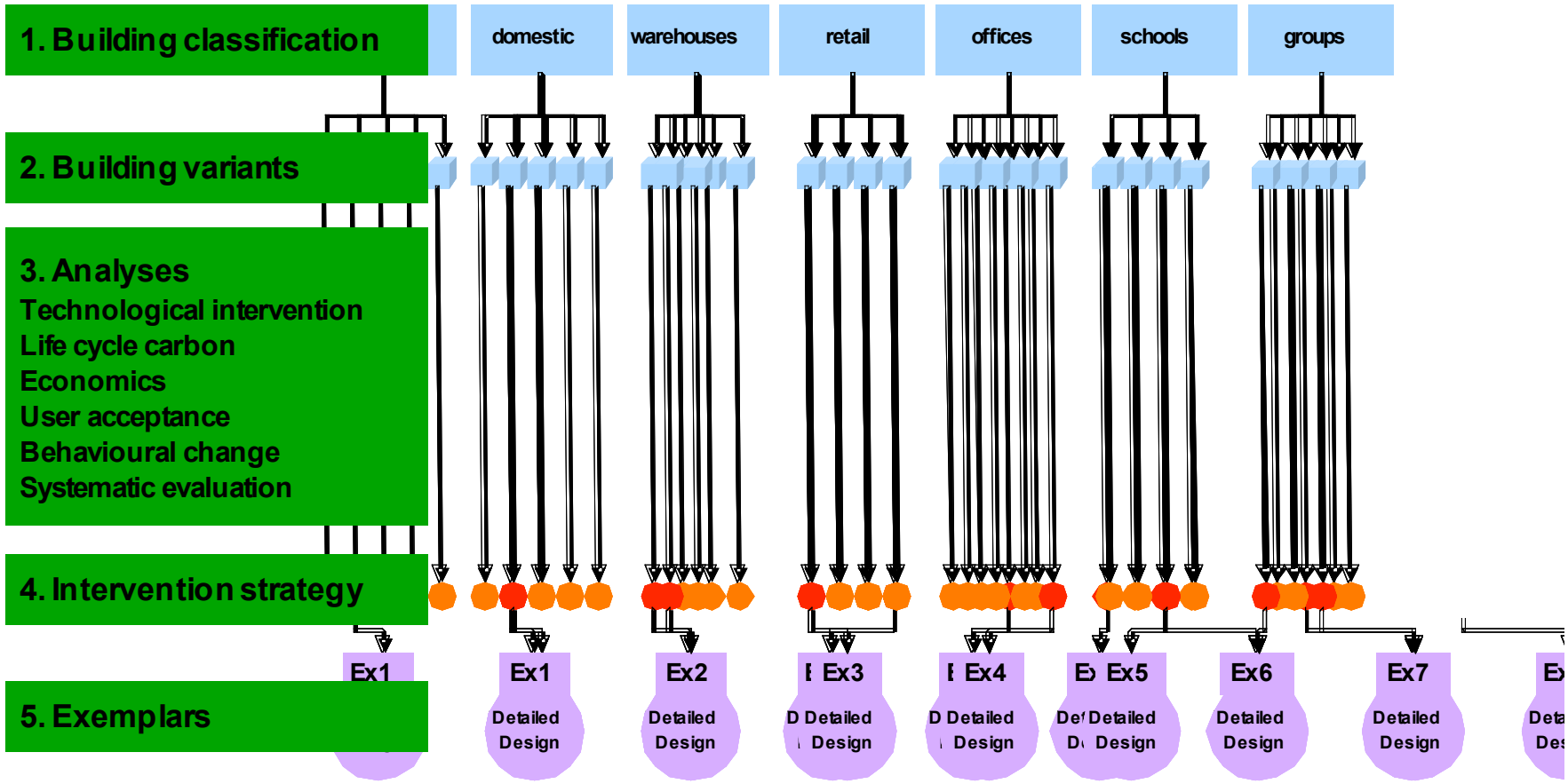
tarbase
technologies for carbon reduction in existing buildings

CARBONVISION PARTNERSHIP

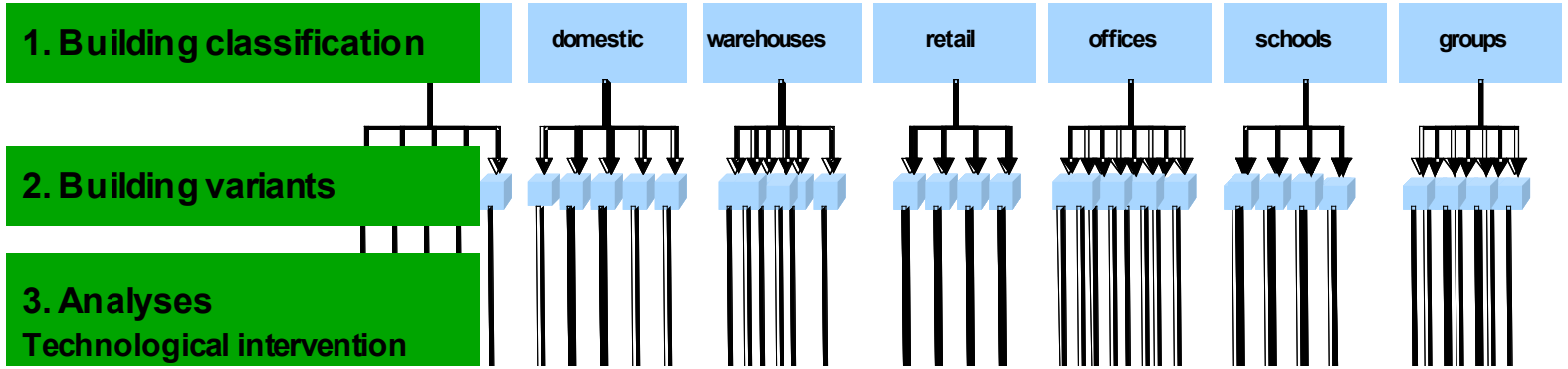
Reducing CO_2 emissions through refurbishment of UK housing

Andrew Peacock

Tarbase overview



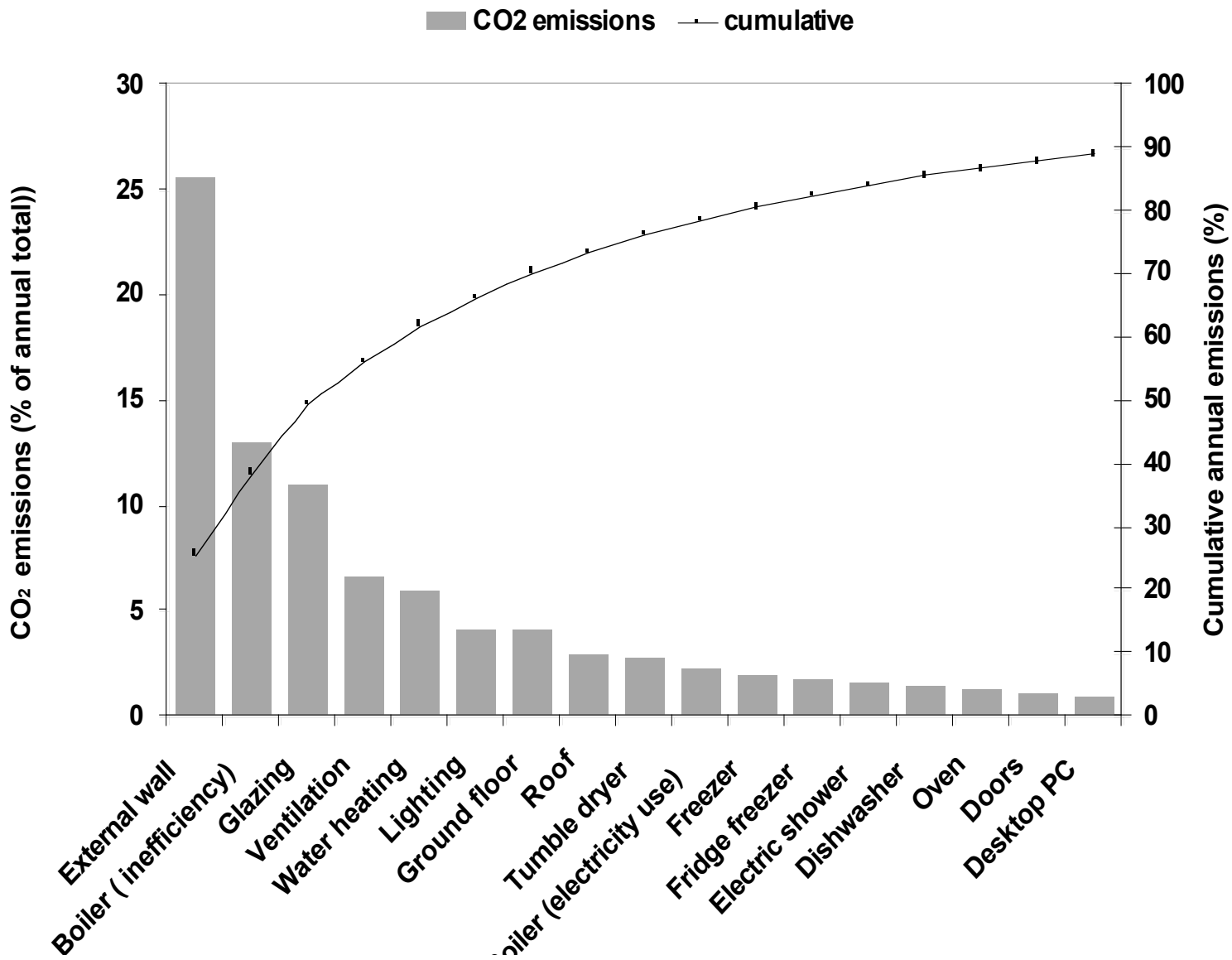
Tarbase overview



Variant 7

Building Variant Number		Building Description	q (kWh pa)	e (kWh pa)
7		Pre 1900 detached dwelling Solid wall construction Occupation: Family – 3 adults working 1 child Location: Manchester	26362	5230

Attribution of CO_2 emissions V7



Technological interventions

Building Fabric and Ventilation
Loft insulation
Cavity wall insulation
External wall insulation
Glazing
Reduced infiltration
MVHR

End use equipment
Lighting
Stirling cycle refrigeration
VIP refrigeration
Ovens
Washing machines
Dishwashers
TV's
PC's
Tumble dryers
Reduced standby loads

Energy production
Micro-CHP
Solar PV
Micro-wind
Solar Thermal
Heat Pumps
Biomass

Demand side interventions
Variant 7

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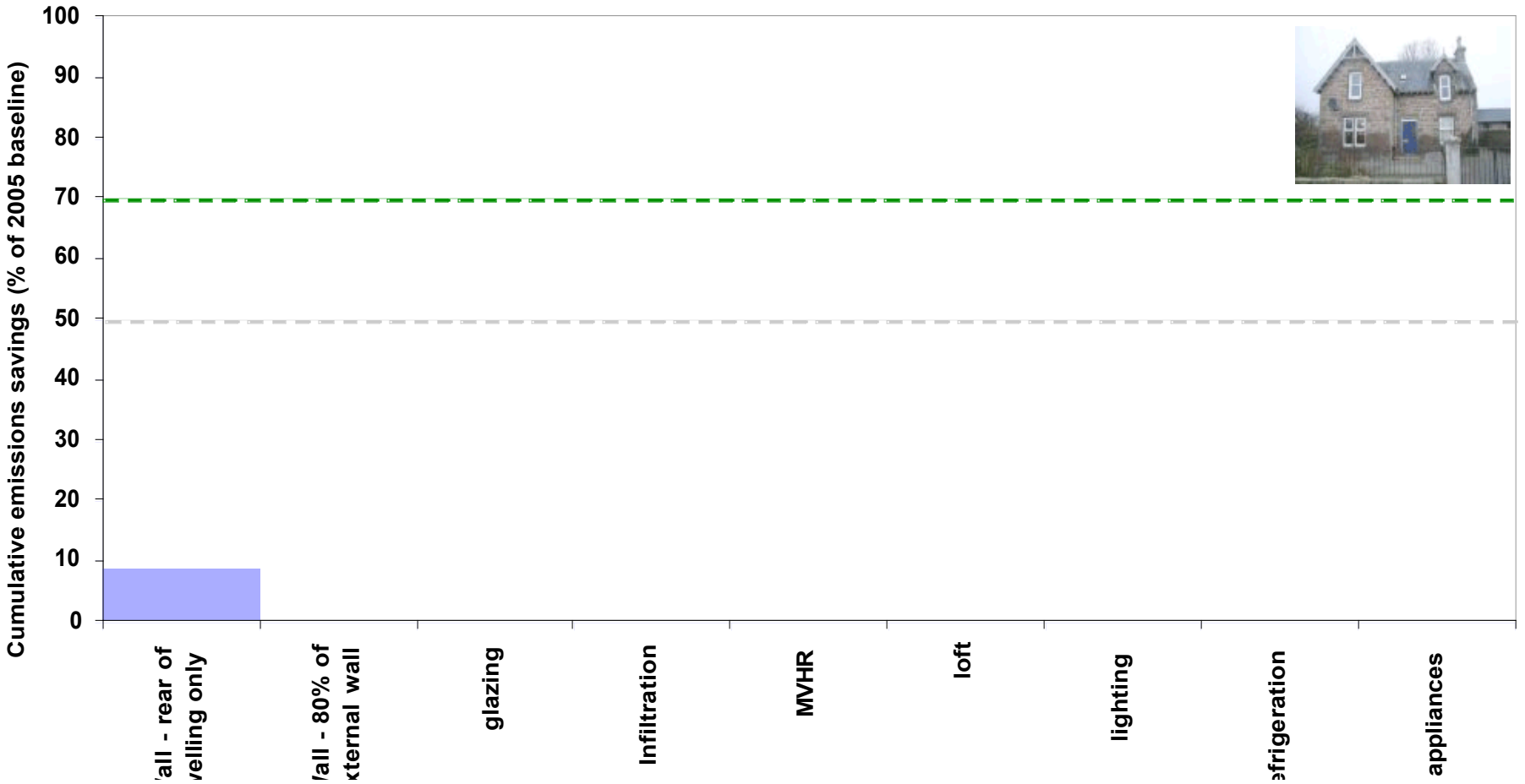

Demand side interventions
Variant 7

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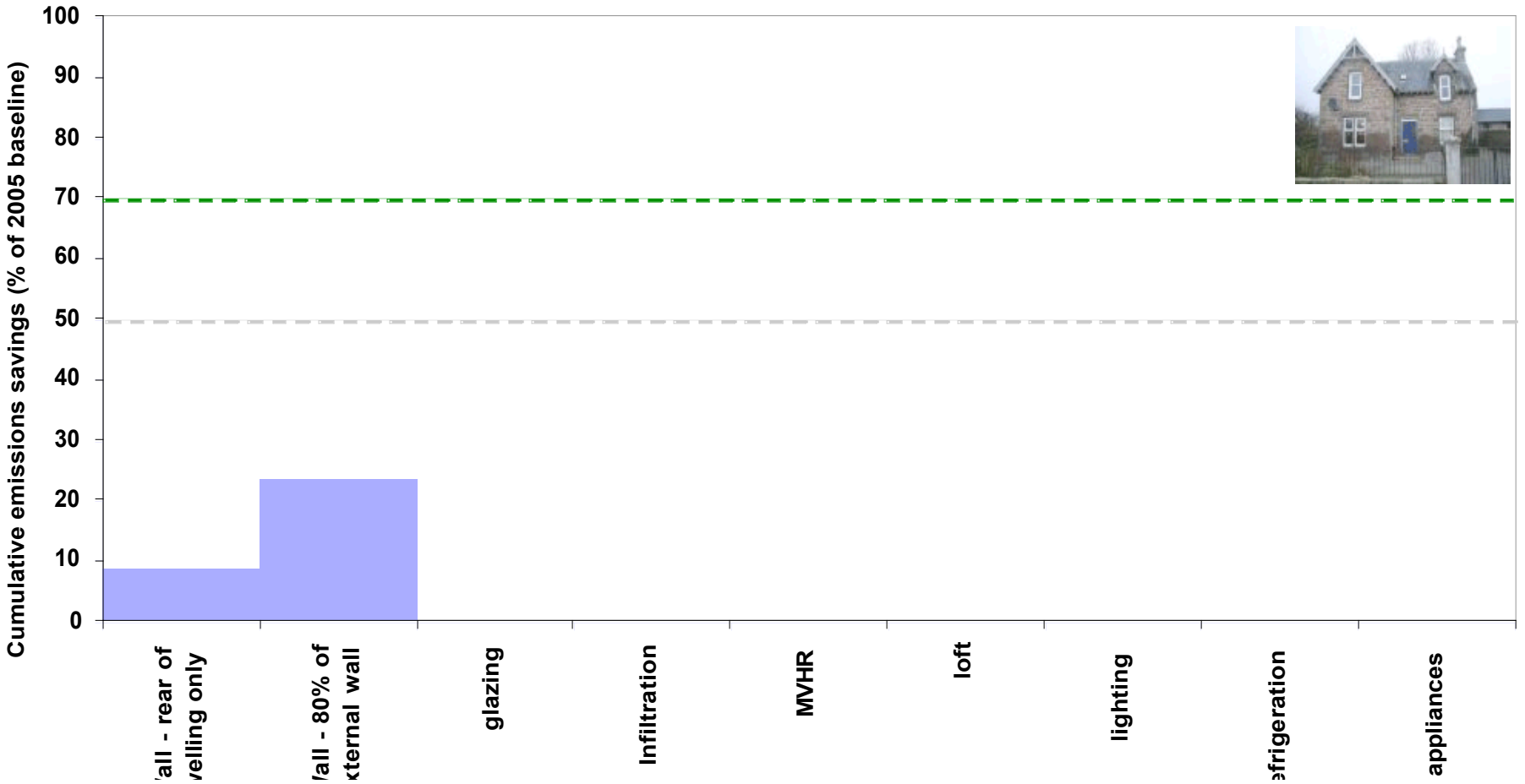
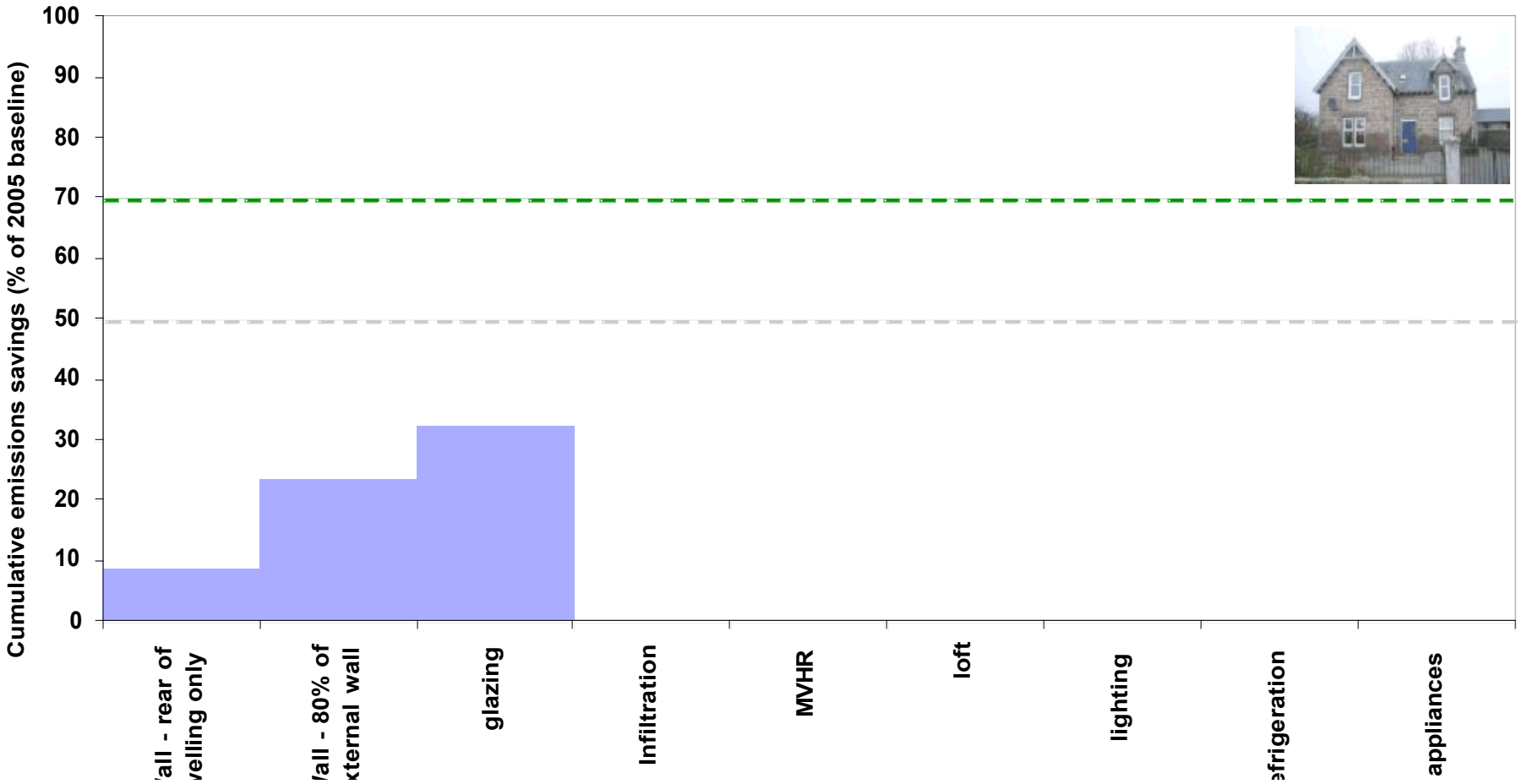
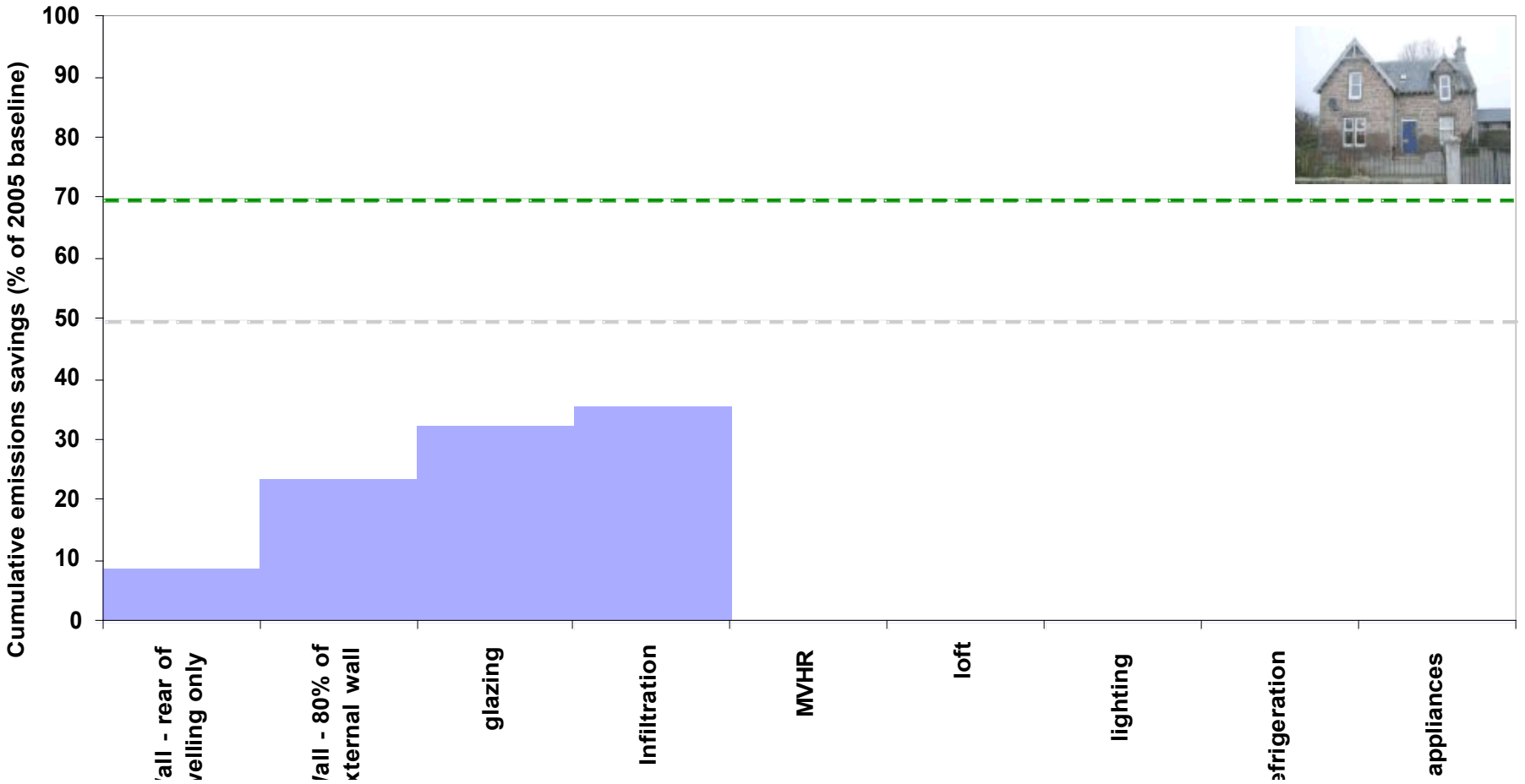


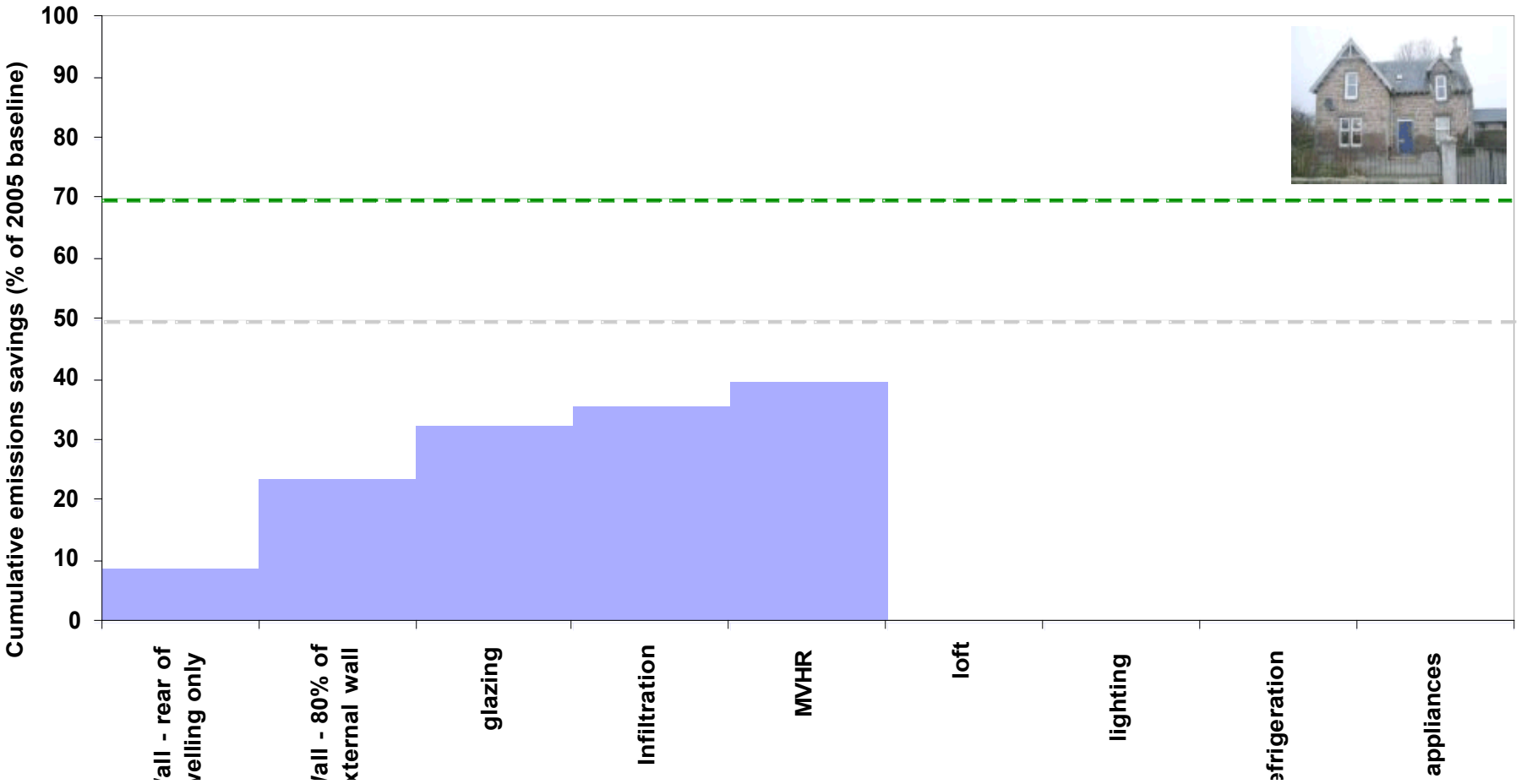
Demand side interventions
Variant 7



Demand side interventions
Variant 7



Demand side interventions
Variant 7



Demand side interventions
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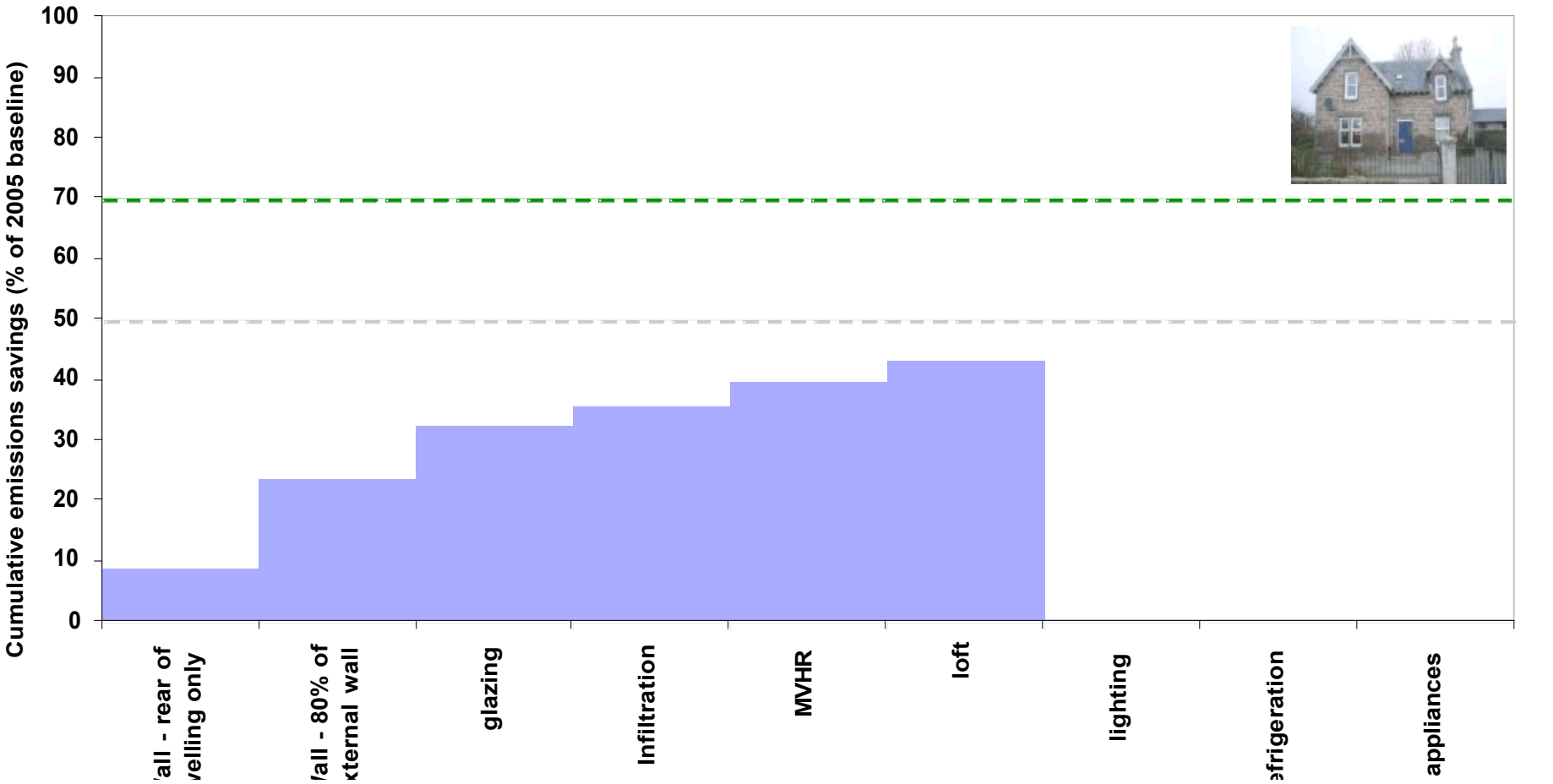

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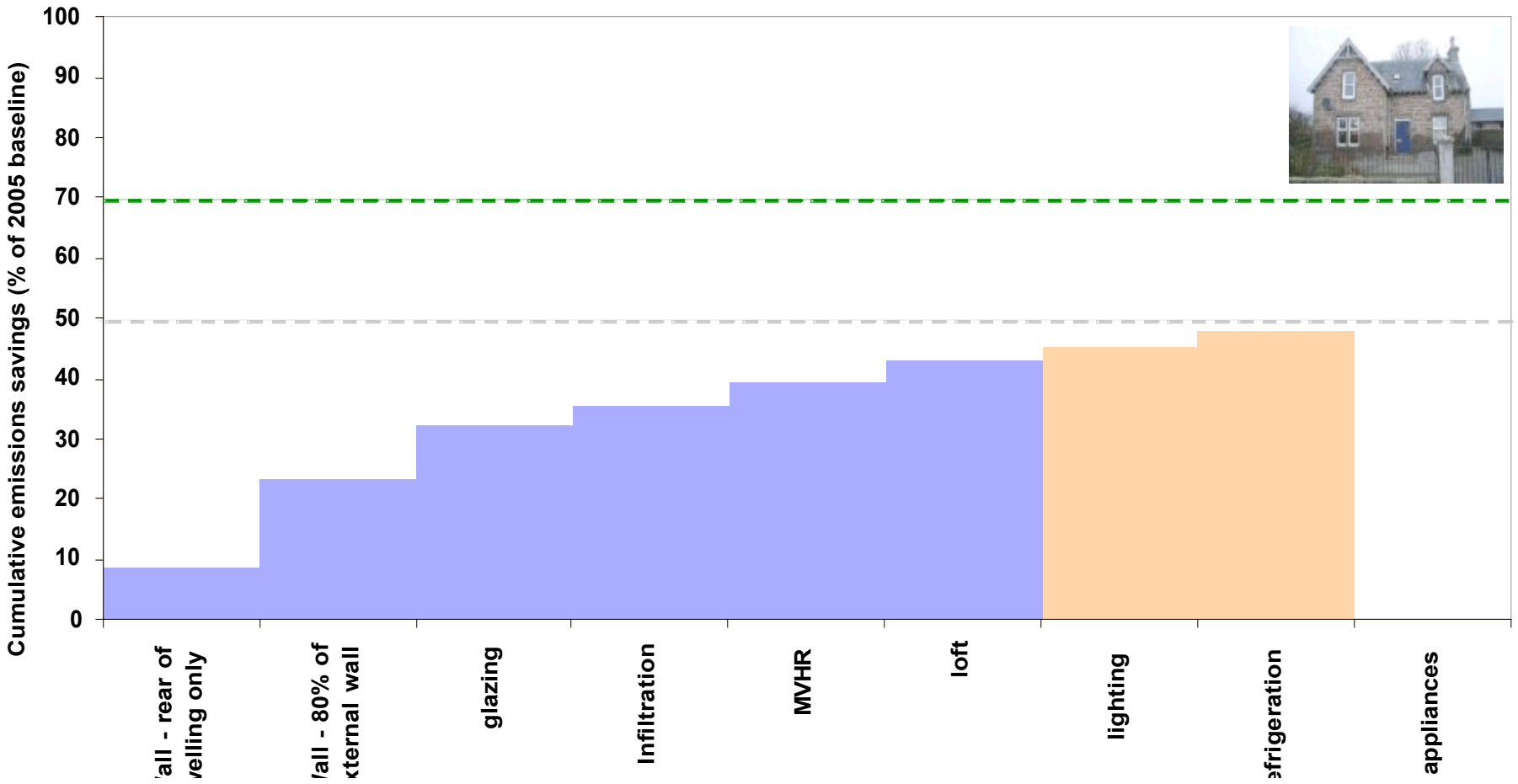
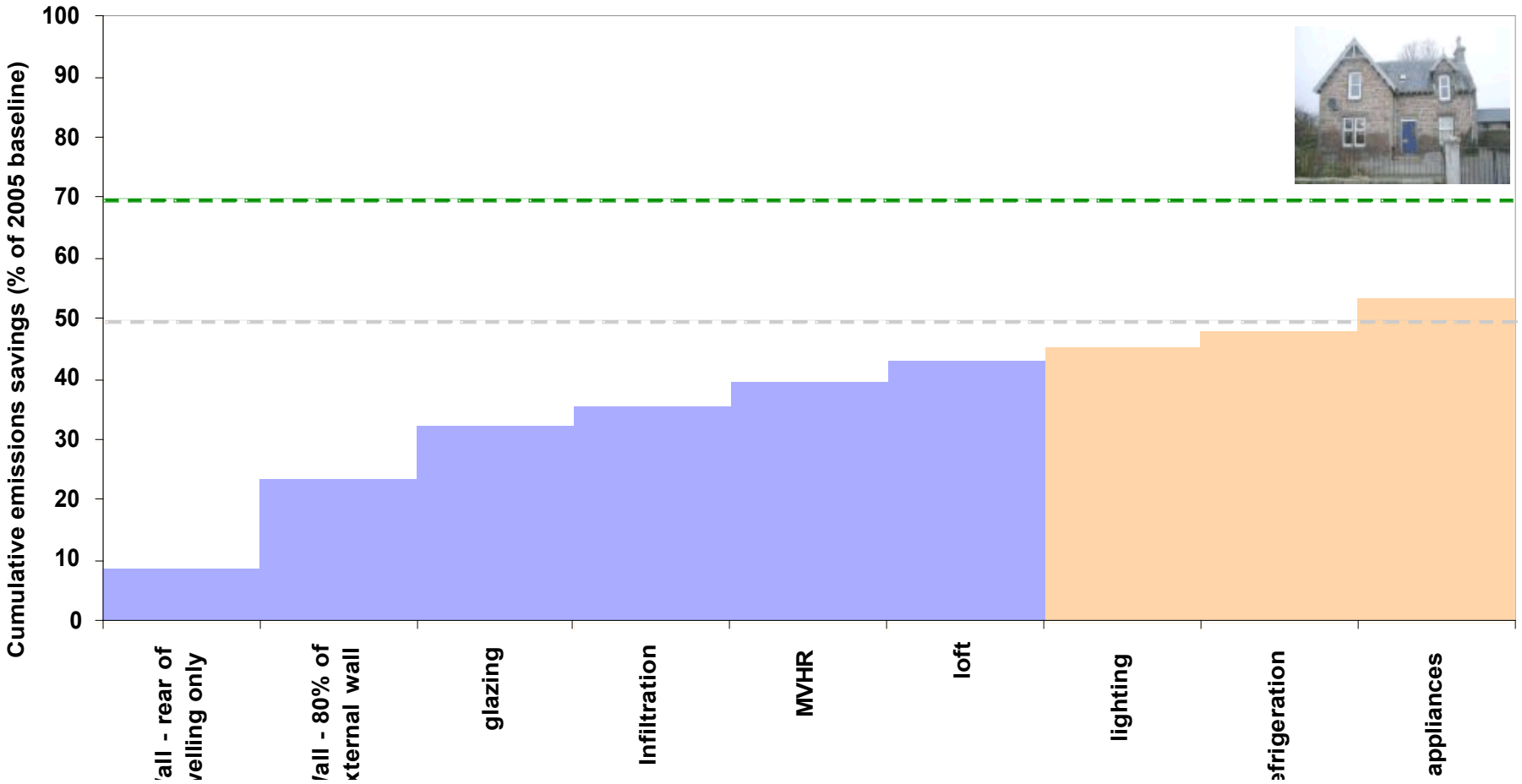
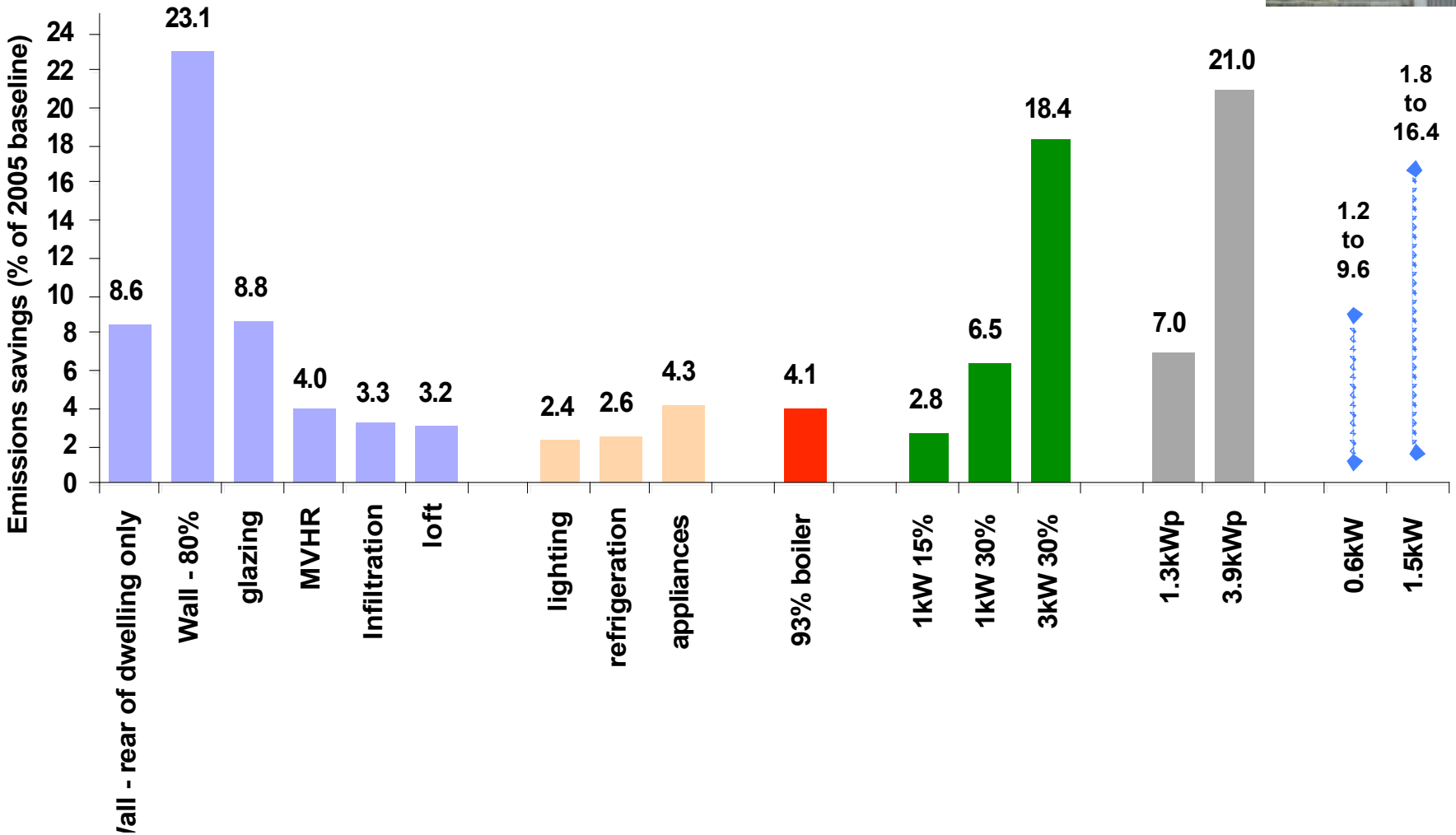


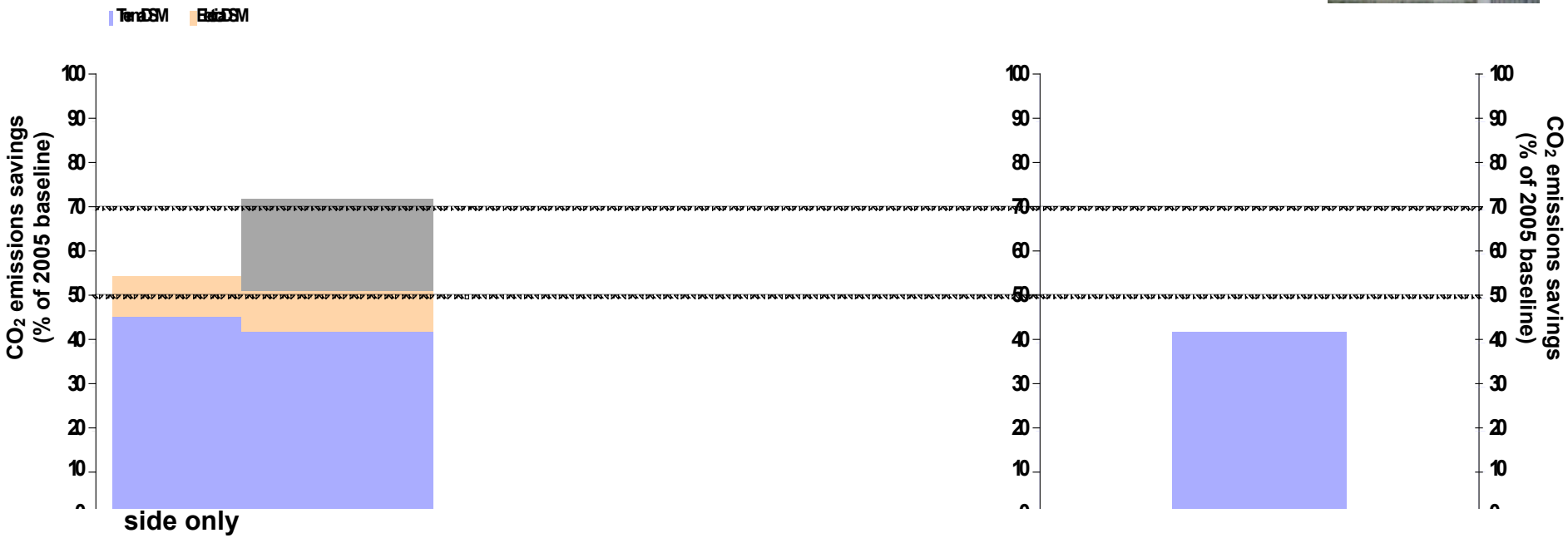
Demand side interventions
Variant 7



Technological Interventions Variant 7



Technological intervention sets for Variant 7



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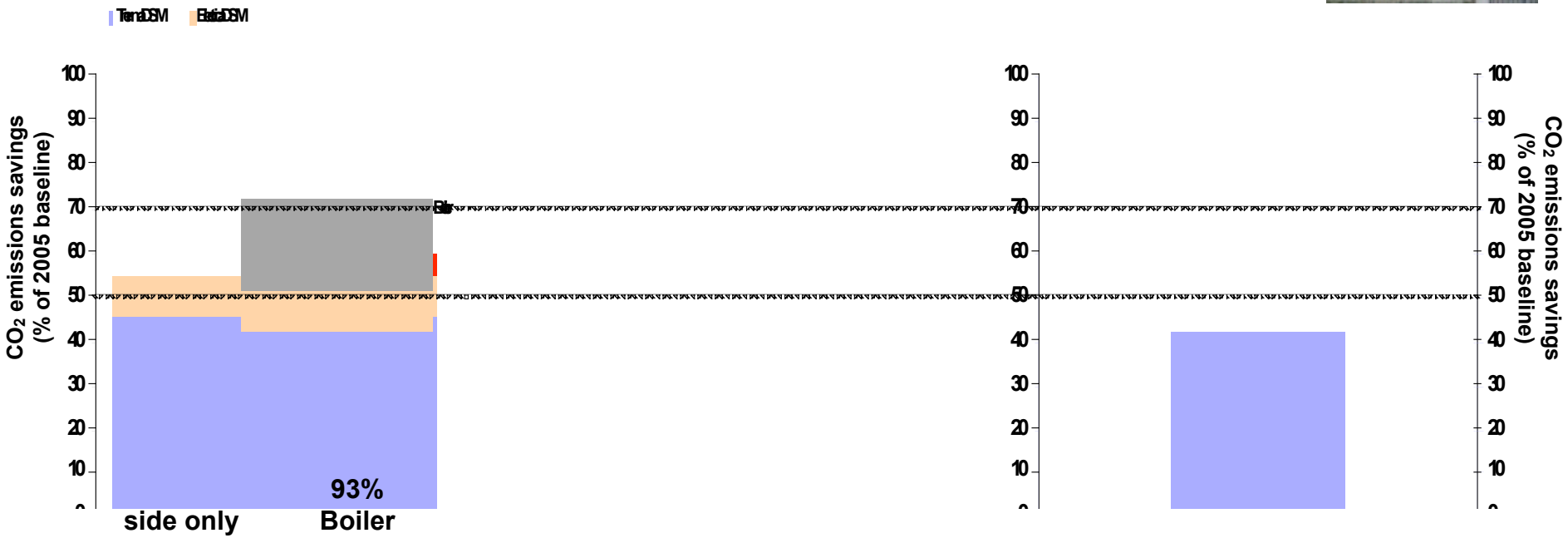

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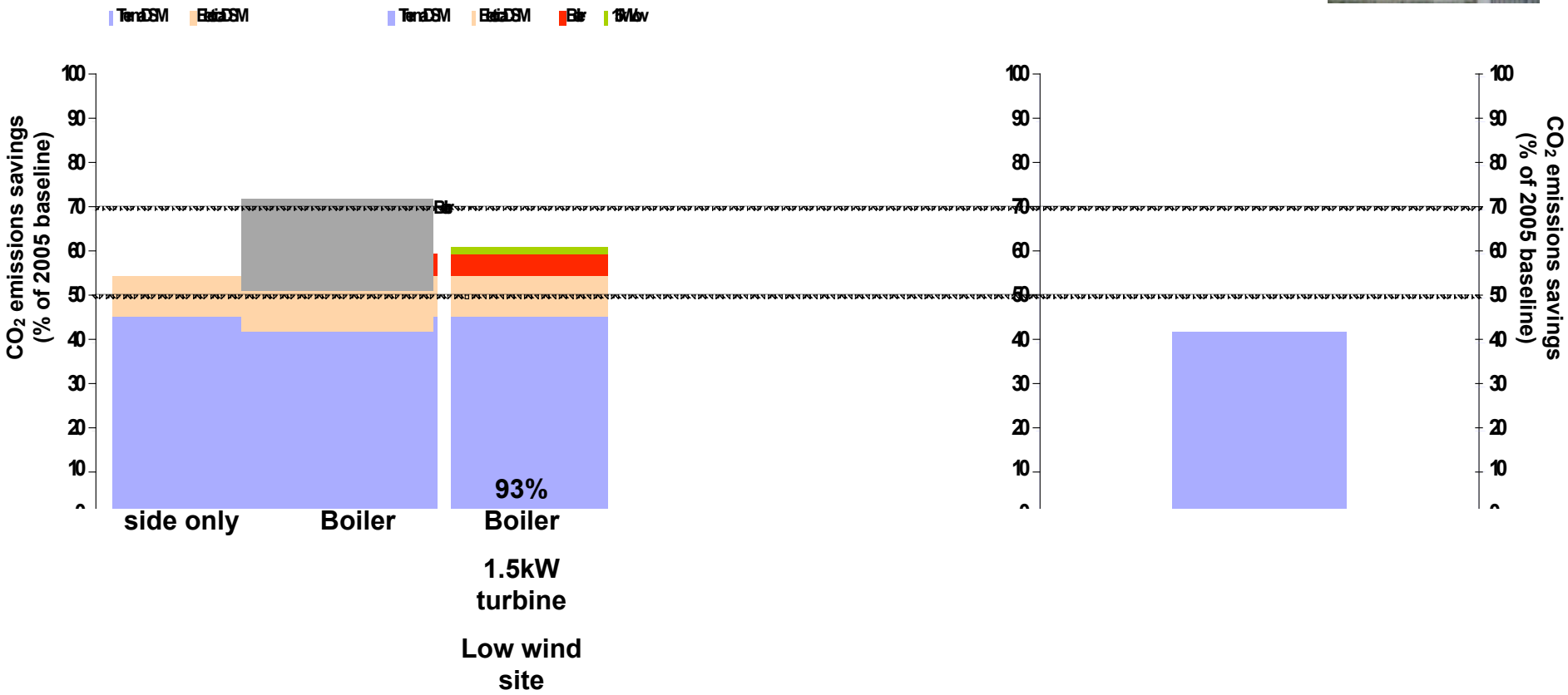
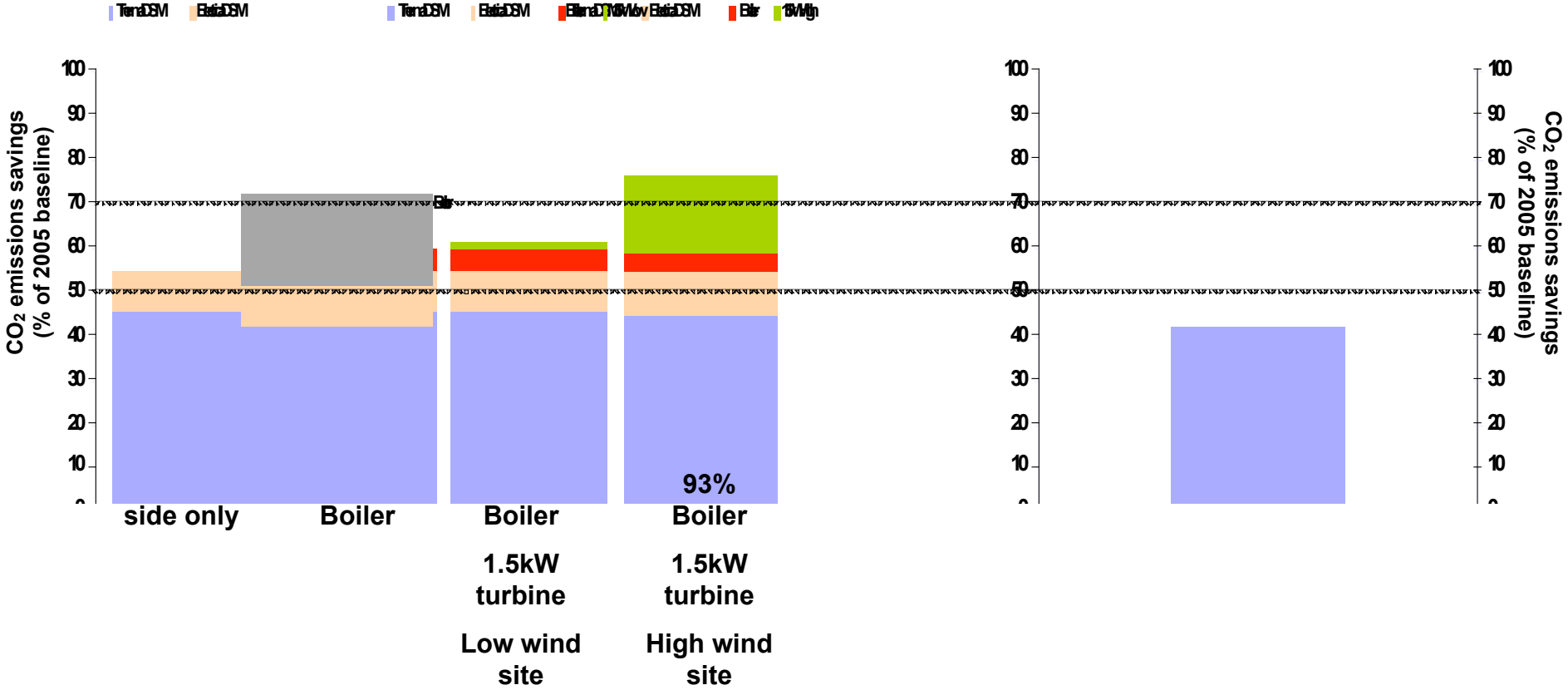


Technological intervention sets for Variant 7



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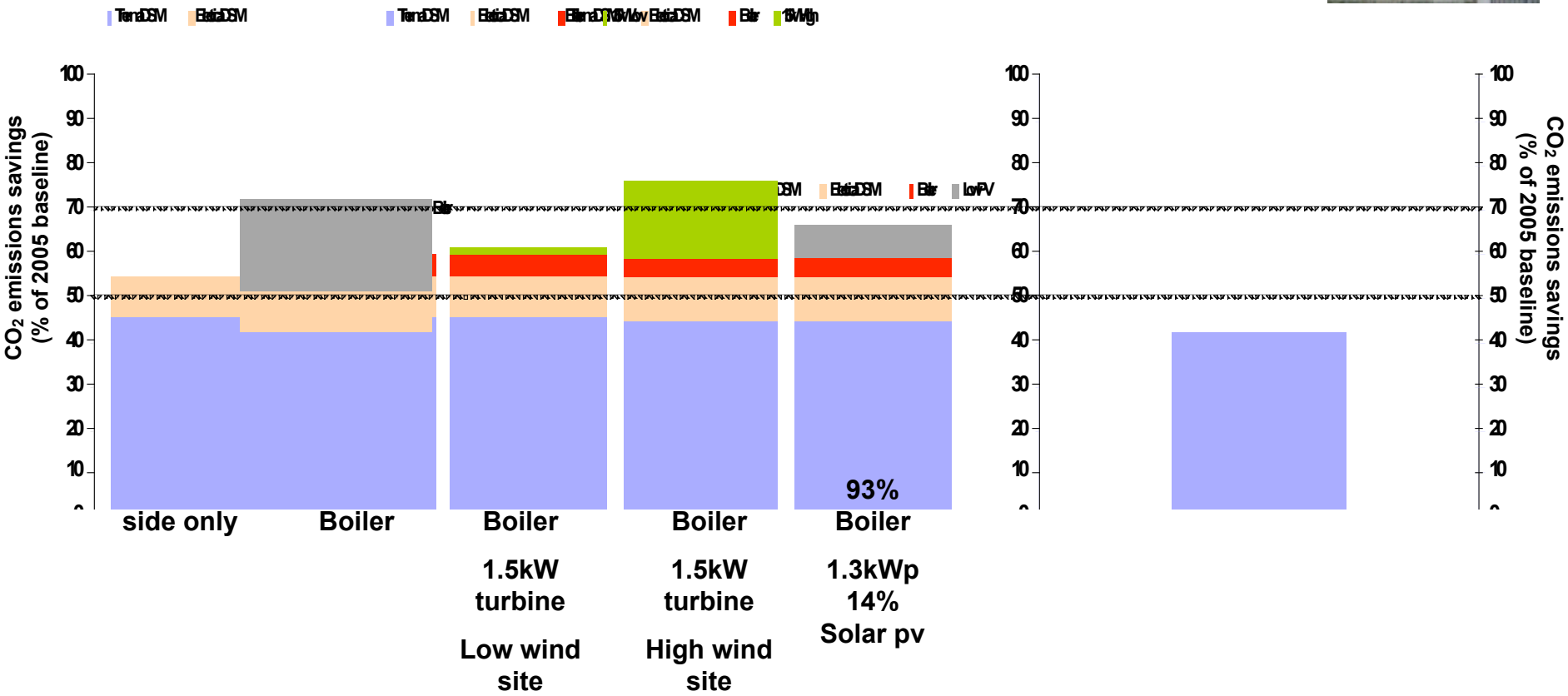

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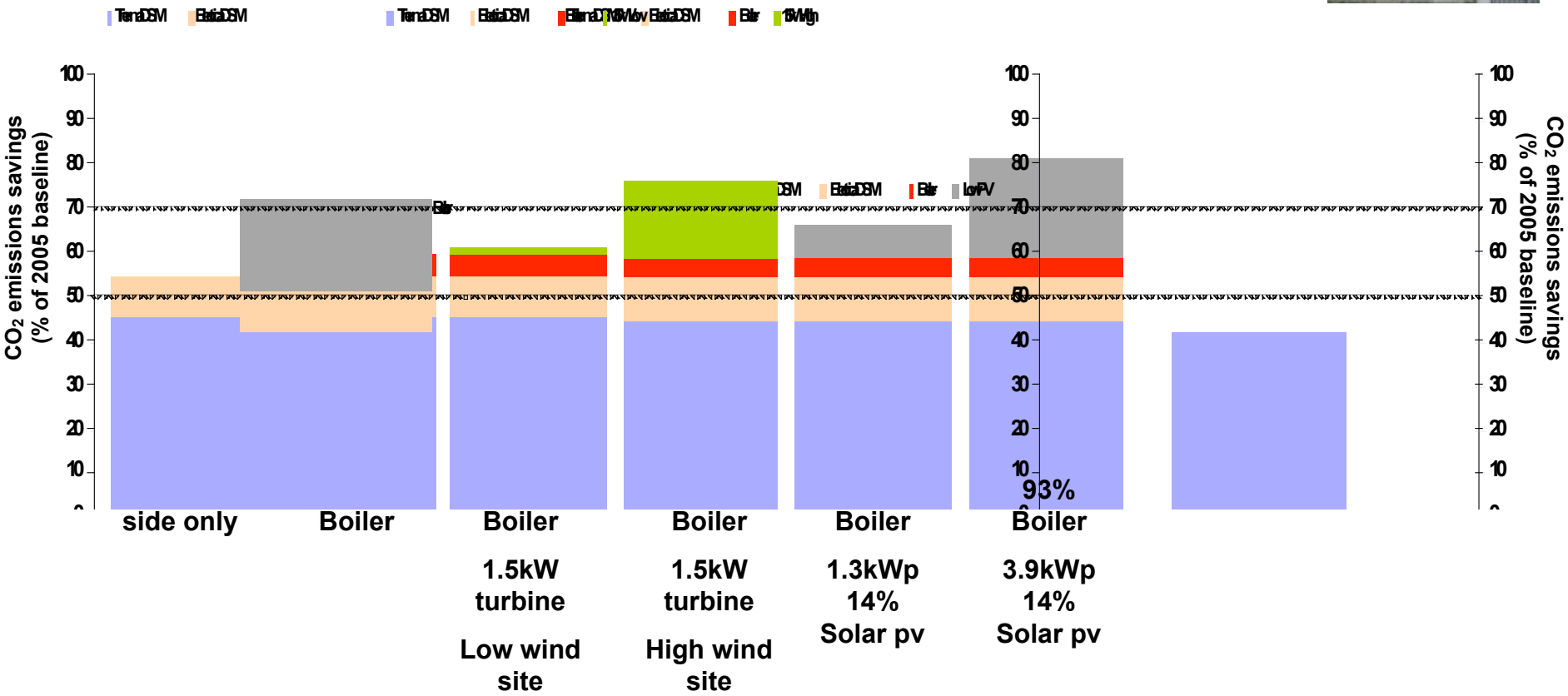
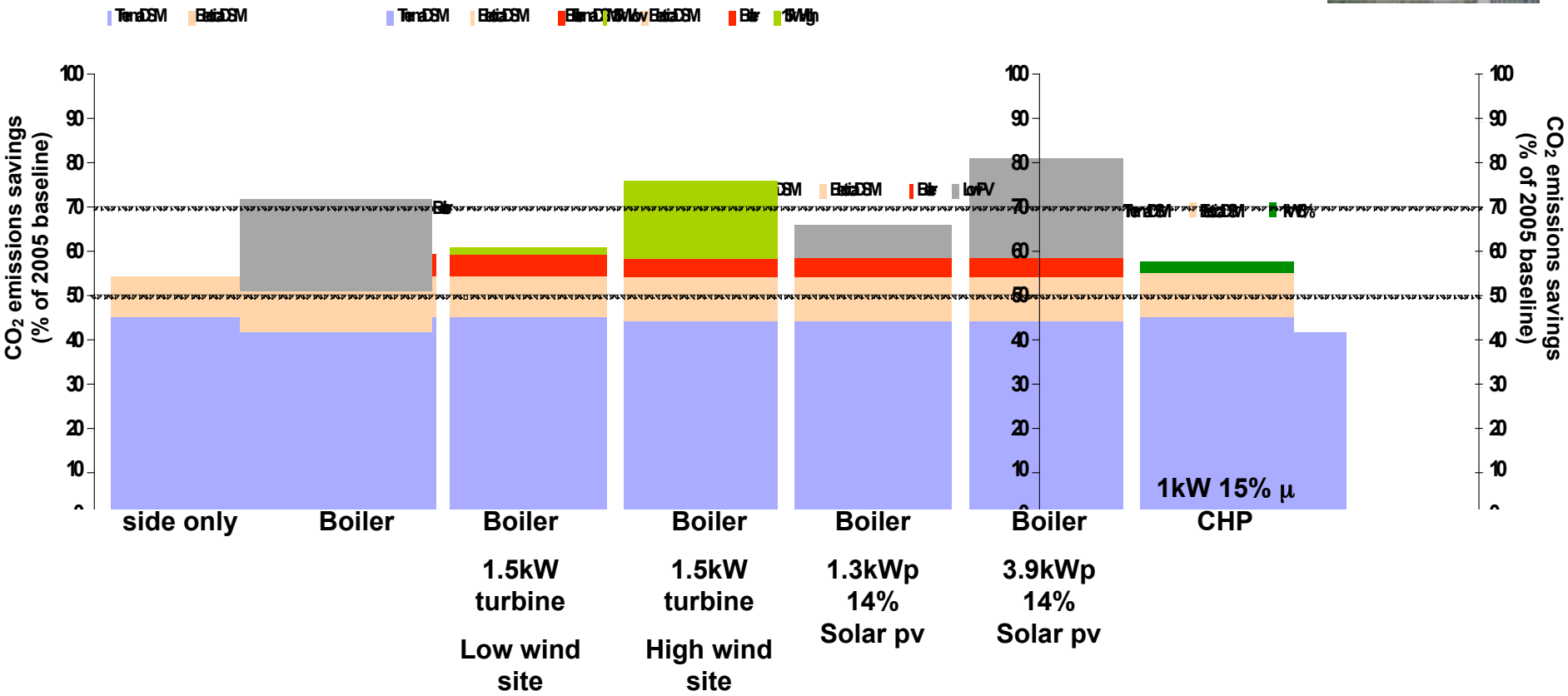
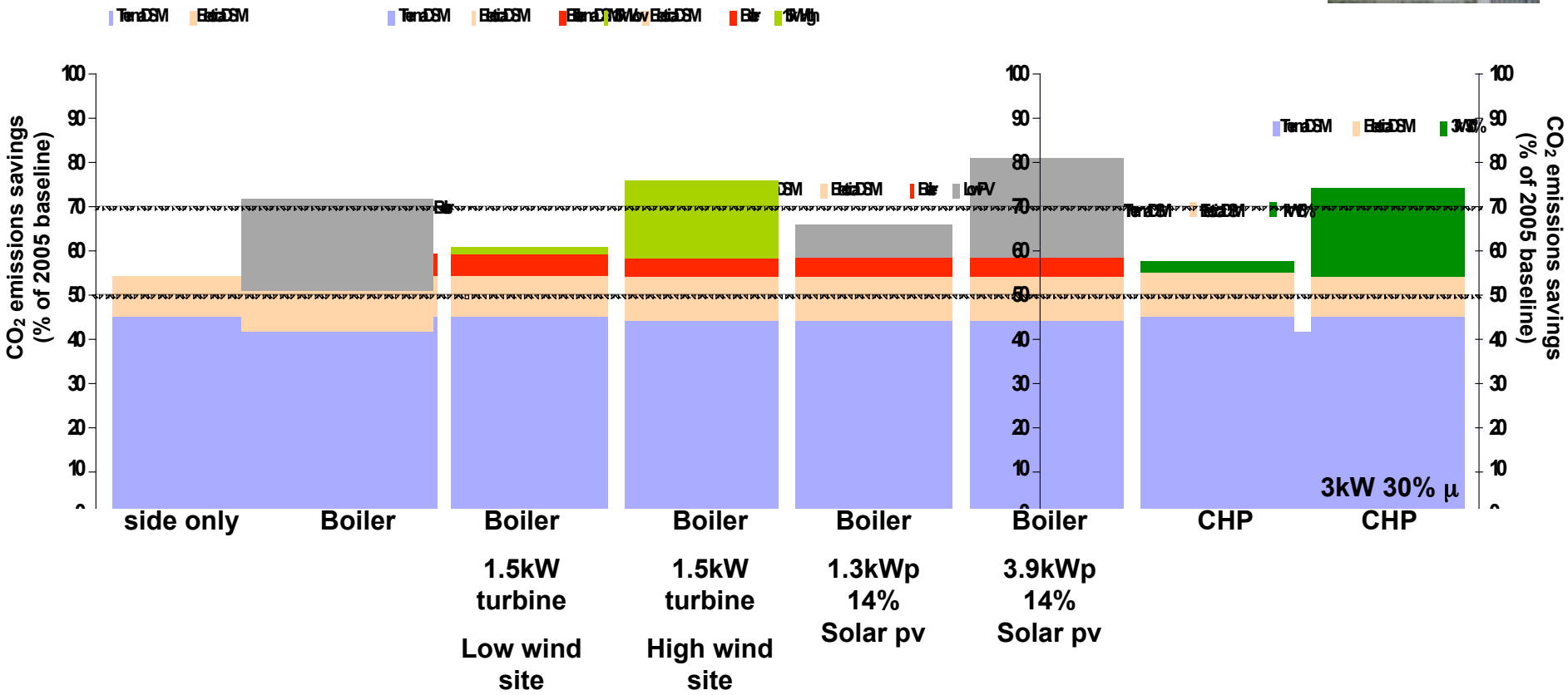


Technological intervention sets for Variant 7

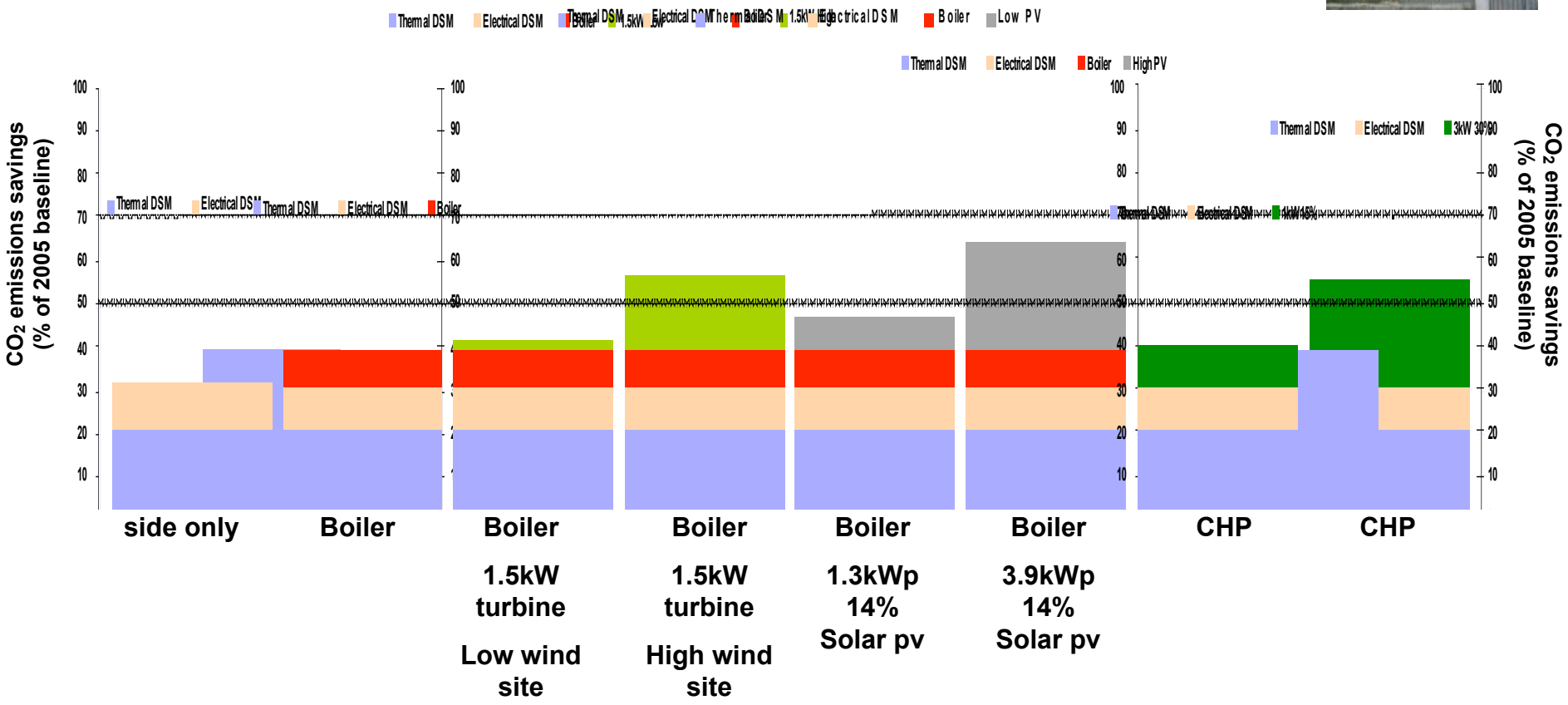


Technological intervention sets for Variant 7



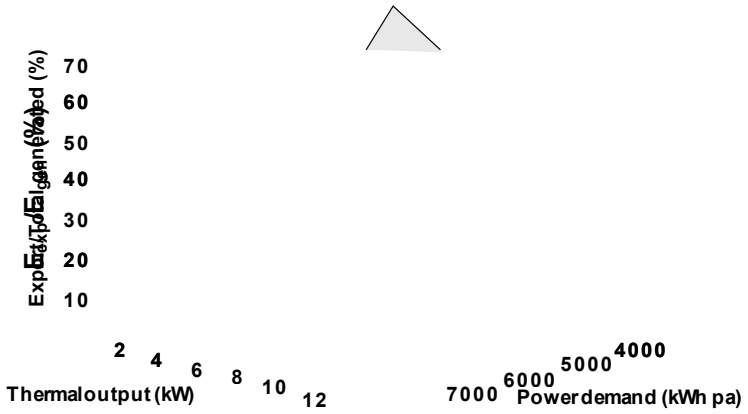
Technological intervention sets for Variant 7

No external wall insulation

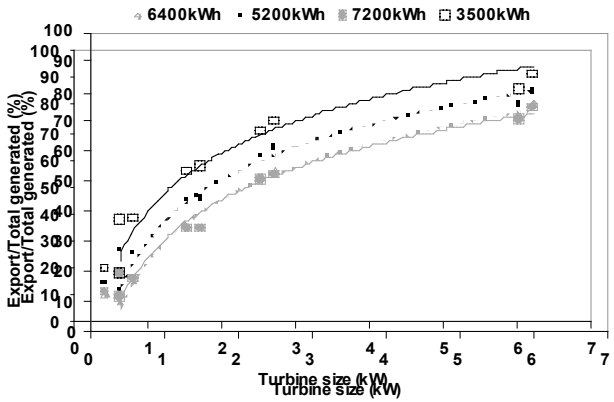


Supply Demand matching of micro-generation systems

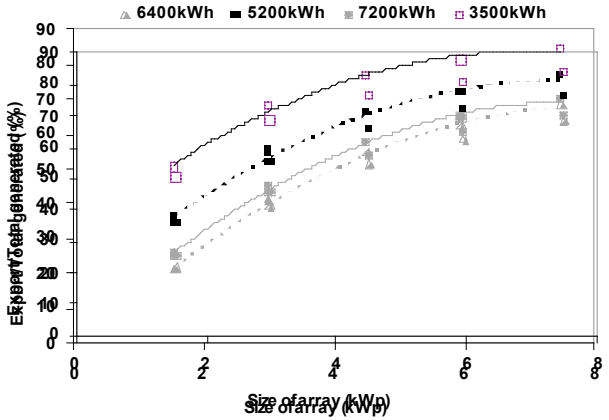
a) Micro -CHP



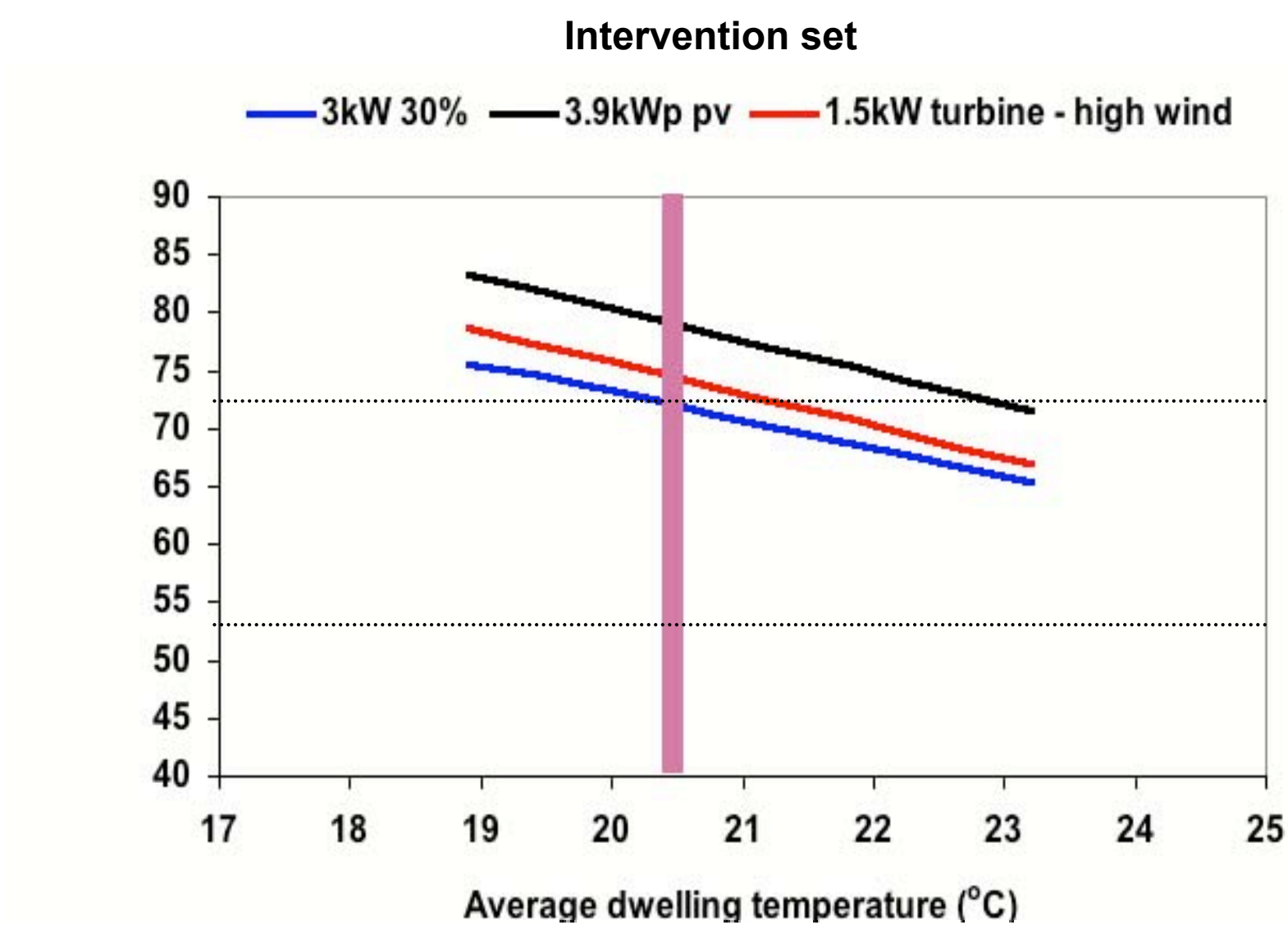
b) Micro -wind



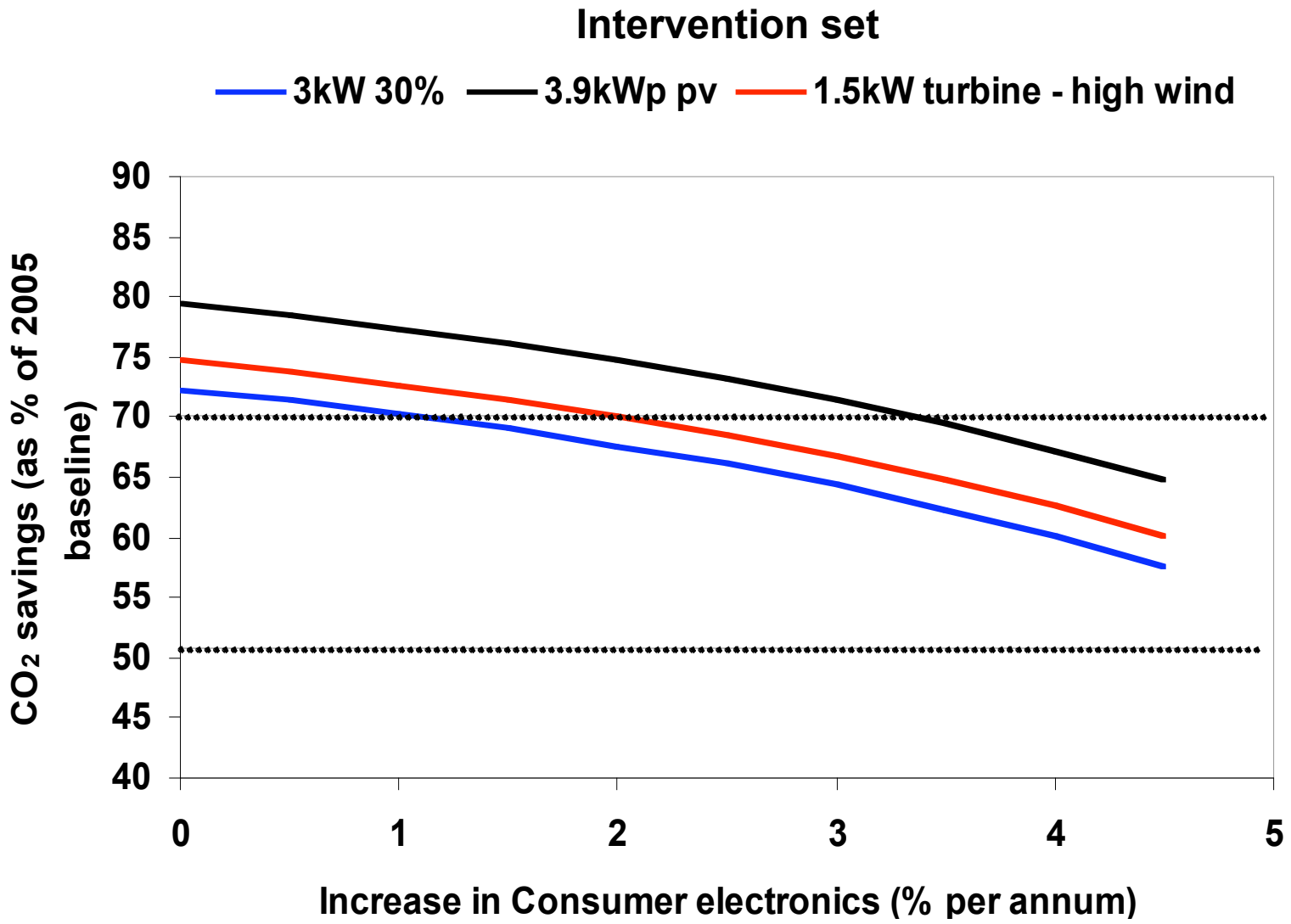
c) Solar -PV



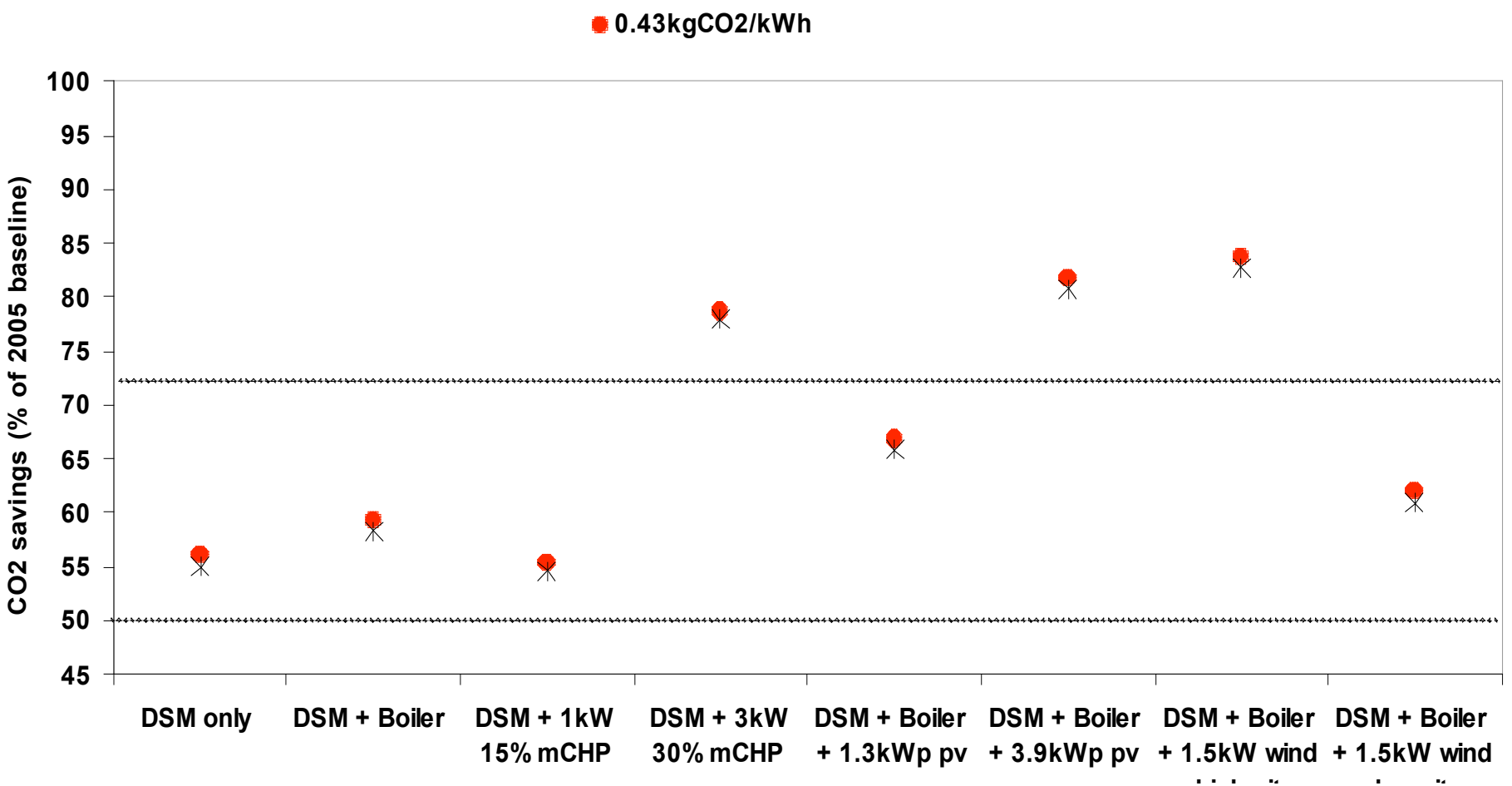
Effect of dwelling temperature on CO_2 emissions attributable to intervention set



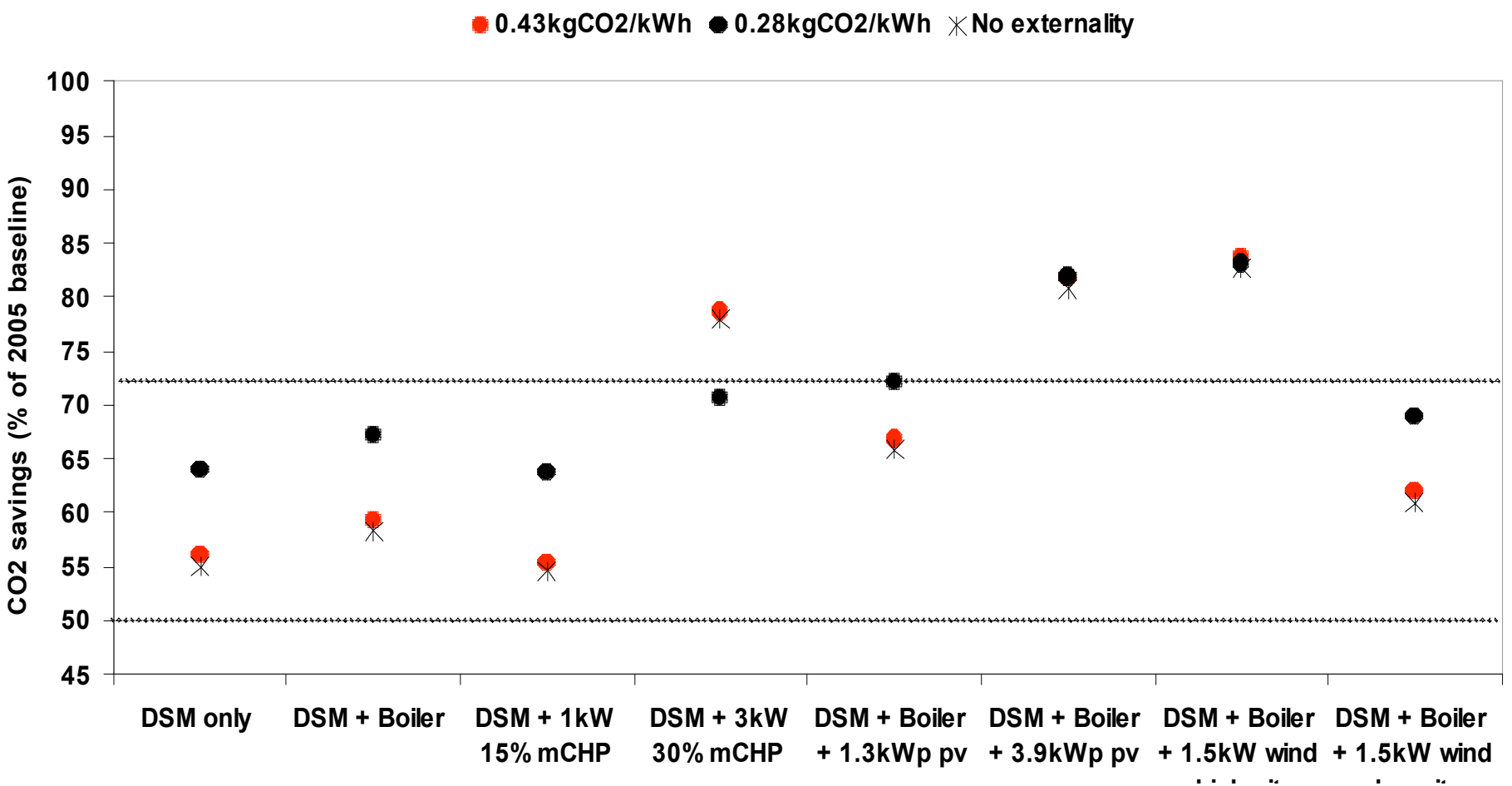
Effect of consumer electronics growth on CO_2 emissions attributable to intervention sets



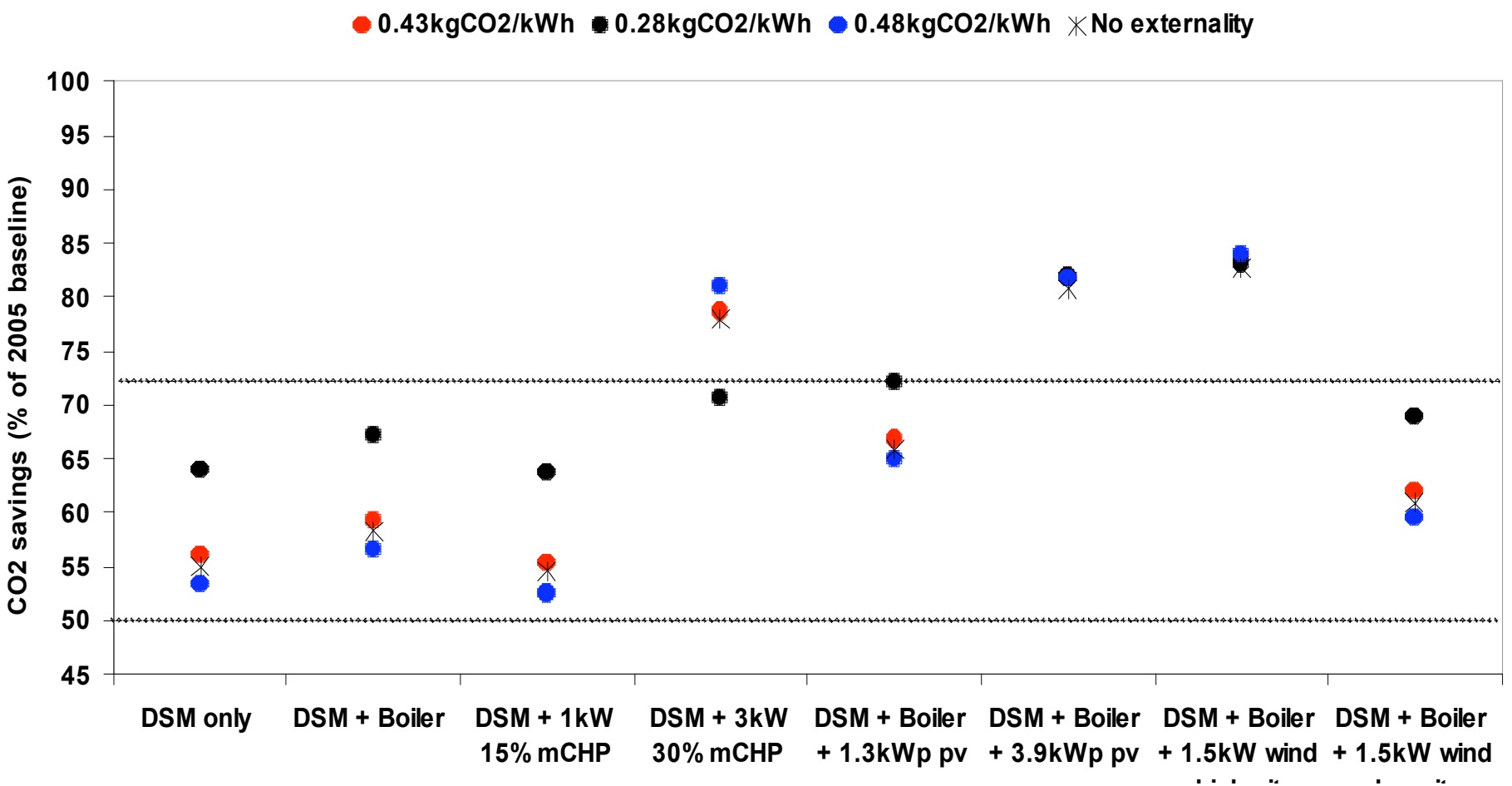
Effect of external factors on CO_2 emissions attributable to intervention sets – V7



Effect of external factors on CO_2 emissions attributable to intervention sets – V7



Effect of external factors on CO_2 emissions attributable to intervention sets – V7

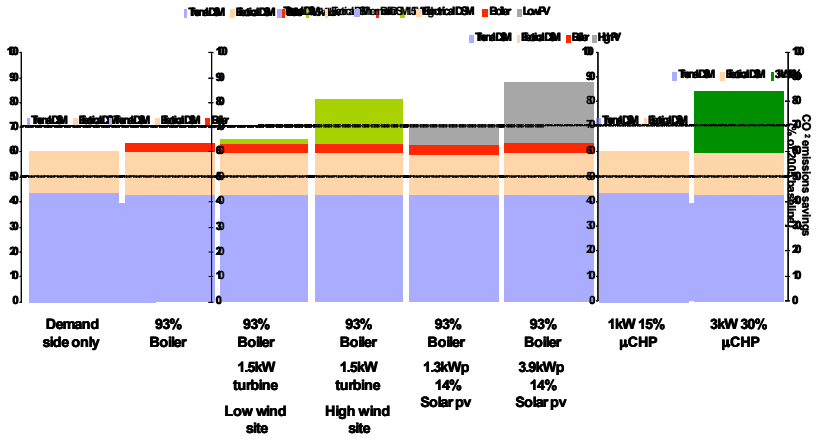


Summary

- A methodology has been developed for assessing the CO_2 emissions attributable to intervention sets
- The contribution of demand side measures outweigh supply side measures
- Sensitivity analysis can be performed on these intervention sets based on external factors studied
- This methodology is being extended to consider other performance metrics

Intervention sets and metrics

Carbon



Embodied energy

Whole Life Cycle cost

User Acceptance

€'s and kgCO_2

- Reduced utility bill from approx €2000 to €900
- What would you do with the €1100?
- Do we need to disassociate CO_2 savings and € savings