We appreciate the early opportunity to comment on possible revisions of the guidelines on state aid for environmental protection and energy. We appreciate that State aid in future should become even more clearly aligned with objectives set in the 2030 Framework, and in particular achieving the EU’s goal of ‘net zero’ by mid-century.

The existing guidelines clearly lay out criteria whereby State aid ‘can be an appropriate instrument to contribute to the achievement’ of the EU’s climate and energy objectives. The existing guidelines further contain a forward-looking statement, namely that “**it is expected that in the period between 2020 and 2030 established renewable energy sources will become grid-competitive…**”

State aid supported wind, solar, and biomass energy in the 2010-2020 period. At this moment it is appropriate to examine which of these technologies have lived up to their promise, and created the conditions for market-based growth in the sector, allowing subsidies to be gradually phased out.

**We find that wind and solar have lived up to the promise associated with the receipt of state aid.** By contrast, an examination of that evidence shows biomass has not lived up to its promise. Biomass companies have failed to reduce generation costs, failed to innovate technologically, failed to achieve scale. Finally, more robust accounting of the smokestack emissions associated with biomass power would likely show that most European biomass power, or coal-to-biomass co-firings and plant conver-sions, may not even reduce carbon emissions, let alone contribute meaningfully to ‘net zero’.

**The biomass industry cannot deliver the requisite cost reductions, innovation and scale needed to become grid-competitive by 2030.** The primary reasons related to the severe set of constraints associated with the hard physical limits associated with feedstock handling – be in imported wood chips or agricultural wastes. In addition to being an increasing uncompetitive technology, the climate consequences of burning biomass for power contradicts the requirement that future state aid investments ‘prepar[e] the ground for achieving the objectives set in the 2030 Framework.’

Without further engaging the question of biomass’ contribution to CO2 mitigation objectives, which we believe will be amply addressed in others’ comments, we lay out four areas where biomass has failed to meet the test set for State aid in the 2014 Guidelines, namely to become ‘grid competitive’:

1. **Cost.** Biomass was deemed worthy of State aid support a decade ago because at the time it was cheaper than other renewables in most locations. But levelized costs of biomass-generated electricity are essentially unchanged since 2010, while the costs for wind and solar have decreased significantly.
2. **Innovation.** The major ‘innovation’ seen in the biomass sector has been the creation of export-import platforms for long-distance delivery of wood chips and pellets to EU power plants, and creating international quality standards for key feedstock characteristics -- *without* needing to take responsibility for the smokestack CO2 emissions associated with burning wood. But the focus on product standards actually reflects the challenges associated with feedstock procurement – no single source of biomass can be sourced sustainably to feed the entire industry. Different supply chains implies different plant designs and adaptations, different due diligence and valuation processes – and thus much higher transaction costs. Innovations that do occur mostly occur in silos and are permanently marginal. A number of companies have indeed developed proprietary processes using torrefaction, HTC and steam explosion, but none of these have reached significant scale, and as far as we can tell none of these efforts have turned a profit. Densification and drying of pellets has helped improve biomass logistics by reducing transport costs, but not enough to allow biomass plants to be profitable without subsidy. Simply put, there are inherent constraints to the amount of energy that can be obtained from biomass feedstocks, and it hasn’t been possible to innovate around that.
3. **Scale.** Biomass was repeatedly touted for its dispatchability and thus ability to provide baseload power and grid balancing services. That advantage has been greatly eroded by investments in improved storage capacity over the last decade. In 2018, global biomass capacity increased 6.5% to 130 gigawatts *in total*. By comparison, wind and solar *added 151 GW of capacity between 2017 and 2018.* So despite more than a decade of financial support and a ‘free pass’ on accounting for smokestack CO2 emissions – not to mention all the advantages conferred by being dispatchable –biomass would be expected to grow at a comparable scale. Yet biomass has added very little to total global power capacity over the last few years. Finally, it’s pretty clear that ratings agencies take biomass’ supply chain risk seriously – variability in supply, safety risks in feedstock handling, plant fire and explosion risks, in addition to uneconomic transport costs – and that this represents another barrier to scale.

**In conclusion,** **biomass has failed to deliver on the promise of previous State aid. It fails both in helping to align 2030 climate and energy objectives with actual ‘net zero’ trajectories, and by failing to become grid-competitive. It remains a niche industry with many intractable and mutually-reinforcing barriers to scale. Meanwhile, two other renewable energy sources -- wind and solar -- have become dominant technologies over the last decade, proving that in the case of those two industry sectors, State aid was an appropriate instrument to reduce costs, push innovation, and achieve scale. The same cannot be said for biomass. State aid should not be directed toward biomass power in future.**