

GHG Project Selection and the Market Value of Carbon



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2 separate (but related) points to consider in relation to IRR calculations:

1. **Shadow pricing** → Integrate a carbon price into IRR calculations
2. **Marginal Abatement Cost Curve (MACC)** → Use the IRR hurdle rate to reveal the cost of carbon reductions



1. Shadow Pricing

- Build a carbon “shadow price”, e.g., \$10 per tonne, into IRR calculations
 - For projects that increase emissions, \$10 per tonne becomes a liability
 - For projects that decrease emissions, \$10 per tonne is a potential savings or revenue
 - Test sensitivity – what’s the impact on IRR?
 - Does the investment beat the hurdle rate with / without a carbon price?



Price of carbon? ...it depends on the market

Commodity	Market	Currency	Recent Prices (\$/tonne)
Allowance	Kyoto Protocol Compliance	AAU	too early to tell
	EU ETS	EUA	\$25-28
	UK ETS	UKA	\$5-10
	Chicago Climate Exchange	CFI	\$1-2
	RGGI	?	?
	Canada ETS	?	?
Credit	Clean Dev. Mechanism (CDM)	CER	\$3-7
	Joint Implementation (JI)	ERU	\$3-7
	Voluntary	VER	\$1-3

AAU Assigned Amount Unit
 CER Certified Emissions Reduction
 CFI Carbon Financial Instrument
 EAU European Union Allowance

ERU Emissions Reduction Unit
 UKA UK Allowance
 VER Verified Emissions Reduction



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**Shell
International**

- investment analysis includes a range of shadow prices—\$5, \$20, and \$40 per tonne of CO₂eq
- project size threshold: 100,000 tonnes CO₂eq emissions annually or, for chemicals sector, \$10 million in capital costs
- helps Shell explain to investors the value of its investments



2. Marginal Abatement Cost of Carbon

- Consider the gap between the internal hurdle rate and the IRR of a carbon emissions reduction project
 - For carbon projects with weak IRRs below the hurdle rate, the carbon emissions reductions have a cost – the delta between the rates
 - For carbon projects with strong IRRs that exceed the hurdle rate, the carbon emissions reductions have zero or negative cost



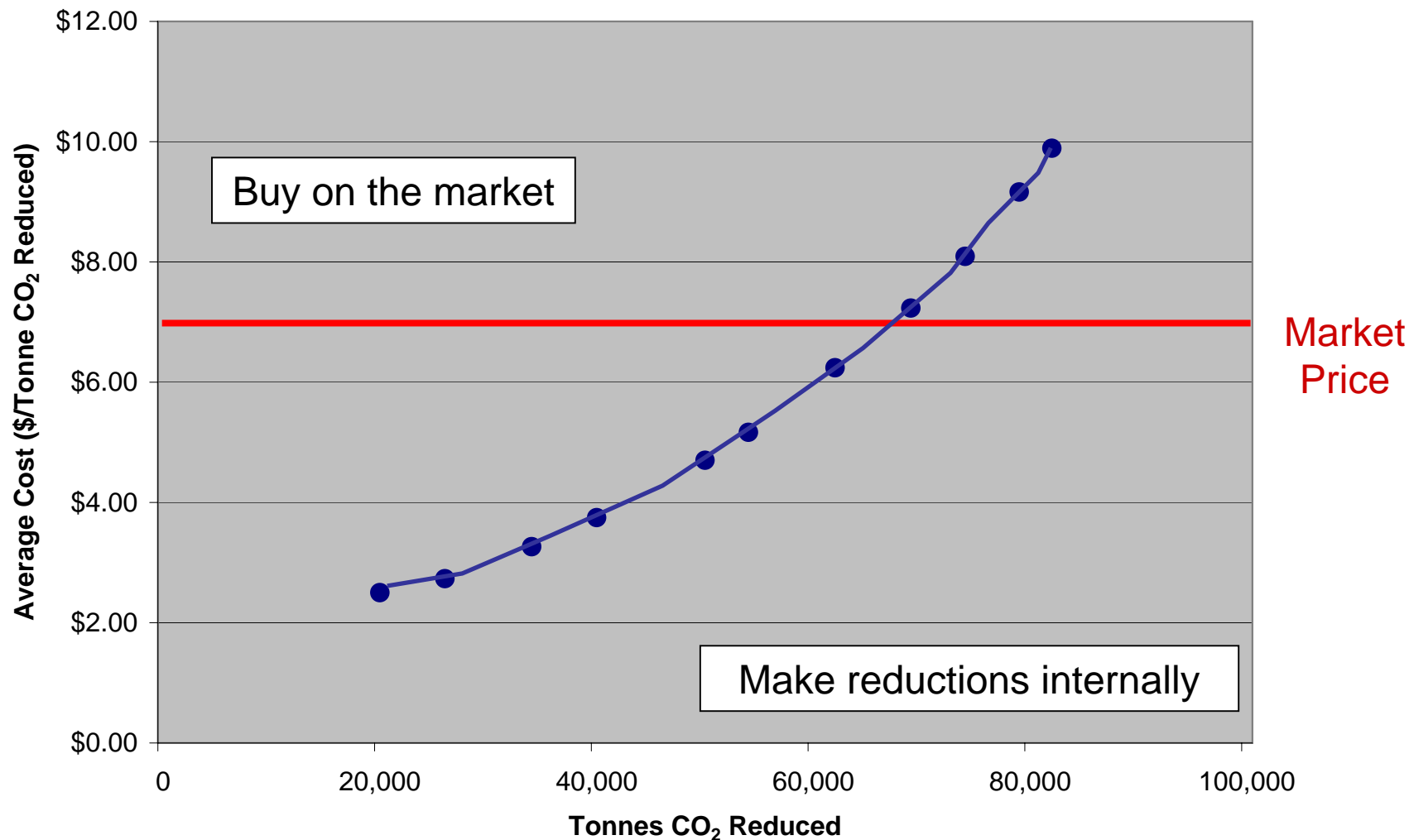
Rank projects by cost per tonne of CO₂

Hypothetical Project Portfolio

Project	Tons CO ₂ Reduced	Marginal Abatement Cost (\$/CO ₂)	Cumulative Abatement (tonnes)
A	20,000	\$2.50	20,000
B	6,000	\$2.73	26,000
C	8,000	\$3.26	34,000
D	6,000	\$3.75	40,000
E	10,000	\$4.79	50,000
F	4,000	\$5.17	54,000
G	8,000	\$6.24	62,000
H	7,000	\$7.23	69,000
I	5,000	\$8.09	74,000
J	5,000	\$9.16	79,000
K	3,000	\$9.89	82,000



The “make or buy” decision



Carbon Value Analysis Tool (CVAT):



- Incorporates carbon value into project IRR calculations
- Allows for sensitivity testing of assumptions
- Currently in Beta testing and will be downloadable from www.wri.org
www.climatenortheast.org

