Residential heat decarbonisation: complementary policies and potentials

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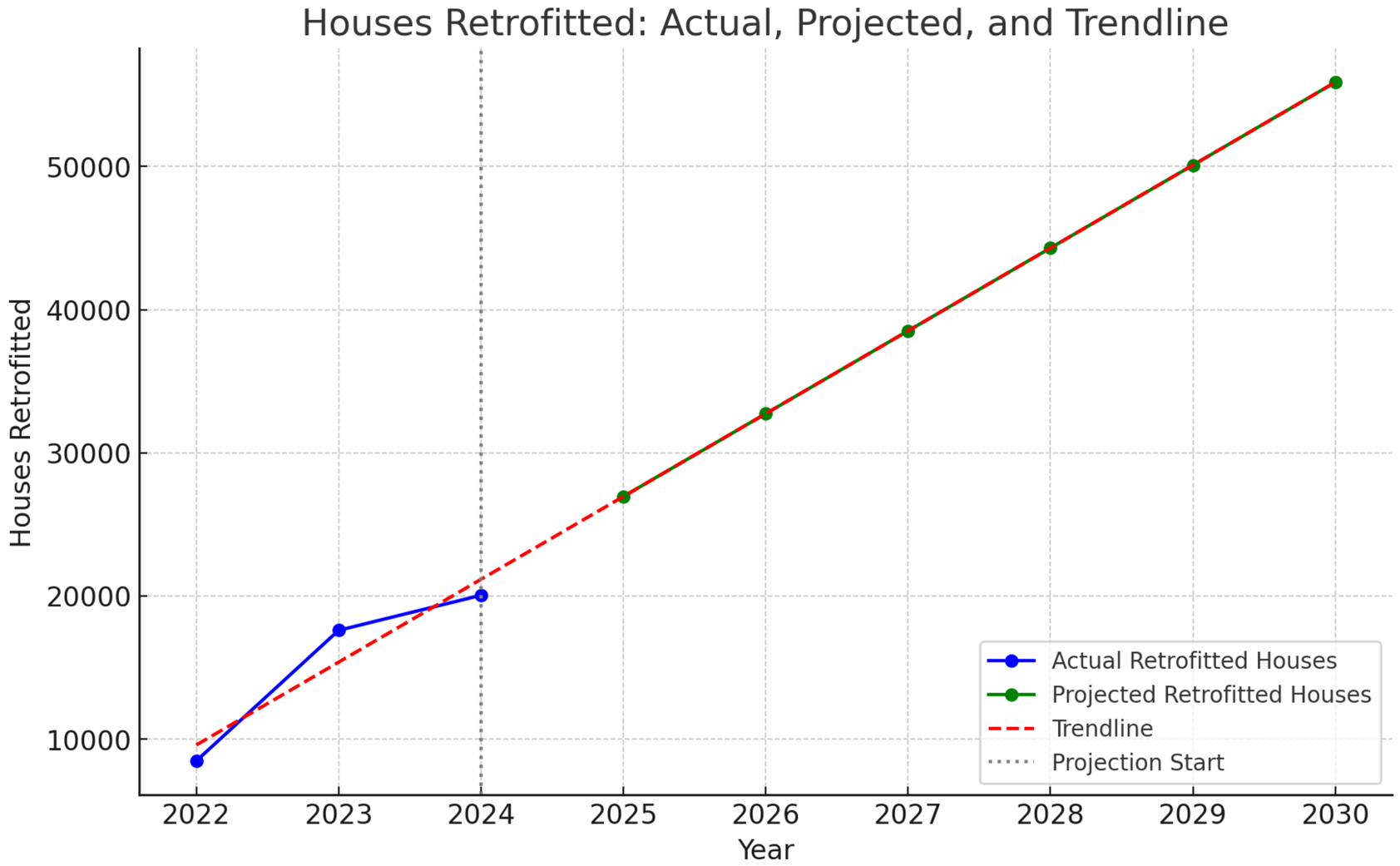
Introduction

- Climate Action Plan envisages the decarbonisation of the residential heating sector via heat pumps and decarbonised electricity
- Grants for retrofitting and heat pumps
- Uptake is very slow – 51152 retrofits to date (~10% of target)

Introduction



Introduction

- Linear trend predicts 300k homes retrofitted to B2 by 2030
- Linear trend assumes <50k heat pumps

Introduction

- Examine costs and emissions associated with various decarbonisation options
- Assume policy is met or not
- Include non-monetary retrofit costs (i.e., cost of disruption)
- Consider complementary policies

Assumptions

- MeetTarget: CAP target is met
- MissTarget: we fall short of CAP targets for retrofits and heat pumps
- CompGas: we fall short of CAP targets but achieve 5.7TWh of biomethane
- CompOil: we fall short of CAP targets but convert households with oil boilers to alternative fuels

- Consider with and without disruption cost
- Assume a new boiler for all alternative fuel scenarios

Assumptions

Policy	MeetTarget	MissTarget	CompGas	CompOil
Retrofit - B2	500	400	400	400
Heat pumps	400	250	250	250
Biomethane			5.7TWh	
HVO				150
LPG				150
BioLPG				50

Data

Data

- CSO:
  - Total dwelling stock
  - BER audits
  - Scaled BERs to national level
- SEAI:
  - Heat study total stock
  - Retrofit data – OSS and individual grant schemes
  - Building archetypes – heat demand

Data

Approach taken:

- Use CSO number for total occupied dwellings that are not BER exempt
- Use CSO data to break out by dwelling type, BER and heating fuel
- Scale Heat Study data to CSO data
- Use Heat Study for total fuel demand

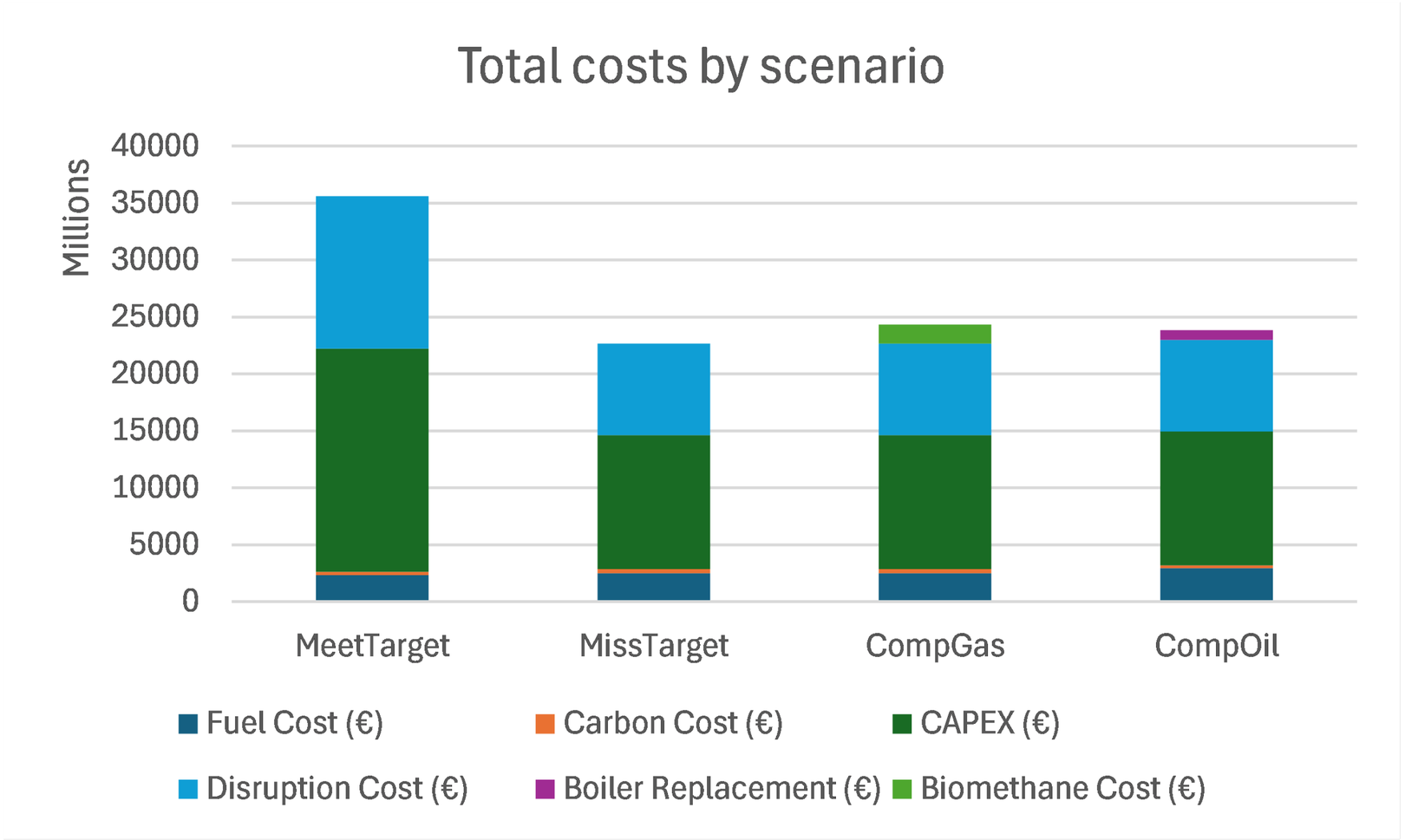
1,554,282 dwellings in total

New builds not captured

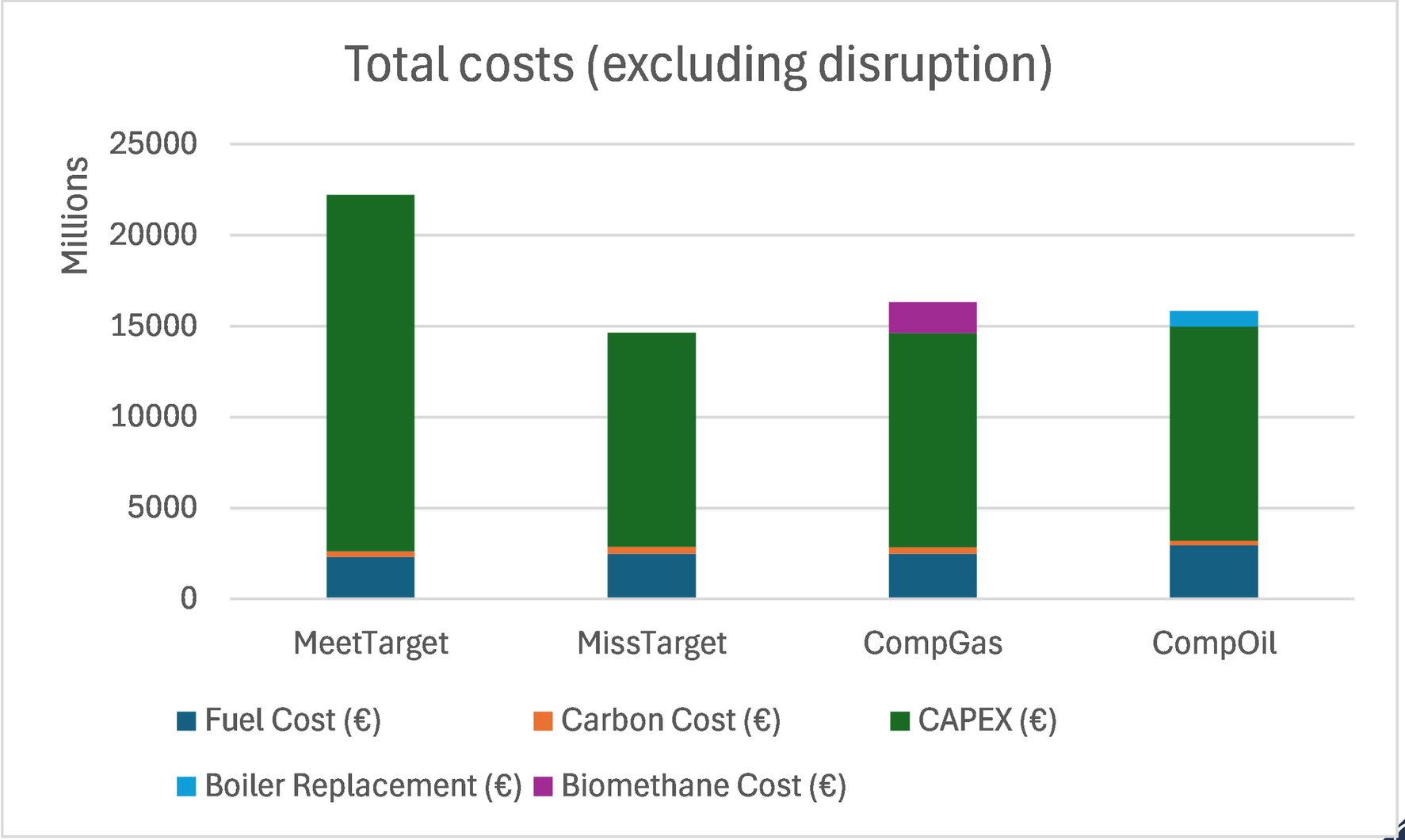
Data

- Gas demand for 2030 from GNI
- Fuel prices and emissions factors from SEAI and industry
- Retrofit costs for One Stop Shops from SEAI
- Disruption costs from Curtis et al. (2024)

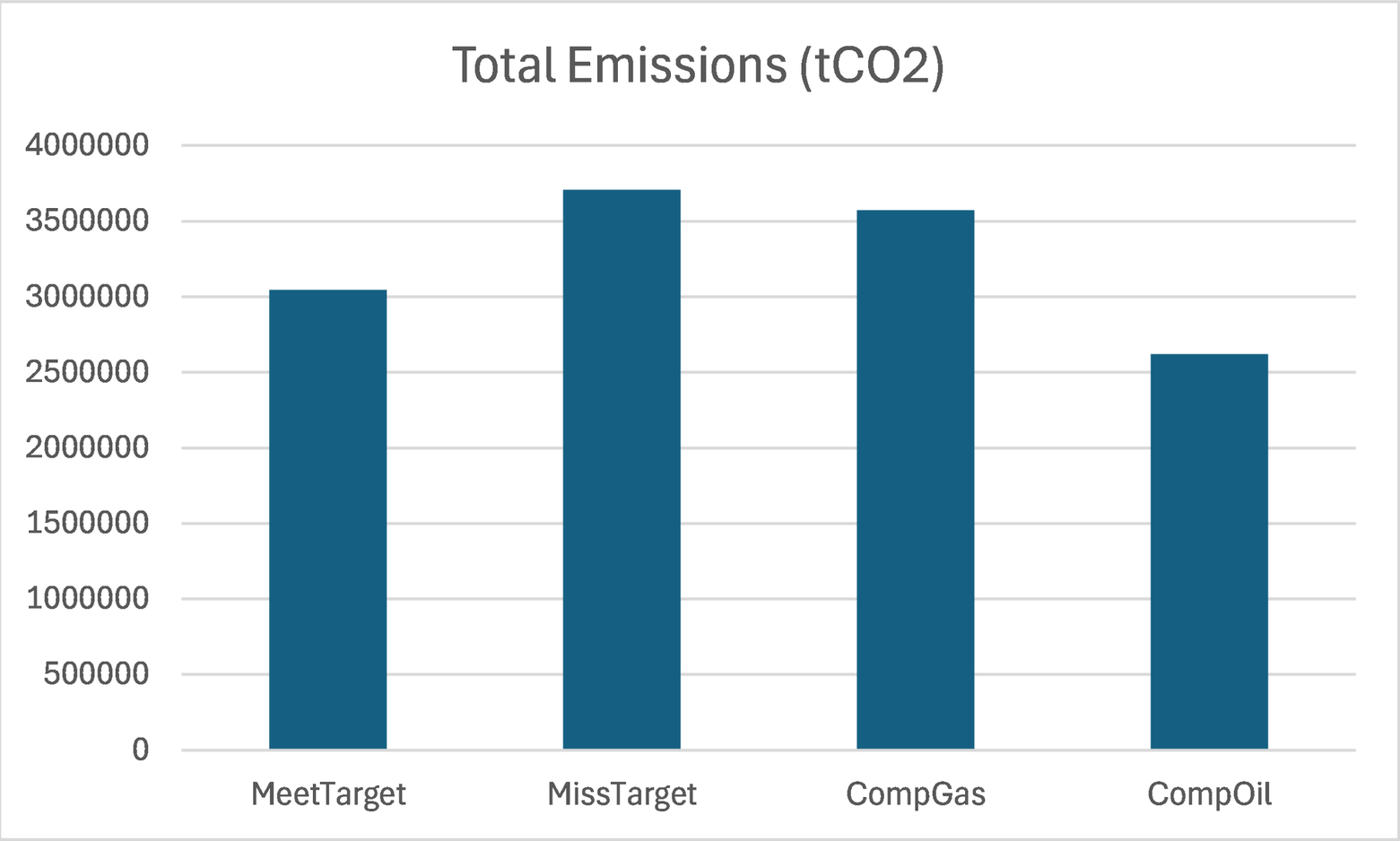
Results



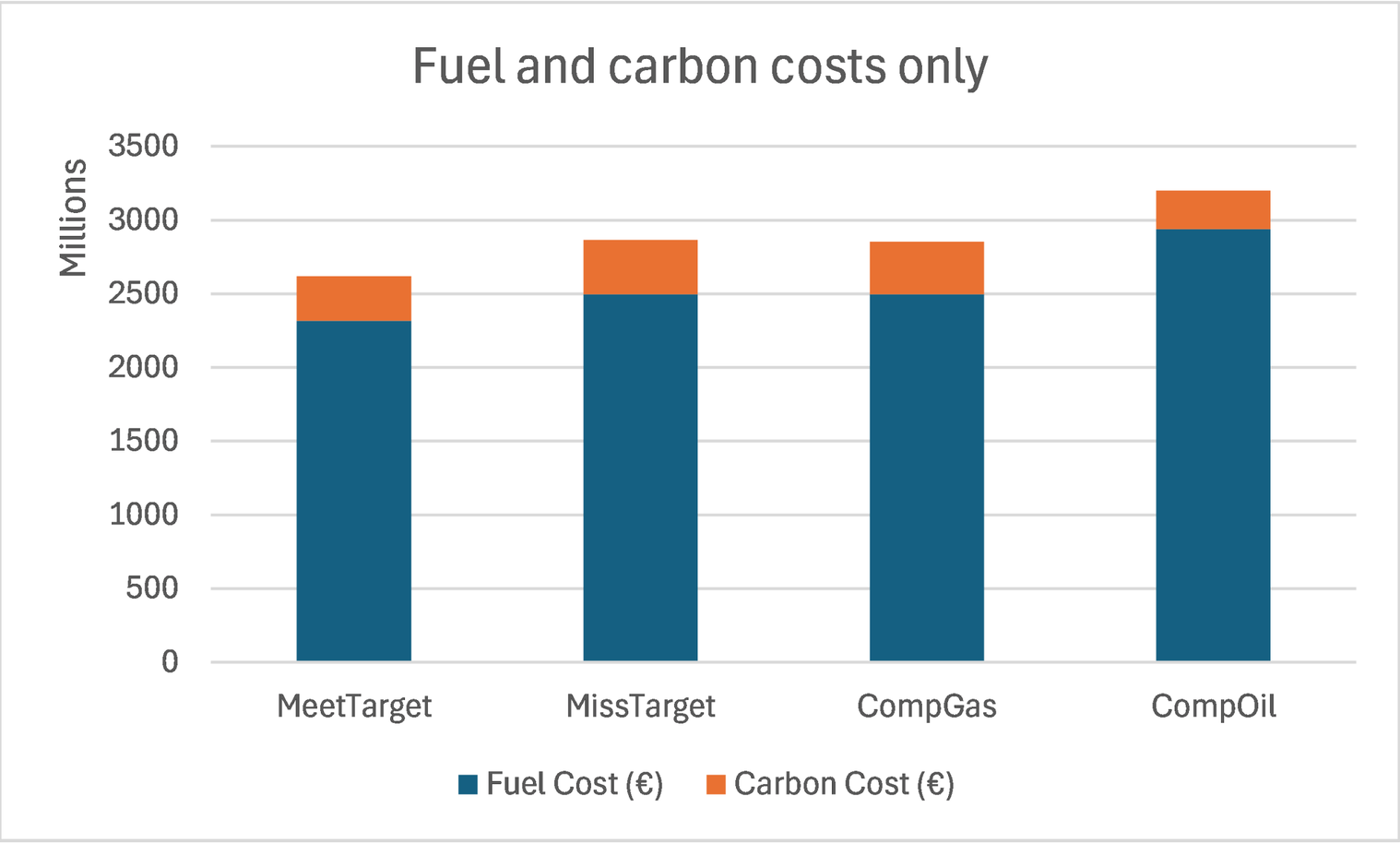
Results



Results



Results



Sensitivities

Disrupt

Ann

Retro

HP

cost

Gas

High

Sensitivities

Disrupt	Y
Ann	
Retro	Y
HP	
cost	
Gas	
High	Y

HP	0
Gas	0
HVO	150
LPG	88
BioLPG	50

Sensitivities

Disrupt	Y	Y
Ann		Y
Retro	Y	Y
HP cost		
Gas		
High	Y	Y

HP	0	0
Gas	0	0
HVO	150	150
LPG	88	88
BioLPG	50	50

Sensitivities

Disrupt	Y	Y	Y
Ann		Y	
Retro	Y	Y	Y
HP cost			
Gas High	Y	Y	

HP	0	0	192
Gas	0	0	0
HVO	150	150	15
LPG	88	88	15
BioLPG	50	50	5

Sensitivities

Disrupt	Y	Y	Y	Y
Ann		Y		Y
Retro	Y	Y	Y	Y
HP cost				
Gas				
High	Y	Y		

HP	0	0	192	192
Gas	0	0	0	0
HVO	150	150	15	15
LPG	88	88	15	15
BioLPG	50	50	5	5

Sensitivities

Disrupt	Y	Y	Y	Y	
Ann		Y		Y	Y
Retro	Y	Y	Y	Y	Y
HP cost					
Gas					
High	Y	Y			Y

HP	0	0	192	192	1
Gas	0	0	0	0	0
HVO	150	150	15	15	150
LPG	88	88	15	15	87
BioLPG	50	50	5	5	50

Sensitivities

Disrupt	Y	Y	Y	Y		
Ann		Y		Y	Y	Y
Retro	Y	Y	Y	Y	Y	Y
HP cost						
Gas						
High	Y	Y			Y	

HP	0	0	192	192	1	196
Gas	0	0	0	0	0	0
HVO	150	150	15	15	150	15
LPG	88	88	15	15	87	15
BioLPG	50	50	5	5	50	5

Sensitivities

Disrupt	Y		Y		Y		
Ann			Y		Y	Y	Y
Retro	Y		Y		Y	Y	Y
HP cost							
Gas							
High	Y		Y			Y	

HP	0	0	192	192	1	196	1,233
Gas	0	0	0	0	0	0	0
HVO	150	150	15	15	150	15	0
LPG	88	88	15	15	87	15	0
BioLPG	50	50	5	5	50	5	0

Sensitivities

Disrupt	Y		Y		Y		Y	
Ann			Y			Y	Y	Y
Retro	Y		Y		Y		Y	Y
HP cost								
Gas								
High	Y		Y			Y		Y

HP	0	0	192	192	1	196	1,233	1,233
Gas	0	0	0	0	0	0	0	0
HVO	150	150	15	15	150	15	0	0
LPG	88	88	15	15	87	15	0	0
BioLPG	50	50	5	5	50	5	0	0

Sensitivities

Disrupt	Y		Y		Y				
Ann			Y		Y		Y		Y
Retro	Y		Y		Y		Y		Y
HP cost								Y	
Gas High	Y		Y				Y		Y

HP	0	0	192	192	1	196	1,233	1,233	0
Gas	0	0	0	0	0	0	0	0	655
HVO	150	150	15	15	150	15	0	0	0
LPG	88	88	15	15	87	15	0	0	0
BioLPG	50	50	5	5	50	5	0	0	0

Sensitivities

Disrupt	Y		Y		Y		Y			
Ann			Y				Y	Y	Y	
Retro	Y		Y		Y		Y	Y	Y	
HP cost									Y	Y
Gas										
High	Y		Y				Y		Y	

HP	0	0	192	192	1	196	1,233	1,233	0	0
Gas	0	0	0	0	0	0	0	0	655	655
HVO	150	150	15	15	150	15	0	0	0	0
LPG	88	88	15	15	87	15	0	0	0	0
BioLPG	50	50	5	5	50	5	0	0	0	0

Sensitivities

Disrupt	Y		Y		Y		Y				
Ann			Y				Y	Y	Y		
Retro	Y		Y		Y		Y	Y	Y		
HP cost									Y	Y	Y
Gas											Y
High	Y		Y				Y		Y		Y

HP	0	0	192	192	1	196	1,233	1,233	0	0	0
Gas	0	0	0	0	0	0	0	0	655	655	46
HVO	150	150	15	15	150	15	0	0	0	0	150
LPG	88	88	15	15	87	15	0	0	0	0	0
BioLPG	50	50	5	5	50	5	0	0	0	0	50

Sensitivities

Disrupt	Y		Y		Y							
Ann			Y			Y		Y	Y	Y		
Retro	Y		Y		Y		Y		Y		Y	
HP cost										Y	Y	Y	Y		
Gas												Y	Y		
High	Y		Y				Y		Y		Y		Y		

HP	0	0	192	192	1	196	1,233	1,233	0	0	0	0
Gas	0	0	0	0	0	0	0	0	655	655	46	412
HVO	150	150	15	15	150	15	0	0	0	0	150	15
LPG	88	88	15	15	87	15	0	0	0	0	0	0
BioLPG	50	50	5	5	50	5	0	0	0	0	50	5

Conclusion

- Retrofit cost dominates – even when annualized
- Low carbon oil complements heat pump policy
- Possibility of behavioural considerations beyond disruption costs – further work

Thank you

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Anita Vollmer
John Curtis

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