



# Formica Asia

## Materialising Sustainability

IN COLLABORATION WITH NEMHO SUSTAINABILITY TEAM



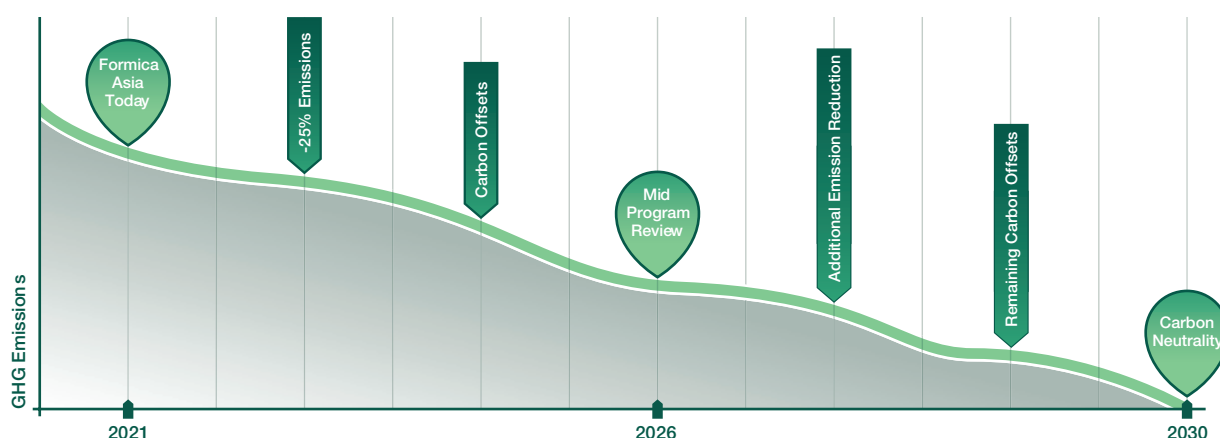
# Executive Summary

## Formica Asia: The path towards carbon neutrality

Since its founding in 1913, Formica has worked to provide innovative, high quality products to its customers. In 2019, Formica joined Broadview, a Netherlands-based company and leader in sustainability in the decorative materials market. The acquisition by Broadview has raised the bar for sustainability expectations and provided access to tools and technologies to accelerate Formica's sustainability improvement trajectory.

In the last challenging months, instead of pulling away from sustainability, we decided to push ourselves further and focus our efforts on one of the most pressing challenges of this day and age: CO<sub>2</sub> emissions. Building on last year's first position paper, we continue to be transparent and proactive in communicating our environmental impact data and our plans for future improvements. Our annual Sustainability Position Paper will detail our journey to reduce emissions in Formica Asia facilities. We will also develop offset projects that help reduce or capture carbon emissions in the broader environment.

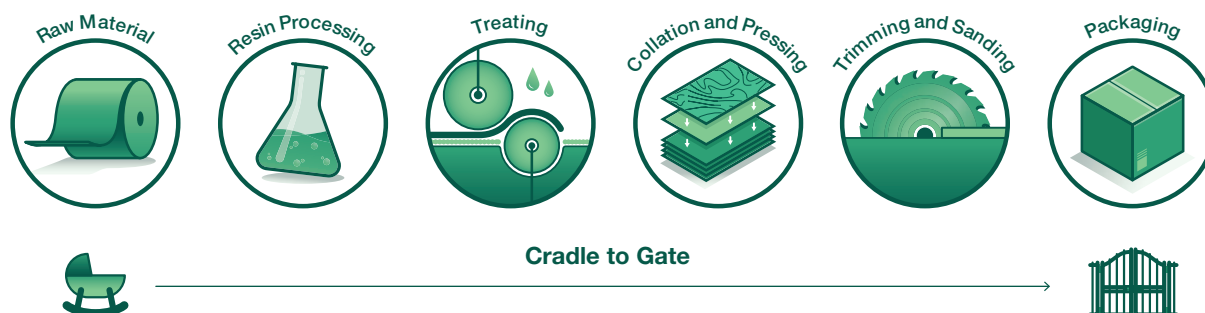
Our path toward carbon neutrality includes a targeted reduction of 25% and a compensation of 25% of our emissions via carbon offsetting by 2026.



### A straightforward approach to sustainability

Reducing our carbon footprint is based on our core belief that it is the right thing to do. We are also convinced that reducing our overall environmental footprint is essential to the long-term success of our business and the environment around us. That is why sustainability is embedded in our business philosophy with the credo 'do no harm, do good, do better'.

At the core of our sustainability strategy is the principle that we should start with ourselves when we seek to improve the world: 'do no harm'. Our approach is straightforward: we measure our impact, select targets to reduce this impact and monitor and report on progress. To measure our impact, we use the Life Cycle Assessment (LCA) methodology. LCA captures the details of the entire environmental footprint of our products, from its raw material extraction up to leaving the gate of the factory.



The second element of our strategy is to look for opportunities that support the environment beyond the direct scope of our own manufacturing footprint: 'do good'. This includes creating highly durable products that have a long lifespan that limit the need for replacement. Additionally, we also develop projects that help to absorb or reduce carbon emissions that are not directly linked to our factories and our product portfolio.

We believe that addressing sustainability challenges will allow our company to continue to grow and 'do better' in the future. Investing in sustainability should – in the end – ensure that these efforts continue beyond the horizon of current regulatory changes and ethical/moral considerations.

# Executive Summary

## Facts on our footprint

We believe you cannot manage what you do not measure. With Broadview, Formica Asia was able to leverage leading sustainability tools to fast track our effort to create a Life Cycle Assessment. This methodology is the most reliable tool available to measure a product or process' footprint.

We have analysed our current footprint across our 5 factories located in Taiwan (HsinChu), Thailand (Bangkok), China (Qingpu and Jiujiang) and India (Kalol). The cradle-to-gate<sup>1</sup> LCA results are shown below for the three key environmental factors (Global Warming<sup>2</sup>, Primary Energy Demand and Water Footprint<sup>3</sup>). The results are expressed for two years: 2019 (the baseline year for our 5-year targets) and 2021.

Impact category	Unit	2019 impact*	2021 impact
Global warming <sup>2</sup>	ton CO <sub>2</sub>	127,643	92,602
Primary energy demand	GJ	5,339,971	3,747,842
Water footprint <sup>3</sup>	m <sup>3</sup>	78,437,915	60,723,914

Formica has plans to address all three environmental factors, however, the urgency of global warming requires that the reduction of CO<sub>2</sub> emissions be our absolute priority for the years to come. Our primary focus will be on projects to cut 25% (i.e., 32 thousand tons) of CO<sub>2</sub> emissions generated in the production of our products.

Between 2019 and 2021, Formica Asia noted an impact reduction on global warming by 27%. This reduction was in part due to the purchase in 2021 of green electricity (Energy Attribute Certificates) in Formica China (allocated between Qingpu and Jiujiang). However, a share of this reduction is also due to the production volume decrease due to the Corona Pandemic as well as some data improvement activities. Therefore, in order to achieve the 5-year targets, we will continue implementing impact reduction projects detailed in the next section.

## A clear 5-year action plan (2021-2026)

Formica's goal to reduce its carbon footprint starts with its goal for a 25% reduction (32 thousand tons) of CO<sub>2</sub> Emissions by 2026.

Key drivers of our improvement are outlined in the table below.

CO <sub>2</sub> emission reduction activity	Scope	Completed (c) and planned (p) actions					CO <sub>2</sub> reduction potential
		Bangkok	HsinChu	Qingpu	Jiujiang	Kalol	
Energy efficiency	Scope 1,2	- Energy consumption reduction in combination room (c)	- Improving chiller efficiency (p)	- Improving compressed air efficiency (p) - Better boiler efficiency (p)	- Improving compressed air efficiency (c)	TBD	5%
Renewable efficiency	Scope 1,2	- Green electricity (c) - Biomass boiler installation (p)	- Biomass boiler installation (p)	- Outsourcing kraft paper impregnation (p)	- Outsourcing steam generated by municipal waste incineration (p)	- Replacing coal with renewable sources (p)	20%
Renewable material	Scope 3	Increase the share of biobased content in at least 10% of our total output				TBD	TBD
					Target reduction total:	25% (32 thousand tons)	

We are continuously exploring every opportunity to increase the efficiency of our processes. In addition, we continue to transition to more sustainable bio-based and renewable sources, which already constitute up to 70% of our product inputs. Biobased, renewable raw materials have a lower environmental impact than traditional petroleum based inputs. Forest and crops absorb CO<sub>2</sub> from the atmosphere during their growth and continue storing it once harvested.

In parallel, Formica Asia will develop projects to capture carbon outside our business; this will include buying offsets or co-investing in projects.

## We will be transparent about progress

The goal of our Sustainability approach is to provide transparency to our stakeholders about our sustainability efforts and updates each year going forward so you can see progress against our commitments. Formica Asia will update its targets and initiatives each year as we progress through this journey.

For those interested in further details of our sustainability program, a long-form version of this paper is available with additional information and data. Our Formica Asia team also is more than happy to answer questions - feel free to contact your local Formica team member for more information.

<sup>1</sup> The emissions generated from cradle to plant gate.

<sup>2</sup> The uptake of CO<sub>2</sub> is taken into consideration when performing the LCAs for the paper based raw materials.

<sup>3</sup> The water footprint indicator shall be used with care due to high uncertainties and limited experience as mentioned in the EN15804-A2 standard.

Thereby, the water footprint impact indicator in 2019 has been adjusted compared to the previous position paper to reflect an accurate comparison between the years.

\* The baseline (2019) LCA data that were previously published in the 2021 Sustainability Position Paper have been rebased to include the impacts of the Formica India (Kalol) plant.

# Introduction



## Global Leader in Decorative Surfaces Formica®: Makers of Change

Formica Group has evolved to become the world's preferred manufacturer for decorative surfaces. Driven by new challenges and delivering constant innovations, we have been setting and surpassing benchmarks for quality laminates worldwide ever since. Working closely with architects, designers and specifiers, the company is ideally placed to offer new products and decors which complement current design trends, and has an ongoing product design and development process.

With sustainability a concern for the global community, Formica Group makes it a priority to offer architects, designers and consumers a full range of environmentally friendly surfacing products, which are widely used in furniture, cubicles, kitchen utensils, train, automobile, cabinets, ships, elevators, etc.

Formica® Laminates have been certified according to the GREENGUARD Certification & GREENGUARD Gold Certification standards for Indoor Air Quality. Formica Group is also the first laminate manufacturer in the world to be awarded with Carbon Trust's Carbon Reduction Label.

Formica® owns manufacturing bases worldwide, with five being located in Asia (Qingpu China, Jiujiang China, HsinChu Taiwan, Bangkok Thailand and Kalol India).

In 2019, Formica Group was purchased by Broadview Holding, a Netherlands-based global leader in material technology. Part of Broadview's explicit strategy is that each business in its group, including Formica Asia, will pursue ambitious sustainability initiatives and results. Along with Broadview Holding, Formica is committed to a long-term planning horizon that includes becoming an industry-leading environmental steward.

A key element to this approach is being highly transparent about our current environmental footprint as well as our plans and targets for reducing our overall impact. Formica Asia is implementing a common sense, fact-based methodology to sustainability focused on a cradle-to-gate approach that is integrated into the way that we manage every part of our business.

**As part of our sustainability approach, Formica Asia will publish its environmental impact data every year, as well as our targets and initiatives for the coming year.** This report is the second annual publication of our sustainability data and results. We are excited to share it with you as we continue to advance our sustainability efforts.



# Overall Philosophy

Formica's sustainability policy is built upon a basic motivation to shift from "being less bad" for the environment to being "good" and having a positive impact on the world around us. This approach has three stages:

## Do no harm

Formica will comply with safety, product and sustainability regulations and guidelines set by the countries in which it operates. Beyond that, we will seek opportunities to minimize the environmental impact in all of our operations and products.

## Do good

Formica will support its suppliers and customers in realizing their sustainability challenges. We will continue to look for opportunities and initiatives to support and promote longer-term sustainability beyond the direct scope of our current operations.

## Do better

Formica believes that investing in sustainability is beneficial to the overall environment and to the long-term health of our business. Many sustainability challenges constitute good business opportunities that support our customers while continuing to allow the company to thrive.

# Sustainability Approach

Enhancing sustainability requires a realistic vision, specific actions and integrated approach across the entire company. Formica's sustainability path is defined by three key principles that shape our thinking and action plans.

## Common Sense

Formica takes a common sense approach to sustainability. This requires the acknowledgment that, by definition, a product requires resources and energy in its creation and as a result, some level of environmental impact will occur. That said, we have adopted the relentless pursuit of maximizing our product functionality while minimizing its environmental impact. We believe that sustainability is a balancing act between product functionality and its impact. Our goal is to reduce the impacts without losing sight of the product functionality our customers require.

## Fact-based approach

At Formica, we believe you cannot manage what you do not measure. In order to address sustainability in a bigger way, we needed to quantify our current impact on the environment. To do this, we implemented the Life Cycle Assessment (LCA) methodology because it represents the most reliable and data-driven tool available to help companies, institutions and governments systematically incorporate sustainability into their decision-making process. LCA is a process to evaluate the environmental burdens associated with the entire life cycle of a product, process, or activity. For our business, this assessment is done through the identification and quantification of the energy and materials used in the production of our 1st brand Formica® Brand products and our other 2nd or 3rd brand products and the resulting wastes and emissions released into the environment.

By using a product life-cycle approach, Formica gets a clear understanding of the actual impact we have on the environment. We can then identify the drivers of sustainability and prioritize initiatives across the entire value chain – from the raw materials through the consumer's use of the product.

The environmental burden of product or an activity can be expressed through a number of impacts, such as global warming, acidification, eutrophication, ozone depletion, primary energy demand, photochemical oxidant formation, water footprint, abiotic depletion and many others. For Formica's LCA assessment, we show results tied to three key environmental factors: Global Warming (CO<sub>2</sub> Emissions), Primary Energy Demand and Water Footprint.

From among these three environmental impacts, global warming represents Formica's absolute priority. This impact poses a serious threat to our planet, one that demands urgent action on a global scale. Beginning with the Rio Earth Summit, then the Kyoto Protocol and the Paris Agreement, action to tackle this global challenge is speeding up. With the Paris agreement, 191 countries (including China, India and Thailand) committed to limit global warming to well below 2° Celsius compared to pre-industrial levels. This means aiming to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.

## Part of how we run the business

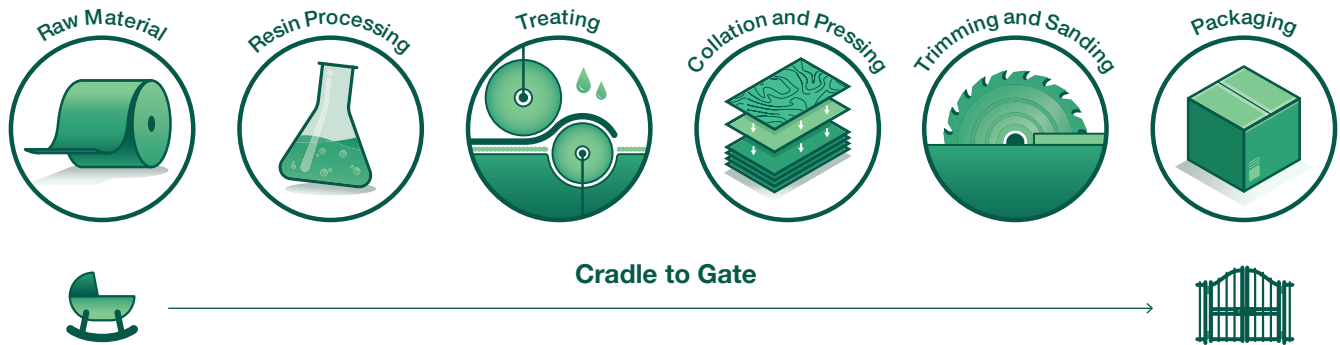
All sustainability initiatives are part of Formica's rolling business planning and review cycle. Our sustainability priorities stem from the results of our LCA studies and what we believe are realistic but challenging targets for achieving meaningful progress. The review cycle comprises annual target setting in the budgeting process and a monthly management review of progress measured in key performance indicators. Each year, new sustainability targets are set and formalized in a detailed sustainability target agreement. Progress is closely monitored and discussed by the leadership team of Formica on a quarterly basis during regularly-held sustainability meetings which are our tool for tracking activities and progresses, and brainstorming on new sustainability initiatives.

Moreover, we are incorporating sustainability training into our onboarding process and updates into our employee communications. Formica is committed to informing our entire team about our sustainability initiatives and including them in our efforts to protect the environment.

# Sustainability Strategy

## Cradle-to-gate approach

At the heart of Formica's sustainability vision and approach is reducing the impacts generated from the cradle-to-gate portion of our materials life cycle. Our guiding principle is two-fold: increasing efficiency or "do more with less" and replacing the most impactful energy and material inputs of our process.



## Increasing efficiency

Efficiency upgrades represent the first lever for improving a product's environmental footprint by reducing the required energy and raw material inputs.

**Energy.** There are many opportunities to improve the energy efficiency of industrial equipment through the use of modern technology and intelligent system design. Replacing motors and pumps with new high-efficiency designs, storing and recycling heat within a closed-loop system, and optimizing the integrated manufacturing system are examples to reduce energy consumption.

**Materials.** A large share of industrial emissions is associated with the creation of materials used in our products. A key opportunity is to absolutely minimize material waste at each step in the process. We are focusing on product and process designs that optimize the use of materials so that our finished product can provide outstanding performance while requiring less material input.

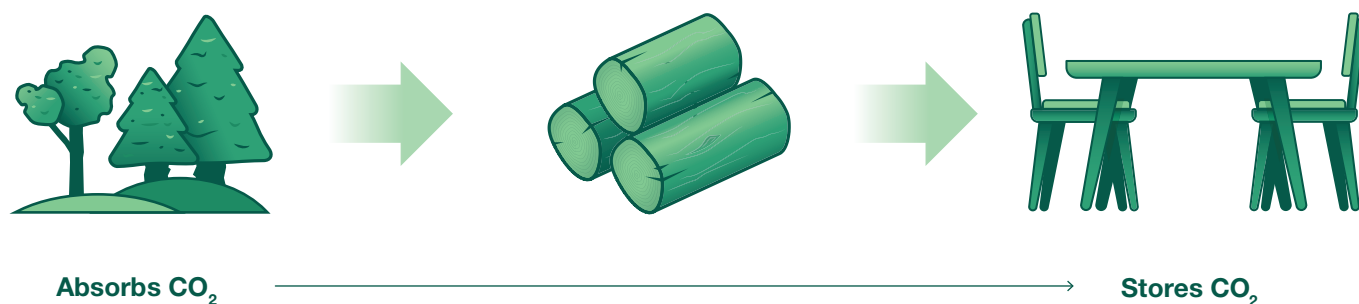
Additionally, we will work with the materials suppliers that contribute the most to our impact, to share our ambitions and goals and work with them to find mutually beneficial opportunities to improve our collective environmental footprint.

# Sustainability Strategy

## Replace the most impactful inputs

There are also opportunities to shift to lower-carbon alternatives for the energy and raw material inputs we source into our process. This approach normally translates into switching from fossil-based to bio-based and renewable options.

**Energy.** The core element of this strategy is to actively pursue opportunities to replace traditional energy sources (electricity and natural gas) with renewable options for gas (e.g. biogas), and electricity (e.g. wind, hydro, solar). This will include working with third parties but also projects implemented on our own sites.



**Materials.** Bio-based, renewable raw materials have a lower environmental impact than traditional petroleum-based inputs. They, in fact, help to save fossil resources and can contribute to reducing greenhouse gas emissions. Forest and crops absorb CO<sub>2</sub> from the atmosphere during their growth and continue storing it once harvested. To get a bit technical, trees absorb through the photosynthesis CO<sub>2</sub> and solar energy in their wood creation and release oxygen in return. The CO<sub>2</sub> absorbed is kept in the wood products for their whole life-time.

Our panels are made of a combination of bio-based, renewable materials (wood fiber) and resin, with the bio-based share exceeding the fossil-based one – up to 70% of our products are bio-based.

The rising availability of bio-based materials is making it more and more feasible to further increase the share of bio-based materials within our products. Between selecting bio-based alternatives and better-performing suppliers, sustainability will become a critical parameter when choosing our partners.

## Balancing out residual emissions

As mentioned above, Global Warming (CO<sub>2</sub> emissions) represents our absolute priority for the years to come. This means we will put extraordinary efforts to cut the CO<sub>2</sub> emissions generated by our products<sup>4</sup>. We will pursue this goal by applying the strategy outlined above to improve our efficiency (of both materials and energy) and replace the most impactful inputs.

Yet, it will not be possible to eliminate all emissions from manufacturing process of our physical product. For residual CO<sub>2</sub> generation, Formica will compensate with equivalent carbon dioxide savings elsewhere. This will be achieved either through purchase of fully-accredited carbon offsets, or, preferably, by developing our own carbon removal projects.

Carbon neutrality is defined by the state when the carbon emissions associated with activity have been compensated by funding an equivalent amount of carbon savings elsewhere in the world. By buying offsets and developing carbon projects it is possible to fully balance out residual emissions and hence obtain a carbon neutral product. Our aim is to achieve carbon neutrality for our products by 2030<sup>5</sup>.

<sup>4</sup> The emissions generated from cradle to plant gate.

<sup>5</sup> Carbon neutrality is assessed with a cradle to gate approach.



# Formica Asia Baseline LCA Data

## Our learnings and progress to date

In recent years, Formica has put additional effort toward strengthening their sustainability approach. As a starting point, we had conducted detailed life cycle analysis at all our facilities and had created a plan to improve our environmental impacts. Formica's LCA studies have enabled us to:

- Better understand our mass and energy flows/balances.
- Measure our environmental impacts per standard unit of material, to establish a normalized measure for future improvements.
- Identify the major environmental impact contributors in order to set priorities.
- Investigate a number of improvement activities to understand their potential of decreasing our global warming impact and implement them.
- In the meantime, we improved the data quality of our LCA model by receiving primary data from suppliers for some of our most used raw materials.

## Environmental impacts of the baseline year

In this section, the cradle-to-gate results of the LCA study for the assessed impact categories are specified. These values are expressed per standard unit of material (i.e., m<sup>2</sup> of panels produced), and make up our total impact in 2019, the baseline year for our 5-year targets.

Impact category	Unit	Impact per m <sup>2</sup> *	Total impact in 2019*
<b>Global warming<sup>6</sup></b>		<b>4,68</b>	<b>127,643,222</b>
Scope 1	kgCO <sub>2</sub> eq	1,65	45,095,872
Scope 2		0,98	26,778,807
Scope 3		2,04	55,771,345
<b>Primary energy demand</b>		<b>195,65</b>	<b>5,339,970,815</b>
Fossil	MJ	118,05	3,221,858,635
Renewable		77,61	2,118,112,192
<b>Water footprint<sup>7</sup></b>	m <sup>3</sup>	<b>2,87</b>	<b>78,437,915</b>

The unit of scale or reference to which the LCA results are referred relates to the given function of the product, called a functional unit. Based on the function of our product, the input per unit is normalized to a standard measure of decorative surface area. These numbers provide a baseline of the environmental impact of our products. As a part of data improvement, more accurate data was received from suppliers resulting in lower values than the previously published.

<sup>6</sup> The uptake of CO<sub>2</sub> is taken into consideration when performing the LCAs for the paper based raw materials.

<sup>7</sup> The water footprint indicator shall be used with care due to high uncertainties and limited experience as mentioned in the EN15804-A2 standard.

Thereby, the water footprint impact indicator in 2019 have been adjusted compared to the previous position paper to reflect an accurate comparison between the years.

\* Compared to the previous position paper, the impacts from Formica India (Kalo) plant are included in the 2019 baseline.

# Formica Asia Baseline LCA Data

## Progress in 2021

Compared to the baseline year 2019, the total environmental impact of Formica Asia panels showed a decrease in 2021; by 27% on Global warming, by 30% on Primary energy demand, and by 23% on Water footprint. This reduction was in part due to the purchase in 2021 of green electricity (Energy Attribute Certificates) in Formica China (Qingpu and Jiujiang).

A share of this reduction is also due to the production volume decrease due to the Corona Pandemic as well as some data improvement activities. Hence, in the coming years we will continue putting our focus on improvement activities mentioned in the previous sections.

Impact category	Unit	Impact per m <sup>2</sup> *		Impact per m <sup>2</sup> Δ (2019-2021)	Total impact		Total impact Δ (2019-2021)
		2019	2021		2019	2021	
<b>Global warming<sup>8</sup></b>		<b>4,68</b>	<b>4,27</b>	<b>-9%</b>	<b>127,643,222</b>	<b>92,602,124</b>	<b>-27%</b>
Scope 1	kgCO <sub>2</sub> eq	1,65	1,71	4%	45,095,872	37,106,389	-18%
Scope 2		0,98	0,98	0%	26,778,807	21,261,172	-21%
Scope 3		2,04	1,58	-23%	55,771,345	34,234,562	-39%
<b>Primary energy demand</b>		<b>195,65</b>	<b>173,01</b>	<b>-12%</b>	<b>5,339,970,815</b>	<b>3,747,842,077</b>	<b>-30%</b>
Fossil	MJ	118,05	101,83	-14%	3,221,858,635	2,206,001,521	-32%
Renewable		77,61	71,17	-8%	2,118,112,192	1,541,840,556	-27%
<b>Water footprint<sup>9</sup></b>	m <sup>3</sup>	<b>2,87</b>	<b>2,80</b>	<b>-2%</b>	<b>78,437,915</b>	<b>60,723,914</b>	<b>-23%</b>

The total and per-unit LCA results of 2020 can be found in the Appendix.

<sup>8</sup> The uptake of CO<sub>2</sub> is taken into consideration when performing the LCAs for the paper based raw materials.

<sup>9</sup> The water footprint indicator shall be used with care due to high uncertainties and limited experience as mentioned in the EN15804-A2 standard.

Thereby, the water footprint impact indicator in 2019 have been adjusted compared to the previous position paper to reflect an accurate comparison between the years.

\* Compared to the previous position paper, the impacts from Formica India (Kalo) plant are included in the 2019 baseline.

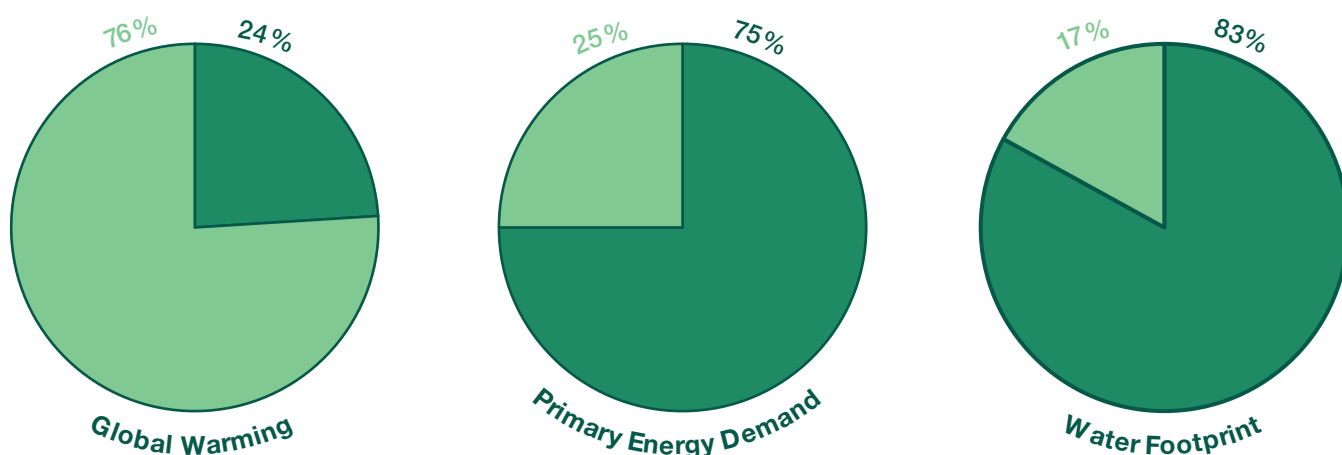
# Formica Asia Baseline LCA Data

## Contribution analysis for 2021

Each of the manufacturing steps described in the cradle to gate cycle contributes to a different extent to the total environmental impact of our laminates. Such impact originates from the manufacturing process itself (the energy and water consumed, waste produced and emissions generated) and from the production of the materials from which our panels are made. The chart below shows the contribution of the manufacturing process and raw materials for the three investigated environmental indicators: Global Warming (CO<sub>2</sub> emissions), Primary Energy Demand and Water Footprint.

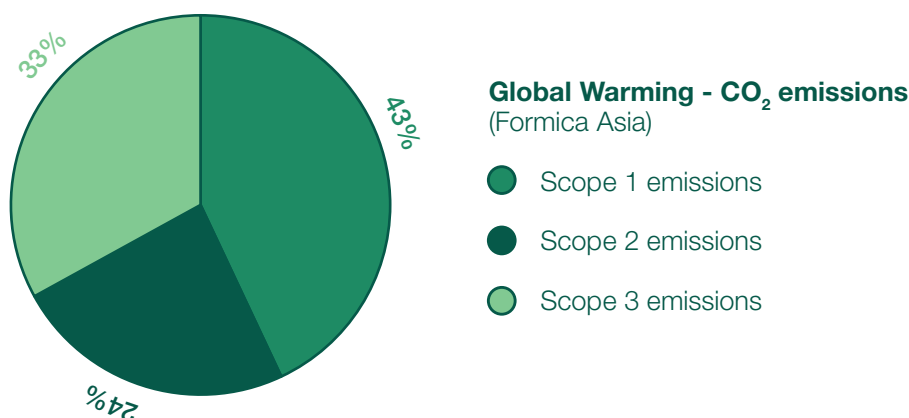
As it can be seen in the figure below, a significant portion of the impact of our panels is attributable to the raw materials we buy, which guides our approach to making improvements to both our own operations and to the inputs we source.

- **Materials** include the impact of production of all raw materials and their transportation
- **Process** includes the impact of electricity, natural gas, diesel and oil, emissions, water and waste



Additionally, Global Warming (CO<sub>2</sub> emissions) for 2021 have been further broken-down in three categories consistently with the Greenhouse Gas Protocol (see below):

- Scope 1 – All direct emissions from the manufacturing plant, including fuel combustion, boilers and afterburners.
- Scope 2 – Indirect emissions from electricity purchased and used by the plant.
- Scope 3 – All other indirect emissions from external sources, namely: raw materials extraction, production and transportation; fuel extraction; waste disposal





# Sustainability Road Map to 2030

## Cradle-to-gate impact reduction

The entire goal of Formica's sustainability approach is to define specific targets and actions to reduce our environmental impact, while continuing to supply the same products you have come to expect. Our reduction targets for 2026 (baseline 2019<sup>10</sup>) are:

- Global Warming (CO<sub>2</sub> emissions): 25% reduction
- Primary energy demand (fossil): 10% reduction
- Water footprint: 5% reduction

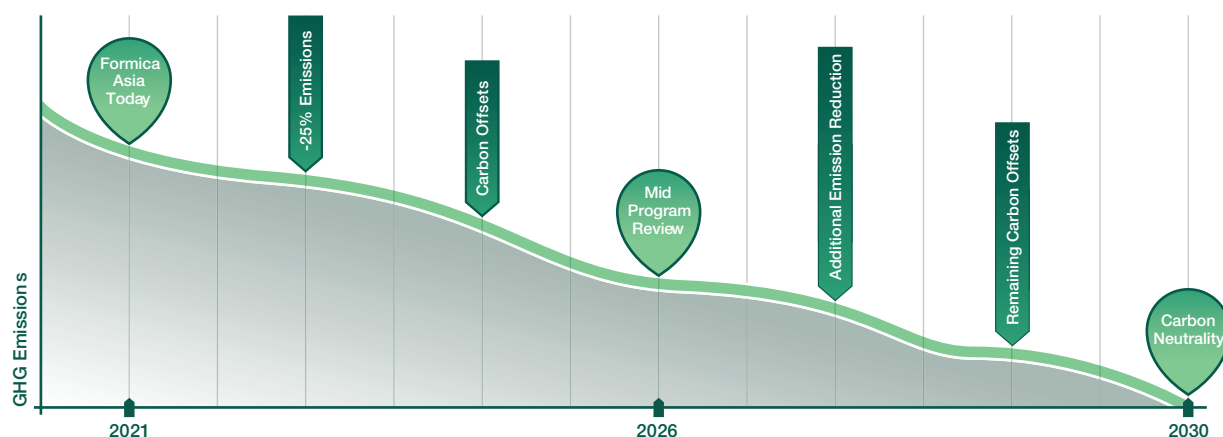
In order to achieve the global warming target, Formica is undertaking a series of activities and projects detailed in the table below.

CO <sub>2</sub> emission reduction activity	Scope	Completed (c) and planned (p) actions					CO <sub>2</sub> reduction potential
		Bangkok	HsinChu	Qingpu	Jiujiang	Kalol	
Energy efficiency	Scope 1,2	- Energy consumption reduction in combination room (c)	- Improving chiller efficiency (p)	- Improving compressed air efficiency (p) - Better boiler efficiency (p)	- Improving compressed air efficiency (c)	TBD	5%
Renewable efficiency	Scope 1,2	- Green electricity (c) - Biomass boiler installation (p)	- Biomass boiler installation (p)	- Outsourcing kraft paper impregnation (p)	- Outsourcing steam generated by municipal waste incineration (p)	- Replacing coal with renewable sources (p)	20%
Renewable material	Scope 3	Increase the share of biobased content in at least 10% of our total output				TBD	TBD
					Target reduction total:	25% (32 thousand tons)	

## Balancing out emissions

Formica also has set an ambitious goal of becoming carbon neutral by 2030<sup>11</sup>. Along with our internal improvement agenda outlined in the previous section, we also will start offsetting CO<sub>2</sub> emissions through the use of carbon credits. In addition to buying carbon offsets, we plan to start developing our own carbon projects. To this end, we have already initiated efforts to identify and select potential projects, discussed with the relevant stakeholders, and are building a plan for execution.

The picture below highlights our path towards carbon neutrality. It reflects the combined impact of our internal improvement measures and carbon offset compensation to help balance our emissions. We recognize carbon neutrality is a long journey and there will be significant learnings along the way. As we progress through this process, we will leverage our experiences to update our approach, targets, and timelines.



<sup>10</sup> The baseline 2019 is rebased to include the impacts from Formica India (Kalol).

<sup>11</sup> Carbon neutrality is assessed with a cradle to gate approach.

# Sustainability Road Map to 2030



## Improving our LCA model

Another key component of our sustainability effort is reliable and transparent data embedded in our Life Cycle Analysis model. The accuracy of an LCA model is entirely dependent on the data available; ensuring this data quality is at the forefront of our priorities. During the next five years, we will put forth a continuous effort toward increasing the breadth and accuracy of data collected in our plants. In LCA, there is a clear distinction between data collected on site (primary data) and data sourced from third parties (secondary data), with the former preferred over the latter. Given the significant role that raw material play in our products' LCA, we plan to continue to refine our data and collect inputs directly from our paper and chemical suppliers to further improve the specificity and accuracy of that data once every three years. The updates of the database (e.g. Ecoinvent) are unavoidable and are likely to reflect the difference in values published between the consecutive three years of our refinement period. Combined, the end goal is to develop and maintain a highly accurate and actionable LCA model for our products.

# What do global warming, primary energy demand and water footprint mean?

## Global warming

This indicator expresses how much heat greenhouse gases trap in the atmosphere. Greenhouse gases are a group of compounds that are able to absorb the infrared radiation released by the Earth surface heated up by the sun. The more greenhouse gases in the atmosphere, the more heat stays on Earth. The main greenhouse gases are carbon dioxide (which is also the most abundant greenhouse gas), methane, nitrous oxide and fluorinate gases. The global warming indicator is calculated in terms of carbon dioxide equivalents.

## Primary energy demand

Primary energy is energy found in nature that has not been subjected to any conversion or transformation process (such as primary energy content in crude oil, natural gas, and biomass). Energy that is already converted will require primary energy to provide this “delivered energy” (e.g. steam, electricity or other thermal energy derived from any technical process). Primary energy demand indicates the amount of energy that a system under assessment has extracted from the natural environment.

## Water footprint<sup>12</sup>

In this paper the water scarcity footprint has been evaluated. This indicator assesses the amount of water consumed weighted by a scarcity indicator, hence accounting for differences in potential environmental impact of water use based on given regional differences in water scarcity.

<sup>12</sup> The water footprint indicator shall be used with care due to high uncertainties and limited experience as mentioned in the EN15804-A2 standard.

## Appendix 1

### Why do we use cradle-to-gate scope?

We use the scope cradle-to-gate for our on-site LCAs, because we focus on the stages that are under our control and that we can influence. We can improve our processes to make them more efficient and we can select less impactful raw materials. Moreover, for the lifecycle stages that are after our factory gate-, we currently don't have enough data which requires us to make additional assumptions in terms of the disposal of our panels. Lastly, we are currently waiting on upcoming regulations and a general consensus on the topic of carbon storage benefits of long-lasting products at the end of the life time.

For the Environmental Product Declarations (EPDs) instead, we use cradle-to-grave scope as required by the standards.

## Appendix 2

### Impact results for CY2020

Impact category	Unit	Impact per m <sup>2</sup>	Total impact in 2020
<b>Global warming</b>		<b>4,66</b>	<b>102,494,380</b>
Scope 1	kgCO <sub>2</sub> eq	1,87	41,154,166
Scope 2		1,32	29,002,550
Scope 3		1,47	32,337,664
<b>Primary energy demand</b>		<b>176,39</b>	<b>3,882,356,977</b>
Fossil	MJ	104,44	2,298,697,286
Renewable		71,95	1,583,659,691
<b>Water footprint</b>	m <sup>3</sup>	<b>2,83</b>	<b>62,227,245</b>



# Formica Asia Offices

## CHINA

### Formica (China) Trading Co., Ltd

#### China – Shanghai

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Shanghai 201702, China

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Fax: (86-21) 6010-2659

#### China – Beijing

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#### China – Guangzhou

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#### China – Dongguan

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#### China – Shenzhen

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## HONG KONG

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Tel: (852) 2598-0117

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## INDIA

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## INDONESIA

### Sales Representative Office

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## MALAYSIA

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## PHILIPPINES

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## SINGAPORE

### Formica (Singapore) Pte. Ltd.

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## TAIWAN

### Formica Taiwan Corporation

#### Taiwan – Taipei

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Zhongshan District, Taipei City 104, Taiwan

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#### Taiwan – Taichung

No. 122, Jingke Rd.,

Nantun Dist., Taichung City 408, Taiwan

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#### Taiwan – Kaohsiung

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## THAILAND

### Formica (Thailand) Co. Ltd.

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Fax: (66-2) 285-2899

## VIETNAM

### Sales Representative Office

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Fax: (84-28) 3832 6129

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