

The future of biomass: Net Zero, 2050 and beyond

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Figure 1: Enviva's Port in Chesapeake, VA exports wood pellets to power and heat generators around the world.

A recent study by the Coalition for Negative Emissions found that global action to deliver negative emissions technologies is falling far short of what is required to address the climate crisis.

The Coalition's research, conducted with knowledge and analytical support from McKinsey & Company, found that to limit global warming to 1.5°C above pre-industrial levels, as agreed in Paris in 2015, efforts to reduce

emissions must be combined with annual negative emissions of up to 1.2Gt by 2025 – equivalent to more than two times the United Kingdom's annual CO2 emissions.

The [study](#)¹ shows negative emissions solutions including bioenergy with carbon capture and storage (BECCS), direct air capture and storage (DACs), and natural climate solutions (NCS) such as afforestation, are all proven and can each provide at least 1Gt of sustainable negative emissions. In

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However, based on the current pipeline of projects, the Coalition's research finds the level of negative emissions required by 2025 in the United Nations' Intergovernmental Panel on Climate Change's (IPCC) 1.5°C pathway will be missed by 80 percent. Investment in negative emissions solutions must also

increase by 30 times current levels to meet the needs of the 1.5°C pathway. If there is no action until 2030, around 8Gt of negative emissions debt will have been built-up, increasing the costs and disruption to society required to keep global warming within 1.5°C.

It is vital that all governments and corporations take an active role in reducing carbon emissions today if we desire to see a carbon-neutral or carbon-negative world tomorrow. As industrialists, it is our duty and responsibility to tackle one of the largest environmental, social, and economic challenges of our time – bringing forth renewable energy solutions that can combat the climate threat this century – but we must act now.

However, global industries were not inherently designed to be low carbon and the road to decarbonization and net zero will necessitate more action than just eliminating plastics and recycling. The climate crisis requires mass collaboration and a radical rethink on how governments, NGOs, societies, and global businesses operate. If we fail to rise to the challenge and adapt, we risk our own extinction.

As countries take aggressive action on climate change to decarbonize their respective economies by 2050, we expect to see more carbon-neutral and carbon-negative renewable technologies working together to achieve carbon neutrality by mid-century. As the global demand for alternative energy increases, 2022 will mark a turning point for the industry as woody biomass, wind, solar, geothermal, hydrogen, and lithium-ion battery energy providers make a collective and coordinated effort to combat the global climate crisis today.

Global Outlook

Biomass is the only renewable fuel on the market that is readily available

today and can replace fossil fuels for heat generation. Relatively speaking, Europe is on a path to become the first carbon-neutral continent by 2050, but it cannot be done without negative emissions, and biomass enables that solution.

The United Kingdom (U.K.) has always been a leader in biomass adoption, and recently announced incremental funding for biomass projects showcasing the government’s strong commitment to biomass as part of the future energy mix. A recent and prime example of progress being made to displace coal was in 2020, when the world witnessed the U.K. complete a record-breaking 67-day period without burning coal, thanks in part to recycling and repurposing segments of grid infrastructure. Most recently, [research shows](#)², the U.K. is already halfway to meeting its 2050 net-zero emissions targets.

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Beyond the U.K., the European Union’s (EU) commitment to ambitious emissions-reductions goals continues to drive higher carbon prices, and new EU Emissions Trading System (“EU-ETS”) reforms included in the “Fit for 55” package suggest that trend should continue. Currently, the U.S. is the leading exporter of wood pellets to Europe. In fact, the U.S. has the potential to supply 65% of the EU’s import demand, representing a trade value of approximately \$1.6 billion.

As it relates to Germany, renewable energy subsidy guidance is expected to remain for the foreseeable future. The next German administration is expected to be even tighter regarding environmental regulations, making the fight against climate change and the transition to a greener economy a key priority. This includes advancing energy policies that phase out carbon-intensive industries



Figure 2: Enviva employs more than 1,200 people across the globe.



Figure 3: Enviva’s sustainably sourced wood pellets help the world’s energy producers reduce carbon emissions by more than 85% on a lifecycle basis.

while replacing coal and other energy sources with renewables and different sustainable options. The renewed focus is anticipated to only add to policies such as the Coal Phase-Out Act (2020), which aims to gradually reduce and eventually end the use of coal-powered energy in Germany by 2038.

Continuing with their prior commitments to implement renewable energy fuels and phase out coal, we continue to see positive tailwinds in both Denmark and the Netherlands. As one of the largest per-capita consumers of coal, Poland is moving swiftly to decarbonize,

further solidifying and strengthening its support for the EU’s mid-century carbon-negative targets.

An unfortunate reality, coal could still be used in some regions of the world. For ambitious countries that have been largely successful in reducing greenhouse gas (GHG) emissions, such as the U.K. and Denmark, the goal is to eliminate coal by 2030 or as close to it as possible. When discussing countries who presently have large dependencies on coal, such as Germany and Poland, coal may not be completely displaced in 10 years, but both economies are expected to

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be well on their way to achieving net-zero carbon emissions by mid-century.

Turning to Asia, Japan’s growing, policy-fuelled appetite is furthering U.S. and global investments in renewable energy. As Japan looks to increase the thermal efficiency of dozens of power generation facilities, biomass is a solution available today that can help achieve those goals. In fact, according to Hawkins Wright, Japan’s demand in biomass was 1.8 million metric tons in 2020 and has grown more than 33% in 2021. What was once the most viable option – nuclear power

generation – has since decreased over time due to Japan’s tragic history with nuclear.

Future Applications

Looking at recommendations from the IPCC and the International Energy Agency (IEA), every pathway to meeting the decarbonization goals that limit the impact of global warming includes wood biomass. If governments and industry are genuine about tackling and achieving net-zero emissions, they must deploy negative emissions technologies urgently and at scale.

As the world begins to realize the true potential of renewable energy, such as sustainably sourced biomass, additional applications to

various industrial sectors will need to be considered. One promising innovation available today is the application of bioenergy with carbon capture and storage (BECCS). To date, this is one of the very few options available that can remove carbon from the atmosphere. The only way to get to net zero is with sustainably sourced bioenergy with carbon capture and storage – which doesn’t just offer opportunities to decarbonize the energy sector, but also heavy industries such as steel, lime, biochemicals and cement – making it an overarching tool to achieve international climate goals.

In fact, as the trend for all industries to decarbonize continues, domestic and international steel

companies have been exploring the incorporation of bioenergy solutions into their business models. Given that wood pellets are the only renewable energy fuel that exists today that can generate both power and high-temperature heat – they serve as the ideal solution. As for timing and implementation of green steel at scale, it’s unknown. However, we’ve already seen some positive signs such as ArcelorMittal [beginning production](#)³ of green steel in 2020 and companies like Mercedes-Benz announcing [new commitments](#)⁴ to use low-carbon steel in their manufacturing process.

Looking ahead to more future-oriented solutions, such as the development of the hydrogen

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Figure 4: A dry hammermill at Enviva’s wood pellet production plant located in Richmond County, NC.

economy, biomass is expected to remain essential and continue to evolve into other critical roles. The most obvious is to use biomass directly to create hydrogen through gasification and thereby avoid carbon emissions that are associated with natural gas. Even further down the road, when surplus solar and wind could potentially be used to create hydrogen at scale, there could be an exciting opportunity to produce aviation and other fuels with BECCS that could result in negative GHG emissions.

For example, the U.S. Department of Energy is working with the U.S. Department of Transportation, the U.S. Department of Agriculture, and other federal government agencies to develop a comprehensive strategy for scaling up new technologies to produce sustainable aviation fuel (SAF) on a commercial scale. In fact, in September 2021, the Biden Administration [announced](#)⁵ new federal actions aimed to produce three billion gallons of sustainable fuel, and reduce aviation emissions by 20% by 2030.

Additionally, as the industry has alluded to, the addressable market for net-zero solutions is huge for industrials. One large steel or cement producer could double the size of the global market for industrialized wood pellets, notwithstanding other verticals such as lime, sugar, and chemicals that are looking to biomass as a solution to decarbonize their energy footprint as well.

In conclusion, in order to meet net-zero commitments by 2050, governments, corporations and NGOs will need to evaluate and implement a new biomass strategy to develop and support new frameworks for BECCS-based projects and other net-zero applications.



Figure 5: Fiber being pushed through a die to form a wood pellet.

Enviva recently announced its climate action plan, which includes a timeline for achieving net-zero GHG emissions in its operations by 2030.

Make Net Zero Your Own

To be clear, getting to net zero will require an “all-in approach” if we are being realistic about decarbonizing the current energy infrastructure. New policy tools will be required and capital investment in societal infrastructure will be essential for success. However, this new market shift and investment should not reside solely on the government – it requires public support and education from companies, organizations, and society at large.

For example, Enviva recently announced its climate action plan, which includes a timeline for achieving net-zero GHG emissions in its operations by 2030. As part of the plan, Enviva has committed to:

- **Reducing, eliminating, or offsetting all of our direct emissions.** Enviva will immediately work to minimize Scope 1 emissions - emissions from fossil fuels used directly in its operations.

- **Sourcing 100% renewable energy by 2030.** To address the emissions arising from electricity purchases in our operations – Scope 2 emissions – Enviva plans to source 100 percent renewable energy by no later than 2030, with an interim target of at least 50 percent by 2025.
- **Driving innovative improvements in its supply chain.** To address emissions generated as part of our upstream and downstream supply chain – Scope 3 emissions – Enviva plans to proactively engage with partners and other key stakeholders to adopt clean energy solutions.
- **Transparently reporting progress.** Enviva will track and publish progress in reducing its emissions annually and intends to disclose climate-relevant data and risks through CDP (formerly the Carbon Disclosure Project) by the end of 2022.

As industrialists we understand the instrumental role woody biomass has and will continue to play in helping the U.K., EU member states, and the world in decarbonizing their respective economies. Including joint efforts from policy makers, business leaders, academics and scientists – it is important we all do our part today to help the world fight climate change. In conclusion, the world cannot get to net zero without sustainable biomass. Let’s not delay progress any further and use all the tools at our disposal to get ahead in what is already an ominous challenge against time.

About Enviva Partners, LP

Enviva Partners, LP (NYSE: EVA) is a publicly traded master limited partnership that aggregates a natural resource, wood fiber, and processes it into a transportable form, wood pellets. The Partnership sells a significant majority of its wood pellets through long-term, take-or-pay off-take contracts with creditworthy customers in the United Kingdom, Europe, and increasingly in Japan. The Partnership owns and operates ten plants with a combined production capacity of approximately 6.2 million MTPY in Virginia, North Carolina, South Carolina, Georgia, Florida, and Mississippi. In addition, the Partnership exports wood pellets through its marine terminals at the Port of Chesapeake, Virginia and the Port of Wilmington, North Carolina and from third-party marine terminals in Savannah, Georgia, Mobile, Alabama, and Panama City, Florida.

REFERENCES

1 The coalition for negative emissions. The case for negative emissions. <https://coalitionfornegativeemissions.org/wp-content/uploads/2021/06/The-Case-for-Negative-Emissions-Coalition-for-Negative-Emissions-report-FINAL.pdf>

2 Evans S. UK is now halfway to meeting its ‘net-zero emissions’ target. *The Carbon Brief*, <https://www.carbonbrief.org/analysis-uk-is-now-halfway-to-meeting-its-net-zero-emissions-target>

3 ArcelorMittal corporate communications. ArcelorMittal Europe to produce ‘green steel’ starting in 2020. <https://corporate.arcelormittal.com/media/news-articles/arcelormittal-europe-to-produce-green-steel-starting-in-2020>

4 Holder M. Mercedes-Benz is latest automaker to embrace low-carbon steel in manufacturing. <https://www.greenbiz.com/article/mercedes-benz-latest-automaker-embrace-low-carbon-steel-manufacturing>

5 The White House. FACT SHEET: Biden Administration Advances

the Future of Sustainable Fuels in American Aviation. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/09/fact-sheet-biden-administration-advances-the-future-of-sustainable-fuels-in-american-aviation/>

To learn more about Enviva Partners, LP, please visit our website at www.envivabiomass.com and follow us on social media [@Enviva](https://twitter.com/Enviva).

DISCLAIMER: This article contains “forward-looking statements,” including the author’s present expectations regarding future regulatory developments and the evolution of the renewable energy industry and bioenergy’s role within it. Forward-looking statements involve significant risks and uncertainties that could cause such expectations to be materially inaccurate. Readers are cautioned not to place undue reliance on the forward-looking statements contained herein.

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Figure 6: An industrial dryer at Enviva’s wood pellet production plant located in Cottondale, FL.