



Thunder Said Energy

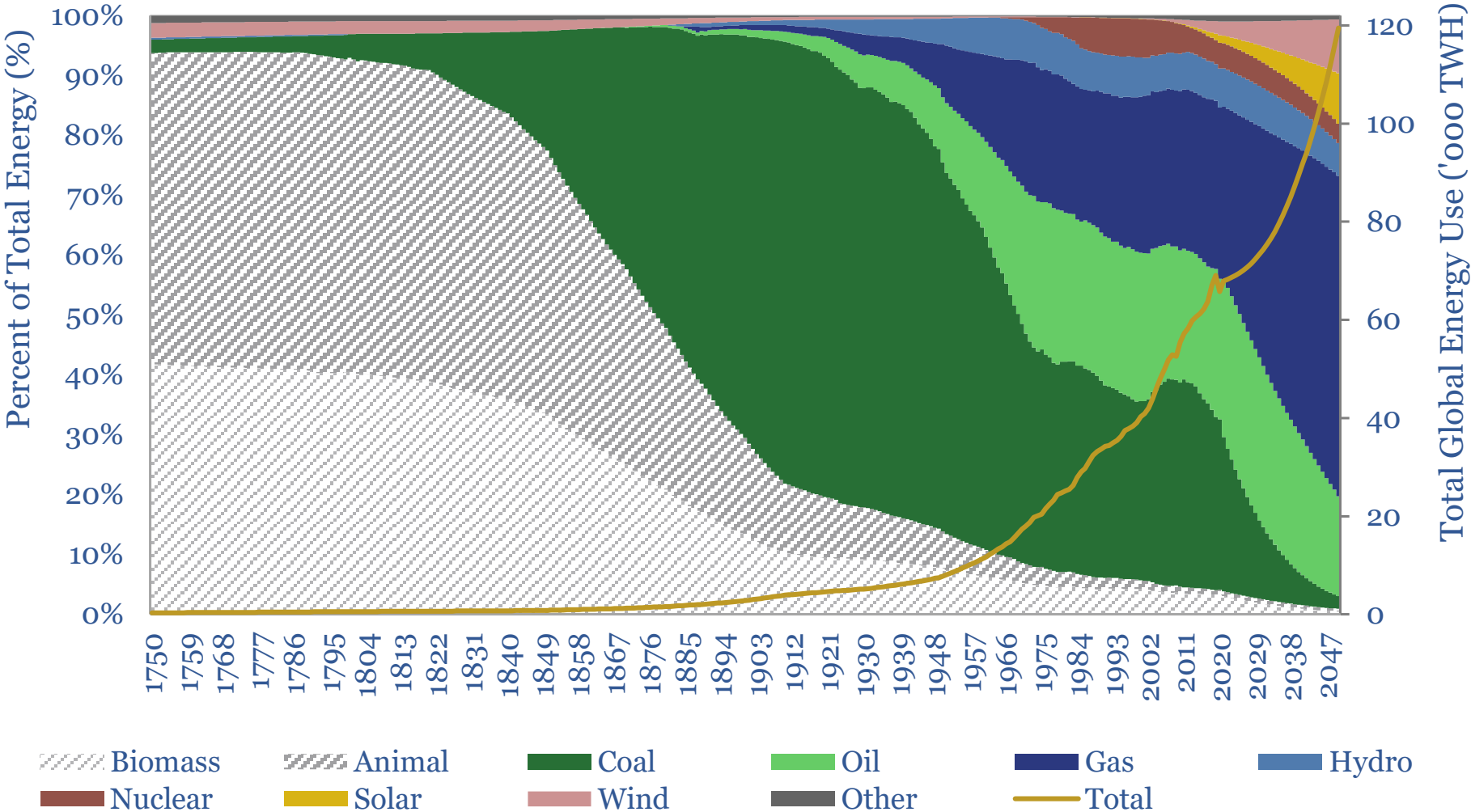
the research-consultancy for energy technologies

*Which technologies and themes will transform the energy industry?
How will they decarbonize the world? How will they move markets?
And what are the resulting opportunities for decision-makers?*

www.thundersaidenergy.com

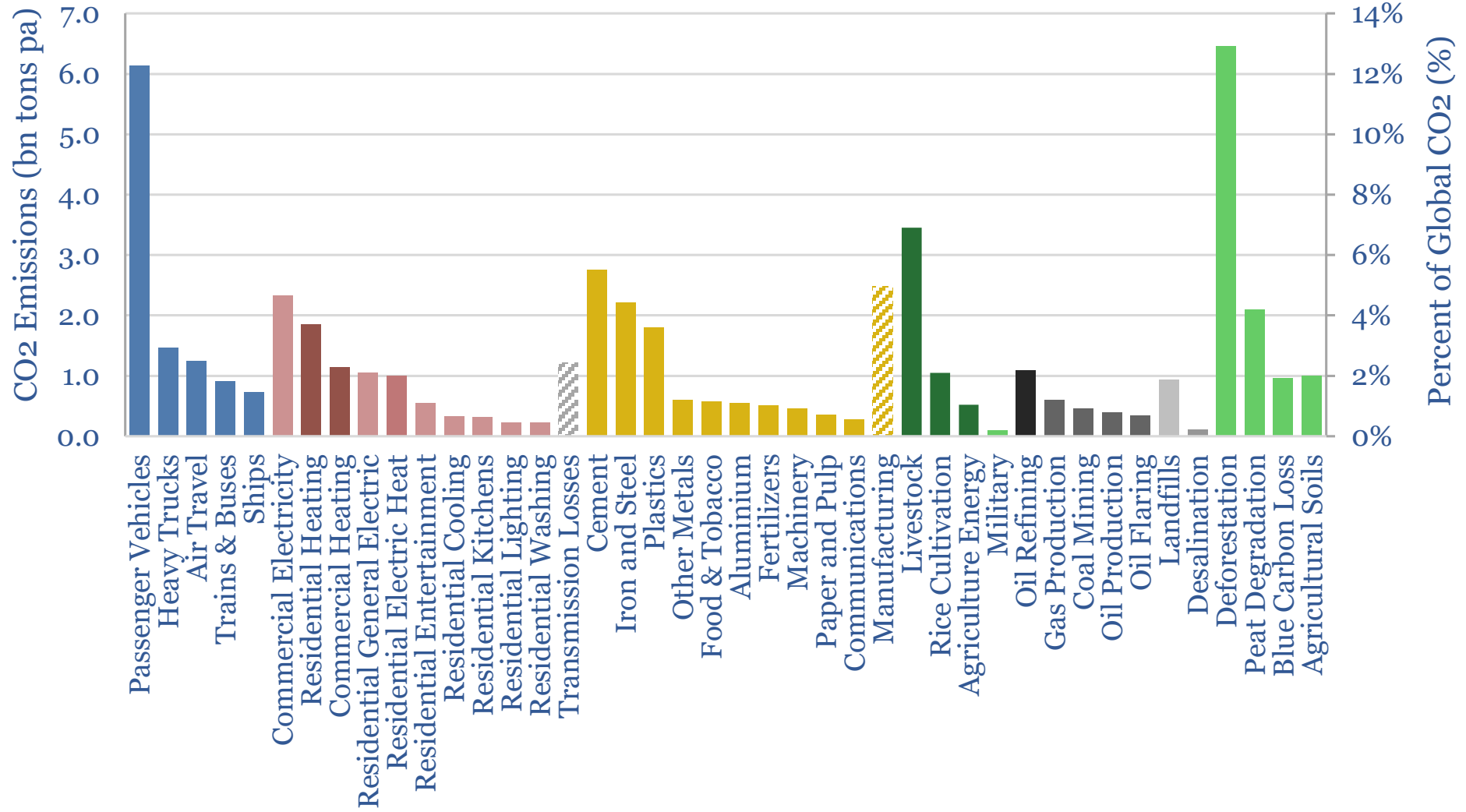


Total Global Energy Consumption runs at 70,000 TWH (equivalent to a kitchen toaster running constantly for every man, woman and child on the planet). Of this useful energy, c30% is from gas, c30% is from coal, c25% is from oil and the remainder is from ‘clean’ sources. Wind and solar are currently c2,200TWH. By 2050, total global demand will be over 100,000 TWH.



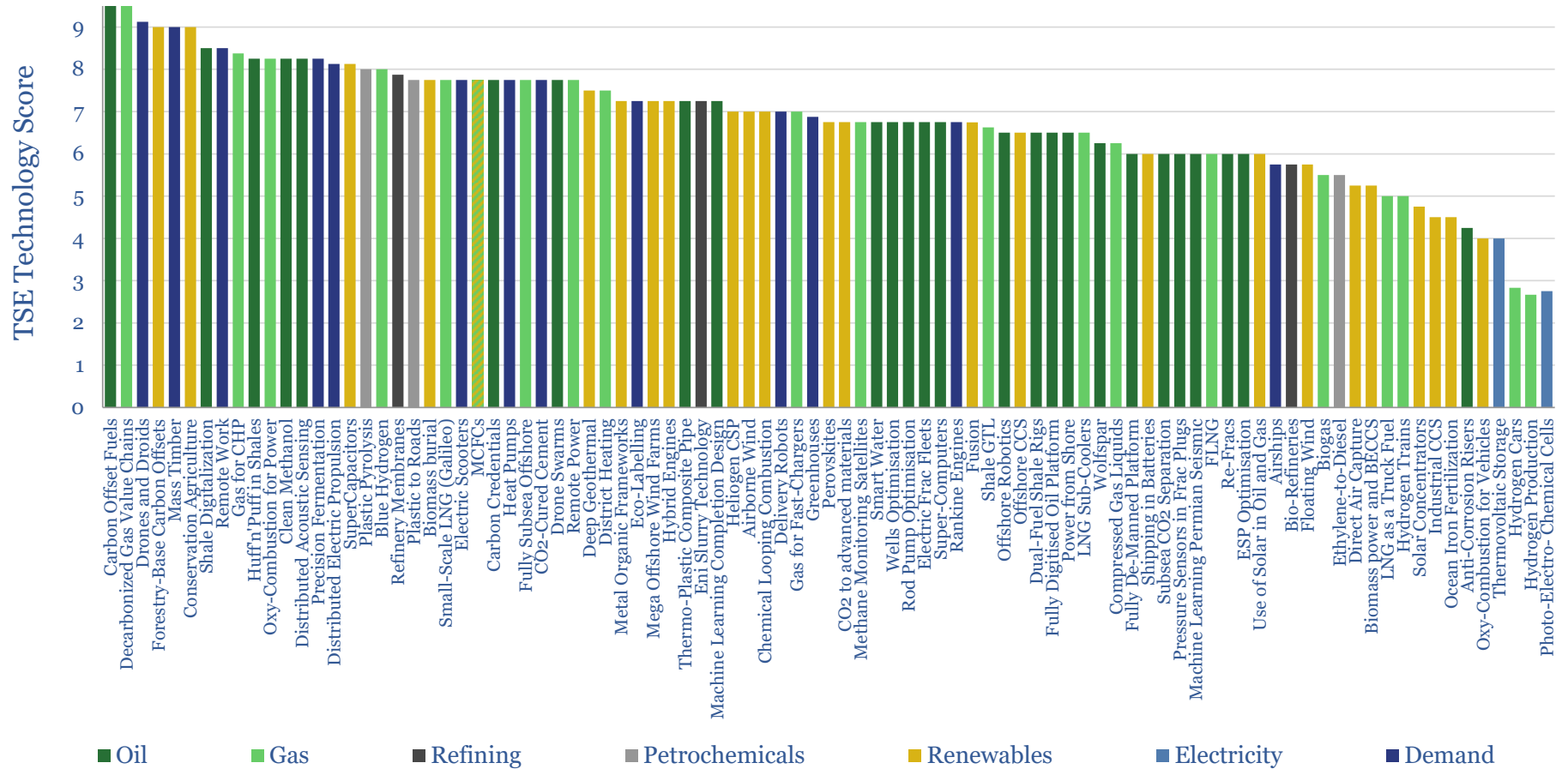
Source: Thunder Said Energy. Download here: <https://thundersaidenergy.com/downloads/the-2050-energy-mix-a-simple-model/>

The context for Net Zero. Mitigating CO2 will require new technologies across each of c40 sectors globally. The largest individual source is just 13% of the total.



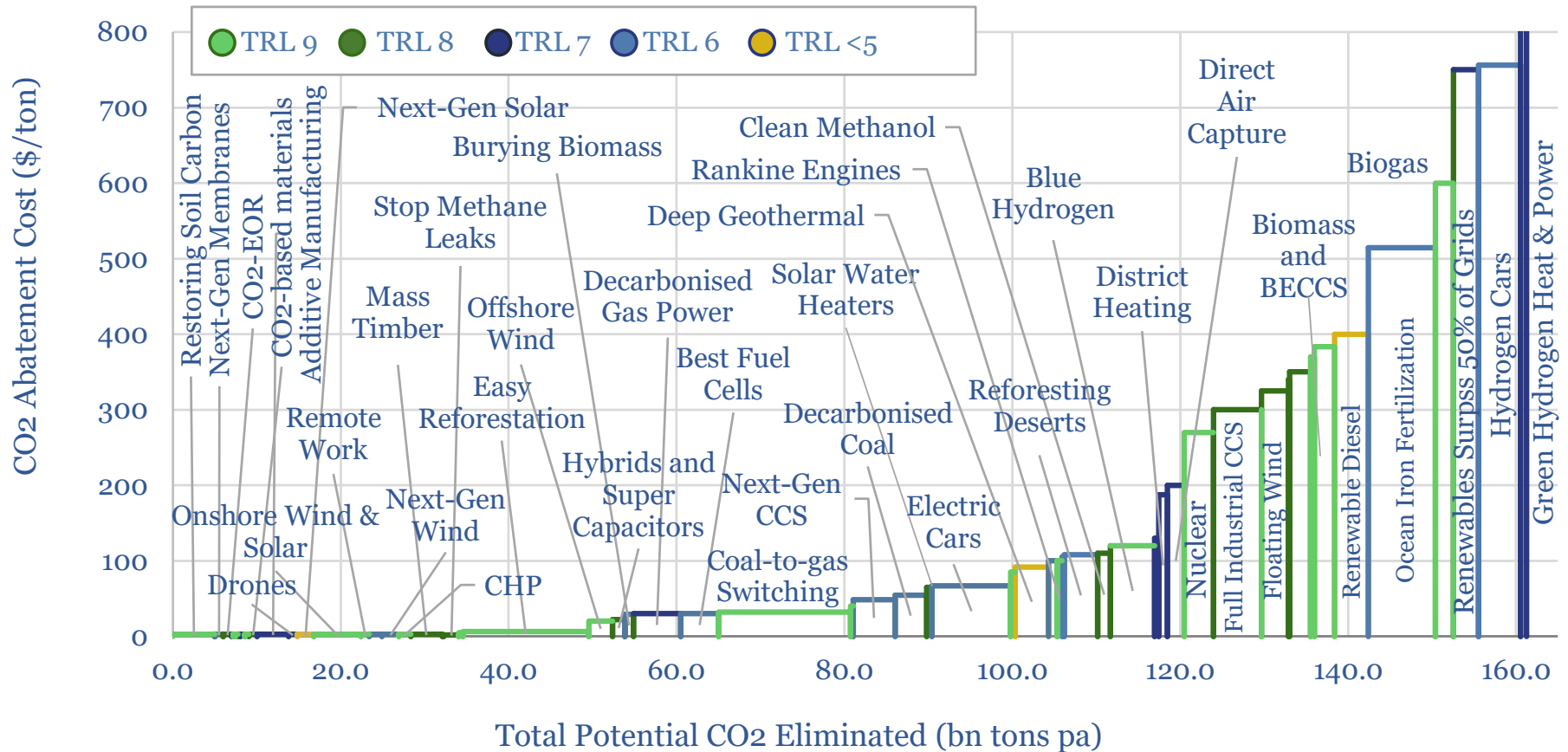
Which energy technologies present the greatest opportunities?

We help leading decisions-makers identify leading energy technologies to change the world and drive the energy transition, with cleaner, more efficient, more economical energy. Our top technologies are ranked below, after screening their economic potential and technical readiness; based on patents, technical papers and economic modelling. Key themes are [decarbonisation](#), [electrification](#), [digitisation](#), [the rise of shale](#) and [the rise of gas](#).

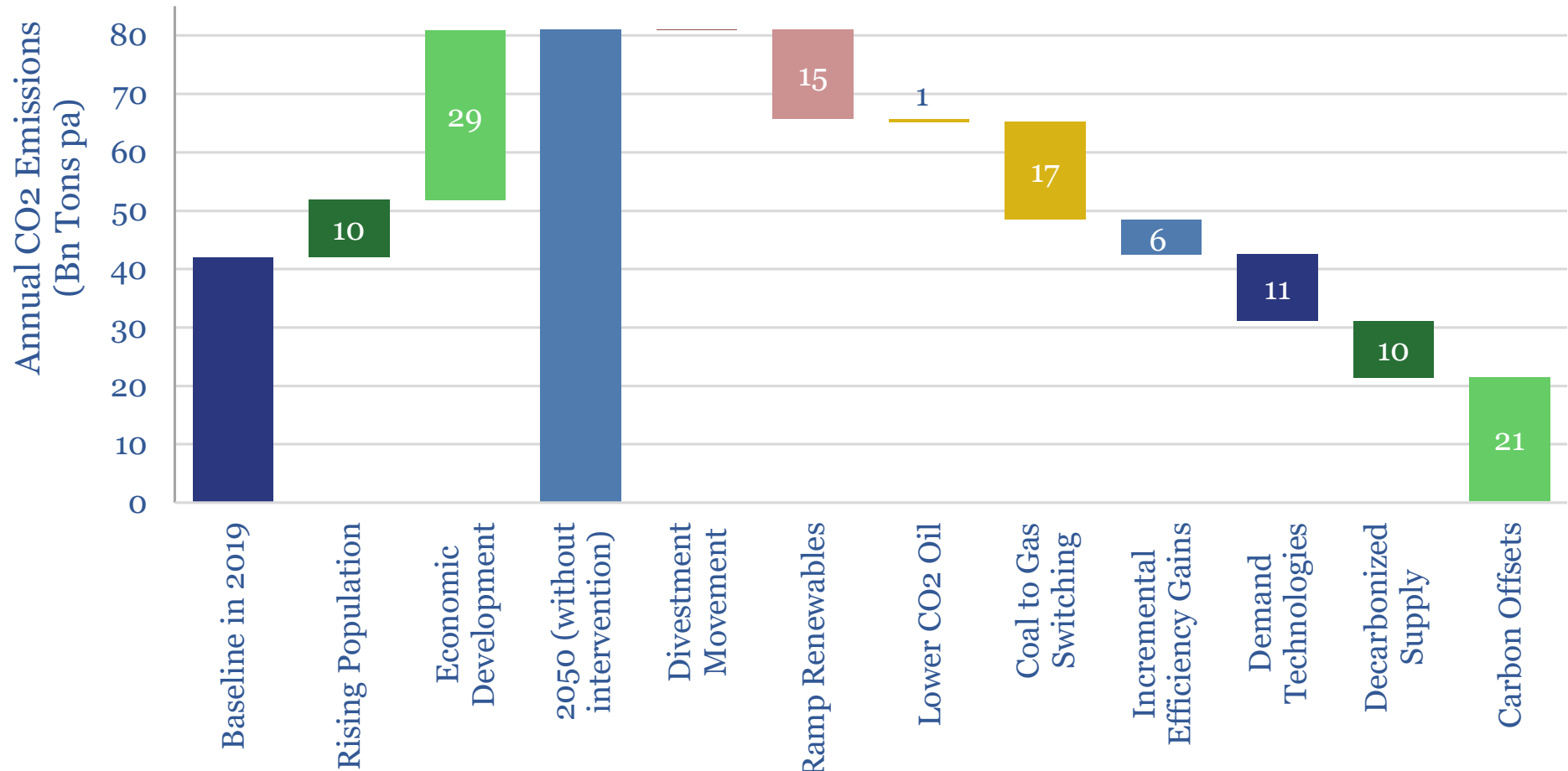


How can these technologies decarbonise the world?

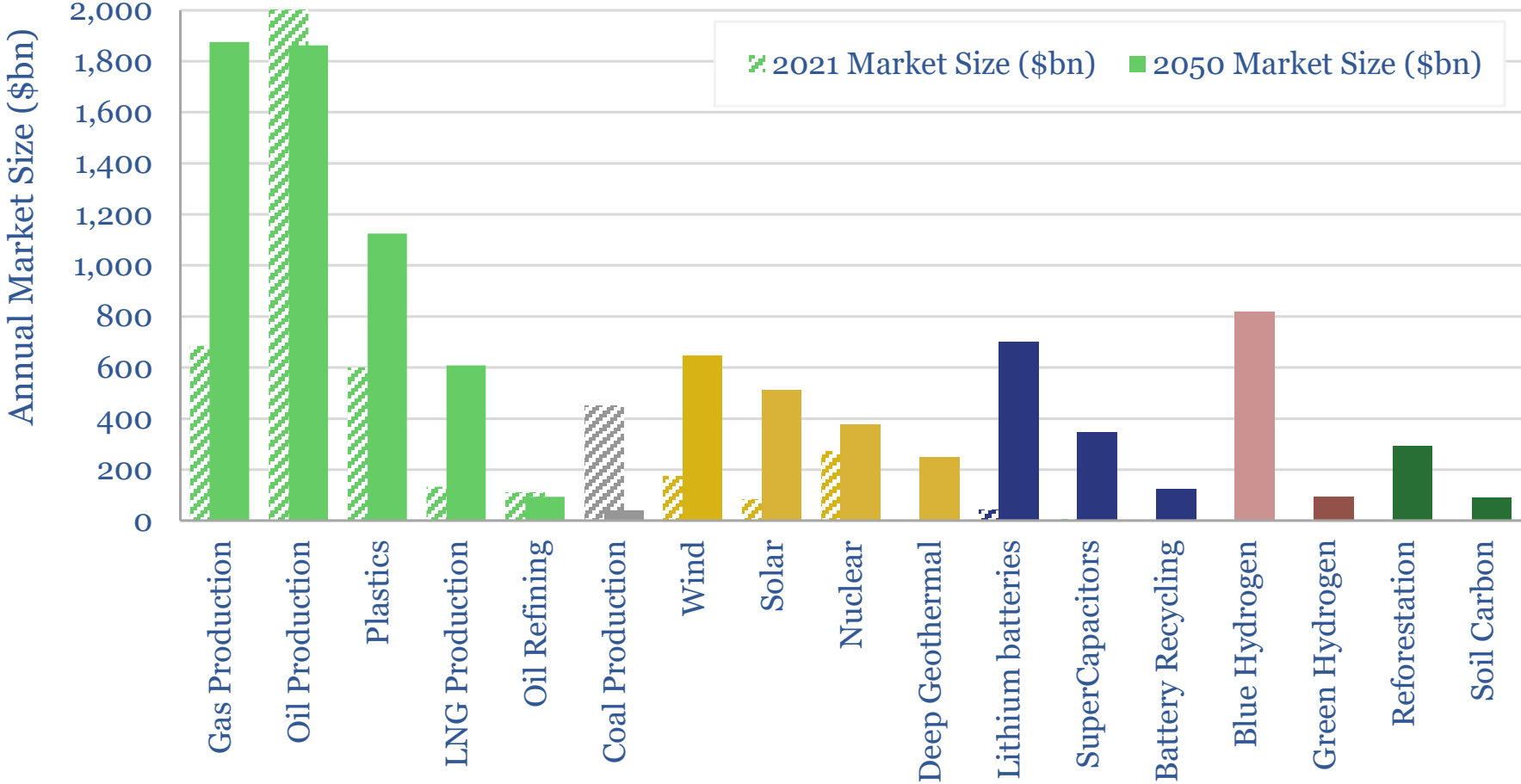
The opportunities in our work can decarbonise the global energy system by 2050, offering investment returns that will compete for \$70trn of necessary capital. Fossil fuels retain a role in this decarbonised system: their demand is c50% higher than today. But these must be the cleanest, most efficient fossil fuels possible, offset by carbon capture and offset technologies. We find leading industrial companies are already beginning to shift their portfolios, with potential re-ratings for the leaders, and likely de-ratings for laggards.



How do we decarbonise the energy system? Investable technologies that yield better, more economical, cleaner energy. They fall into six main categories.

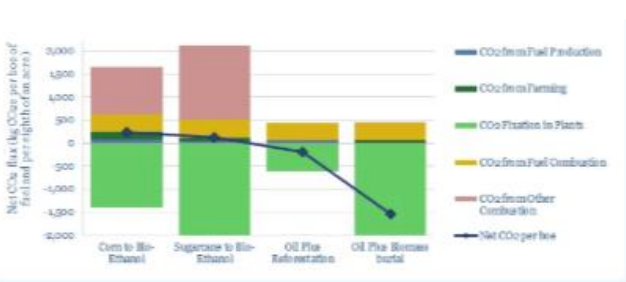
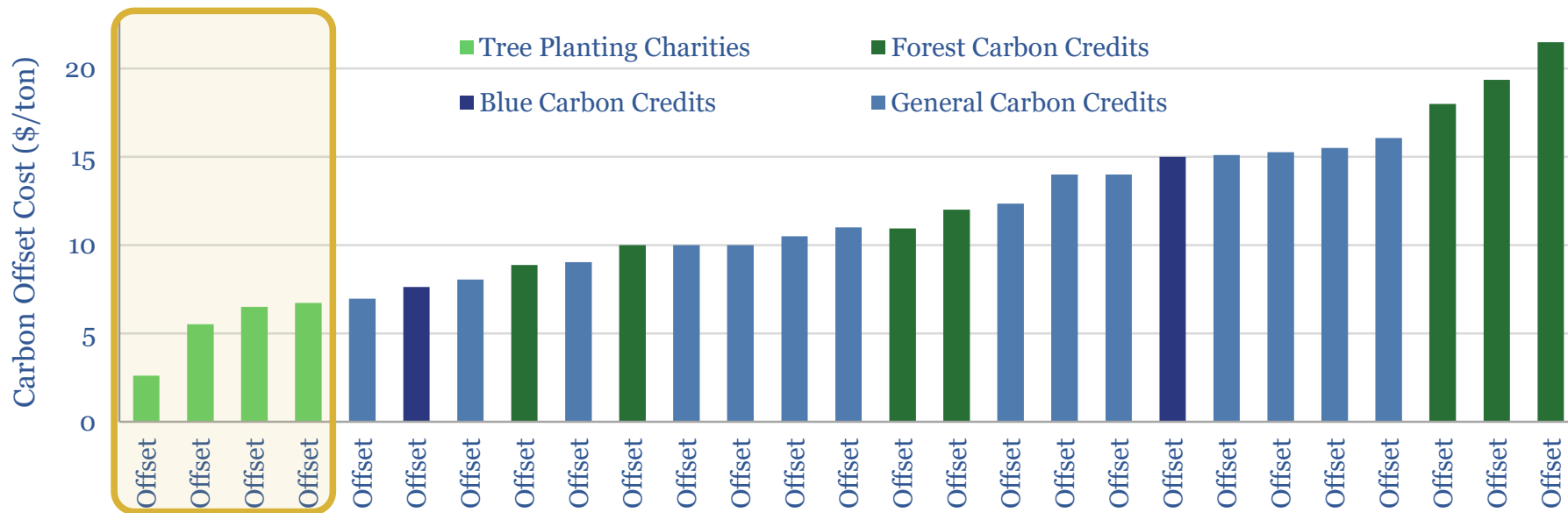


Market sizing? Natural gas will eclipse oil as the largest and most valuable energy market globally, under our roadmap. Deflation mutes the 10x rise of renewable volumes to a 6x growth in market size. 15 totally new energy technologies, which are today in their infancy, will be worth over \$5trn per year by 2050, more than all fossil fuels.



Source: Thunder Said Energy. Download here: <https://thundersaidenergy.com/downloads/market-sizing-commodities-and-themes-in-the-energy-transition/>

Nature Based Solutions?



Can carbon-neutral fuels re-shape the oil industry?

Fuel retailers have a game-changing opportunity seeding new forests, outlined in our 26-page note. They could offset c15bn tons of CO₂ per year at a competitive cost, well below c\$50/ton. We 15-25% uplifts in the value of fuel retail stations, allaying fears over CO₂, and benefitting as road fuel demand surges after COVID.

Access Report

Conservation agriculture: farming carbon into soils

Conservation agriculture builds up carbon in soil. It can sequester 3-15 bn tons of CO₂ per year, generating carbon credits, while restoring loss-making farmlands to exceptional profitability. Fertilizer demand would be decimated. This 17-page report outlines the opportunity, costs, CO₂-removal, winners and losers.

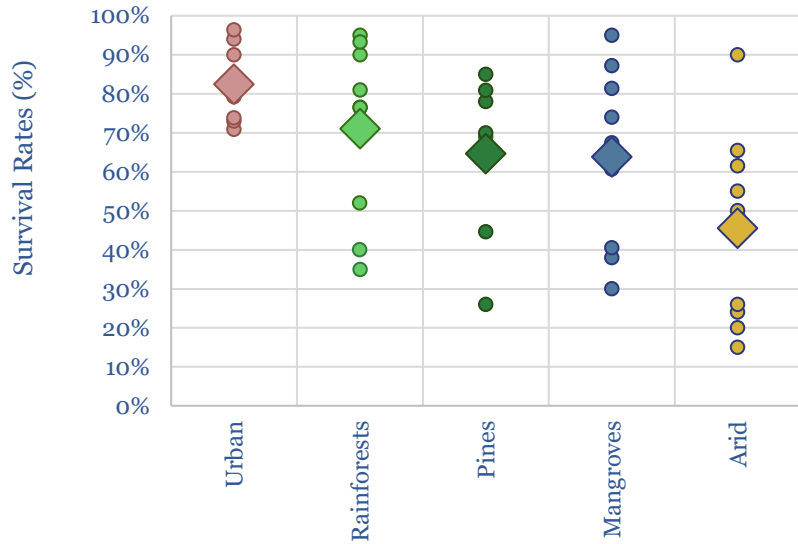
Access Report

Biofuels: better to bury than burn?

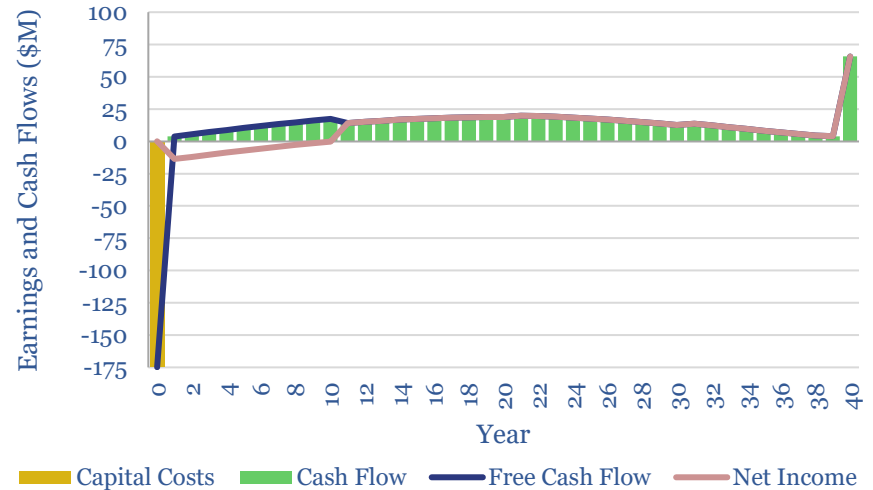
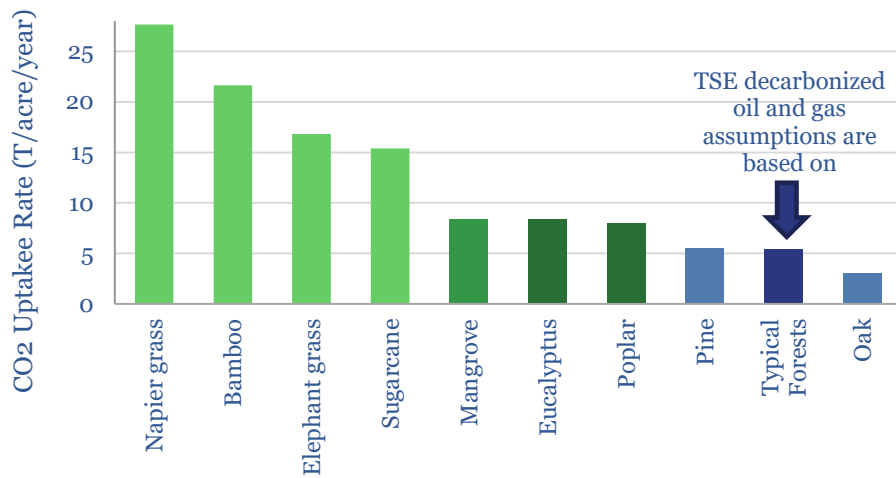
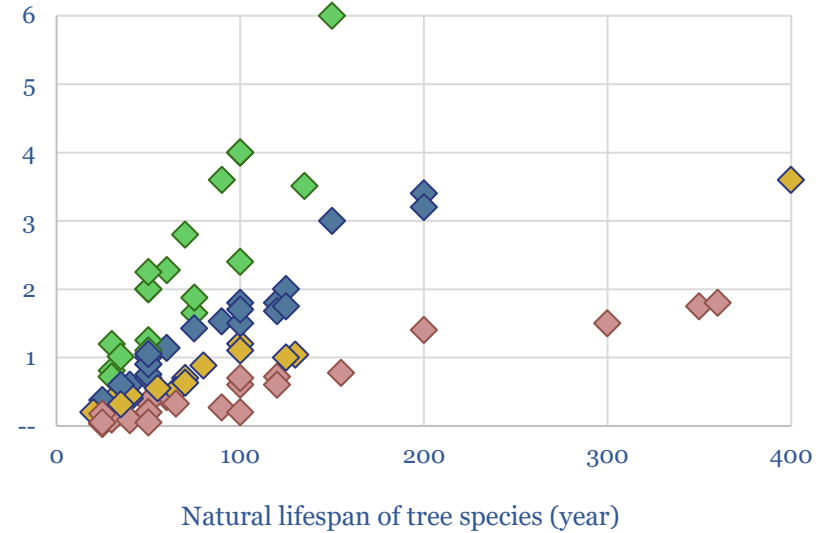
The global bioethanol industry could be disrupted by a carbon price. Somewhere between \$15-50/ton, it becomes more economical to bury the biofuel crop, rather than convert it into biofuels. This would remove 8x more CO₂ per acre, at a lower total cost. Ethanol mills and blenders would be displaced.

Access Report

Nature based solutions and 'tree planting charities'

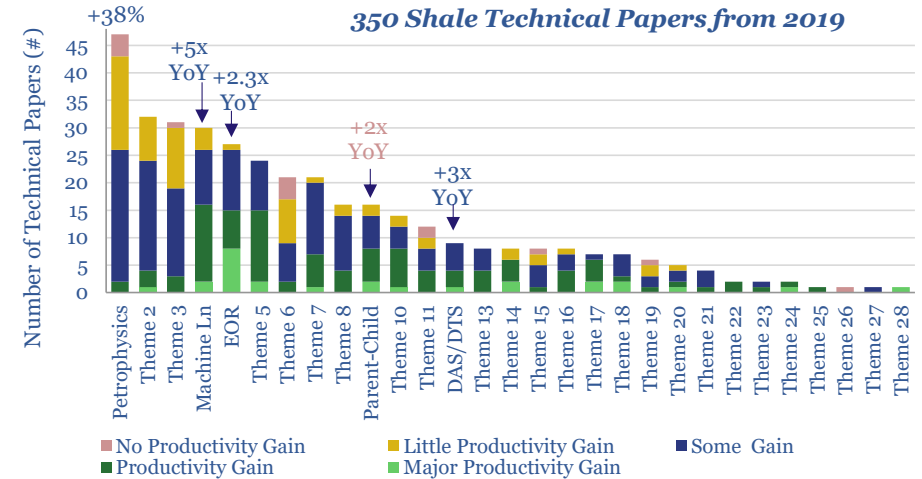
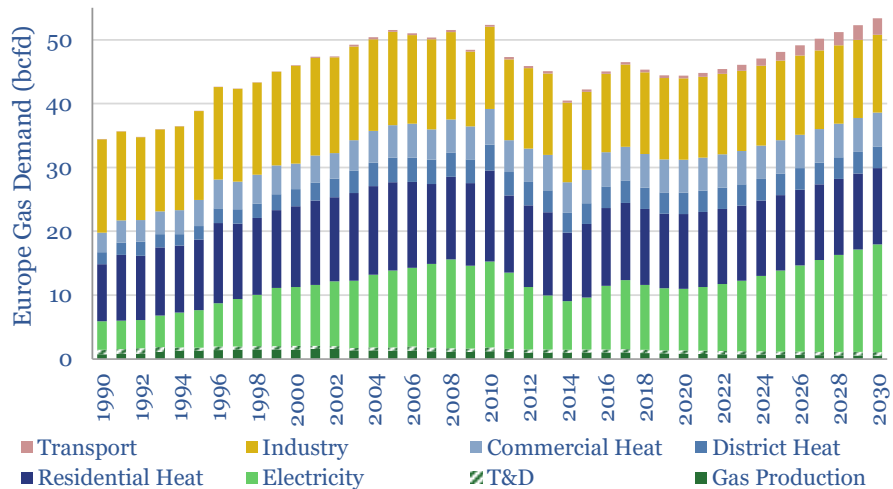
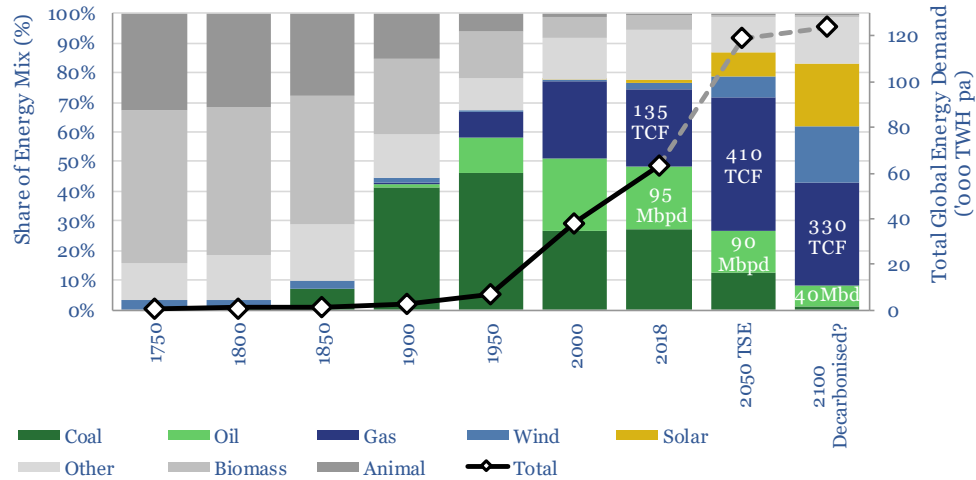
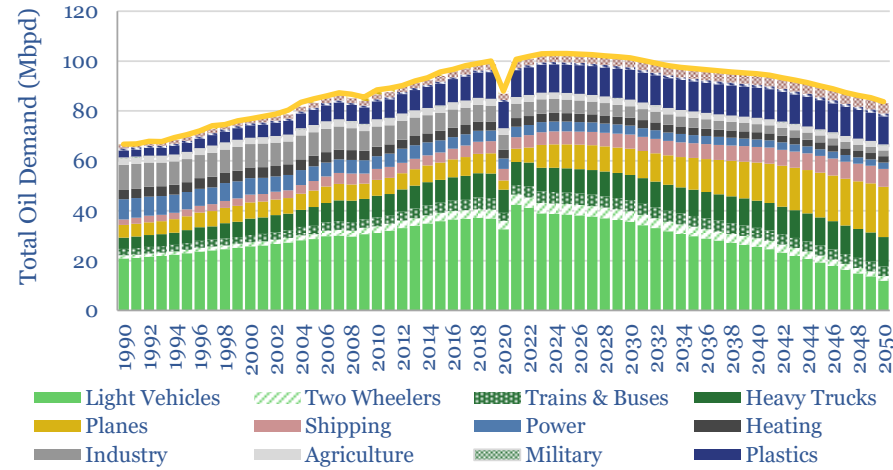


Total CO2 Offset per Tree (tons)



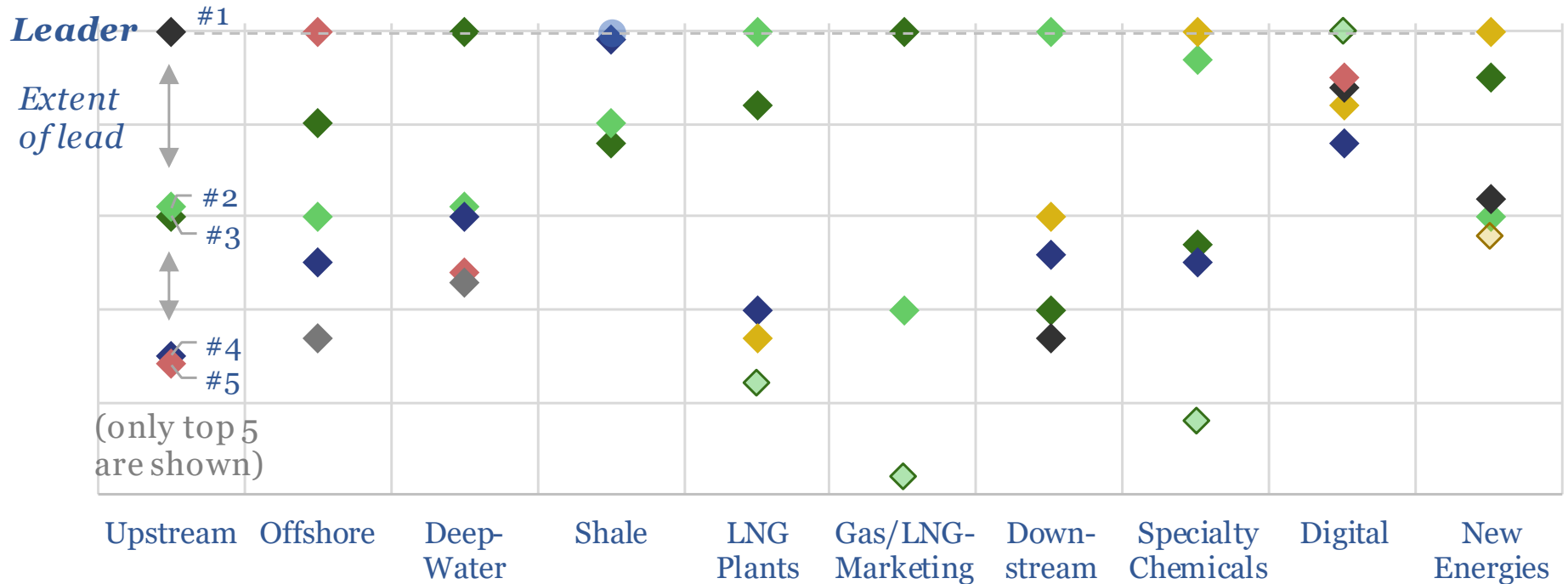
How will these technologies move energy markets?

Our energy market forecasts reflect the game-changing technologies that others ignore. Oil plateaus in the mid-2020s. Gas demand trebles by 2050, with Europe rising at its fastest pace in a quarter century, propelling 2030's LNG demand 200MT above consensus. Productivity gains in shale have not slowed down, but continue at a phenomenal pace. Combined with digital technologies that halve LT decline rates, oil may run near marginal cost.



Which companies have the best technologies?

We quantify which companies have the best energy technologies, category by category, across 40 different sub-segments of the industry, based on our database of 6,000 patents and over 1,000 technical papers. This matters in a commodity industry, where technology leadership correlates 50-70% with return on capital employed (ROACE) and -88% with ultimate project costs. Leaders in each of ten categories are shown below.

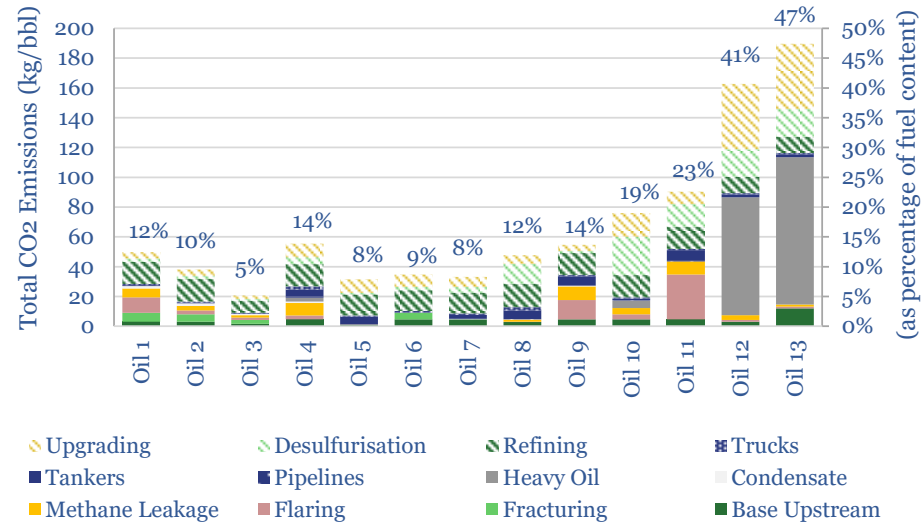
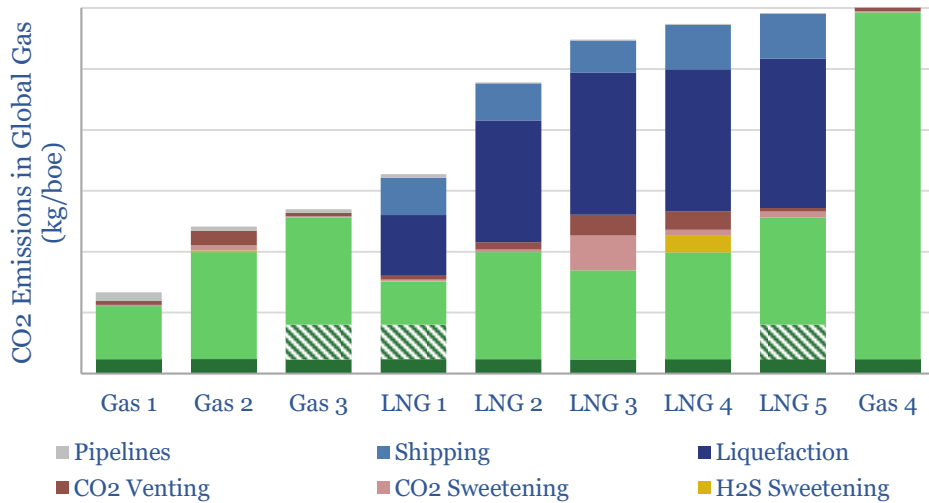
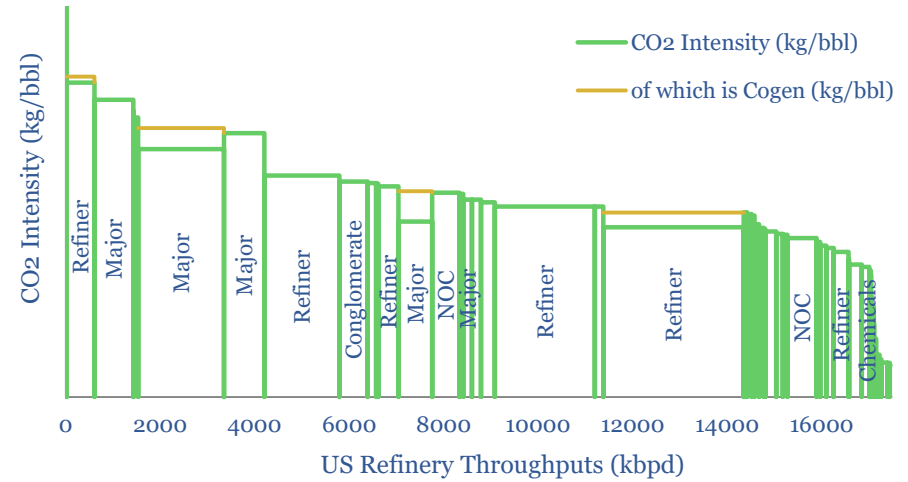
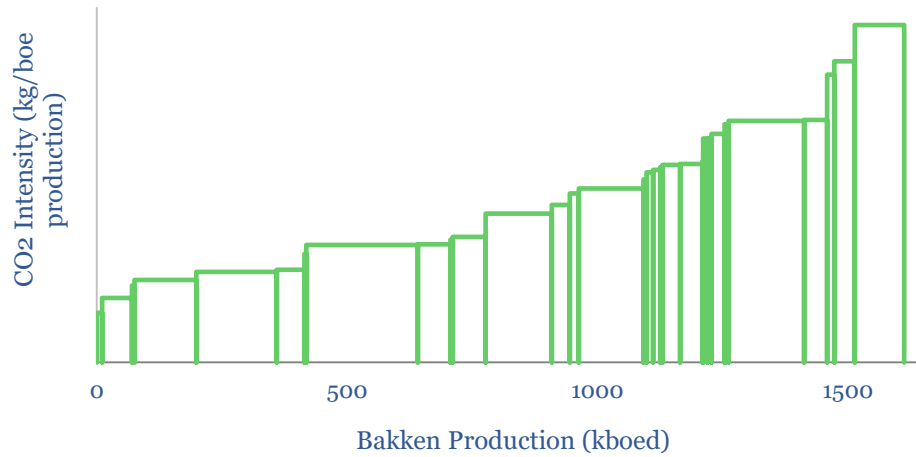


◆ Major 1 ◆ Major 2 ◆ Major 3 ◆ Major 4 ◆ Major 5 ◆ Major 6 ◆ Major 7 ◆ Major 8 ◆ Major 9 ◆ Major 10

The 'Top 25' private companies, out of hundreds that have crossed our screens, are also [presented here](#).

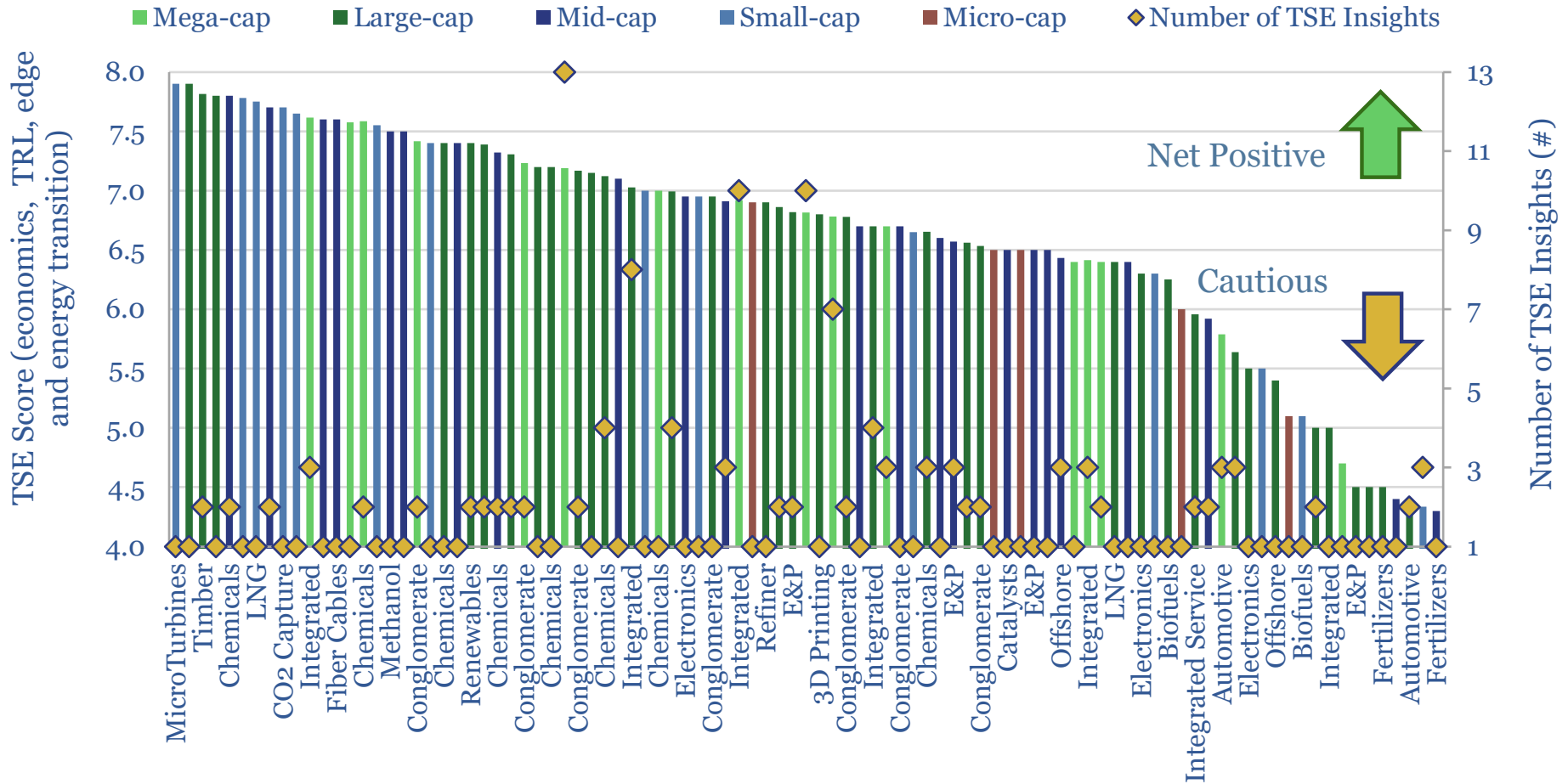
Which companies and projects have the lowest CO2?

CO2 intensity also hinges on technologies. Our research identifies industry leaders and laggards, looking into individual basins, sub-industries or projects.



Economic implications for companies driving energy transition?

200 differentiated insights into 100 companies (and growing). The chart below captures all our value-added insights into companies, ranked according to their economics, technical readiness, technical 'edge' and how they contribute to our long-term models of a fully decarbonized energy system.



About Thunder Said Energy – work with us?

Our commercial aim is to find you opportunities in the energy transition. We deliver value-adding insights via our [web-platform](#), which contains **hundreds** of research reports, data-files and models.



Thunder Said Energy was founded by Rob West in 2019. The aim is to bring a Wall Street researcher's economic mindset to the energy technologies re-shaping the world.

Prior to ThunderSaid, Rob built up the energy practice at Redburn, among the world's leading, independent equity-research firms. He was responsible for the team's energy strategy and commodity market research, while covering Super-Majors, such as ExxonMobil, Chevron, Shell, BP, TOTAL, Eni and Equinor. Previously he was an analyst at Bernstein.

Rob is also a Research Associate at the [Oxford Institute for Energy Studies](#). He has completed 75 modules in the IPIMS Petroleum Geology and Engineering programme. He holds a first-class degree in Experimental Psychology from the University of Oxford. He is a CFA charterholder. He is also happy to help, so please email...

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