

Manufacturing Technique Catalogue

LEGEND

Material sourcing = Is the material used for this technique sustainably sourced? For example, by sourcing from certified suppliers, using less energy or sourcing renewable materials? The more it implements any of these aspects, the higher the sustainability score.

Transport = Does the material or product have to be transported into the country? The smaller the distance to Kenya, the higher the sustainability score.

Production = Is the product sustainably produced? For example, by using less energy or generating minimum waste? The more it implements any of these aspects, the higher the sustainability score.

End of life = Can the product after its use easily be reused or recycled? The better it can be reused or recycled, the higher the sustainability score.

INTRODUCTION

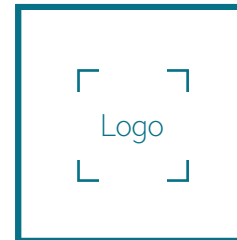
This is the Manufacturing Technique Catalogue. A guide to help you find manufacturers in Kenya for the most common production techniques. The manufacturers are rated according to how sustainably they produce their goods. This document is for anyone interested in finding out more about different kinds of manufacturers in Kenya and how sustainable they are. This document serves as a living document and anyone can write their experience with any of the manufacturers down to help others in finding the best fitting manufacturers for their project.

This catalogue is originally made for the Green Kids' Museum, a museum in Kenya that teaches children about the different elements of sustainability in Kenya. This catalogue helps the museum find manufacturers who can build their interactive exhibit pieces and do this in the most sustainable way.

MANUFACTURING TECHNIQUE

Visuals technique/product

[What does the manufacturing technique or product entail and how common is it in Kenya]



[Name manufacturer]

[What do they do and how sustainable are they]

Material sourcing - +

Transport

Production

End of life

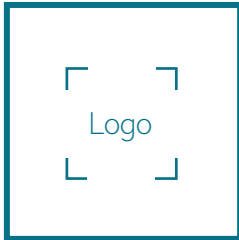
Rating & experience: ☆☆☆☆☆

[Website]

[Address]

[Email/phone number]

[How can this technique or product be of use for the Green Kids' Museum]



[Name manufacturer]

[What do they do and how sustainable are they]

Material sourcing - +

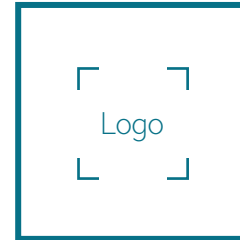
Transport

Production

End of life

Rating & experience: ☆☆☆☆☆

[Website]
[Address]
[Email/phone number]



[Name manufacturer]

[What do they do and how sustainable are they]

Material sourcing - +

Transport

Production

End of life

Rating & experience: ☆☆☆☆☆

[Website]
[Address]
[Email/phone number]

WOODWORKING



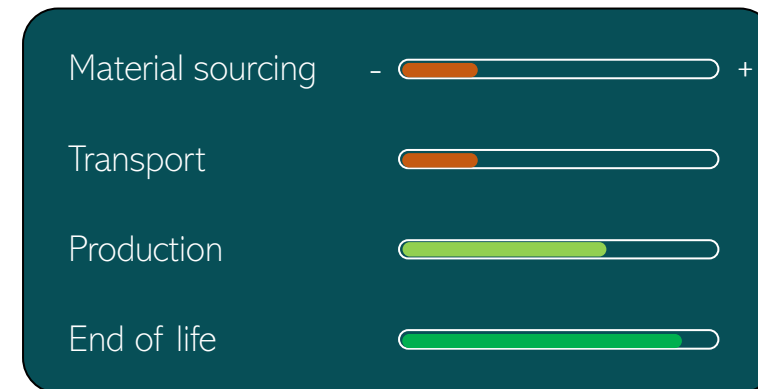
Woodworking is the production technique of creating a product out of wood, which includes steps like cutting, shaving and polishing (Klein, 2021). Kenya is very advanced when it comes to woodworking. They are able to realise great detail in their woodworking and use prime quality material. There are many woodworkers in Nairobi which are able to realise almost anything. Think of intricate doorwork, flooring and kitchens.



Advanced woodwork Timber

Primarily creates wooden doors. The company uses less energy during production and the products are durable and can easily be reused. However, no information about the location and way of sourcing is available, so it is assumed that this is done outside of Africa from non-certified

suppliers.



Rating & experience: ☆☆☆☆☆

<https://advancedwoodworktimber.business.site/>
13256 Nairobi, Kenya
0707 827263

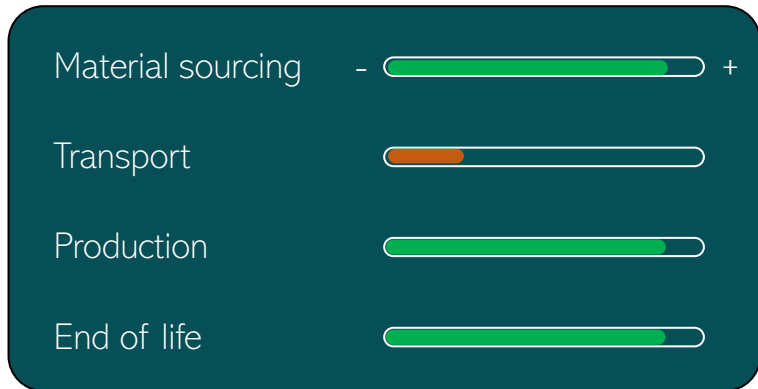
Wooden products can be very sustainable when made from local FSC certified wood. Wood is durable, especially when coated, and can easily be reused by making it into something new (Naturally Wood, n.d.). Woodworking is a perfect technique for the Green Kids' Museum. It is very suitable for interior products and decoration and to give the museum a more natural look.



Wood Products Kenya

Creates wooden interior products, which are eco-friendly, quality products that comply with international standards. The company uses FSC certified wood, uses less energy during production and the products are durable and can easily be reused. However, the wood is sourced from

outside of Africa.



Rating & experience: ☆☆☆☆☆

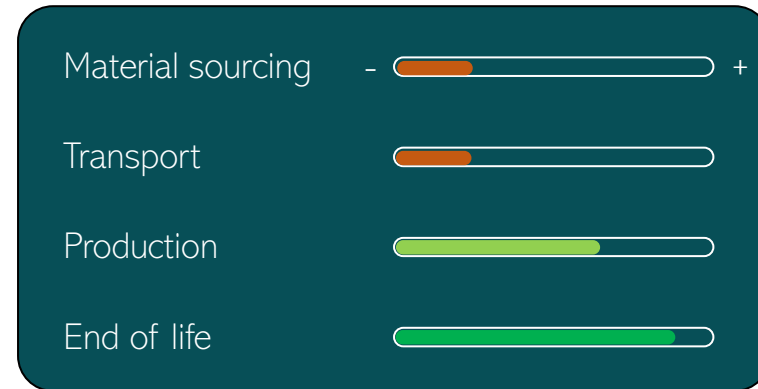
<https://www.woodproductskenya.co.ke/category/69>
Enterprise Road, Industrial Area Nairobi
info@woodproductskenya.co.ke



SLM Woodworks Limited

Primarily creates wooden cabinets for kitchens and other interior designs. Not much information is available on this company when it comes to sustainability, but it is assumed that the products can easily be reused, that the production uses a regular amount of energy and that the material is

sourced outside of Africa from non-certified suppliers.



Rating & experience: ☆☆☆☆☆

<https://www.facebook.com/SLM-Woodworks-Interiors-2162340473883125/>
8 Kampala Rd, Nairobi, Kenia
slmwoodworksltd@gmail.com

METALWORKING

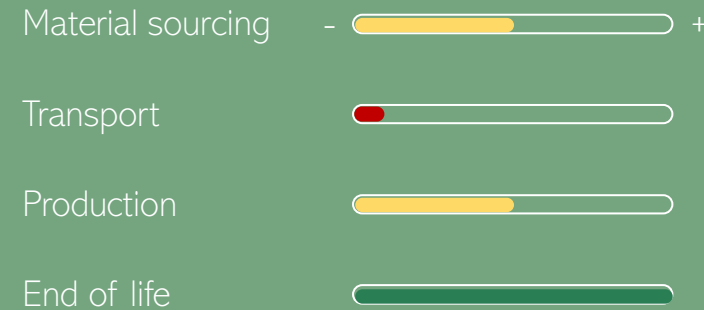


Metalworking is the technique of creating parts and objects out of any metal via mechanical or manual deformation. Within this technique are 5 different processes: rolling, extrusion, drawing, forging, and sheet-metal forming (Charles, 1998). Kenya has a lot of small businesses that produce metal products via one of these processes. They create products such as gatework, (door) handles and appliances. There are only a handful of companies that produce metal base material in the form of tubes, beams and rolls of which some supply their base material to the rest of Africa.



Kamco

Creates and supplies stainless steel equipment. They use stainless steel from a manufacturer in China, however this company does not mention anything about sustainable efforts in their sourcing. Stainless steel is recyclable and Kamco's products can therefore be reused.



Rating & experience: ☆☆☆☆☆

<http://www.kamco.co.ke/>
Bamburi Road
info@kamco.co.ke

Metals can easily be recycled and therefore made into something new (Axil, n.d.). This makes their end of life very sustainable. The sourcing of metals, however, is not always as sustainable. It is not a renewable material and we should therefore make a conscious decision whether to use metal or not. This material also often has to be imported far away from Kenya, making the transportation also less sustainable (LePan, 2021). This technique and material is therefore not the best option for the Green Kids' Museum and they are suggested to look into different materials and techniques first.



TARMAL

Creates steel products via steel rolling, tube milling and wire milling. The company states that they have installed modern pollutions control technology for their mills and have waterwaste treatments and rain collection systems in place. And when buying new equipment they take its

environmental impact into account.



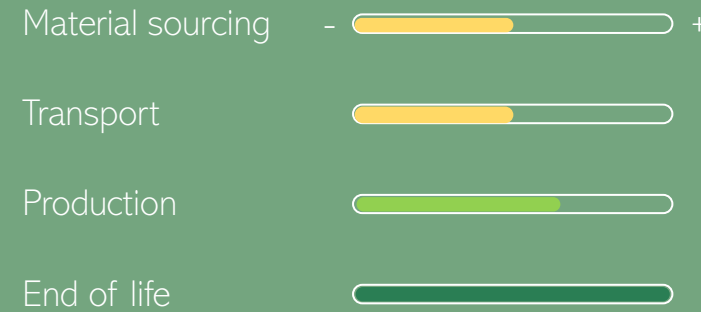
Rating & experience: ☆☆☆☆☆

<https://www.tarmalsteel.com/>
Mazeras, Kenya
info@tarmalsteel.com



Kens Metal Industries Ltd

Creates metal products. The company uses solar energy during their production. Less information is available on where they source their iron. Therefore this is rated as average.



Rating & experience: ☆☆☆☆☆

<https://www.kensmetal.co.ke/index.html>
Off Enterprise Road, Industrial Area
info@kensmetal.co.ke

INJECTION MOULDING

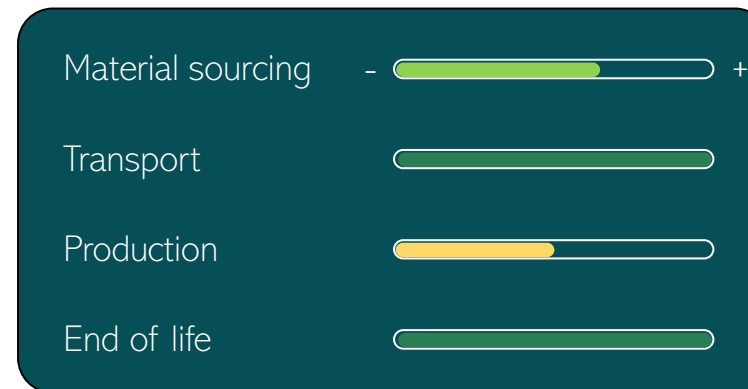


Injection molding is a production technique that creates industrial, high quantity products. It is perfect for creating identical products for high-mass production. Many different plastics can be used, which are pressed into a mold at high pressure and temperature to create a high tolerance product (Protolabs, n.d.). Injection molding is a very popular production technique in Kenya, with many companies executing this technique in Nairobi. There are also companies that use recycled plastic for their products, such as Nzambi Matee who makes plastic bricks from recycled plastic that are stronger than concrete (Kenya Architecture news, 2021) or Mr. Green Africa that makes quality products for local and international markets (Mr. Green Africa, n.d.).



Precision Plastics Limited

Creates plastic products. Not much information is available on this company when it comes to sustainability, but it is assumed that they use local materials and use a regular amount of energy. The products are also durable and can easily be recycled.



Rating & experience: ☆☆☆☆☆

<https://www.precisionplastics.co.ke/>
Industrial Area Nairobi, Enterprise Rd, Nairobi, Kenya
customercare@precisionplastics.co.ke

Injection molding is a time-efficient and relatively low cost production technique once produced industrially (Rex Plastics, 2013). Besides, when plastic is the only suitable material for the installation, the technique is quite sustainable (BP, 2021). This all sounds like an interesting technique for the Green Kids' Museum. However, the museum will not use this technique on an industrial level, making it not suitable to use. On top of that, the startup costs of injection molding are rather high (Rex Plastics, 2013) and a product has to apply to a lot of design rules to make it a good quality product (Dienamics, 2018).



SILAFRICA

Creates plastic packaging. The company is very sustainable for a plastic product production company. They use less energy during production, use local materials and use as little material as possible.



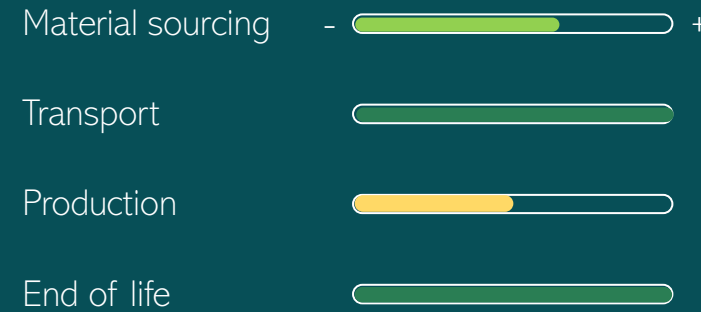
Rating & experience: ☆☆☆☆☆

<https://silafrica.com/>
Westlands Business Park, Chiromo Lane, 7th Floor, Nairobi
info@silafrica.com



ADIX

Creates plastics household, industrial and promotional goods. Not much information is available on this company when it comes to sustainability, but they do create durable products that can easily be recycled. It is assumed that their materials are locally sourced and they use a regular amount of energy during production.



Rating & experience: ☆☆☆☆☆

<https://www.adixplastics.com/>
ADIX House, Yallow Road, off Nanyuki Road, Industrial Area
0722 423 600

3D PRINTING

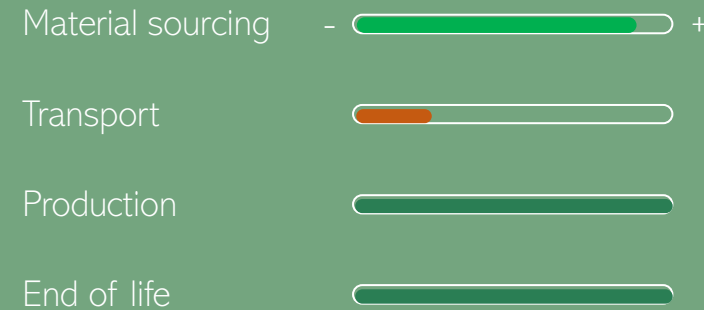


3D printing is a low cost and quick prototyping technique which can be used to make all sorts of products (TWI [a], n.d.). There are many different printing techniques which all have their own pros and cons, but the most known technique is FDM printing, which is used a lot in printing companies in Kenya. 3D printed products are becoming more popular in Kenya and in 2021 they even started creating 3D printed housing, which are now being inhabited (Njihia, 2021).



Ultra Red Technologies

Creates 3D printed products with the use of FDM printers. The company is pretty sustainable, as they use natural materials, use little energy during production and the products are easy to recycle. The filament, however, is imported from Spain.



Rating & experience: ☆☆☆☆☆

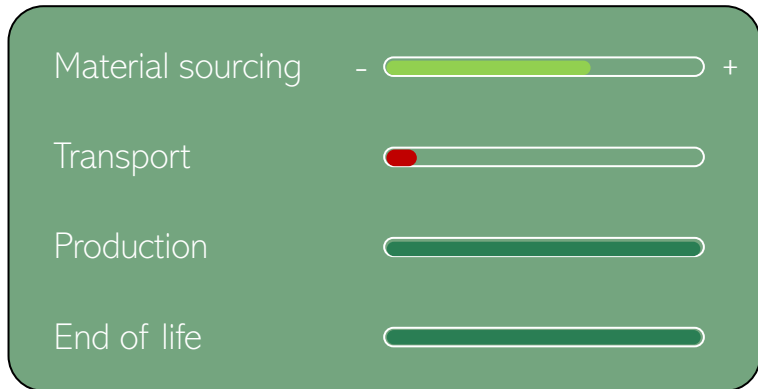
<http://ultrared.biz/>
Parklands Rd, Nairobi
+254722944848

3D printing does not consume much energy and it is very time-efficient, when not used on an industrial level (Khalid, 2019). It also reduces waste and the emission of CO2 making 3D printing a very sustainable technique (Castenson, 2021). And besides it being sustainable it is also very affordable, making it a suitable technique to be used in the Green Kids' Museum. The museum building itself could be made out of 3D printed parts or they could have some displays be 3D printed.



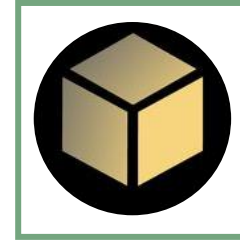
Impala

Creates products via SLA 3D printing, 3D scanning and 3D CAD designing. The company is quite sustainable, as they use natural materials, use little energy during production and the products are easy to recycle. The filament, however, is imported from China.



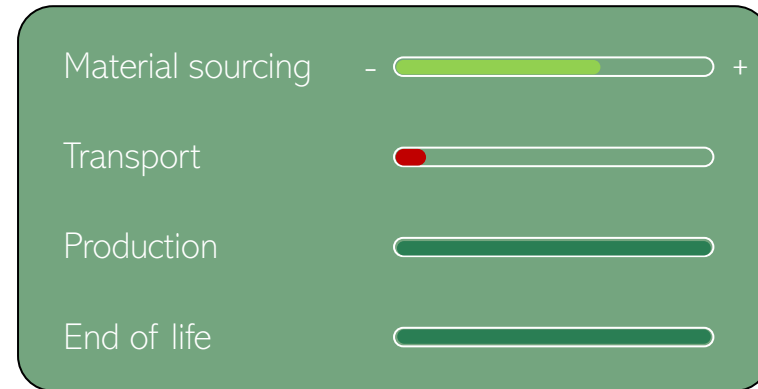
Rating & experience: ☆☆☆☆☆

<https://impala3d.com/>
Addis Ababa road, Industrial Area, Nairobi
info@impala3d.com



Cubic 3D

Creates products via FDM 3D printing and models through CAD software or Thingiverse. The company is quite sustainable, as they use natural materials, use little energy during production and the products are easy to recycle. The filament, however, is imported from China.



Rating & experience: ☆☆☆☆☆

<https://cubic3d.co.ke/>
0728 274 309
support@cubic3d.co.ke

LASER CUTTING



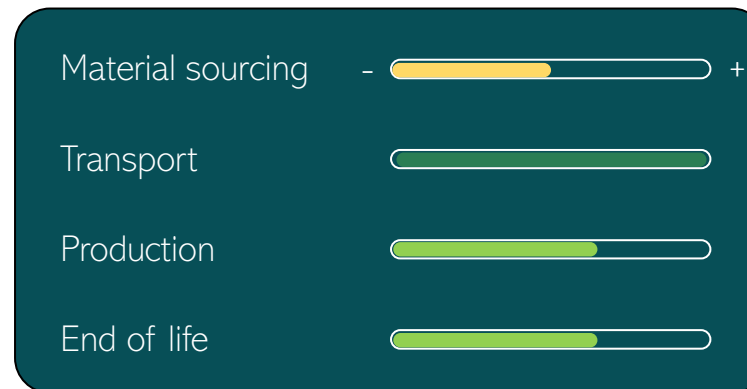
Laser cutting is a technique that uses a laser to vaporize material, resulting in a cut edge (TWI [b], n.d.). This technique can be done on many materials, such as wood, metal and leather. Kenya is rich in companies that lasercut signs out of wooden slabs, but have not yet really found the potential in lasercutting parts and assembling products from that.



Blackwood Signs & Decor

Specializes in CNC wood carving and laser cutting/engraving. The company sources their wood from a local supplier and always minimizes their waste during production. It is however not known where the supplier sources their wood and if it is FSC certified, so this is

rated as average.



Rating & experience: ★★★★★

The communication with Blackwood Signs & Decor went very smoothly and fast. They helped me improve the design of part of my product so it is easier to manufacture and more low cost. They are on stand-by if I have any more questions -----

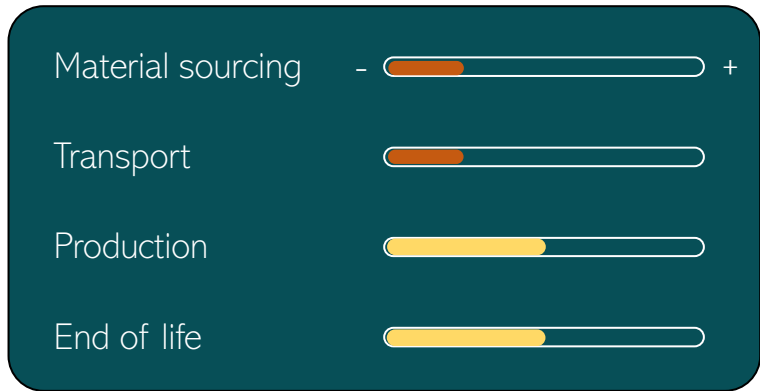
<http://blackwoodsignsanddecor.com/>
 Kiambu Rd, Nairobi
 blackwoodsigns.decor@gmail.com

Lasercutting is a very suitable technique to easily cut out parts from a material and have them engraved with figures and patterns. This could be of use for the Green Kids's Museum as they could use this technique to create decor or to create (parts of) the installations. It is a low cost and fast technique and therefore something the museum is suggested to look into (TWI, n.d.).



Laser Max

Creates laser engravings on any type of material. The company does not mention anything about where their material is from, so it is assumed this is sourced from outside of Africa. Also no information is found on their production, so this is therefore rated as average.



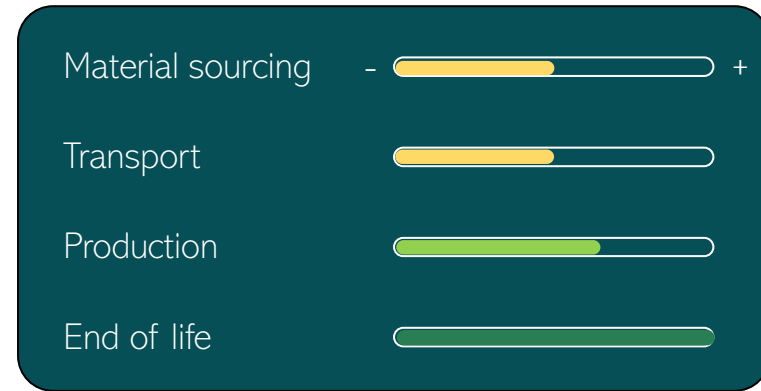
Rating & experience: ☆☆☆☆☆

<http://lasermax.co.ke/>
19 Keekorok Rd, Watersys Arcade, 3 Floor, Nairobi CBD
lasermaxltd@gmail.com



Kens Metal Industries Ltd

Creates engravings via laser CNC cutting. The company uses solar energy during their production. No information is available on where they source their material for these engravings. Therefore this is rated as average.



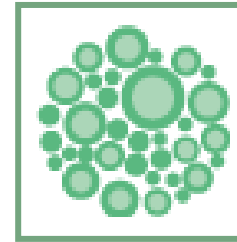
Rating & experience: ☆☆☆☆☆

<https://www.kensmetal.co.ke/index.html>
Off Enterprise Road, Industrial Area
info@kensmetal.co.ke

ELECTRONICS & CODING



There are a handful of companies in Kenya that create electronic components and even less companies that also manufacture electronic circuits and write code for it. The companies that do have this expertise usually use local materials and are therefore pretty sustainable.



NumerallOT

Create electronic circuits and products. Make their own electronics for in the electronic circuit. No information could be found on the material sourcing, so this is rated as average. If broken, the electrical parts cannot easily be repaired, however they can be recycled.

Material sourcing - +

Transport

Production

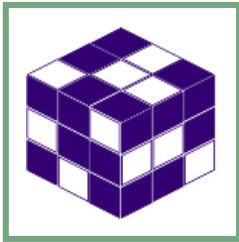
End of life

Rating & experience: ★☆☆☆☆

NumerallOT never responded to any of the calls, emails and Whatsapp messages. It is therefore doubtful if this company is still in business -----

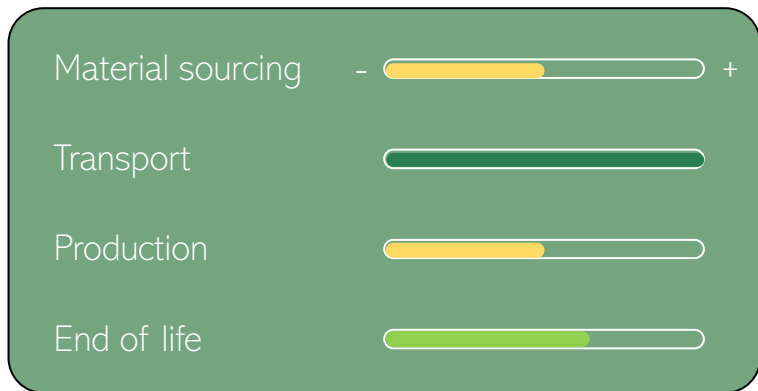
<https://www.numerallot.com/>
Solanite Godowns, Mombasa Road, Nairobi
info@numerallot.com

If the Green Kids' Museum wants to implement electrical exhibits, it is necessary that the right electronic circuit is created with sustainably sourced and produced components. This is something most companies in Kenya that have this expertise apply. The Green Kids' museum should keep in mind that not all components can easily be repaired (Behdad, 2017), however all electronic components and circuits can easily be recycled and made into new electronic components (Okoro, 2019).



RubiksTech

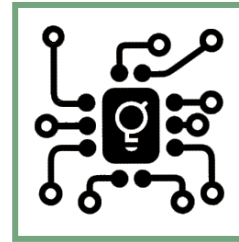
Manufactures and sells electronic components. No information could be found on where they source their materials, so this is rated as average. The same goes for their production method. If broken, the electronic parts cannot easily be repaired, however they can be recycled.



Rating & experience: ★★☆☆☆

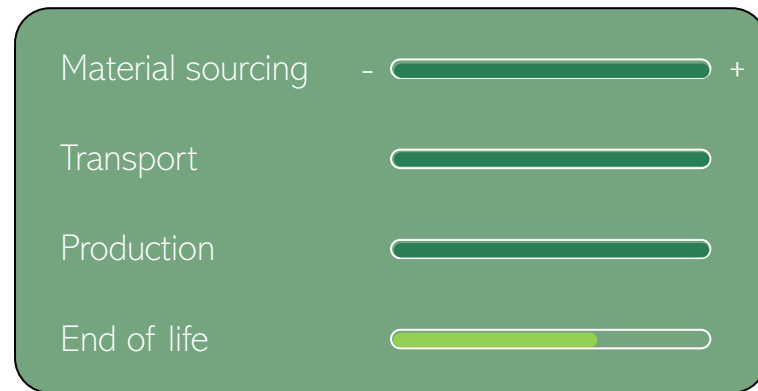
Whatsapp contact with RubiksTech made clear that they only manufacture electronic components and not create electronic circuits or write code. The contact with the company went however very smoothly and they brought me in contact with the engineer of Geviton who could help me further. -----

<https://rubikstech.co.ke/>
CBD, Nairobi, Kenya
info@rubikstech.co.ke



Geviton

Creates the end to end design of circuits, from hardware to firmware. The electronics are sourced from a local manufacturer called Gearbox who also source their materials mostly locally. Geviton often uses recycled parts and they implement low power features during production.



Rating & experience: ★★★★★

Geviton has been extremely helpful and insightful during our contact. They always responded fast on emails and phone calls and helped create the best fitting electronic circuit for the envisioned product. They are always on stand-by if more help and information is needed. -----

<https://geviton.co.ke/>
Office no. G7, 5th Floor, Krishna Center,
Woodvale Grove, Westlands, Nairobi
info@geviton.co.ke

INTERACTIVE BEAMER

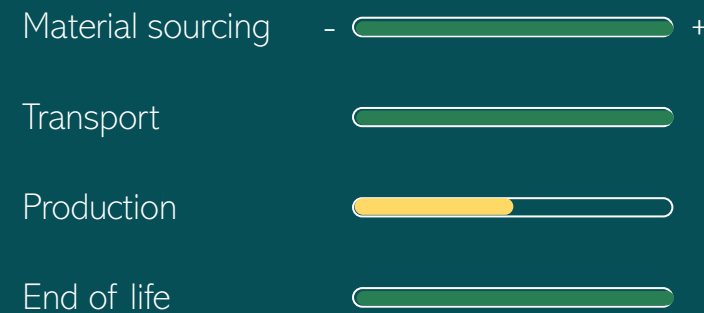


An interactive beamer shines images on a surface where users can interact with. The images will move with the movement of the user. The user can use their whole body to create these moving images. The interactive beamer experience consists of both the beamer and the images which could either be developed by one company or separate companies. Kenya does not create such kind of beamers yet, because they are not as known with such interactive experiences. Therefore this beamer would have to be imported.



Breeze Creative

Creates interactive experience designs. Because they do not create a physical product, they score high when it comes to material sourcing, transport and end of life. The production, however, costs a lot of energy due to all the computers that are needed to create this.



Rating & experience: ☆☆☆☆☆

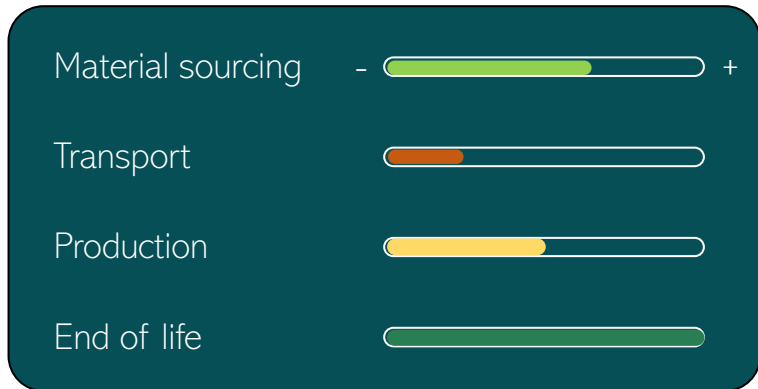
<https://www.breezcreative.com/>
222 Broadway, 19th floor New York, NY 10038
contact@breezcreative.com

An interactive beamer could be used for many installations in the Green Kids' Museum. It is a very low maintenance technology and the beamer can be placed up high where children cannot reach it. It is also easy to update the technology and to therefore keep the images up to date. This therefore would be a very suitable technology for the Green Kids' Museum. The only downside would be that it has to be imported, as Kenya does not produce this technology yet.



Tover

Creates interactive experience designs and interactive beamers. Not much information about the beamer and its sustainability is available, but it is assumed that the materials are sourced outside of the Netherlands and that a regular amount of energy is used during production.



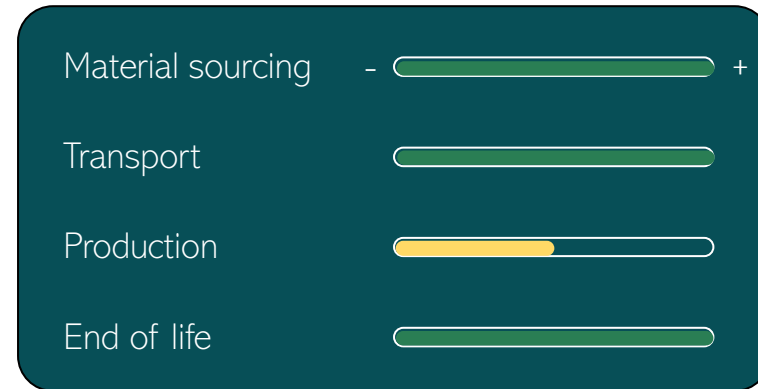
Rating & experience: ☆☆☆☆☆

<https://www.tover.care/nl/>
Hamburgerstraat 28a, 3512NS Utrecht
info@tover.care



Igloo

Creates shared immersive spaces. Because they do not create a physical product, they score high when it comes to material sourcing, transport and end of life. The production, however, costs a lot of energy due to all the computers that are needed to create this.



Rating & experience: ☆☆☆☆☆

<https://www.igloovision.com/>
Stokewood Road, Craven Arms, Shropshire SY7 8PF
info@igloovision.com

OTHER

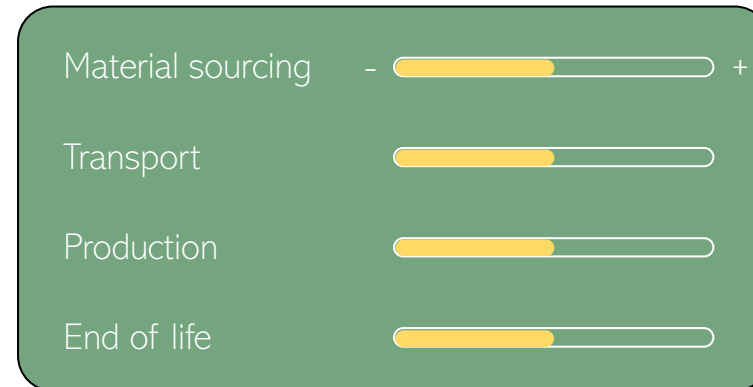


In this chapter manufacturers are discussed that are currently the only ones in Kenya that create their product. After thorough research Bluewave showed up as the only company in Kenya that creates the kind of screens that are suitable in museum (both LED and LCD screens). They can make both kinds of screens in any size and pixel pitch. Village Photo Shop is the only manufacturer in Kenya that prints pictures on wood. Wood printing is a technique where pictures are printed on wood via 7-colour UV printing. This will make sure the pictures will not discolor over time.



BlueWave International

Develops and deploys software and hardware. No information can be found on the companies production, where the materials are from and what their end of life looks like. Therefore this is all rated as average.



Rating & experience: ★★☆☆☆

The contact with Bluewave was quite short and direct. Only part of my questions were answered and they specifically kept avoiding my question about how they implement sustainability in their production. I therefore assume sustainable efforts are not put in creating their screens. -----

<https://www.bluewave.co.ke/>
 Woodley off joseph kangethe road
 info@bluewave.co.ke

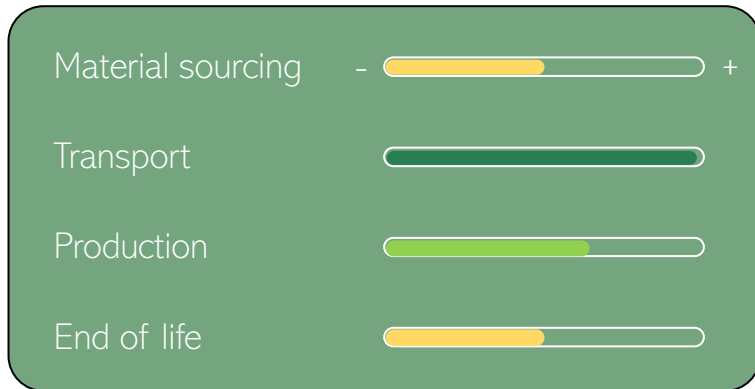
LED and LCD screens can both be suitable for the Green Kids' Museum as they require minimum maintenance, are easy to use and can be used in installations to play the games on or display additional information. The printed pictures on wood can also be used in the installations or as decoration. The pictures on wood are durable and suitable for rough handling.



Village Photo Shop

Prints photos on any type of surface. They always try to create minimum waste during production and they source their wood from a local supplier, however it is not known where this supplier sources the wood from. It is also unknown if the wood is still recyclable with the print on it,

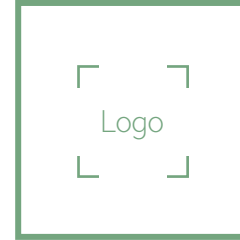
so both factors are rated as average.



Rating & experience: ★★★★★

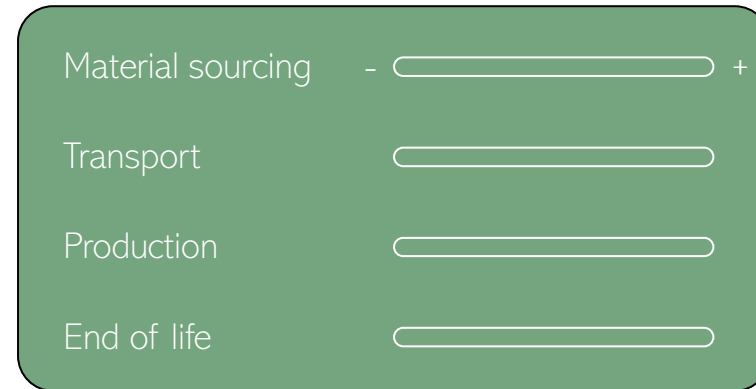
Village Photo Shop were able to answer all my questions in one interview and were very helpful. I was able to ask anything and they also had an answer to anything. They informed me about what wood to best use and why this is more beneficial for my project.

<https://villagephotoshop.co.ke/>
Village Market, Ground Floor, Nairobi
info@villagephotoshop.co.ke



[Name manufacturer]

[What do they do and how sustainable are they]



Rating & experience: ☆☆☆☆☆

[Website]
[Address]
[Email/phone number]

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Axil. (n.d.). Five Reasons Why It's Important to Recycle Metals. Retrieved on June 08, 2022 via <https://axil-is.com/five-reasons-why-its-important-to-recycle-metals/>

Behdad, S. (2017, July 12). Why can't we fix our own electronic devices? Retrieved on June 08, 2022 via <https://theconversation.com/why-cant-we-fix-our-own-electronic-devices-77601>

BP. (2021, March 12). "Green" Standards in Plastic Injection Molding. Retrieved on June 08, 2022 via <https://www.bennettplastics.com/blog/green-standards-in-plastic-injection-molding>

Castenson, J. (2021, October 12). 3D Printing Offers Outstanding Sustainability Benefits, While Also Avoiding Supply Chain Issues. Retrieved on March 11, 2022 via <https://www.forbes.com/sites/jennifercastenson/2021/10/12/3d-printing-offers-outstanding-sustainability-benefits-while-also-avoiding-supply-chain-issues/?sh=2ed1b4bc5eaf>

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