

Renewable gas at the mill: a practical route to decarbonise tissue drying

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INTRODUCTION:

Meva Energy's biomass gasification technology demonstrates how tissue producers can strengthen energy security, reduce exposure to fossil fuel volatility and cut emissions with locally produced biogas.

Tissue production depends on reliable, high-quality process heat. At the same time, mills are under growing pressure to reduce fossil emissions, improve energy resilience and maintain cost competitiveness. Meva Energy's installation at Sofidel Sweden's mill in Kisa shows that renewable biogas produced through gasification can already replace fossil LPG in tissue drying — not as a distant concept, but as an industrial solution in operation today.



Image 1: Meva Energy's renewable gas plant replacing fossil gas consumption at Sofidel Sweden's tissue mill in Kisa, Sweden.

Article highlights

- Renewable biogas is already verified in tissue production at Sofidel Sweden's mill in Kisa.
- The 4.5 MW plant replaces fossil LPG in the tissue drying process and produces biochar as a co-product.
- The solution strengthens energy security by producing gas at the mill from local residual biomass.
- A long-term energy purchase model can reduce customer investment and operational complexity.
- The Kisa case demonstrates approximately 8,500 tonnes/year fossil CO₂ reduction potential, increasing to approximately 10,600 tonnes CO₂e/year when biochar sequestration is included.

The tissue industry's energy challenge

Few industrial sectors illustrate the complexity of the energy transition as clearly as tissue production. The product is lightweight, but the process is energy intensive. A large share of thermal energy is used in the drying section, where hot air is supplied to the tissue machine and comes into direct contact with the paper web. This places strict demands on the heat source: it must be stable, clean, controllable and compatible with high production availability.

For decades, fossil LPG and natural gas have fulfilled these requirements. They are easy to control, provide high-quality heat and fit existing burner systems. However, their strategic disadvantages have become increasingly clear. Fossil gaseous fuels expose producers to volatile energy markets, geopolitical supply risks and carbon costs. They also make it harder for tissue producers to deliver on climate targets and customer expectations.

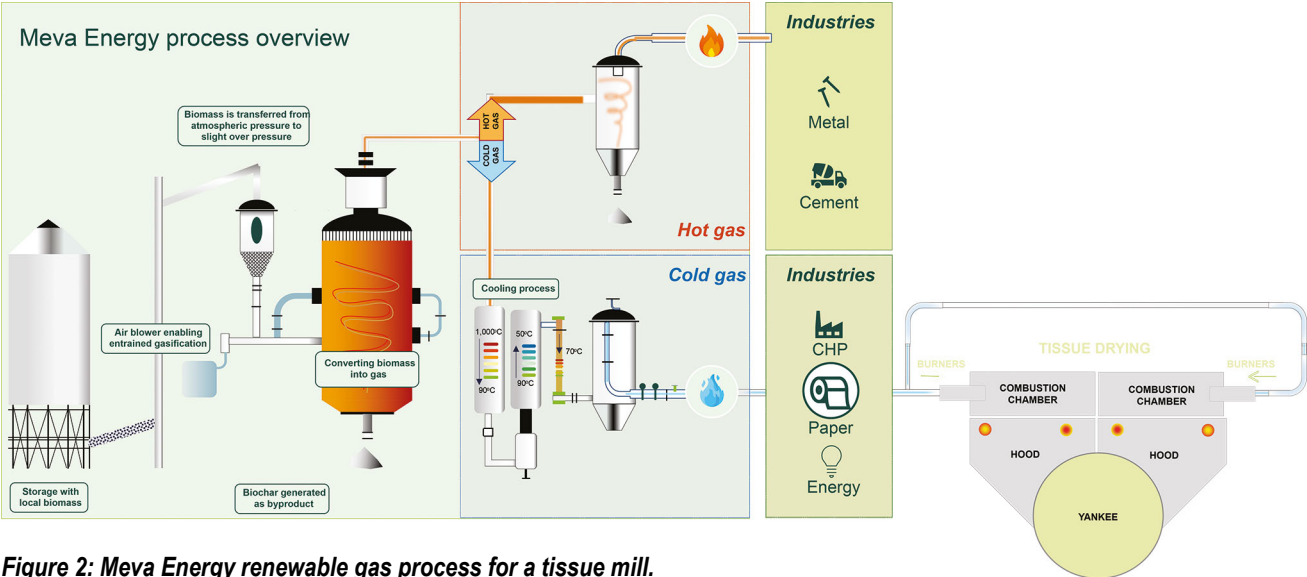


Figure 2: Meva Energy renewable gas process for a tissue mill.

The challenge is therefore not simply to find a low-carbon fuel. Tissue producers need an energy solution that can address three requirements at the same time: secure supply, competitive cost and substantially lower climate impact.

Biogas from biomass: renewable industrial gas produced where it is used

Meva Energy’s answer is to produce renewable biogas directly at the mill from local or regional solid biogenic residual streams. Through thermochemical gasification, low-value biomass such as sawdust, pellets, wood fibres and other suitable residues can be converted into a combustible gas consisting mainly of carbon monoxide, hydrogen and methane.

The gas can then be used directly in industrial heat applications. This is an important distinction compared with several other renewable gas pathways. The gas does not need to be upgraded to grid quality, liquefied, compressed or transported over long distances before it reaches the industrial process. It is produced for a specific customer, at a specific site, for a specific heat demand.

For a tissue mill, this creates a local energy system in which biomass residues are converted into renewable process heat and biochar. The model reduces dependence on external fossil fuel value chains and gives the mill greater control over a critical production input.

Verified in tissue production at Sofidel Kisa

The clearest proof point is Meva Energy’s installation at Sofidel Sweden’s tissue mill in Kisa. The 4.5 MW gasification plant supplies renewable biosyngas to the mill’s tissue drying process, replacing fossil LPG.

The feedstock is locally produced wood pellets made from sawdust, and the process also produces approximately 400 tonnes of biochar per year.

The project was commissioned in 2023 and has demonstrated that biosyngas can be integrated into an existing tissue production environment. Multifuel burner solutions from ANDRITZ EnviroBurner support the use of biosyngas in the drying hoods, while the existing fossil fuel system remains available as redundancy. This ability to switch between fuels is important for industrial adoption because it reduces operational risk and supports production continuity.

At Kisa, the potential fossil CO² reduction is approximately 8,500 tonnes per year compared with fossil LPG. When the carbon storage effect of biochar is included, the total climate impact potential is approximately 10,600 tonnes CO²e per year. Strengthening security of supply

Energy security has become a strategic issue for energy-intensive industry. Tissue mills cannot afford uncertain fuel availability or unpredictable interruptions in process heat. By producing gas at the mill from local biogenic residual streams, Meva Energy’s model shifts part of the energy supply away from imported fossil fuels and towards regional resource flows.

This has several implications. Shorter supply chains can improve resilience. Local biomass sourcing can reduce exposure to international fossil fuel volatility. The use of existing burner infrastructure and fuel redundancy means that renewable gas can be introduced without removing the operational safety net that mills require.

In practical terms, the mill gains a renewable energy supply that is physically close to the process and commercially less dependent on the fossil gas market. For producers seeking greater control over energy risk, this can be as important as the climate benefit.

Site	Sofidel Sweden, Kisa, Sweden
Application	Renewable gas for tissue drying hoods
Gas production	4.5 MW
Feedstock	Locally produced wood pellets made from sawdust
Biochar output	Approximately 400 tonnes/year
Fossil CO2 reduction	Approximately 8,500 tonnes/year compared with fossil LPG
Total reduction potential	Approximately 10,600 tonnes CO2e/year including biochar sequestration
Commissioned	2023

Improving affordability and cost predictability

Affordability is often the decisive factor in industrial decarbonisation. For tissue producers, the relevant comparison is not only the commodity price of gas or LPG, but the total cost of delivered useful heat. Fossil fuel cost includes fuel purchase, logistics, infrastructure, taxes, emissions costs and exposure to market volatility.

On-site biogas changes this cost structure. Because the gas is produced and consumed at the same industrial site, the value chain avoids several costly steps associated with centralised renewable gas supply. There is no need to upgrade the gas to pipeline specification if the customer's process can use biogas directly. There is also less dependence on long-distance transport and external gas infrastructure.

Meva Energy can also deliver the solution through a long-term energy purchase agreement. Under this model, Meva builds, owns and operates the gasification plant, while the customer purchases renewable energy as an output. For tissue producers, this can reduce upfront investment, simplify implementation and place responsibility for gasification performance with the technology provider.

Reducing emissions — and creating a carbon removal pathway

The sustainability case for biosyngas begins with the replacement of fossil LPG or natural gas. When biomass feedstocks are sustainably sourced and comply with applicable regulatory criteria, biosyngas can qualify as a renewable under the EU ETS framework. To demonstrate this, Meva Energy performs greenhouse gas emissions calculations in accordance with the Renewable Energy Directive (RED), resulting in a climate impact of 1.6 g CO₂-eq/MJ, substantially lower than the fossil fuel comparator of 80 g CO₂-eq/MJ, defined in the RED.

Beyond renewable gas production, Meva Energy's technology generates biochar, a stable carbon-rich co-product capable of storing carbon over long periods when used in approved applications. By accounting for biochar carbon sequestration and broadening the scope of the calculations, based on the ISO standards on life cycle assessment (LCA), results in a climate impact of -6.4 g CO₂-eq/MJ. This shows how the combination of renewable energy production and durable carbon storage can go beyond fossil fuel substitution, creating a fundamentally different climate profile for industrial heat. It also highlights the potential to support corporate pathways towards both net-zero and carbon-negative operations.

Why this matters for tissue producers

Several pathways are being discussed for the decarbonisation of industrial heat, including electrification, biomethane, hydrogen and carbon capture. All may have roles to play. However, tissue drying has specific requirements, and many mills already operate with combustion-based heat systems. For those sites, renewable gas produced at the mill can offer a pragmatic transition route.

The key advantage is fit with existing process logic. Biogas is a gaseous fuel. It can be integrated with burner systems. It supports controllable heat. It can coexist with existing fuel redundancy. And, unlike future hydrogen infrastructure or large-scale grid constraints, it can be deployed where suitable biomass resources and industrial heat demand are already present.



For the tissue industry, this makes biomass gasification an immediately relevant option: not a theoretical decarbonisation pathway, but a technology that has already produced renewable gas for tissue drying.

From plant project to energy service

Industrial energy projects are complex. Customers must often manage technology risk, construction risk, fuel supply, operations, maintenance and financing. Meva Energy's commercial model is designed to reduce this threshold by offering renewable gas as a service under a long-term agreement.

In this structure, Meva Energy can develop, finance, build, own and operate the gasification plant. The customer purchases renewable process energy, while Meva is responsible for plant performance and operation. This makes decarbonisation easier to evaluate as an energy procurement decision rather than as a fully customer-owned infrastructure project.

For tissue producers that want to reduce fossil dependency but maintain focus on their core production, this model can be a practical way to accelerate implementation.

Conclusion: a proven route for renewable process heat

The tissue industry's energy transition must succeed in real operating environments. It must deliver reliable heat, support competitiveness and reduce fossil emissions. Meva Energy's installation at Sofidel Kisa demonstrates that renewable biosyngas can meet these requirements in tissue production today.

By producing gas directly at the mill from local residual biomass, the model strengthens security of supply. By avoiding unnecessary upgrading and transport steps, and by enabling long-term energy purchase agreements, it supports affordability and cost predictability. By replacing fossil gas and producing biochar, it can significantly improve the climate profile of tissue production.

For tissue mills looking for a near-term route to fossil-free process heat, locally produced biosyngas offers a practical answer: renewable energy generated where it is needed, from resources available close to the mill, with a proven reference in operation.

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