Short-Term Vs Long-Term Planning – Impact of Emissions Pathways on Energy Resources

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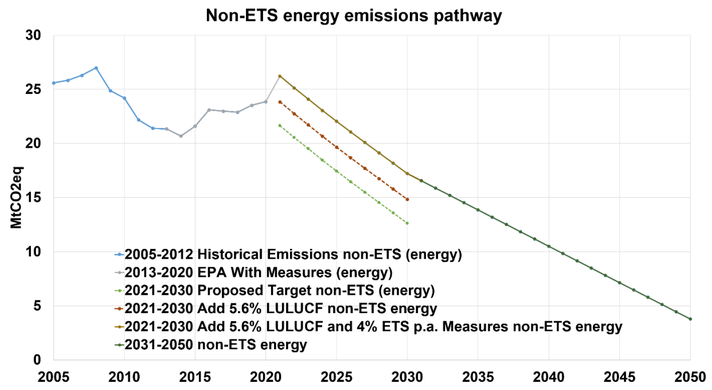
Research Question – What is the impact of limited foresight on different resources in low-carbon pathways when considering non-ETS targets and budgets ?

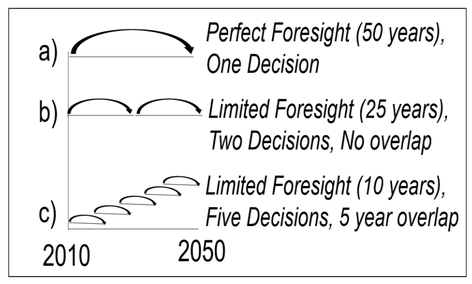
Methodology – Irish TIMES energy system model emission scenarios

Emission Targets vs Budgets



Non-ETS energy 2021-2030
216 Mt CO_2
Non-ETS energy 2031-2050
203 Mt CO_2

Perfect Foresight vs Limited Foresight



Myopic_10_Target - Target scenario with a 10 year foresight

Myopic_20_Target - Target scenario with a 20 year foresight

Myopic_10_Budget - Budget scenario with a 10 year foresight

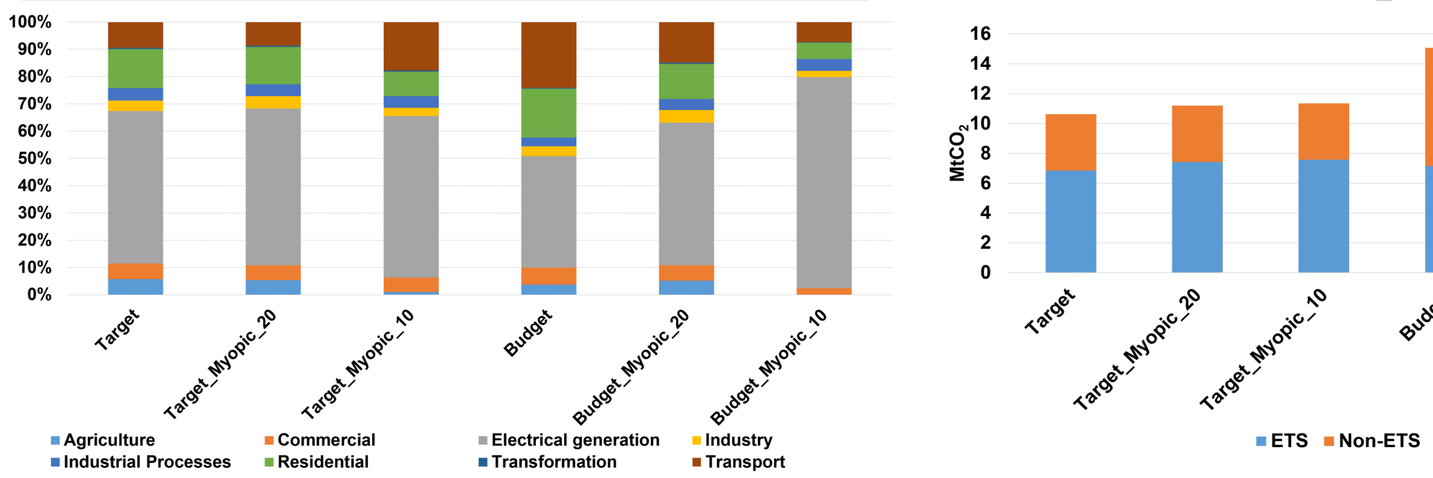
Myopic_20_Budget – Budget scenario with a 20 year foresight

Scenarios Analysis Results – Impacts on Costs, Emissions and Energy Resources

Marginal Abatement Costs

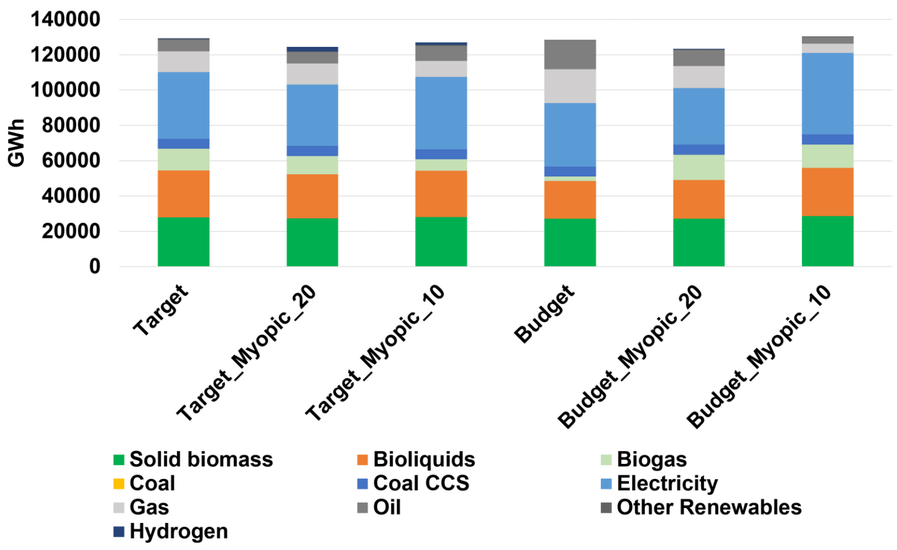
Scenario (2014 €/tonne)	2030	2040	2050
Target	142	196	407
Target_Myopic_20	142	194	430
Target_Myopic_10	118	190	692
Budget	67	299	321
Budget_Myopic_ 20	92	338	437
Budget_Myopic_10	145	407	1132

Emissions Sectoral 2050 (%)



Emissions ETS and non-ETS 2050 ($MtCO_2$)

Total Final Consumption by Fuel



Bioenergy Imports

2050	Domestic Bioenergy	Imported Bioenergy
Target	34%	66%
Target_Myopic_20	33%	67%
Target_Myopic_10	27%	73%
Budget	14%	86%
Budget_Myopic_20	32%	68%
Budget_Myopic_10	34%	66%

Conclusions

- Marginal Abatement Costs (MAC) increase for a non-ETS target framework compared to a budget framework.
- Delayed action also increases MAC to 2050.

- Budget scenario has less stringent constraints on the transport and residential sector to 2050; however, myopic foresight has a high impact on these sectors.
- Limited Foresight increases overall emissions to 2050 in target scenarios mainly as a result of electricity generation emissions.

- Highest uncertainty within the transport sector in resource consumption for freight.
- Limited foresight in target scenarios has a trade-off for use of hydrogen instead of bioenergy.
- Increased reliance on bioenergy imports for limited foresight in target scenarios.

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