Linking Reduced Deforestation and a Global Carbon Market: Implications for Clean Energy Technology and Policy Flexibility*

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Appendix: Supplemental Tables and Figures

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Figure A1. Emissions and climate impacts under business-as-usual and climate policy without RED

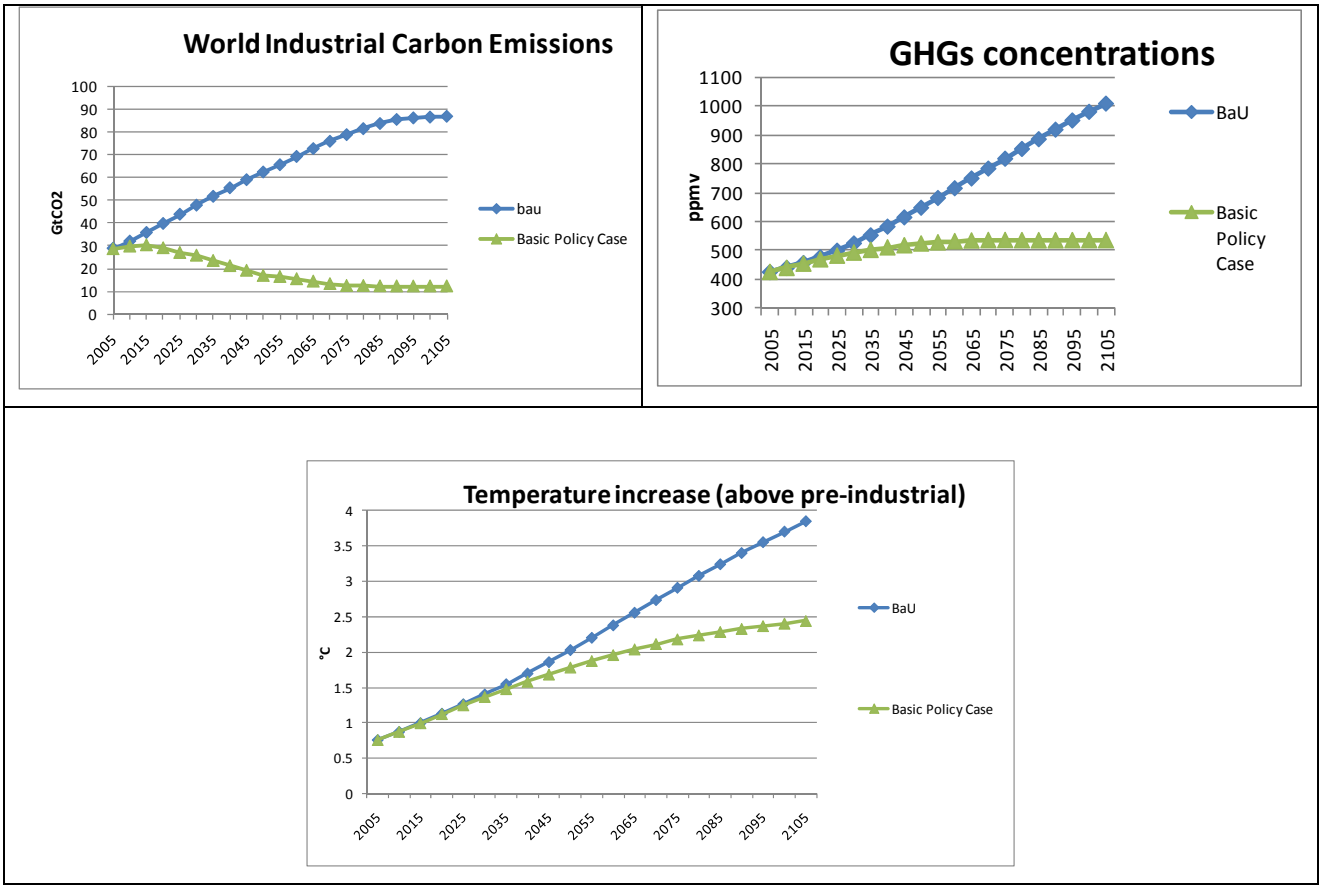


Figure A2. Impact of banking on the carbon price trajectory, no-RED base case

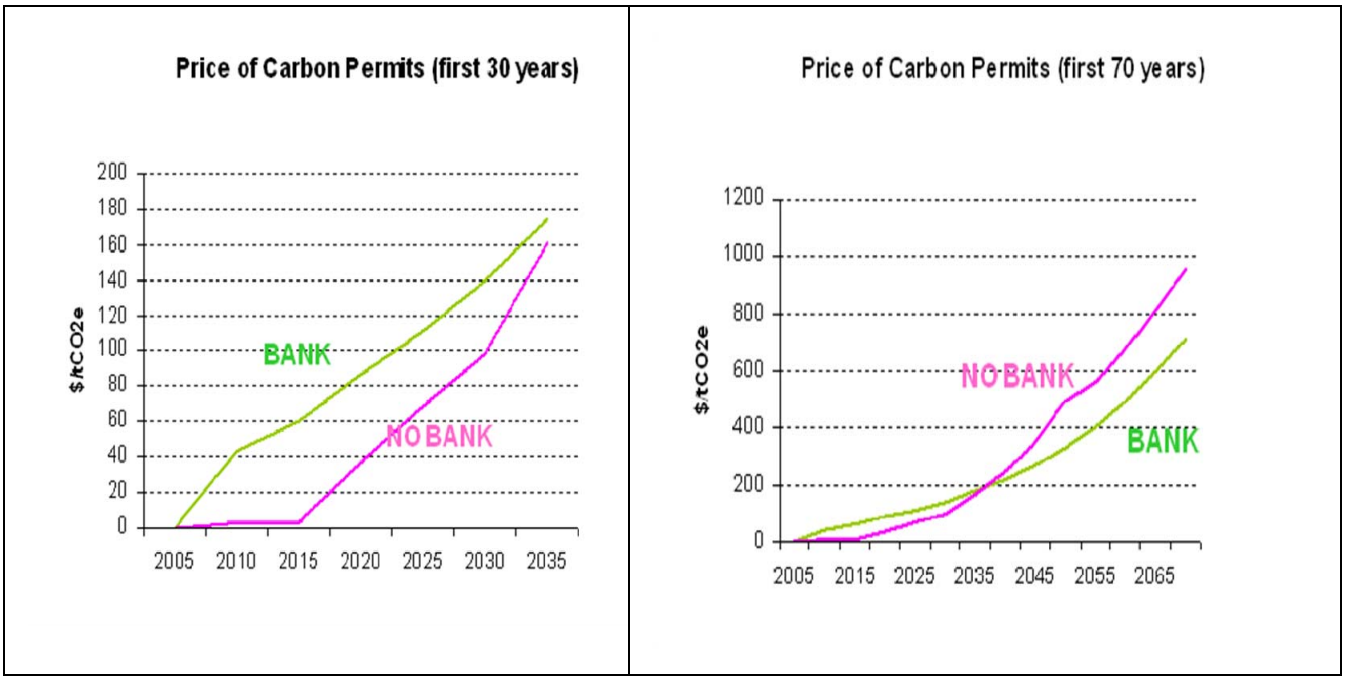
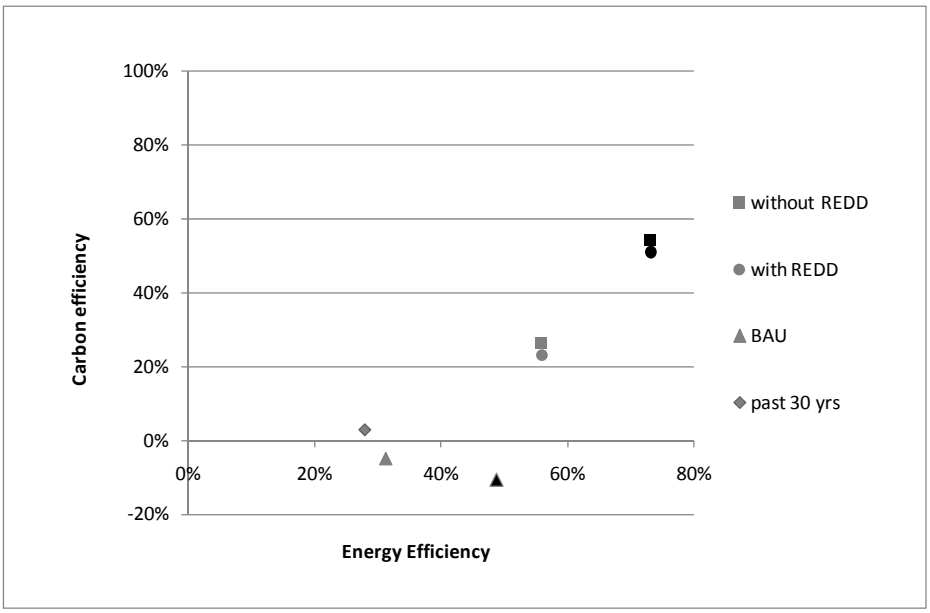
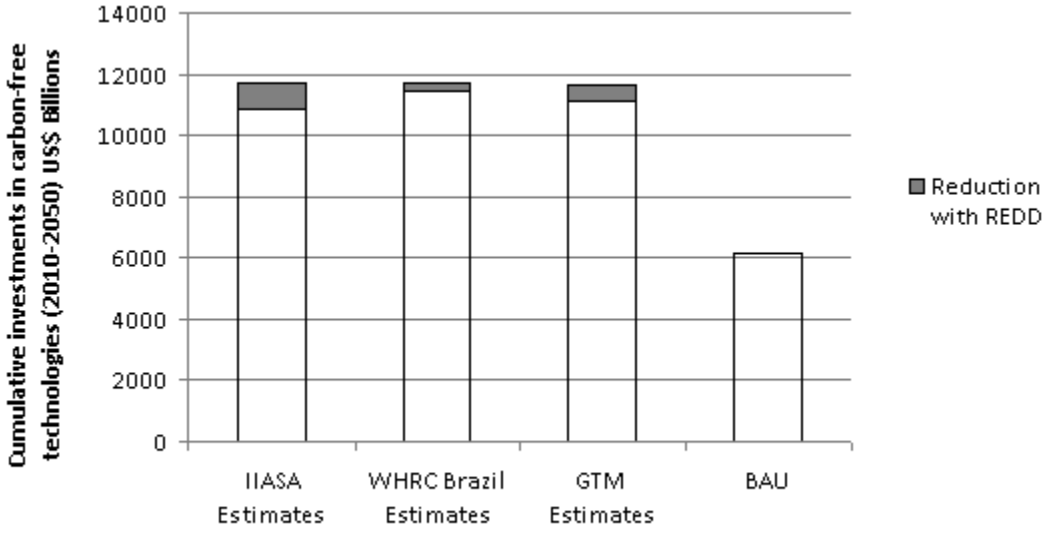


Figure A3. Relative improvements in energy and carbon intensity, with and without RED



Note: Projections for the year 2030 and 2050 are shown in gray and black, respectively. Improvements in energy and carbon intensities are with respect to the base year under the baseline and in the two policy cases with and without RED (IIASA scenario, without banking). Energy and carbon efficiency improvement in the last 30 years are also reported for comparison.

Figure A4. Impact of RED on cumulative investments in carbon-free technologies (wind plus solar and nuclear) over 2010-49, under scenarios without banking



Note: The entire height of each column indicates the case without RED, while the grey and black portions, respectively, indicate the reductions and in increases with RED, under the scenarios without banking. Business-as-usual (BAU) projections without climate policy are for comparison.

Table A1. Cumulative impacts of RED on abatement share, deforestation emissions, and global policy costs, by time period (All estimates reported as percentages)

Variable (RED scenario below)		2010-19	2010-49	2010-99
Cumulative Share of RED in Global Abatement (%)				
With Banking	WHRC Brazil	5.6	2.9	1.6
	Global Timber Model	19.3	9.2	4.1
	IIASA Model	19.8	8.7	4.1
Without Banking	WHRC Brazil	9.4	3.1	1.6
	Global Timber Model	3.2	7.5	3.5
	IIASA Model	7.9	7.2	3.6
Global Cumulated CO2 Emissions (GtCO2)				
With Banking	WHRC Brazil	440	1,225	2,046
	Global Timber Model	385	1,118	1,896
	IIASA Model	422	1,173	1,980
Without Banking	WHRC Brazil	502	1,265	2,035
	Global Timber Model	462	1,170	1,888
	IIASA Model	510	1,247	1,976
Cumulative Reductions in Emissions from Deforestation (%)				
With Banking	WHRC Brazil	-15.7	-21.7	-29.6
	Global Timber Model	-72.2	-87.8	-90.9
	IIASA Model	-50.3	-63.9	-68.4
Without Banking	WHRC Brazil	-11.3	-20.4	-28.9
	Global Timber Model	-4.9	-64.3	-78.1
	IIASA Model	-8.2	-47.6	-59.9
Cumulative Reductions in Loss of Gross World Product (%)[a]				
With Banking	WHRC Brazil	-7.2	-8.5	-9.9
	Global Timber Model	-7.6	-17.7	-21.4
	IIASA Model	-10.6	-19.8	-22.9
Without Banking	WHRC Brazil	-6.9	-7.8	-11.1
	Global Timber Model	-13.3	-18.7	-24.0
	IIASA Model	-15.4	-17.2	-22.2

Table A2. Impact of RED on carbon prices, by time period

Variable (RED scenario below)		2015-19	2045-49	2095-99
Change in Carbon Price (%)[a]:				
With Banking	WHRC Brazil	-7.8	-7.9	-11.3
	Global Timber Model	-22.1	-22.2	-18.0
	IIASA Model	-23.3	-22.9	-22.2
Without Banking	WHRC Brazil	-0.1	-11.0	-12.3
	Global Timber Model	0.0	-25.7	-21.5
	IIASA Model	0.0	-20.4	-24.7
Carbon Price with RED ($/tCO$_2$e.):				
With Banking	WHRC Brazil	56	247	1,063
	Global Timber Model	47	208	984
	IIASA Model	46	207	932
Without Banking	WHRC Brazil	3.5	307	1,118
	Global Timber Model	3.5	257	1,000
	IIASA Model	3.5	275	960

[a] Estimated reductions are relative to carbon prices in the base policy case without RED, with and without banking, respectively.

Table A3. Percent change in Gross World Product (GWP) over 2010-99 relative to business as usual (BAU) under more stringent policy case with tightening after 2050, with and without RED and policy anticipation (Banking cases)

Climate Policy Scenario[a]		Change in GWP versus BAU case (%), 2010-99		
		5% discount rate	3% discount rate	0% discount rate
With RED	No Anticipation	-1.61	-2.26	-3.41
	Optimal Anticipation	-1.61	-2.09	-2.91
Without RED	No Anticipation	-2.15	-3.09	-4.76
	Optimal Anticipation	-2.26	-3.00	-4.27

[a] All these scenarios involve the maximum feasible policy tightening after 2050, which results in stabilization at 515 ppmv by 2100. These scenarios all include banking and use the IIASA model estimates of RED potential. When there is no anticipation, mitigation actions prior to 2050 do not reflect any anticipation of the policy tightening. This contrasts with the optimal choice of mitigation activities when the tightening is completely foreseen under the optimal anticipation case.