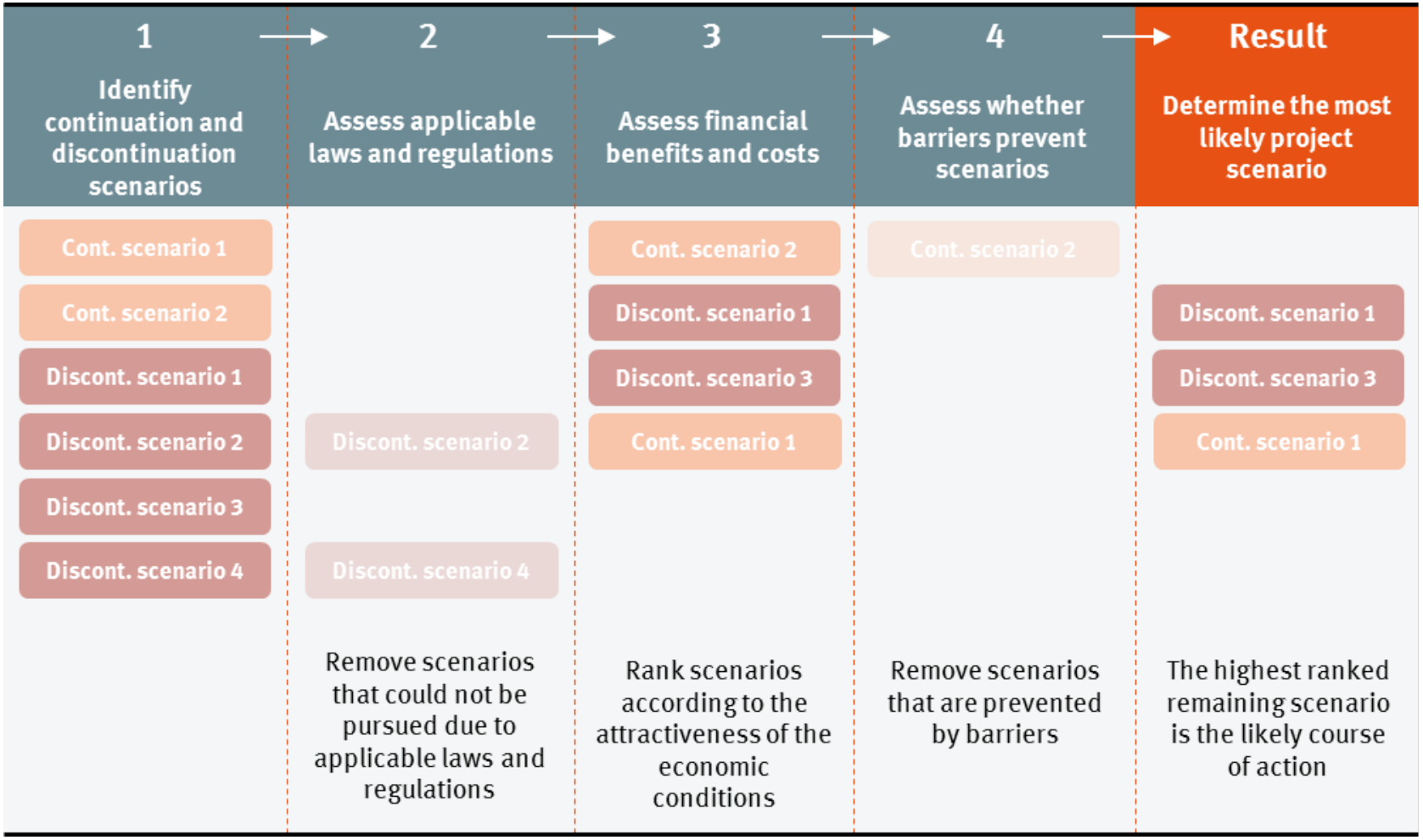
Research questions

1. Which CDM projects are most at risk of discontinuing mitigation?

2. What is the potential mitigation impact from supporting vulnerable projects?

3. What options exist for supporting vulnerable projects?

Assessing vulnerability



Assessing vulnerability

Low – medium risk	Variable risk / potentially high
Coal mine methane	**Biomass**
EE Industry	**Household energy efficiency**
EE own generation	Fugitive
EE supply side	HFCs
Forests	Landfill gas
Fossil fuel switch	**Methane avoidance**
Geothermal	N_2O
Hydro	PFCs+SF_6
Solar	
Wind	

Vulnerability: Methane avoidance

Table 23: Summary of vulnerability of methane avoidance projects

	Mexico	Brazil	India	Thailand	Malaysia
Commercial livestock ma-nure	High risk > 88% already dismantled	High risk > 58% already dismantled	Not evaluated	Low risk	Not evaluated
Wastewater	Not evaluated	Not evaluated	Low risk	Low risk	Low risk
Palm oil solid waste composting	Not evaluated	Not evaluated	Not evaluated	Not evaluated	*Uncertain*

Mitigation potential for manure management ca. 2 MtCO2e in each country, and replicable in non-CDM activities.

Support options: manure management

Policy / measure	Policy assessment for Mexico: Practical feasibility	Policy assessment for Mexico: Barrier removal effectiveness	Policy assessment Brazil: Practical feasibility	Policy assessment Brazil: Barrier removal effectiveness	Barrier addressed
Market and carbon pricing based measures					
International					
CER demand through credit purchase facilities or for vol. offsets	x	n.a.	x	n.a. n.a.	-
Alt. crediting programmes	x	n.a.	x	n.a. n.a.	-
Pilot sector-level crediting	•	•	•	•	Potentially all
Domestic					
GHG taxation	x	n.a.	x	n.a.	-
Domestic offsetting	x	n.a.	x	n.a.	-
Renewable energy certificates	✓	x	x	n.a.	-
Nutrient crediting and trading	x	n.a.	x	n.a.	-
Domestic non-market measures (e.g. with international support through NAMAs or RBF)					
Agric. & env. standards	•	•	•	x	-
Streamlining grid connectivity	✓	✓	✓	✓	Connectivity
RE support schemes	✓	x	✓	x	None directly
Micro-credit	✓	✓	✓	✓	Capital
Capacity building	✓	✓	✓	✓	Capacity

Support options should consider:

- Limited capacities at the farm level
- Small-scale capital for motor replacements
- Difficulties with connecting to the grid
- Unavailability of the original 3rd party project operators

Vulnerability: Biomass energy

Table 37: Summary of vulnerability of biomass energy projects

	India	Brazil	Thailand
Bagasse energy in sugar industry	Low risk	Low risk	Not evaluated
Biomass IPP	High risk	Not evaluated	Low risk
Biomass for captive energy	High risk	Not evaluated	Not evaluated

Mitigation potential is uncertain, dependant on availability of biomass.

Support options: biomass energy

Policy / measure	Policy assess-ment for IPPs: Practical feasibility	Policy assess-ment for IPPs: Barrier removal effectiveness	Policy assessment for captive energy: Practical feasibility	Policy assessment for captive energy: Barrier removal effectiveness	Barrier directly addressed
Market and carbon pricing based measures					
International					
CER demand through credit pur-chase facilities or for vol. offsets	✓	•	✓	•	Costs
Alt. crediting programmes	x	n.a.	x	n.a.	-
Pilot sector-level crediting	x	n.a.	x	n.a.	-
Domestic					
GHG / fossil fuel taxation	x	n.a.	•	•	Costs
Domestic offsetting	x	n.a.	x	n.a.	-
Renewable energy certificates	x	n.a.	x	n.a.	-
Domestic non-market measures (e.g. with international support through RBF)					
RE support schemes (e.g. FIT)	✓	✓	x	n.a.	Costs
Biomass supply support schemes	✓	✓	✓	✓	Supply chain

Support options should consider:

- High price of biomass
- Volatility of market supply

Vulnerability: Household energy efficiency

Table 49: Summary of vulnerability of household energy efficiency projects

	India	Pakistan	Mexico	Kenya
Energy efficient lighting	Low risk	Low risk	Low risk	Not evaluated
Energy efficient cook stoves	High risk	Not evaluated	Not evaluated	High risk

Mitigation potential for cook stoves up to ca. 1.2 MtCO2e in India and Kenya combined, but this potential is uncertain.

Very high replicability: emissions from wood fuels worldwide are approx. 1.2 $GtCO_2e$

Support options: cook stoves

Policy / measure	Policy assessment: Practical feasibility	Policy assessment: Barrier removal effectiveness	Barrier directly addressed
Market and carbon pricing based measures			
International			
Credit purchase facilities	✓	✓	Engagement of the project owner
CER demand for vol. offsets	✓	✓	Engagement of the project owner
Alt. crediting programmes	✓	✓	Engagement of the project owner
Pilot sector-level crediting	•	✓	Potentially all barriers
Domestic			
Emissions trading scheme	✗	n.a.	-
GHG / fossil fuel taxation	✗	n.a.	-
Domestic offsetting	✗	n.a.	-
Domestic non-market measures (e.g. with international support through NAMAs, RBF or direct support)			
Capacity building	✓	✓	Awareness and cultural preferences
Standards	✓	•	May lead to reduced cost of stoves
Subsidies / tax exemptions	✓	•	Cost of stoves
Innovative financial models	✓	✓	Cost of stoves

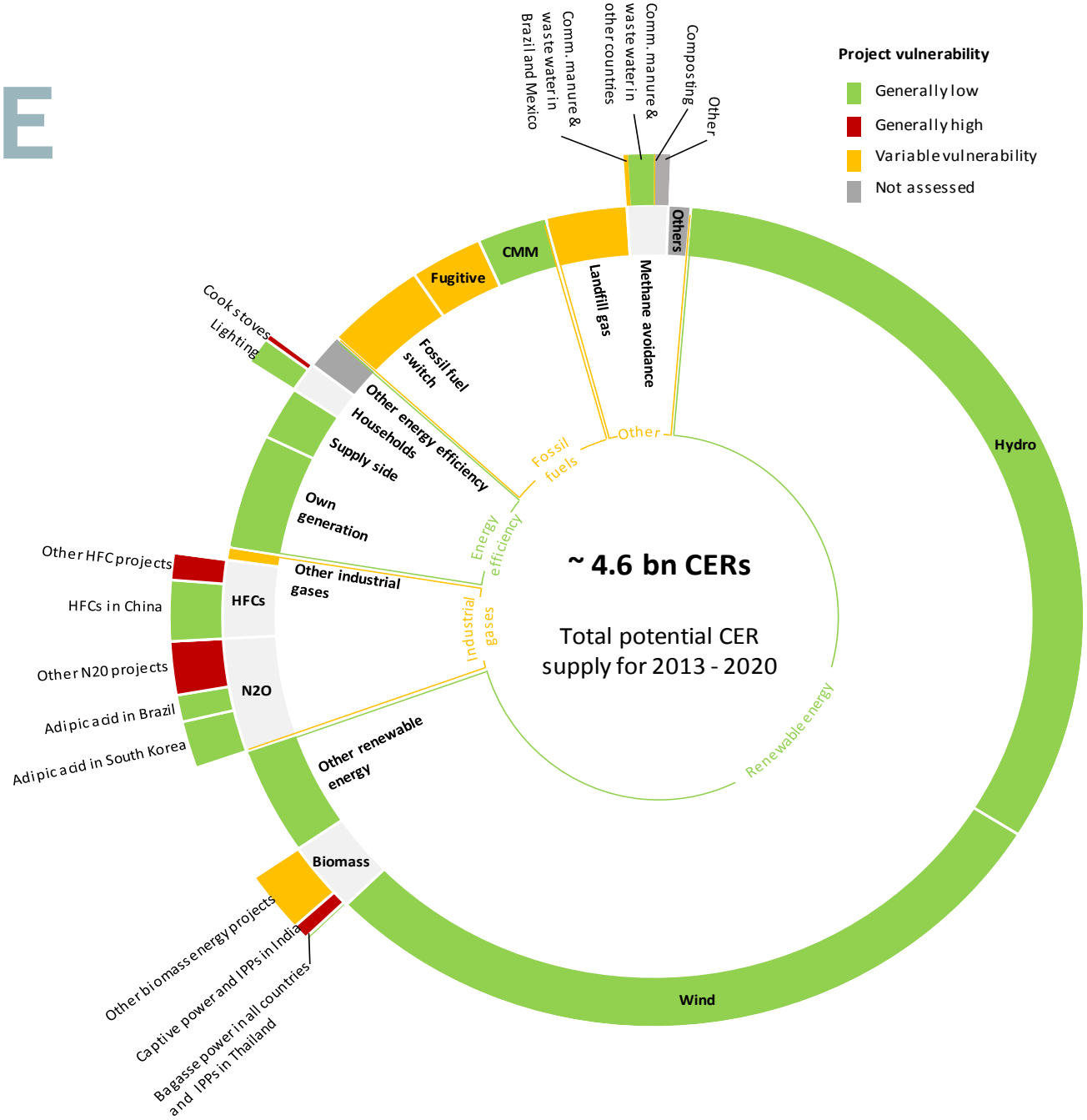
Support options should consider:

- No incentives for project owner to participate
- Households cannot afford clean stoves
- Awareness on optimal usage limited amongst households
- Cultural preferences for traditional methods

NEW CLIMATE INSTITUTE

CER supply potential by project vulnerability

Preliminary results



Insights on support options

Discontinuation risk

- Projects with 3rd party ownership/participation generally at higher risk
- Projects without revenues / cost savings remain highly dependant on carbon finance
- The discontinuation scenario of vulnerable projects is not always the same as the project baseline scenario

Support options

Enhanced CER demand *(intl. purchase facilities / domestic market instruments)*

- Can increase financial benefits & stimulate re-engagement of 3rd party project participants.
- Not all project types face the same barriers as they did at project conception; restored CER finance should not be expected to always remove the barriers.
- Should be implemented with other instruments for longer-term removal of barriers.

Domestic policies / programmes *(unilateral or with support e.g. NAMAs)*

- High potential for long-term barrier removal for all project types assessed.
- Pilot sector-level crediting mechanisms may offer an appropriate channel for supporting a policy / programme oriented approach driven at the sector level.

Implications and further questions

- Implications for pre-2020 mitigation support
  - Conditions should be investigated to determine the precise impact of the support
- Implications for design of post-2020 mechanisms
  - What will be the objectives of potential mechanisms?
  - What are the barriers to desired impacts and how can action most efficiently address these barriers?
- How can the situation that emission reductions from crediting mechanisms are more short-term / dependent on carbon finance be avoided?
  - E.g. German nitric acid initiative makes crediting contingent on introduction of policies
- Potential for sector-level approaches needs to be further explored and tested

NEW CLIMATE INSTITUTE

Thank you for your attention!

Contact details:

Thomas Day

t.day@newclimate.org

www.newclimate.org

NEW CLIMATE INSTITUTE

Shortlisted project types

Table 4: Summary of shortlisted project types

Project type	Number of projects [1]	Abatement potential (% of CDM) [2]	Long term transformation impact [3]	Human development impact [3]	Information availability [4]	Initial assessment of project vulnerability for discontinuation of abatement activity [4]
Biomass energy	684	4.3%	High	Low-High	Good	**Low – High:** Projects could be stopped due to excessive OPEX, or because alternative use of the equipment is more profitable.
Fugitive	47	2.4%	Low	Low	Unrated	**Low – High:** Financial benefits usually cover additional OPEX in flaring reduction projects, but not necessarily for natural gas pipelines.
Household energy efficiency	417	1.6%	High	High	Good	**Low – High:** Financial incentives may need to be conducive for continuation of abatement for both the project owners and the individual households.
HFCs	22	7.9%	Low	Low	Poor	**High:** Continued operation incurs costs yet no significant financial benefit
Landfill gas	382	5.3%	Low	Medium	Good	**Low – High:** Continued operation is expensive and accrues no financial benefit for flaring projects; revenues are sometimes greater than OPEX for projects with utilisation of landfill gas and MSW.
Methane avoidance	792	2.6%	High	Medium	Good	**Low – High:** Continuation is likely to be rational for projects that utilise wastes or methane for energy or compost for fertiliser.
N_2O	104	6.1%	Medium	Low	Fair	**High:** Continued abatement involves operating expenditures but no or very low financial benefits
PFCs and SF_6	15	0.5%	Medium	Low	Unrated	**Low – High:** No revenues but additional operating expenditures for projects using methodologies AM35 and AM65

1 – The number of projects is considered high if accounting for at least 2% of the CDM population, and low if accounting for less than 1%

2 – The abatement potential between 2013 and 2020 is considered high if accounting for at least 4% of the CDM population, and low if accounting for less than 1%

3 –Long-term transformation impact and the human development impact are subjective assessments based on the judgement of the authors. Project types are considered to have low long term transformational impact if they reduce the emissions of activities that are not understood to be sustainable in the long-term future, such as projects related to the fossil fuel industry.

4 – Information availability is based on authors' judgement and response rates from CDM Evaluation (see Warnecke, Day, & Klein, 2015)

Shortlisted countries

Table 6: Overview of shortlisted countries for the selected project types

Country	Region	Number of projects (No.) and 2013-2020 abatement potential ($MtCO_2e$)					
		Biomass energy		Household EE		Methane avoidance	
		No.	Mt	No.	Mt	No.	Mt
India	Asia	294	107	123	37	32	7
Thailand	Asia	27	11	0	0	77	32
Malaysia	Asia	42	37	0	0	89	30
Pakistan	Asia	6	5	53	6	2	0
Mexico	LAC	11	5	27	6	102	28
Brazil	LAC	48	32	0	0	67	28
Kenya	Africa	2	2	18	6	3	1
South Africa	Africa	6	4	6	2	4	1
China	Asia	139	177	20	2	180	46
Nigeria	Africa	1	1	15	5	0	0
Honduras	LAC	5	1	1	0	7	2
Vietnam	Asia	17	5	1	1	23	10
Indonesia	Asia	14	15	0	0	76	29
Philippines	Asia	5	3	0	0	43	8
Peru	LAC	2	0	0	0	2	1
Colombia	LAC	3	2	0	0	5	9
Ecuador	LAC	3	2	1	4	8	2
Bangladesh	Asia	1	0	20	5	2	0

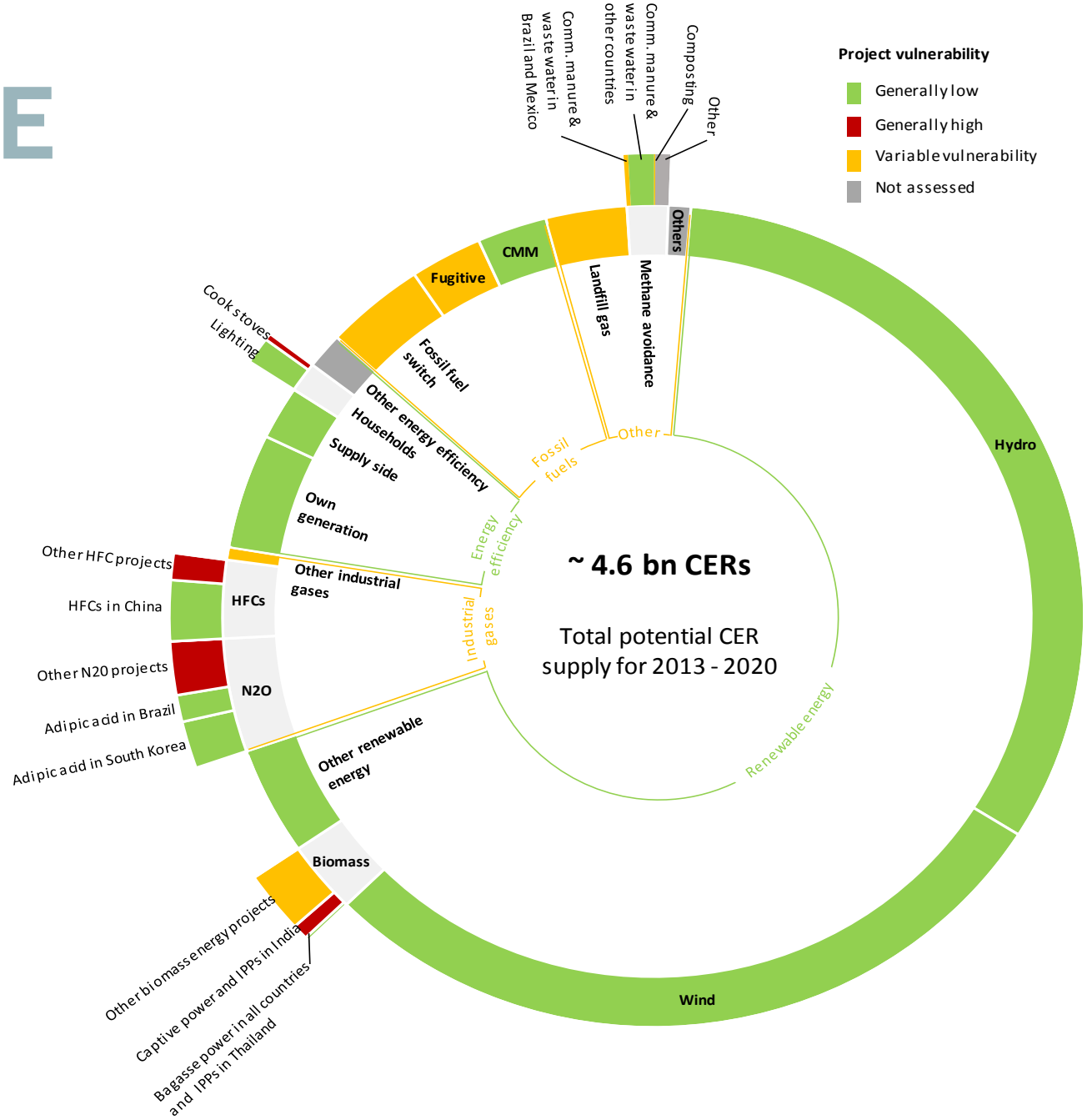
CER supply potential 2013-2020

- **Total CER supply potential:** **4.6 billion**
- **Actual CP2 issuance to date:** **337 million**
- **Expected remaining CP2 issuance: (UNFCCC secretariat)** **77 million / year**

	Billion CERs	%
Ex-ante estimates in PDDs	**7.67**	
Contribution of different limitations	**-3.05**	100%
Lower actual issuance	-1.90	62%
Non-implementation of projects	-0.09	3%
Non-continuation of GHG abatement	-0.47	15%
Availability of data to monitor emission reductions	-0.32	11%
No administrative steps taken in time to renew the crediting period	-0.27	9%
CER supply potential	**4.61**	

NEW CLIMATE INSTITUTE

CER supply potential by project vulnerability



Why is the share from vulnerable projects low?

1. **Many vulnerable projects already stopped abatement or monitoring**
   - Share of vulnerable projects would be twice as high if none of the projects had stopped abatement or monitoring
2. **Methodology revisions to industrial gas projects are conservative**
   - Emission reductions from industrial gas projects on average 3.6 times higher than the amount of CERs being issued
3. **Some projects are no longer vulnerable of stopping abatement due to domestic policies**
   - E.g. HFC-23 in China, efficient lighting