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Carbon Budgets 2021-2030:

A bridge from climate ambition to climate action

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Caron Budgets for Ireland 2021-2030

This note explores choices regarding Ireland's first two carbon budgets that will be established under the proposed Climate Action and Low Carbon Development (Amendment) Bill 2021. According to the Bill, the carbon budgets will be proposed by the *Advisory Council, finalised by the Minister and approved by the Government.* The note builds on a previous MaREI discussion paper on the *role of carbon budgets in translating the Paris Agreement into national climate-policy*[1]. The note takes account of a number of issues raised in the revised Climate Bill related to carbon budgets, namely

- the first two carbon budgets shall provide for a 51% reduction in GHG emissions by 2030 relative to 2018 levels.
- The role of LULUCF emissions (i.e. whether they are to be included or excluded in the 2018 GHG emissions and the 51% target emissions reduction)
- Ireland's commitments under the EU 2030 Climate and Energy Framework and the Paris Agreement on Climate Change
- Starting point for 1st carbon budget
- Need to maximise employment and economic competitiveness

Table 1 summarises the widest range of Ireland's first two carbon budgets based on the illustrative pathways considered in this note.

Name	Time Period	**Range Mt CO_{2eq}**
Carbon Budget 1	2021-2025	**213 – 337**
Carbon Budget 2	2026-2030	**159 – 219**
Carbon Budget(1+2)	2021-2030	**372 – 556**

Table 1 Indicative Possible Carbon Budgets 2021-2030

The range in possible carbon budgets is large. Over the ten year period the difference between the highest and lowest options quantified in Table 1 is 184 Mt CO2eq. This represents three times the annual estimated GHG emissions in 2020.

The range of options make assumptions regarding possible decisions regarding *early action* and *delayed action,* whether LULUCF GHG emissions are included or excluded and different options regarding the starting point. Reconciling the competing criteria underpinning the choice for early of delayed action may be the most difficult task carbon budgets, unless the Council can propose a range of carbon budgets.

The range of options presented do not cover all possible options, but rather present a number of indicative plausible choices that reflect the different considerations that might impact the final decision. In addition, the options here do not take account of sectoral allocations of these possible choices for carbon budgets or the achievability of any of the options carbon budgets presented.

[1] Mc Guire J., Rogan F., Daly H., Glynn J., Balyk O. and Ó Gallachóir B. 2020 *The role of carbon budgets in translating the Paris Agreement into national climate policy.* MaREI Discussion Paper available from https://www.marei.ie/wp-content/uploads/2020/10/Discussion-Paper_The-role-of-carbon-budgets-in-translating-the-Paris-Agreement-into-national-climate-policy.pdf

1 Initial Baseline Trajectory from 2020 estimate to 2030 target

Figure 1 provides a useful simple starting point for discussion. The pathway here is referred to as the *baseline trajectory* and is generated by a simple linear trajectory between a starting point based on EPA estimates for GHG emissions in 2020 to an end point based on the target to achieve a 51% reduction relative to 2018 levels[2].

A linear trajectory is deliberately chosen as one of the criteria for determining the carbon budgets is alignment with the EU 2030 Climate and Energy Framework. Under the current framework, Ireland has to effectively remain within a carbon budget for non-ETS GHG emissions that flows a linear trajectory. It is of course not mandatory that a linear trajectory is adopted for Ireland's carbon budgets, but this is the rationale for selecting a linear trajectory for this initial estimate.

The question of achievability of the carbon budgets quantified in this note is an open question that is not addressed here.

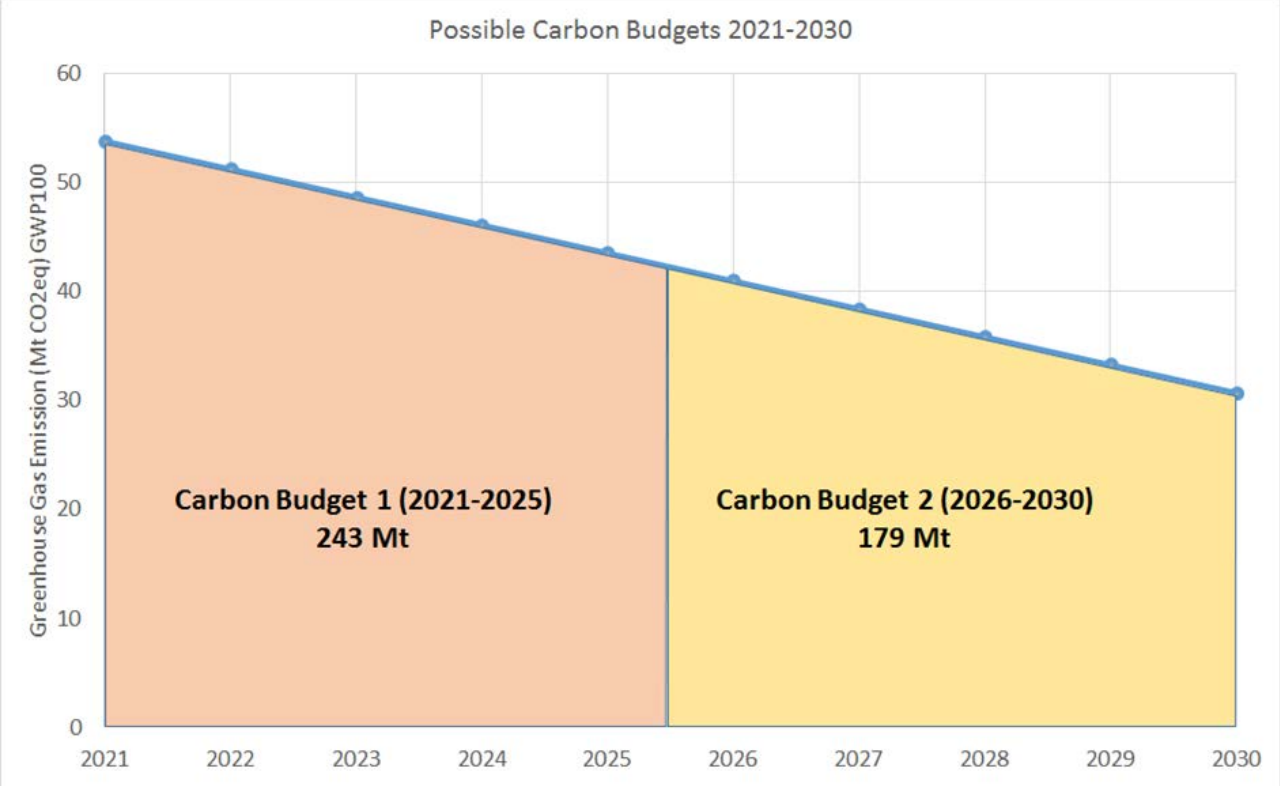


Figure 1 Initial baseline linear trajectory from 2020 estimates to 2030 target

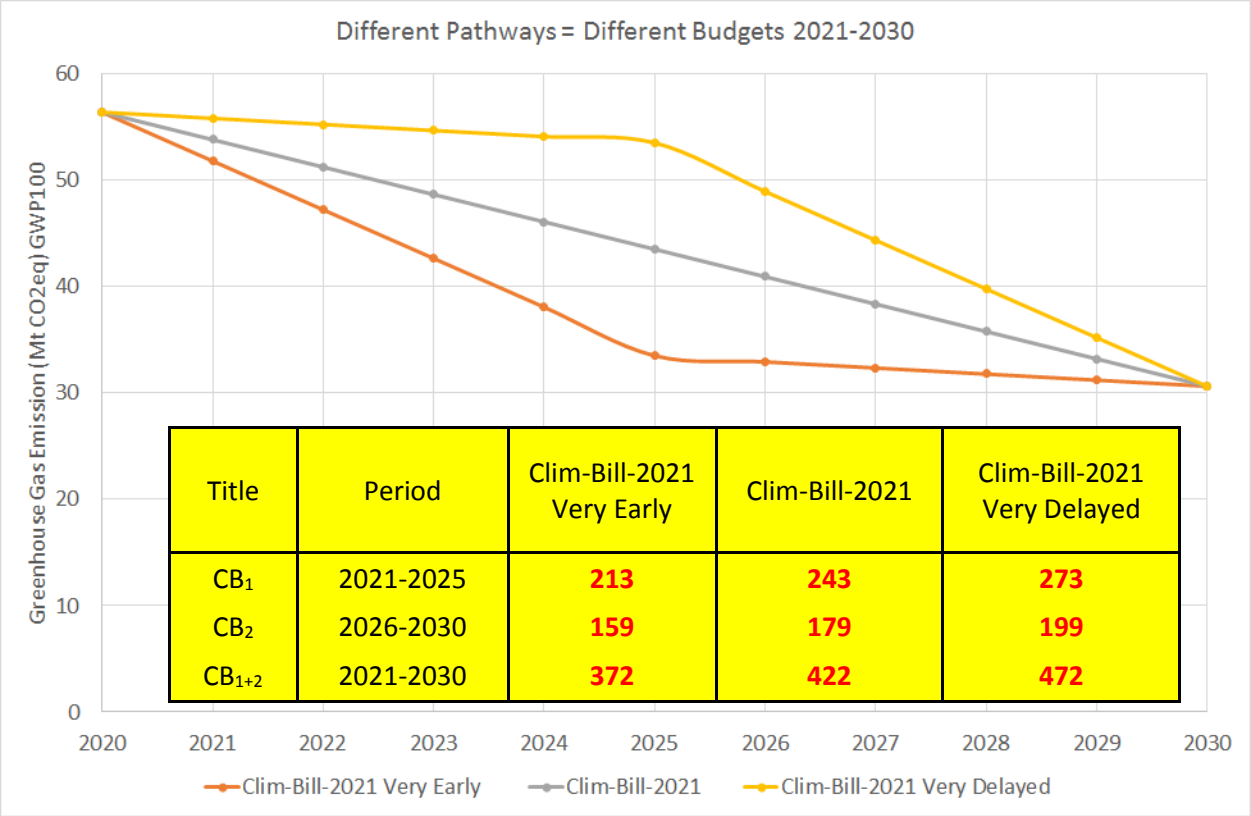
[2] Here the EPA April 2021 GHG emissions inventory data is used to specify the 2018 GHG emissions

2 Big Choice - Early Action or Delayed Action?

Figure 2 highlights the significant impact on the proposed carbon budgets of choices regarding early action or delayed action. Each of the pathways shown have the same starting point and end point. They vary significantly in terms of GHG emissions for 2025 and as a result in terms of the total carbon budgets. Simple linear trajectories are used here for each five year period. The 2025 GHG emissions selected here are 10 Mt below and above the baseline trajectory for the early action and delayed action pathways respectively.

The choice of these specific early action and delayed action trajectories is not based on scientific reasons and is purely to illustrate the implications of early and delayed action choices. The key criterion underpinning early action is taking into account the Paris Agreement. Early action means a lower carbon budget, which results in lower cumulative GHG emissions in the atmosphere and hence a lower impact on climate change. If this was the only consideration, early action would be a sensible proposition. There are also criteria underpinning delayed action choices, notably the need to maximise employment and economic competitiveness in particular. If these were the only criteria delayed action would be a sensible proposition.

The difference between these carbon budgets over the 10 year period 2021-2030 is 100 Mt $CO_{2eq.}$ Reconciling these competing criteria is likely to be the most difficult task in deciding on carbon budgets.



Title	Period	Clim-Bill-2021 Very Early	Clim-Bill-2021	Clim-Bill-2021 Very Delayed
CB_1	2021-2025	213	243	273
CB_2	2026-2030	159	179	199
CB_{1+2}	2021-2030	372	422	472

Figure 2 The implications of decisions on early or delayed action are very significant

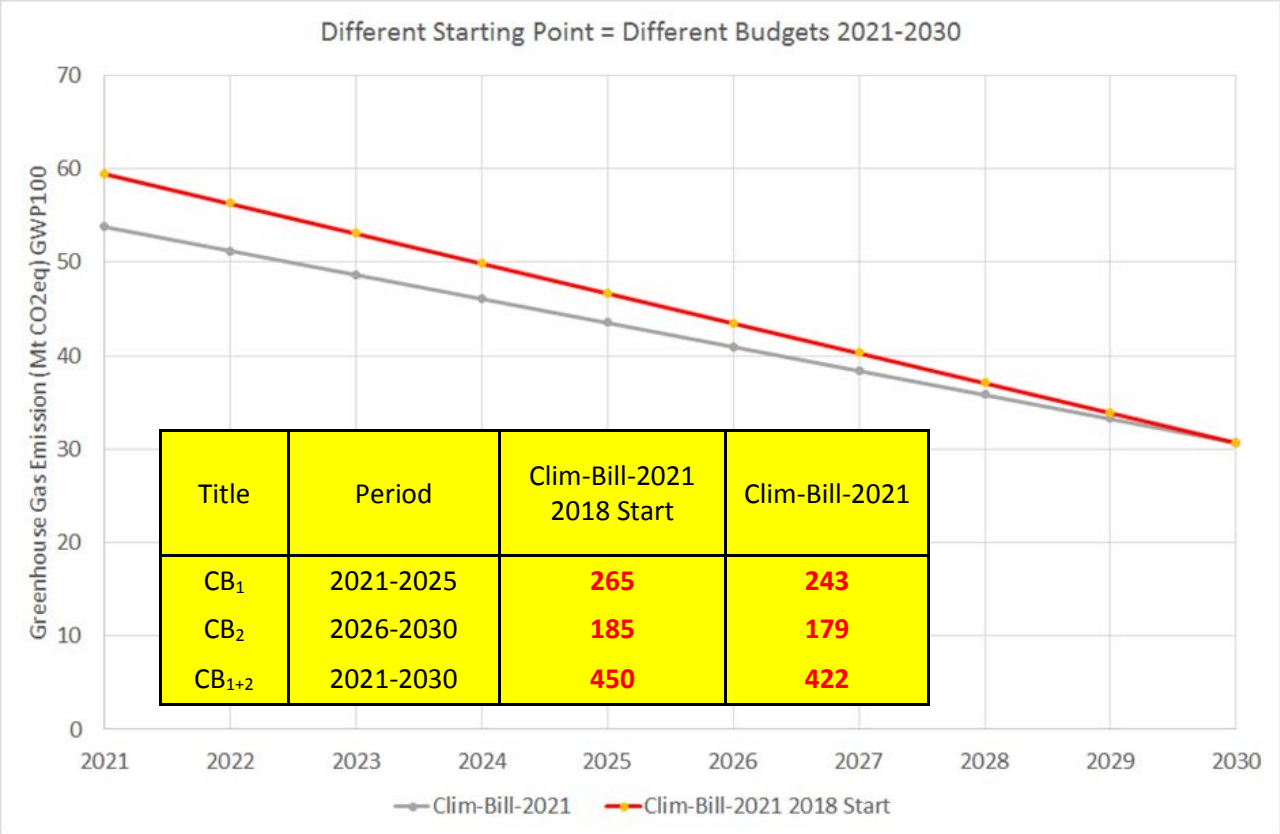
3 Choice of Starting Point

Figure 3 illustrate the implications of the choice of starting point. While the Bill is clear on the reference point for the 2030 target (i.e. 2018 GHG emissions), it is not clear on the starting point, i.e. how should the maximum allowable GHG emissions in 2021 be determined?

The baseline trajectory (labelled *Clim-Bill-2021* in Figure 3) takes the estimated GHG emissions in 2020 as a starting point and the pathway linearly interpolates between this value for 2020 GHG emissions and the 2030 target GHG emissions value.

An alternative approach (labelled *Clim-Bill-2021 2018 start* in Figure 3) takes the 2018 GHG emissions value as the starting point (i.e. as the reference GHG emissions value in 2020). The pathway then interpolates between this value for 2020 GHG emissions and the 2030 target GHG emissions value. There are other possible *starting points* – the ones selected here are illustrative of the possible implications of the selection of starting point.

The difference between these carbon budgets over the 10 year period 2021-2030 is 28 Mt CO_{2eq} which is equivalent to one half of estimated total GHG emissions in 2020.



Title	Period	Clim-Bill-2021 2018 Start	Clim-Bill-2021
CB_1	2021-2025	265	243
CB_2	2026-2030	185	179
CB_{1+2}	2021-2030	450	422

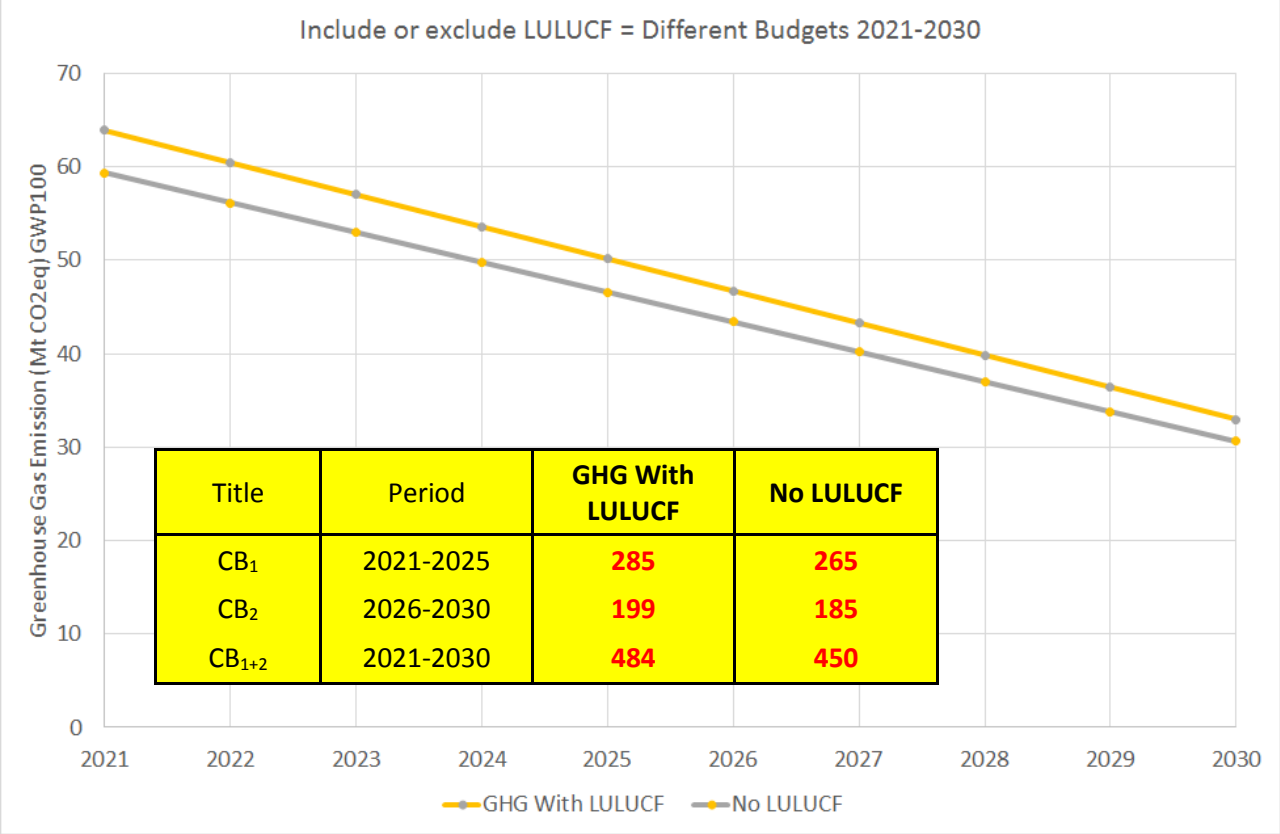
Figure 3 The implications of the choice of starting point on carbon budgets

4 Include or Exclude LULUCF emissions?

Figure 4 illustrates the implications on the carbon budgets of including or excluding Land Use, Land Use Change and Forestry (LULUCF) GHG emissions. In the absence of an EPA estimate for LULUCF emissions in the year 2020, the 2018 emissions are taken as the starting point for both trajectories in Figure 4.

The revised Bill does not specify explicitly whether LULUCF emissions should be included or excluded in the calculation of carbon budgets. This note does not explore the benefits of inclusion or exclusion, but rather quantifies the impact it has on the carbon budget quantities. It is worth noting that some of the discourse on this matter is limited to the potential benefits in terms of emissions reductions associated with increasing forestry and restoring peatlands. However, LULUCF emissions currently act as collectively as a source of (over 4 Mt CO_{2eq}) GHG emissions rather than a sink, largely due to the nearly 7 Mt CO_{2eq} associated with grasslands.

The difference in carbon budgets over the ten years period is 34 Mt CO_{2eq}



Title	Period	GHG With LULUCF	No LULUCF
CB_1	2021-2025	285	265
CB_2	2026-2030	199	185
CB_{1+2}	2021-2030	484	450

Figure 4 The implications of including or excluding LULUCF GHG emissions

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