

**NEXT  
LEVEL  
CLIMATE  
THINKING  
AND  
ACTION**

CLIMATE  
ACADEMY

Chapter Seven  
**The CUTx Index**

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## Between a Rock and a Hard Place

**Aron Ralston** was out exploring in the Bluejohn Canyon in Utah in 2003 when he fell down a crevasse, just ahead of a large boulder that then literally trapped him “Between a Rock and a Hard Place” (2004). With only two burritos, 350ml of water and a blunt knife he quickly understood that there was no way that he could move the rock that crushed his lower right arm against the canyon wall. After being trapped for five days, he had to drink his urine and, expecting the worst, he carved his name, the date, and final messages to his family onto the sandstone wall right next to him. However, after waking up on the sixth day, he realised there was a chance that he could survive. His decomposing arm could be broken, and he could cut through the tendons and everything else with his blunt knife.

It was a simple choice. Either he was going to die there with both of his arms remaining attached to his body – or he was going to survive, but without his lower right arm.

Leaving the main arteries until last, he did the self-surgery in about an hour and then, after 10km of hiking during which he lost around 25% of his blood, he found a Dutch family on vacation who gave him food, drink, and everything else he needed. The extraordinary details can be seen in the movie “127 hours”.



The blunt truth is that this is the kind of situation we are in with climate change. We do not have a choice — the law of gravity which pinned the 360kg rock onto Aron Ralston’s arm is just as stubborn as the laws of physics and chemistry that determine the atmosphere and the climate.

Denial does not change the situation, neither does bargaining. Either we do immediate and major surgery to the infrastructure of our societies — with unprecedented levels of focus and investments, or we will push the climate system into a viciously spasmodic and unbalanced state.

If we are not prepared to chop our arm off, if we are not prepared to force our reason to override our senses, we will not get out of the canyon we are stuck in. The participants of Extinction Rebellion protests and those who strike for the climate are not the idealists, they are the realists. The only reason they have adopted disruptive methods of protest is that so few people in the media or in power have understood the most basic equation of the crisis.

Our situation is undoubtedly hard to accept, especially because this reality can only be clearly seen in graphs, data, and trends. Climate change does not appear before our senses<sup>1</sup>, like a crushed arm stuck between two rocks. And even if we do look, it is very difficult to think through the situation we are in all the way to its logical conclusion because it is so alarming.

However, mainstream science is unambiguous, it states that we simply cannot keep doing what we do.

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<sup>1</sup> The increasing intensity and frequency of destructive weather events could be understood as our tactile contact with the crisis. However, any one dot on a scatter graph of events remains a dot (and not the curbed average). It requires statistical mapping of probabilities to justify why any one event should be understood as part of the trends of climate change.

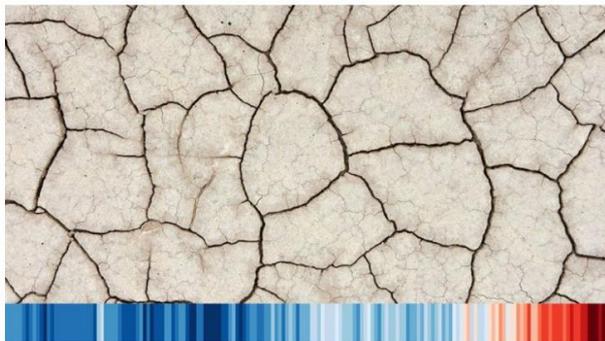
There are various estimates for how expensive the U-turn towards a regenerative green economy would be. Perhaps it would cost as much as a finger? Maybe it would cost half an arm, or a whole leg? Yet, whatever the cost, any figure stated needs to be compared with the cost of not doing it. It is common for politicians to describe their latest climate pledges as “ambitious”. However, it would not have been “ambitious” for Aron Ralston to commit himself to sawing just a bit of his arm off. He needed to saw it off completely in order to escape and survive.

One step away from the action there is a bizarre reluctance by the media to ask the obvious question “*are our commitments enough?*” An announcement of a new climate pledge by a country is always accepted as good. Given the fact that most pledges improve the previous one, this is not a false reaction. However, it should not be the only reaction.

The media analysis that follows is almost always limited to three standard types of enquiry: first, the media question if the new commitment is ‘doable’ (even if not doing it is “suicidal”<sup>2</sup>). Secondly, if the new policy is implemented, which industries are likely to suffer the most (even if the investments required will generate wealth elsewhere)? And thirdly, once the pledge becomes a part of the *status quo*, the only question that gets asked is “are nations fulfilling their commitment?” (Even if it is utterly inadequate in the first place).

## Full story

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[Have countries kept their word on COP26 pledges?](#)



Five ways Russia's war in Ukraine may play out



The Nigerian boss who applied to be Queen's footman

**BBC Website: News Homepage: June 5<sup>th</sup> 2022.**

What is rarely the centre of gravity for the coverage is the question that matters the most. Again: *is the pledge enough?*

This zombie like response is utterly remarkable.

One fundamental reason why this question is not asked, is because ***the media simply does not have any way to measure the true value of a new pledge***. There is no reliable, standard index that is available to them which could be used to get a proper grip on how good the commitment actually is.

This chapter is written to put the first step forward in fixing this glaring hole in our awareness.

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<sup>2</sup> Antonio Guterres, speaking at Stockholm+50. 2<sup>nd</sup> June 2022. (<https://unric.org/en/guterres-at-stockholm50-end-the-suicidal-war-against-nature/>)

This chapter will provide that index.

It is simply called the CUTx Index.

## MAIN TEXT

### The Numbers

#### The CUTx Index

The numbers of the CUTx Index assume some very basic things:

1. There is only one atmosphere;
2. Greenhouse gases disperse equally in the atmosphere;
3. The atmosphere should be shared equally by all humans;<sup>3</sup>
4. The index starts from the total remaining carbon budget that would limit warming to 1.5°C or 2°C<sup>4</sup>;
5. This budget is then divided *per capita* (on the basis of points 1-3).

Each national number is calculated in the following way:

1. These budgets do not include unproven negative emissions to be achieved by technology that does not yet exist;
2. They do not include the possibility of overshooting the targets and then dragging the concentrations back to a safe level at a later date;
3. Each nation is apportioned their fair share of the budget (multiply the *per capita* budget by the size of the population);
4. Calculate how current national emissions from the consumption of goods and services must be changed to remain within their fair share of the carbon budget;
5. The required changes are given in percentage / per year from the current level of emissions;

This percentage is to be achieved in the year starting from now and repeated each year.

To be noted:

1. The final numbers include the latest updates to how we understand Earth System sensitivity to greenhouse gas emissions;
2. The final numbers are based on the latest data and the conclusions of the best science available in 2022 (Sixth Assessment of the Intergovernmental Panel on Climate Change);
3. The final numbers have been calculated by the Only One Earth Science initiative,<sup>5</sup> which is reviewed and supported for public communication by IPCC Co-Chairs Dr Valérie Masson

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<sup>3</sup> See the 'One Atmosphere Equal Rights' initiative, administered by Homo Sapiens Foundation, supported by many eminent scientists from every nation and discipline, including Nobel Prize winners (OnlyOneEarth.Science).

<sup>4</sup> IPCC AR6 WG1 best chance budget to hold waring to 1.5C and 2C (a probability of 83%), updated to 2022

<sup>5</sup> UN Only one Earth science is considered "an important contribution to the UN 75th Anniversary Initiative", \* public communication of which is supported by Dr Jian Liu, Chief Scientist UNEP, Dr Pavel Kabat, Chief Scientist

Delmotte, Dr Panmao Zhai, Dr Hans Pörtner, Dr Debra Roberts, Dr Jim Skea, and UNEP Emissions Gap Report's "intellectual leaders" Dr Bert Metz and Dr John Christensen, IRP Co-Chairs Dr Janez Potocnik, Dr Izabella Teixeira founding Co-Chairs Dr Ashok Khosla, Dr Ernst Weizsaecker among other eminent scientists below.

In addition, **Prof. Kevin Anderson**, a world authority in climate science, met with the Climate Academy and the experts of OnlyOneEarth.Science inside the European Commission in 2019. After examining the details of the science and the principles behind it, he also endorsed the value of 'CUTxPercent': "It is really good to see this level of scientific understanding and political integrity brought together to produce this very challenging but robust target that we all need to be using to inform our policies for the future."

ENDORSEMENT



**Prof. Kevin Anderson**

Professor of Energy and Climate Change  
& former Director of the Tyndall Centre for Climate Change Research

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WMO, Dr Soumya Swaminathan, Chief Scientist WHO, Dr Youba Sokona, Vice Chair IPCC, Dr Shamila Nair-Bedouelle, Director General Science UNESCO, Dr Guido Schmidt-Traub, Executive Director UNSDSN, Dr Elizabeth Mrema, Executive Secretary CBD, Dr Stefan Swartling Peterson, Director Health UNICEF among many others. \* Fabrizio Hochschild, UN Technology Envoy, UN 75th Anniversary Special Advisor.

## The Headlines

Here are the main headlines that you get when you make the calculations described above. Again, to underline the point, the calculations use the *remaining carbon budgets*. These are the only numbers that give a clear indication of how well we are doing. These are the numbers that matter when we are dealing with a crisis that is rooted in physics and chemistry.



- The emissions reductions required to keep global warming below **2°C** are:
  - 4.8% per year (starting from now) for the whole of humanity;
  - 8.3% per year (starting from now) for the EU.
- The emissions reductions required for the **1.5°C** target are (an improbably large):
  - 16.1% per year (starting from now) for the whole of humanity;
  - 27% per year (starting from now) for the EU.

The numbers are updated annually.

The numbers for each nation will either rise with inaction or fall with strong action.

Behind these averages there are 197 individual nations. It is informative to zoom in on a few of them (particularly your own) to get a clearer view. Here is a sample:

DEVELOPMENT level by Education, Health, Income, UNDP <sup>a</sup>	LIVING STANDARD, Wealth, Credit Suisse <sup>b</sup>	BIODIVERSITY LOSS, 90% caused by consumption of extracted natural resources, IRP <sup>c</sup>	BIODIVERSITY TREATY, 7 tonnes consumption per year per capita by 2050, "1 Earth" science limit, IRP <sup>d</sup>	CLIMATE CHANGE, emissions CO2 from consumption, GCP <sup>e</sup>	CLIMATE TREATY pledges Climate Resource <sup>f</sup>	CLIMATE TREATY for 1.5°C / 2°C, CO2 reductions required, 29 / 96 tonnes per capita 2021 - 2100, science limit, IPCC <sup>g</sup>
Development UH Ultra High, VH Very High, H High, M Medium, L Low	Wealth \$ / capita	Consumption Tonnes / year / capita 25 years trend % / yr	Consumption - CUT or + ADD % per year now	Emission CO2 Tonnes / year / capita 25 years trend % / yr	Pledge as average % per year 2021 - 2030	Emission CO2 - CUT or + ADD % per year now, for 1.5°C for 2°C
<b>Ultra High Developed</b>	\$ 282,200	29 + 1.4%	- 4.7%	13 +0.2%	- 4.0%	-45% - 14%
<b>Very High Developed</b>	\$ 48,300	17 + 1.8%	- 3.1%	8.7 +1.2%	+ 0.4%	-30% - 9.1%
<b>High Developed</b>	\$ 32,100	16 + 4.6%	- 2.7%	4.9 +4.0%	+ 1.0%	-17% - 5.2%
<b>Humanity</b>	\$ 53,700	12 + 2.9%	- 1.4%	4.8 +1.9%	+ 0.3%	-16% - 4.8%
<b>Medium Developed</b>	\$ 7,500	4.5 + 3.6%	+ 2.6%	1.6 +5.0%	+ 3.1%	-5.8% - 1.3%
<b>Low Developed</b>	\$ 1,600	2.3 + 3.0%	+ 6.1%	0.4 +5.1%	+ 1.1%	-1.0% + 1.5%
<b>EU 27</b>	\$ 174,500	24 + 1.4%	- 4.5%	8.3 -0.6%	- 3.3%	-27% - 8.3%
1 <b>Norway</b>	\$ 212,900	38 +2.5%	- 5.2%	9.4 +0.6%	- 8.8%	-32% - 9.5%
2 <b>Ireland</b>	\$ 195,000	22 +2.8%	- 3.4%	8.9 +0.2%	- 3.1%	-29% - 8.7%
2 <b>Switzerland</b>	\$ 541,800	32 +2.8%	- 4.9%	15 +1.4%	- 4.5%	-48% - 14%
4 <b>Hongkong</b>	\$ 422,400	na na	na	15 +0.5%		-50% - 15%
4 <b>Iceland</b>	\$ 252,000	35 +2.3%	- 5.2%	10* +1.4%	- 9.1%	-34% - 10%
6 <b>Germany</b>	\$ 218,100	23 +0.5%	- 4.3%	11 -1.1%	- 4.6%	-36% - 11%
7 <b>Sweden</b>	\$ 259,400	32 +2.6%	- 4.9%	7.4 -0.8%	- 2.1%	-24% - 7.4%
8 <b>Australia</b>	\$ 363,500	43 +2.0%	- 5.4%	16 +1.7%	- 2.4%	-52% - 16%
8 <b>Netherlands</b>	\$ 296,200	28 +1.9%	- 4.8%	9.3 -1.4%	- 4.7%	-31% - 9.4%
10 <b>Denmark</b>	\$ 295,900	25 +1.9%	- 4.1%	9.3 -1.0%	- 2.0%	-31% - 9.3%
11 <b>Finland</b>	\$ 132,300	37 +1.5%	- 5.7%	13 -0.8%	- 3.1%	-43% - 13%
11 <b>Singapore</b>	\$ 278,100	78 +5.5%	- 7.9%	20 +1.1%	+ 1.3%	-65% - 20%
13 <b>United Kingdom</b>	\$ 225,100	23 +1.5%	- 3.8%	8.3 -0.7%	- 5.1%	-27% - 8.1%
14 <b>Belgium</b>	\$ 272,600	24 +1.2%	- 4.2%	16 +0.4%	- 5.0%	-54% - 16%

## Human Development Index

A quick scan of those figures makes it clear that there is a major difference between the reductions required from the 'Global North' and the 'Global South'. In Human Geography these concepts depict rough zones of human development: the rich lie to the North, and the poor lie to the South (with a few major exceptions). The UN has a more specific system of categorization, the Human Development Index (HDI). This index groups nations into Very High Developed Nations (VHD), High Developed Nations (HD), Medium Developed Nations (MD) and Low Developed Nations (LD), based on a wide range of data, from life-expectancy (health) to schooling (education) to purchasing power (PPP) (wealth).<sup>6</sup> The top 26 VHD are put into a category of their own, they form the **Ultra High Developed Nations (UHD)**, the 12% of the population that are the healthiest (they live on average 20 years longer than the Low Developed), best educated (on average an University degree compared to slightly more than elementary education of the Low developed) and wealthiest (they earn on average \$54,000 per year compared to LD \$3,000 of the LD, and have accumulated 178 times more wealth per person.).

### The UHD

It is immediately clear from the table that the highest emitters are the healthiest, wealthiest, and best educated nations on the planet. They set the example of 'human development' - a standard of living that all nations aspire to achieve. The UHD (makes up 12 % of the population, and yet they are responsible for 33 % of consumption emissions and for 51 % of historic or cumulative emissions (the cause of climate change).

They are the ones with the prime responsibility for the situation we are all in, and they are the nations with the highest capacity to achieve the change required. Once the UHD nations take the lead, the other nations will find it much easier to follow. Therefore in the full table to be found at [www.cutxpercent.org](http://www.cutxpercent.org) the nations are listed in this order.

Within this group, there are some heavy hitters. The colossal states of **Australia** (-16%) **Canada** (-16%) and the **USA** (-19%) and the diminutively sized **Luxembourg** (-40%) have the heaviest carbon footprints because of their highly consumptive lifestyles<sup>7</sup>. Of these big players, **France** (-7.1%) has a lower number because of its nuclear power capacity. By contrast **HD Portugal** (-6.1%) benefits from a Mediterranean climate, a well-developed green energy supply and a more modest level of consumption than most of its EU neighbours.

Despite the general sense in public debates that the EU is a world leader in sustainability, the figures simply do not bear out this claim. It is important to note the gap between what each UHD nation has promised to do, and what it needs to do. As noted previously, it is currently standard practice for the EU nations to state their pledges in the highly confusing format: "cut 'x' % by date 'y' compared to date 'z'". In the CUTx Index, these commitments have been translated into the same metrics as all the other numbers so that the pledges can be seen in a clear light. So, in the case of **Germany**, for example, if their policy commitments are cashed out into measurable metrics of the index it can be seen that they have effectively only pledged to cut emissions by 4.6% per year from now. What they

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<sup>6</sup> <https://hdr.undp.org/en/home>.

<sup>77</sup> All the figures in this section will be quoted for 2°C, with the reductions starting now and with 83% probability. The complete set of numbers can be found at [www.cutxpercent.org](http://www.cutxpercent.org). For ease of reference here, the reductions necessary for 1.5°C are: Australia (54%), Canada (52%), USA (62%), Luxembourg (overlimit), France (23%) and Portugal (20%).

need to do is cut emissions by 36% for 1.5°C and 11% for 2°C. In the case of **Sweden**, it has pledged to cut emissions by 2.1% per year from now, but it will need to do 24% for 1.5°C and 7.4% for 2°C.

And so on.

It is only when a proper measure is held up that we can get any true sense of how well a nation is performing. These numbers expose how slack the media coverage is. The gap between the current pledges and the action required for 1.5°C is so improbably wide it makes a nonsense of any talk of “ambitious pledges”.

Furthermore, for all the sense of progress with the climate crisis that comes with each new round of pledges, the trends for emissions since 1992 *have been upwards*. For example, the top five developed nations of the world have *increased* their emissions on a 25 year trend (**Norway** +0.6%, **Ireland** +0.2%, **Switzerland** +1.4%, and **Hong Kong** +0.5%).<sup>8</sup>

Finally, as established in Chapter 3, “Spaceship Earth”, the cause of the elevated emissions is rooted in the resource extraction figures. It is informative to remember the (unsurprisingly) close correspondence between the two sets of figures. For example, the heaviest emitting nation in the world is **Luxembourg** (cut 38% per year from now for 2°C), and it is also the hungriest extractor of resources (104 tonnes per year, trending upwards at +3.5% over a 25-year period).<sup>9</sup>

Although at surface level, the lifestyles of the UHD might look clean and advanced, a proper look down the chain of consumption shows dirty, destructive reality. If every human emitted as UHD, global CO2 emissions would triple overnight, with immediate catastrophic consequences.

### The VHD, HD, MD and LD nations

The **Very High Developed (VHD)** nations, with on average 8.7 tonnes of CO2 emissions *per capita*, need to make average annual cuts of 9% per year from 2022. There is wide variation in emissions in the **VHD** group, with for example 45th ranked **Qatar** needing to reduce 32% per year, 46<sup>th</sup> ranked **Argentina** only 4.4% per year, and 52nd ranked **Russia** 10% per year.

The **High Developed (HD)** nations need to make average annual cuts of 5.2% per year from 2022.<sup>10</sup> Ranked 85th in the United Nations Human Development Index, **China** is the biggest emitter of greenhouse gases in the world, with 1.4 billion people. However, its consumption emissions are 6.5 tonnes CO<sub>2</sub> per person, which is exactly half that of the UHD average (13 tonnes CO<sub>2</sub> per person), and about one third of USAs 18 tonnes / cap. Whilst they are a world leading investor in green technology, they are still heavily reliant on coal to meet their energy demands. For China to play its role in a world that holds temperatures below 2°C it would need to cut its emissions by 6.9% per year from now.

The **Medium Developed (MD)** countries need to make annual reductions of -0.9% on average. **India** (-1.7%) with almost 1.4 billion inhabitants, is the most significant nation in this group. The modest lifestyles of India’s huge population means that their *per capita* emissions are low, at 1.7 tonnes CO<sub>2</sub> *per capita*. However, if India would follow the same path as the UHD nations into a very high

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<sup>8</sup> Global Carbon Budget 2020, Consumption emissions; and although Hong Kong is not a nation, it is still possible to harvest specific data for the city as Special Administrative Region of China.

<sup>9</sup> As a reminder, the scientific authority on natural resources (IRP) has concluded that for sustainable development, the average person can consume seven tonnes of the Earth’s resources per year by 2050. “*International Resource Panel, Managing and conserving the natural resource base for sustained economic and social development*” (2014).

<sup>10</sup> A reminder that all the figures quoted in this section are for 2°C.

consumptive, fossil fuel-powered economy then it will shunt global emissions into truly dangerous territory.

Finally, the **Low Developed (LD)** countries could actually accelerate their emissions by 1.5% per year on average until 2100 and it would still be consistent with the 2°C budget because their emissions are so very little per person.

And so, the contrast between the **UHD** and **LD** is startling. Those who have barely contributed to the crisis are, perversely, the ones who have and who will suffer the most. The injustice between the “Ultra High developed” and “Lesser developed” will be explored in more detail in the next chapter. However, one detail can punctuate the text here to illustrate how heavy the cost of climate change will be for the people who are most vulnerable to change ahead:

On 15th March 2019, the monstrous typhoon Idai slammed into **Mozambique** (+1.4%). It caused a four-metre storm surge in Beira and an ‘inland ocean’ of over 3,000sq kilometres. The ensuing humanitarian crisis left hundreds dead, devastated infrastructure and destroyed thousands of homes, crops, and futures. There was also some very heavy-hearted cost counting in the neighbouring countries of **Zimbabwe** (+0.2%), **Madagascar** (+0.8%), and **Malawi** (+0.2%). One estimate put the total financial cost of the storm for the region at over \$2.2bn.<sup>11</sup>

## Visualising the change required

This chapter’s central goal, concerning the science, is to establish the vital statistics for our future on this remarkable planet. These key figures do lead the mind to wonder what such a level of emissions reductions would look like on the ground. What kind of change would be necessary to cut us loose from the climate crisis? In real terms, how much do we need to saw off with a blunt army knife?

To help visualise what x% per year might look like, it could be useful to take the example of Germany. This is because the national emission cuts they need to enact are close to the average for all the UHD nations. Germany needs to reduce its emissions by 11% per year starting from now.

Suppose for the sake of the thought experiment, that the transport industry in Germany makes up about 11% of their overall emissions (this is a fairly standard figure for transport in UHD countries). To make an 11% cut, Germany would then require the entire transport sector to be genuinely carbon neutral within one year. The example of transport is just illustrative. It is not that far off from being correct, but the percentage for each sector of the economy will be very different for each nation. The details do not really matter – it is the process that helps us see things more clearly. It just shows how deep and purposeful the actions that we must take are.

Hypothetically, the next year would require the food industry to be carbon neutral for a further 11% reduction. Then in the third year, a massive investment in renewable green energy, and so on. . A plan should be put in place for everything so that the country could be carbon neutral before it exceeds its budget to stay within a 2°C rise.

And so on. One of the most urgent areas of research and development should be into carbon capture – for the moment it only functions as a ‘concept’, that allows nations to conceal their lack of action with a shocking level of twisted accountancy. With a war like mind-set, massive investments

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<sup>11</sup> "Global Catastrophe Recap: First Half of 2019" (PDF). Aon Benfield

in this field of chemical engineering might actually take this aspect of the technology from distant sci-fi dreaming closer to reality.<sup>13</sup>

Once a plan to reduce GHGs for every greenhouse gas emitting sector of the economy is put in place, there would then be a huge argument between each sector about which one goes first. Why should the transport sector have to be the first one to act in 2022? Why should the food industry have to achieve all its reductions in 2023? The role of a competent government would be to take all those transformations and line them up in a proper sequence, evenly and strategically distributed. Each sector can then fulfil its responsibility for their national economy to complete its role in keeping the global temperature rise under 2°C.

This is not the place to work through the complexities of how this might be done, let alone for each individual economy. Instead, it aims to serve as a taste of the kinds of system thinking that is required. In fact, the energy sector would certainly have to move first, because this part of the economy fuels all the sectors and, therefore, all the subsequent infrastructure and industry transformations could be achieved with low carbon emissions.

Secondly, there are a lot of cross-sector targets that could be done too, such as increasing efficiency and reducing waste. Most importantly, reducing emissions sufficiently will not be possible without drastically reducing the background energy use and consumption. Indeed, there are thousands of books and academic papers that provide insights and guidance for such challenges.

However, this is not the point to get distracted, given that these types of publications do not provide their advice within a coherent plan that is based squarely on an absolute target provided by science. This short section is just a thought experiment (a type of writing that is frequently used in Philosophy). Thought experiments are deployed to get a clearer picture of the way things are behind the clutter of details. This scenario with all the 11% emission cuts lined up in a row has been constructed to illustrate the right pace of the reforms required, and to understand what a genuine effort to deal with climate change would look like.

Perhaps the UK could be used as a more precise example of how it might all work out. Classified as a UHD nation, the UK needs to reduce its emissions by 8.1%. The government is advised to 'reduce beef and lamb' consumption by 50%, which will reduce greenhouse gas emissions by 3%. Stopping food waste will reduce emissions by 0.7%. Many people target airflights; these are about 7% of GHG emissions in the UK, so halving them would achieve a 3.5% reduction. These three actions together would get the UK close to the required annual reduction rate of 8.1% for 2022. Then the UK would have to plan for the next 8.1% for 2023, then 2024, until the UK is near zero carbon.

Ultimately, it is a task for each nation state to complete these targets as democratically as possible. In theory, each nation should then come to the global table with their commitments that are rooted in the science and principles above, and then combine their efforts with the same basic logic. Again, now is not the time to delve into the complexities of diplomatic negotiations. The point of this chapter is to point out the type of system thinking needed, and to show what is lacking amongst all the ubiquitous images of solar panels and battery powered cars, all the grand speeches given at COP meetings, and behind all the hugely important (but disparate) ambitions of different NGOs and action groups.

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<sup>13</sup> For the moment, although the price has fallen to around \$100 a tonne, the amount of energy required to build these machines, and the rate at which they can sink carbon keeps the mechanized sequestration of carbon far from being a realistic hope.

What is missing so far is a robust frame of reference.

## The Right to Know

There simply must be an accountable, realistic, science-based plan.

Every nation of the world has signed up to the Paris Agreement. This agreement is a commitment “to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.”<sup>14</sup> It only seems fair to assume that the signatories of the document actually meant it. It only seems reasonable to take the Paris Agreement at face-value.

Where is the transparency then?

A transparency, not only to measure our failings, but also to affirm, with genuine depth, those moments when a major step forward *is* taken. Any Party to the UN Climate Treaty, every nation that sets a target, would be expected to have a clear, accountable method of measuring the progress made. They should have the chance to have their efforts and achievements applauded and be held responsible for failures. This is especially true in a democratic state. Indeed, many of the signatories of the Paris Agreement are from the world’s most celebrated democracies; and the UN itself is an institution which upholds the value of democratic rights.

The numbers of the CUTx Index could not be simpler. They provide a clear and direct measure of what is going on above our heads. No citizen should have the burden of completing a PhD in Physics to understand what will happen to the basic stability of all the living systems of the planet in the next few years. All the CUTx Index does is take the remaining carbon budget defined by the most authoritative science body on climate change, the Intergovernmental Panel on Climate Change and divide that budget equally between every inhabitant of the planet. There are no weird accountancy tricks, no vested interests amplified, and no minority interests diminished. The index is simply the product of scientific exactitude and the established United Nations principles of equity, and different capabilities and responsibilities.

In an age where information is so often weaponised or withheld for profit, the numbers of the CUTx index are different. They have no commercial background; they do not come from any slanted governmental agenda. Like Socrates, in the famous painting by Jacques-Louis David, they simply point to the truth.

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<sup>14</sup> <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>



**Jacques-Louis David, “The Death of Socrates” (1787)**

(An exploration of this painting can be found in Chapter 2 of the Teacher’s Guide)

If the media was to start consistently using these numbers, instead of accepting the standard knotted format that has no relationship to the actual carbon budget, it would surely help sharpen the public mandate to take the necessary steps.

Catastrophe by stealth should not be possible.

Everyone has the Right to Know the truth about the vital statistics of the planet.

## Science based laws

The suffragists had a clear goal – a woman’s right to vote. The Civil Rights Movement also had a clear goal – full racial equality before the law. The Climate Movement should also have a clear goal – the establishment of science-based climate laws.

For the moment, the slogans and speeches of the climate marches are very powerful and moving – but until they consolidate around a demand for laws that are based on the reality of the chemistry and physics of the atmosphere, those in power will find it easy to agree with all the sentiments and problems... and then carry on doing nothing. In the absence of a specific demand for laws that frame human development within safe limits, we are observing that the beauty and depth embodied in the protest movement just triggers admiration but does not lead to the required action. The climate movement cannot afford to just become cultural wallpaper.

The climate crisis is a profoundly systemic one. It simply cannot be understood in fragmented, atomised pieces and it certainly cannot be solved with individual, incoherent actions. Systemic problems require systemic responses.

Fortunately, there is an invisible matrix which frames all our economic and social reality, that can pull our actions to the level of change required: the law. Laws are the abstract structure to all our lives and at this late stage in the crisis they seem to be the singular most effective way to leverage our response with the energy and grip that can pull us up square to the science. What else could provide the framework needed? What else could act with the same cohesive and multi-dimensional power? How else can we get out of the “rigidity trap” (cf. Chapter 12) and achieve a system wide regeneration?

If clear boundaries are set it will trigger many levels of innovation and restoration that we would love to see around the globe. The slow crawl of establishing sufficient emission reductions by voluntary consent has failed to achieve any meaningful progress so far. As the CUTx Index shows, the trends over the last 25 years are mostly for nations to *increase* their emissions. It is clearly the time to take our climate thinking and action to the next level.

The details of this legal depth to the Climate Academy project will be more fully explored in the final chapter. But it is worth underlining the fact that the CUTx Index is designed to show the data at a national level for good reason. This is because nations are the law-making units. It is also the level at which the strongest legal, psychological, media and social forces operate. For example, we are easily triggered by national news events that are reported in the media with a sensitivity to the particular history and characteristics of our nations. It offers a manageable level of imagination and divides the budget into equitable blocks. Perhaps most importantly, national legal systems are also far more developed than those that are emerging in international law.

## Climate Academy

This textbook is written for the Climate Academy, and this is the middle chapter of 14. It is arguably the most important chapter of the book because it presents the first ambition of the Academy (*a systemic understanding of the climate crisis*) in its starkest, numerical terms. These numbers are what it all comes down to in the end, both for humanity and for the Academy. The CUTx Index is rightly the essential science that all activities of the Academy revolve around.

Just like the concentrations of greenhouse gases in the atmosphere are the critical measure of whatever climate actions we take, so the understanding and dissemination of these numbers is the defining mark of what the Academy does. Just like an economy and a society can flourish if a safe and stable environment is in place, so all the creative and artistic skills of the students can thrive in bringing these numbers into the world.

It is so odd that a simple climate index does not exist already. It is so odd that education is so far behind the curve with the crisis.

There are all kinds of environmental initiatives and projects happening in schools which all have an important value. But how many of these are framed by the core, systemic problem of the carbon budget? How many projects at upper secondary level are focused on plastics and recycling which have a minimal effect on that budget? How many are informed by the clarity provided by the CUTx Index? Does any government in the world have an educational programme that extends a student's understanding of the crisis beyond what could be understood at Primary School level?

If governments started pouring millions into climate education how effective would it actually be if it only replicated the same moral messaging about individual actions? How would any student get a grip on the overall crisis if most of the content is only looking at particular problems such as rising sea levels, or more intense and frequent storm events?

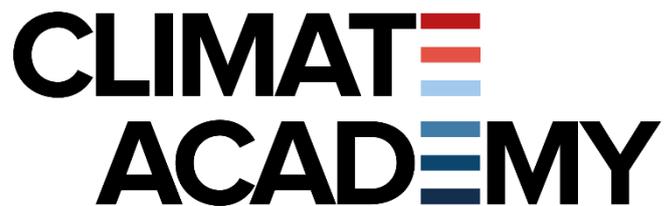
Where would these funds go? If they went into a general school budget how would the extra resources be spent effectively? Most school timetables are so loaded with curriculum demands that they keep climate change at the margins, as a final, bolt-on thought. Who would teach the new material? If space was made in the timetable, how would students get a clear view of what is really going on at a systems level? What learning materials would they use? Generally, the materials are either far too atomised and basic or they are far too specialised and advanced.

Indeed, this set of problems in education is symbolic of the climate crisis across the whole of our society.

We have no central handle on it. We only have a limited awareness of the systemic threat. There is deep siloed knowledge in university research papers on the one hand, and very generalised, sometimes confused public understanding on the other.

The CUTx Index cuts through the noise and offers an immediate view of where we are, and the Academy offers that clear vantage point to the world.

The Climate Academy was founded in 2011 to make the gap between the science and social reality both clearly and widely understood. This commitment to a “**Systemic Understanding**” has remained the first pillar of the Academy. Ten years ago, however, it only existed as a singular school lunchtime project, and therefore it was rather difficult to communicate this reality gap with any volume at all. Therefore, a further two pillars have been added.



Through “**Civic Service**” the core truths studied in the Academy are brought into the democratic space as the students publish articles and podcasts, make short films and host events. Students learn so much about the science themselves, and those around them when they commit to sharing their time and understanding with others.

And this second pillar needs to be undertaken in a savvy way because the carbon budget fuses for 1.5°C and 2°C warming are so short. In the third pillar of the Academy: “**Systems Entrepreneurship**”, it is fundamentally important to think and act in a way that has the most dynamic systems impact. Whilst individual lifestyle choices are an irreducibly important component of the full solution, the crisis is too complex and deeply rooted for that to be anywhere near sufficient on its own. The inspiring truth about engaging with the problem at a full systems level is that it challenges and develops the students in a genuinely holistic way – in mind, heart, and ‘soul’.

The Academy offers a safe and structured space for anyone to play their role in advancing our awareness of the systemic problems and solutions.<sup>15</sup> The most obvious place to set up an Academy is within a school. The “free space” of education, the energy of youth and the social capital embodied in a school community is a wonderfully powerful foundation. But any group of citizens, with half an hour per weekend to read a chapter and a space in the week to chew over the details (and a biscuit) can get started.

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<sup>15</sup> “The Climate Academy Teacher Guide” (2022) offers a full explanation of both the practical mechanics of running an Academy and of the principles and values that underpin it.

## Conclusion

Back to the Blue John canyon with Aron Ralston.

The changes required in the 1970s, when we had a very complete understanding of the science, could have been implemented with ease. Even as late as 1995, when the first COP was held in Berlin, the bending of the emissions curve would have been very achievable with a determined effort. But we just didn't want to look at it.

Now, the size of the reductions necessary for 1.5°C are way beyond anything in public discourse at the moment. In fact, even remaining anything under 2°C is difficult to imagine from here, given the lack of momentum. Very bold decisions must be taken now at a major systems level. COP27 in Egypt (2022) must give a massive policy signal to the markets. Infrastructure change takes years, and our ability to deal with the problem with small individual gestures was toasted many years ago.

Just as Aron Ralston had to get his reason to somehow override his instincts, we must set in place some laws that frame our ambitions for economic growth within the boundaries defined by our planet.

Ralston was faced with a mind melting choice. Lose half an arm or die.

Climate change puts us in front of a similar choice.

The people in the streets shouting for justice are *categorically not* soft minded idealists.

They are the hard realists.

Change is not too difficult to deliver. We can do it. It needs guts and clear minded focus, but we can do it.