

Reviewing carbon budgets in light of IPCC AR6 WG I

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Introduction

- ❖ The AR6 WG I report adds more detail on the range of plausible global budgets.
- ❖ The report emphasises the special role of methane, and the need for strong, rapid cuts in it.
- ❖ There is a set of underlying assumptions, from SR1.5, on what happens with methane; the budgets set out in AR6 WG I are all conditional on those assumptions.
- ❖ There is sufficient space in the range of budgets given in AR6, that Ireland's budgets as proposed previously are consistent with them, as long as the assumed methane trajectories (at least 50% cuts by 2050) are met.

The special role of methane

- “limiting human-induced global warming to a specific level requires limiting cumulative CO₂ emissions, reaching at least net zero CO₂ emissions, along with strong reductions in other greenhouse gas emissions. **Strong, rapid and sustained reductions in CH₄ emissions** would also limit the warming effect resulting from declining aerosol pollution and would improve air quality.” (AR6 WG I, SPM-36)
- A working paper* from the Consultative Group on International Agricultural Research reports that 5% annual reductions in agricultural CH₄ are required to neutralize its additional warming.
- * “Global Warming Potential* (GWP*): Understanding the implications for mitigating methane emissions in agriculture”, Costa et al, August 2021

Uncertainty on global budgets

Global surface temperature change since 2010–2019	Global surface temperature change since 1850–1900 ^{*(1)}	Estimated remaining carbon budgets starting from 1 January 2020 and subject to variations and uncertainties quantified in the columns on the right					Scenario variation	Geophysical uncertainties ^{*(4)}			
		Percentiles of TCRE ^{*(2)} GtCO ₂						Non-CO ₂ scenario variation ^{*(3)}	Non-CO ₂ forcing and response uncertainty	Historical temperature uncertainty [*] (1)	ZEC uncertainty
°C	°C	17th	33rd	50th	67th	83rd	GtCO ₂	GtCO ₂	GtCO ₂	GtCO ₂	GtCO ₂
0.43	1.5	900	650	500	400	300	Values can vary by at least ±220 due to choices related to non-CO ₂ emissions mitigation	Values can vary by at least ±220 due to uncertainty in the warming response to future non-CO ₂ emissions	±550	±420	±20
0.53	1.6	1200	850	650	550	400					
0.63	1.7	1450	1050	850	700	550					
0.73	1.8	1750	1250	1000	850	650					
0.83	1.9	2000	1450	1200	1000	800					
0.93	2	2300	1700	1350	1150	900					

A small diversion – what’s Ireland’s real long-term budget?

- Not because this will affect CB1 & CB2, but because we can understand the first part of the journey better, if we have the final destination in mind.
- “In the longer term, sea level is committed to rise for centuries to millennia” (AR6 SPM-28)
- Recent research has looked at the detailed implications for expected flood levels, using the best available land elevation data - <https://coastal.climatecentral.org/map>

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COASTAL RISK SCREENING TOOL

LAND PROJECTED TO BE BELOW 10-YEAR FLOOD LEVEL IN 2100

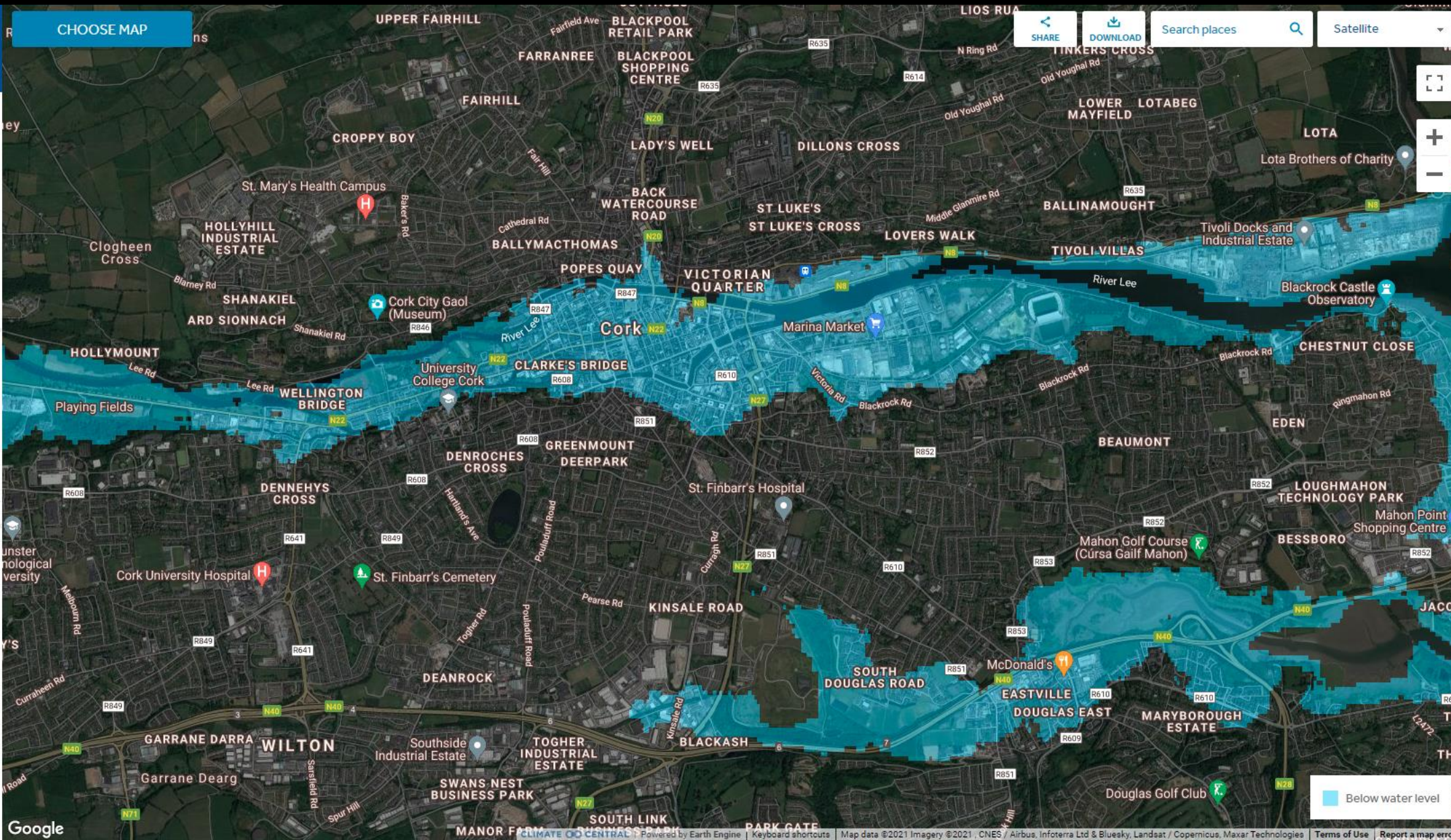
Explore sea level rise and coastal flood threats by adjusting the controls below.

DETAILS AND LIMITATIONS

YEAR 2100

CHANGE OTHER SETTINGS

Video Tutorial



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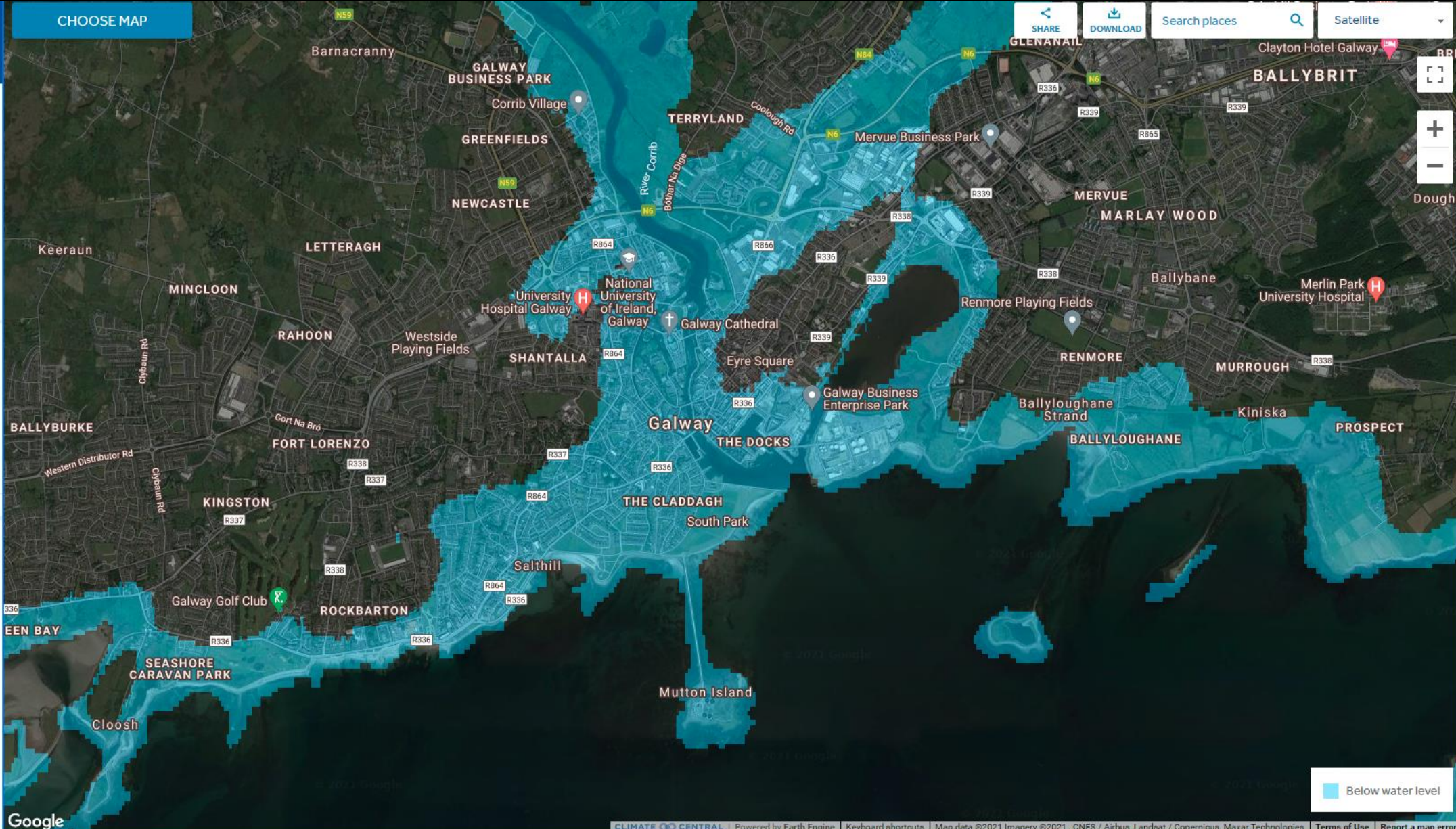
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DETAILS AND LIMITATIONS

YEAR
2100

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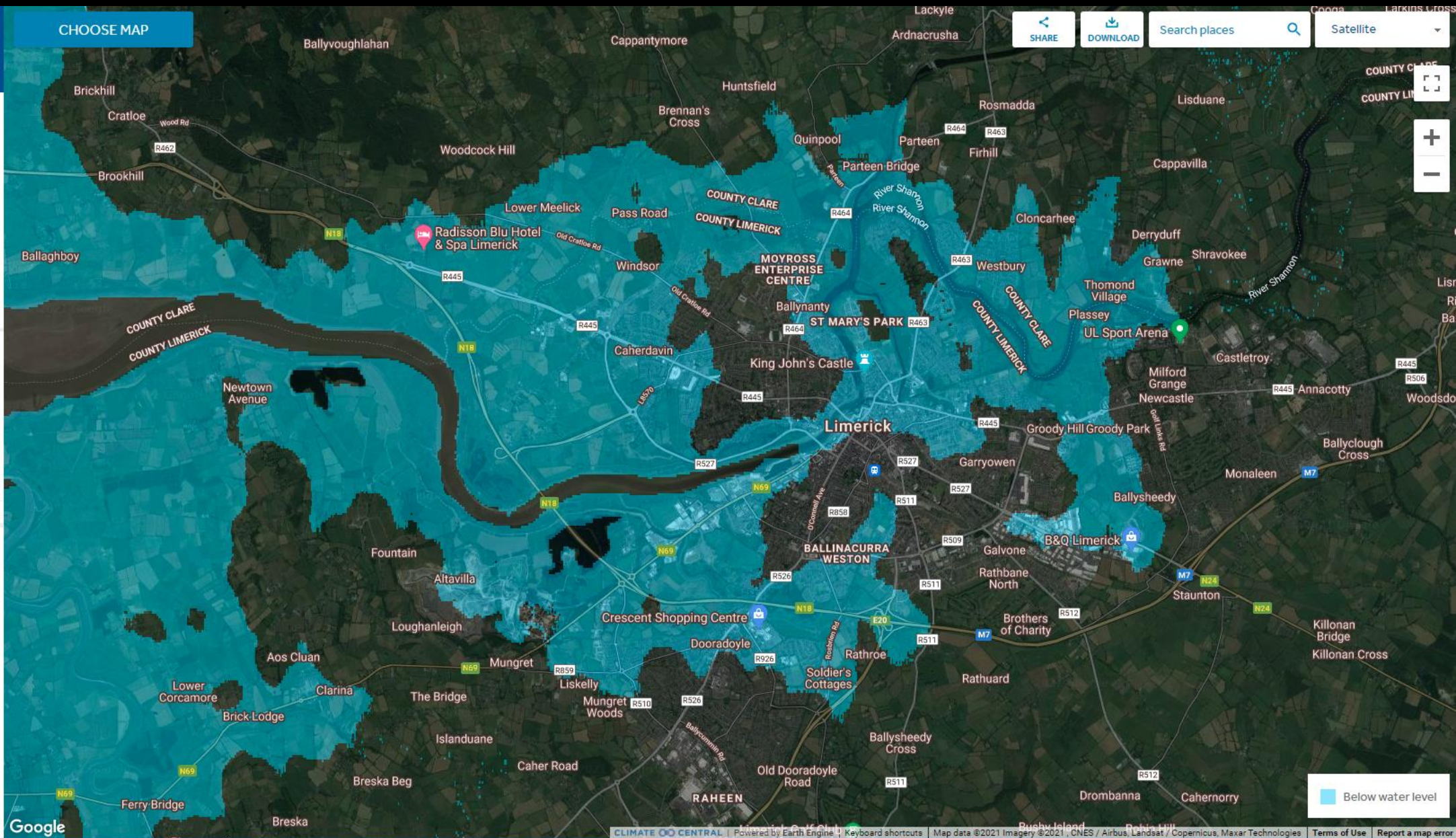
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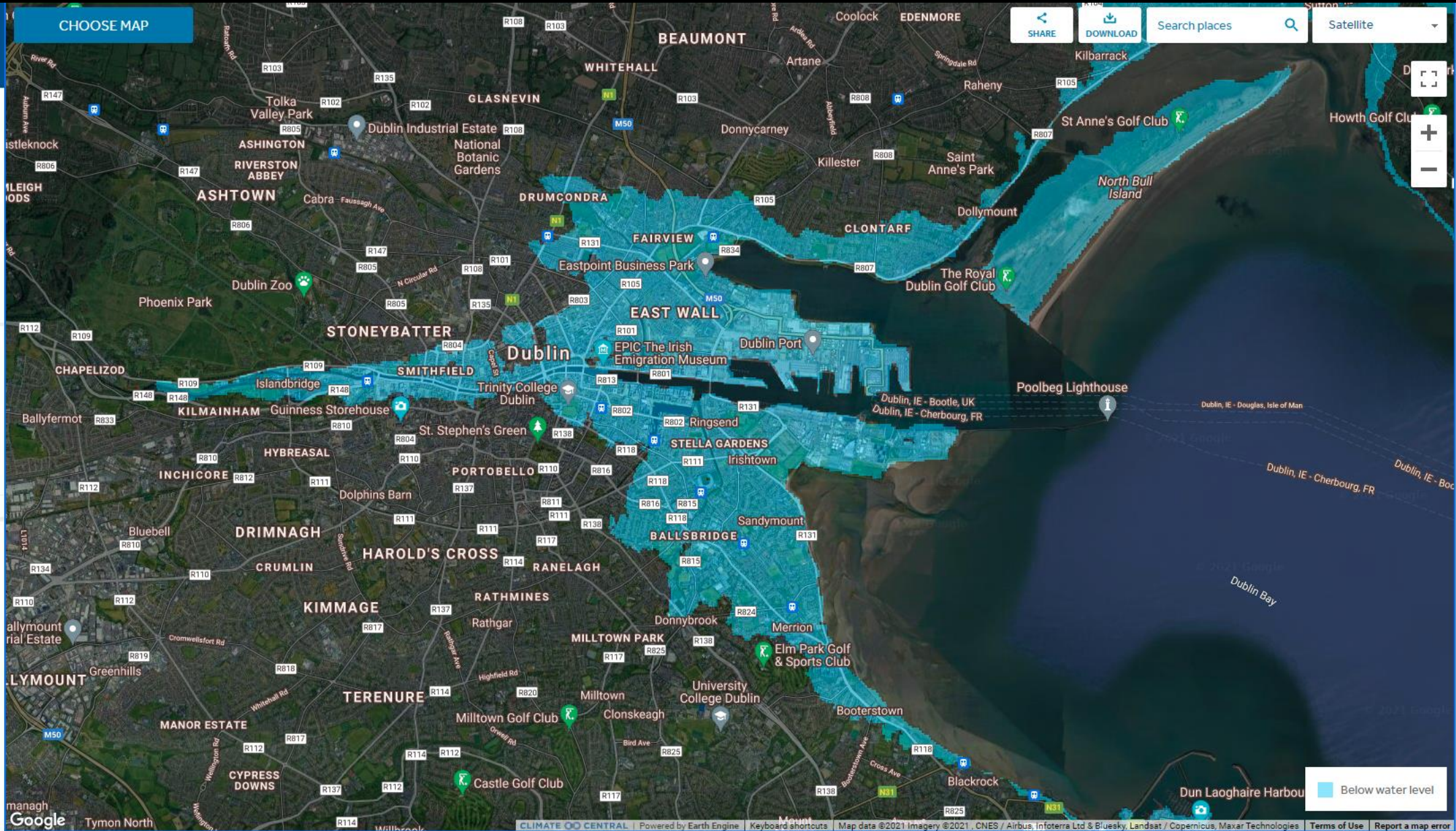
DETAILS AND LIMITATIONS

YEAR

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Ireland's real long-term budget

is probably of the order of -1000 MtCO₂e

End points

- ❖ 5% per year cuts in methane are consistent with the Paris Agreement, the Climate Amendment Bill, the AR6 budgets, and put Ireland on a trajectory to negate the excess warming from methane since the 1980s. This will also put Ireland on a solid trajectory for 50%+ cuts by 2050 (5% per year for 8 years = 36% compound reduction by 2030).
- ❖ An overall budget for Ireland of 650-750 MtCO₂e (GWP100-AR5) is also consistent with those criteria. But every tonne emitted from now on, is probably going to have to be captured & sequestered later.
- ❖ (and these targets are also likely to be compliant with Ireland's final required effort under the Fit for 55 package, once finalised)