

# METHOD TO EVALUATE THE EFFICIENCY OF CLIMATE CHANGE MITIGATION MEASURES UNDER CONSIDERATION OF ENVIRONMENTAL AND ECONOMIC CO-EFFECTS

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Due to the signing of the so-called Kyoto protocol Austria is committed to a mitigation of greenhouse gas emissions until 2008–2012 by 13 % compared to the base year 1990. There exist many proposals of possible measures to achieve this aim, however, they vary in efficiency respective to the achievement of objectives as well as to the usage of public funds. Furthermore, in the past additional effects of greenhouse gas mitigation measures, so-called co-effects, have been disregarded, although these co-effects (mostly co-benefits) have considerable impacts on the well being of population, which could lead to a better enforceability of climate change mitigation measures. Thus, this study provides a tool to connect intended advantages of climate change mitigation measures with the through these measures generated and certainly not intended, but absolutely desired advantages (or also undesired disadvantages). Thereby, decision makers are given the possibility to valuate and rank climate change mitigation measures in dependence on society's worthiness of different kinds of advantages of these measures.

## External effects of CC mitigation measures

- Health effects
- Ecological effects
- Effects on damages of buildings

## Macroeconomic effects of CC mitigation measures

### Impacts on ...

- GDP
- Employment rate
- Equal allocation of income
- Balance of trade
- Public finances
- Technological progress and change

## Energy supply risk related effects of CC mitigation measures

- Costs for preventive measures
- Costs of stochastic shortages or blackout of fossil fuels

$$\frac{I_m}{\left[1 + \sum_{i=1}^k (\alpha_i * R_{im})\right] * \beta + V_m} \Rightarrow \min.$$

- $I_m$  Implementation costs of CC mitigation measure  $m$  per ton of abated  $CO_2$
- $\alpha_i$  Weighting factor for local pollutant  $i$
- $R_{im}$  Ratio of reduction of local pollutant  $i$  per ton of abated  $CO_2$  by measure  $m$
- $\beta$  Value added, of which a society is willing to forgo to abate one ton of  $CO_2$
- $V_m$  Value added generated by measure  $m$  per abated ton of  $CO_2$

	Climate protection	Value added generation	Climate protection + value added generation	Climate protection + value added generation + abatement of local pollutants
Thermal restoration	5	3	4	4
Biomass CHP	2	2	1	2
Wind energy	1	4	3	1
JI/CDM with tech. transfer	4	1	2	3
JI/CDM without tech. transfer	3	5	5	5

Figure 1: Example of ranking where only climate protection is appreciated;  $\beta \rightarrow \infty$

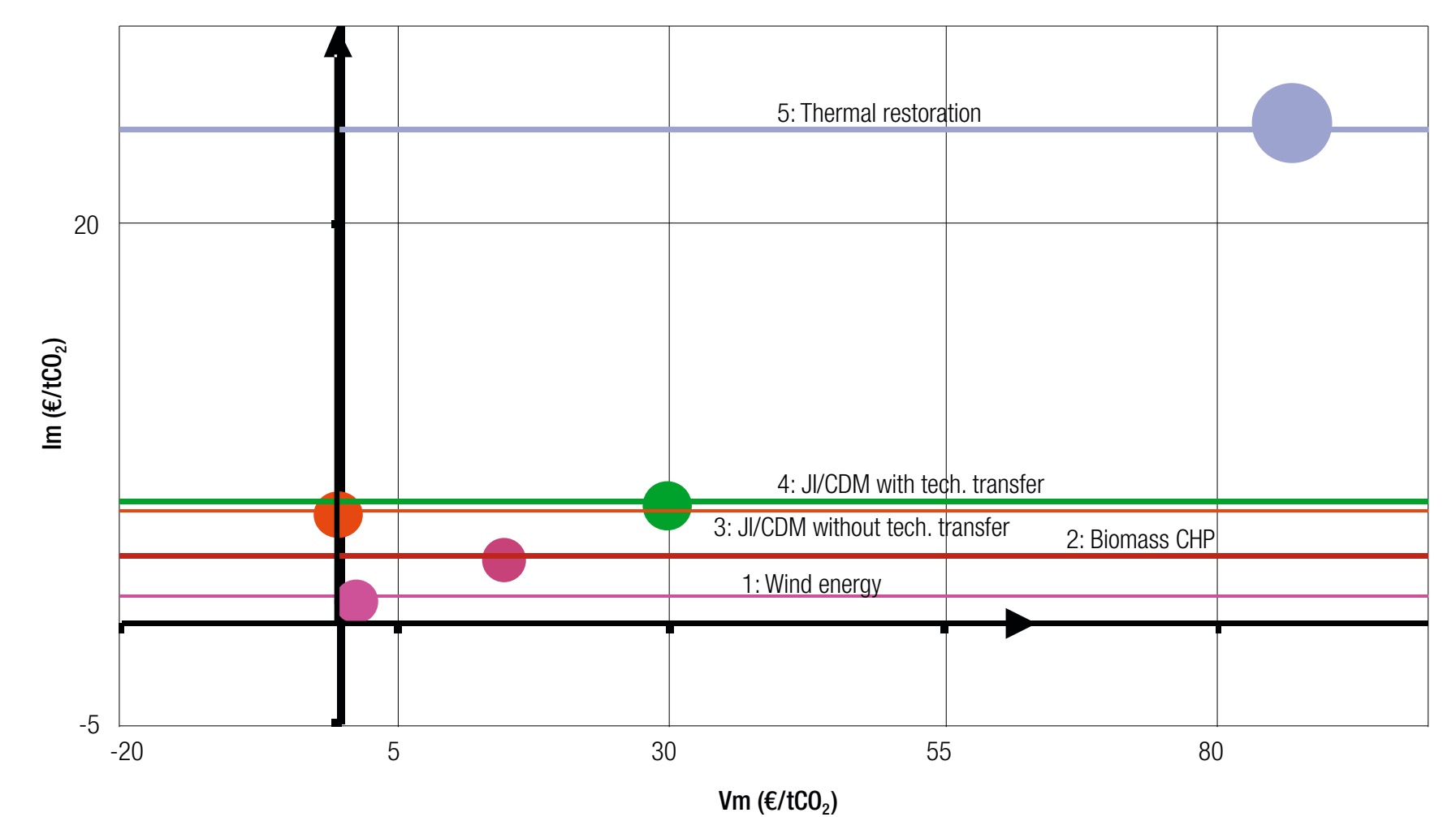


Figure 2: Example of ranking where only value added generation is appreciated;  $\beta \rightarrow 0$

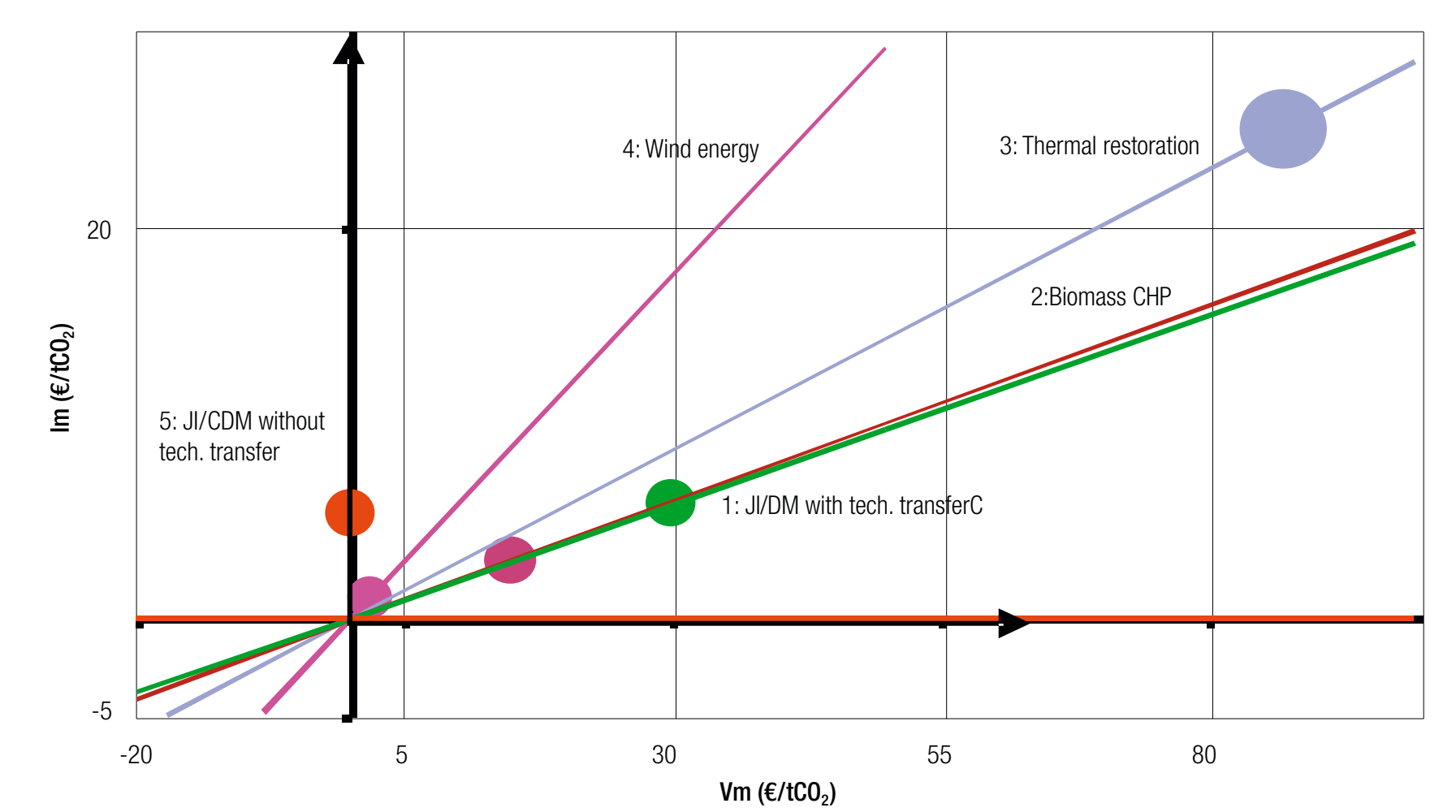


Figure 3: Ranking by integration of both climate protection, domestic value added generation

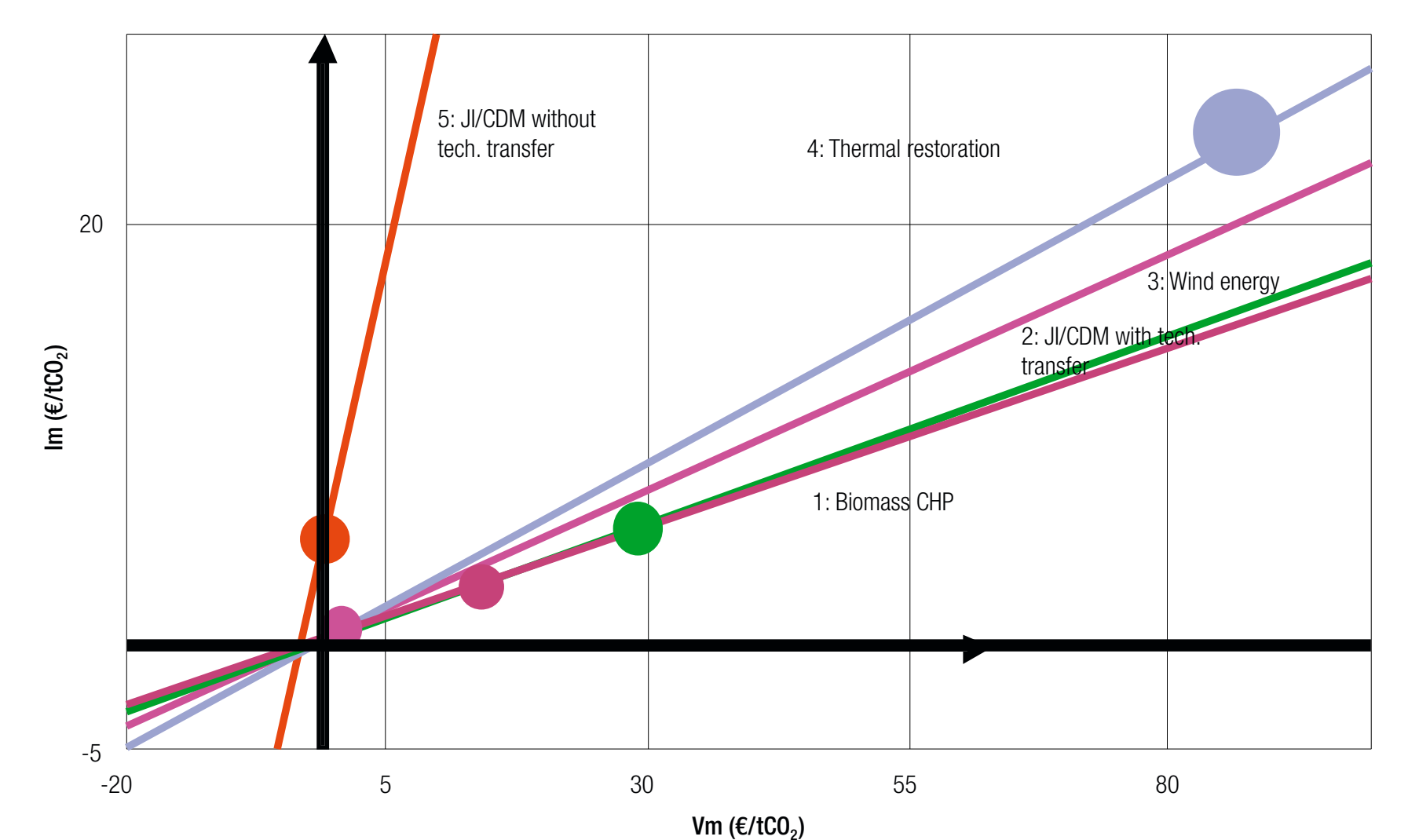
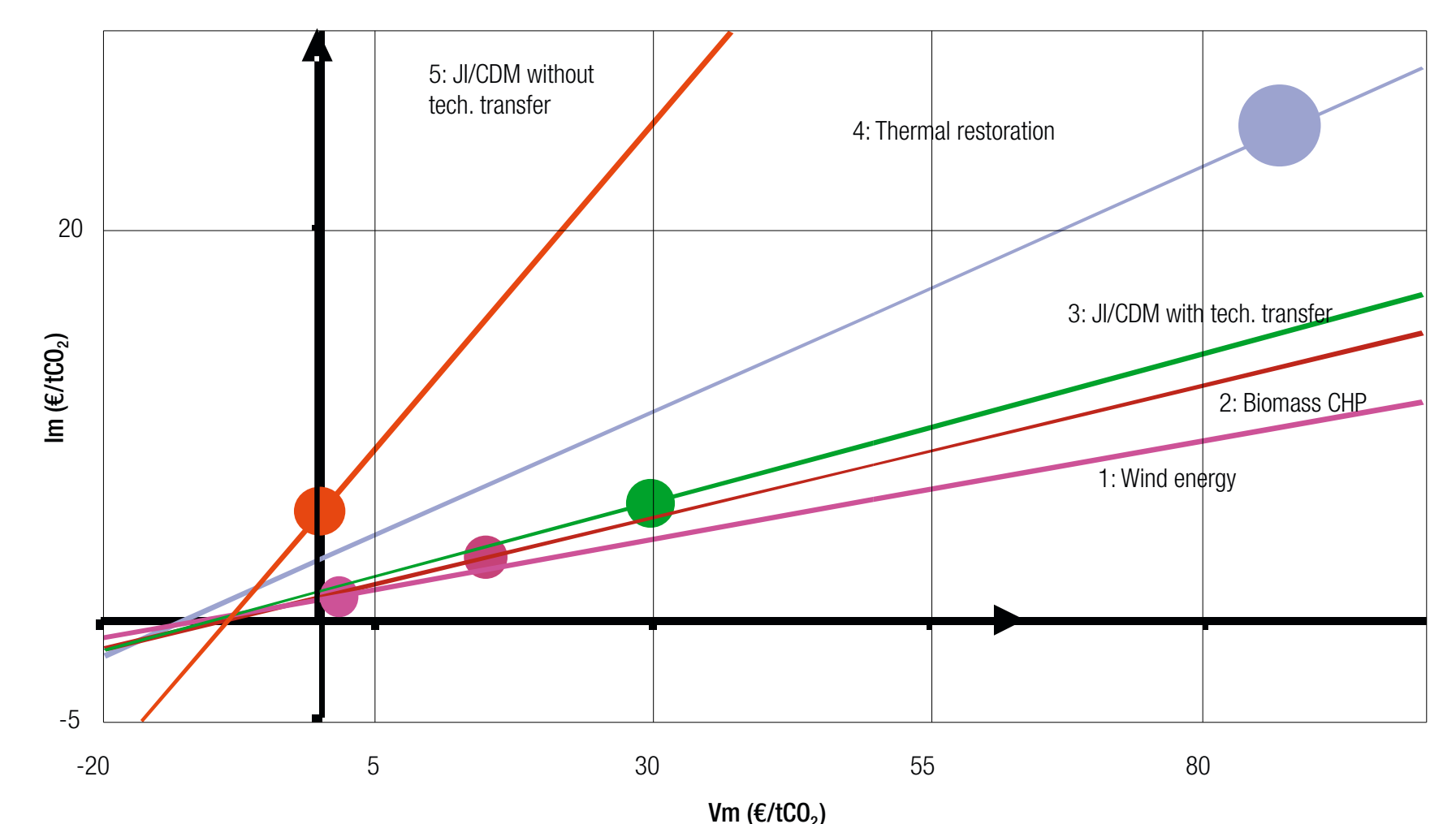


Figure 4: Ranking by integration of both climate protection, domestic value added generation and reduction of local pollutants emissions



## Conclusion

- Attribution of GHG mitigation cost solely to climate protection can (and will) be misleading and wrong
- Economic and/or ecologic impacts of CC mitigation measures can have substantial influence of the ranking of those measures
- Method to evaluate the National Climate Strategies?