



GHASE

Project Development & Consultancy

تطوير المشاريع والاستشارات



Projects



Eco-Friendly Projects





Project Development & Consultancy
مشاريع التطوير والاستشارة



Projects

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SCAN ME

Musallabagları Mh.
Mahpeyker Sk.
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Medium Density Fiberboard Factory



introduction of MDF

MDF boards are classified into different types according to the requirements, both according to their use (structural or non structural), and according to the type of environment where they are used (dry and humid)

The different kinds of MDF are mentioned below, which are sometimes labeled by color - Normal / Plain MDF, Moisture-resistant MDF, Fire-retardant MDF and others

| Plain MDF | Moisture Resistant MDF | Fire Retardant MDF | Melamine MDF |
|---|---|---|---|
| <ul style="list-style-type: none"> – Color: Typically beige / light brown in color – Usage: Normally used for indoor applications | <ul style="list-style-type: none"> – Color: Typically green in color – Usage: Designed for damp environments. It is used in places like bathrooms, kitchens and flooring where moisture / humidity is a concern | <ul style="list-style-type: none"> – Color: Typically red or blue in color – Suitable for use in internal dry conditions for non-structural applications – Usage: Ideal for applications such as wall linings, partitions, display panels and so on. Used in stores, offices and in homes for extra protection | <ul style="list-style-type: none"> – Color: Typically white in color – Usage: It is melamine laminated used as an overlay for the wood to give a durable and attractive finish. |





Projects

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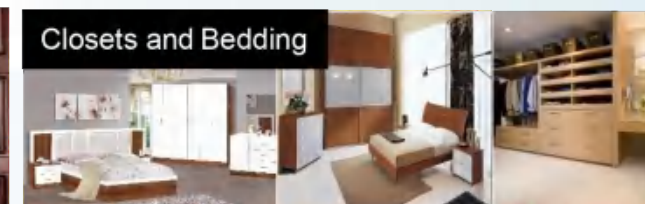
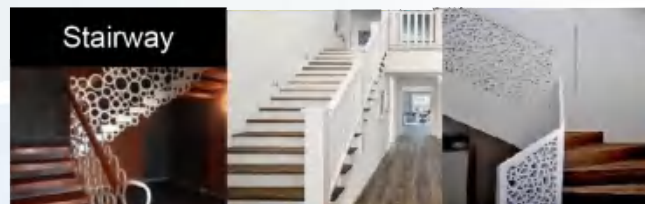
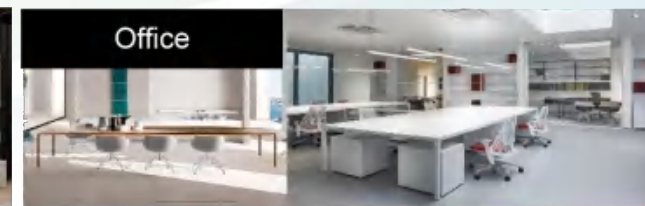
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introduction of MDF

Different types of MDF offers multiple possibilities in terms of framing, coating and finishing and is widely used in the manufacturing of furniture, kitchen cabinets, door parts, wall-panels, storage units moldings, millwork and laminate flooring.

Applications of MDF (all types) in different real estate sectors

|  Residential Projects |  Commercial Projects |  Institutional Projects |
|--|---|--|
| <ul style="list-style-type: none"> Modular furniture (table, stands, chair, stools) Kitchens (cabinets, cupboards) Cabinets & Entry Doors Bathroom Bedroom Exteriors such as play areas, lobbies, etc. | <ul style="list-style-type: none"> Offices (desks, shelves, closets) Factories Warehouses Hotels Restaurants | <ul style="list-style-type: none"> Educational Institutions Medical Institutions Public Utility Spaces (Libraries, Airports, Waiting Rooms, etc.) |





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Plant information



Daily Maximum Production Capacity

- 400 to 1000 cbm /day

Annual Maximum Production Capacity

- 130.000 to 325.000 cbm / year



Raw Material Sources

- Palm Trees and Fronds
- Recycled Woods
- Soft-Hard Woods Logs and Chips



Product Type

- Plain and Laminated Sheets



End Product Size

- 4` x 8`



Typical Sheet Thicknesses

- Small (3 mm to 5 mm)
- Medium (6 mm to 9 mm)
- Large (10 mm to 18 mm)
- Extra Large (19 mm to 35 mm)



Total Land Area

- min 38.000 sqm

* for 400 cbm capacity

BUA

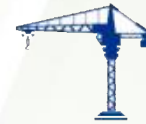
- min 20.000 sqm

* for 400 cbm capacity



Suggested Factory Location

- Free Zones



Construction Partner



Total Workforce

- min 80



No. of Work Shifts

- 3 shifts



MDF Plant Machinery & Equipments Cost

- \$ 45 Mn to \$ 65 Mn.

Factory Construction Cost



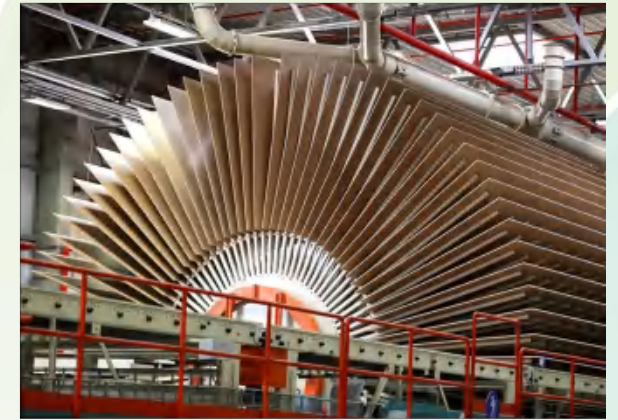
demand analysis

| | Value (QAR Million)* | | | Volume ('000 cbm)* | | | <u>TOTAL</u> * | | |
|-------------------------|----------------------|--------------|--------------|--------------------|--------------|--------------|----------------------|-------------------------|-------------------|
| MDF Importing Countries | > 9mm | 5mm-9mm | < 5mm | > 9mm | 5mm-9mm | < 5mm | Total Value (QAR Mn) | Total Volume ('000 Cbm) | % share by Volume |
| KSA | 699.7 | 159.3 | 98.3 | 420,3 | 66,2 | 46,1 | 957.3 | 532,6 | 15% |
| UAE | 795.1 | 78.4 | 93.3 | 915,1 | 78,6 | 112,1 | 966.8 | 1.105,8 | 30% |
| Iran | 738.0 | 7.7 | 61.2 | 730,0 | 7,5 | 59,9 | 806.8 | 797,4 | 22% |
| Iraq | 358.0 | 59.7 | 32.0 | 304,7 | 50,3 | 22,3 | 449.8 | 377,2 | 10% |
| Kuwait | 119.6 | 43.1 | 25.2 | 108,6 | 34,6 | 22,0 | 187.9 | 165,2 | 5% |
| Jordan | 102.0 | 14.5 | 14.0 | 99,3 | 10,5 | 11,5 | 130.5 | 121,3 | 3% |
| Türkiye | 28.3 | 11.5 | 11.4 | 16,4 | 6,6 | 5,1 | 51.2 | 28,1 | 1% |
| Lebanon | 79.5 | 12.8 | 7.2 | 66,8 | 10,0 | 5,4 | 99.5 | 82,2 | 2% |
| Egypt | 573.5 | 5.4 | 4.4 | 274,4 | 2,4 | 2,5 | 583.2 | 279,3 | 8% |
| Qatar | 61.3 | 14.3 | 4.0 | 44,7 | 13,4 | 5,1 | 79.6 | 63,3 | 2% |
| Syria | 44.2 | 2.9 | 1.6 | 41,8 | 2,9 | 1,9 | 48.7 | 46,6 | 1% |
| Bahrain | 21.8 | 6.3 | 1.6 | 33,9 | 3,4 | 2,8 | 29.8 | 40,1 | 1% |
| Oman | 36.1 | 3.7 | 1.1 | 34,9 | 2,5 | 0,9 | 40.9 | 38,2 | 1% |
| TOTAL | 3,657.2 | 419.5 | 355.2 | 3.091,0 | 288,8 | 297,5 | 4,431.9 | 3.677,3 | 100% |



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sample factory



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Pallet Blocks Factory



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introduction of Pallet Blocks

The strengths of FOCUS ON THE PRODUCT

Woodchips from the processing of natural softwood and processed recycled wood chips serve as the solid basis of composite blocks. Both are pressed at high pressure and temperature. This yields a high-quality homogeneous wood material that can be further processed in various dimensions.

Composite blocks offer crucial advantages over solid wood or plastic blocks – in both technical and economic terms.



Sustainability

- > Environmentally friendly wood product
- > CFC free
- > Helps preserve wood resources
- > No chemical wood protection required
- > After its use, the product can be recycled or thermally utilised in authorised plants (Waste wood category A1)

Material advantages

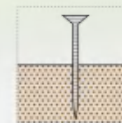
- > Standardised quality thanks to sophisticated industrial production
- > High compressive strength
- > Constantly high gross density, no moisture expansion
- > High nail retention
- > Low susceptibility to repairs, longer pallet service life
- > No crack formation

Moisture proof and shape retention

- > Residual humidity after production is about 10 %
- > Size accuracy at constant moisture content
- > Shape retention at temperature fluctuation
- > Waterproof glueing guarantees constant pallet quality, no matter if used indoors or outdoors
- > Resistant against environmental influences
- > Accurate pallet sizes

Advantages compared to solid wood

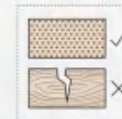
- > "Non solid wood" material in the sense of international regulations for the treatment of wood packaging – ISPM 15
- > No SIREX treatment required
- > 100 % mould or insect infestation resistant due to low material moisture content. Pallet always looks clean
- > High, permanent availability



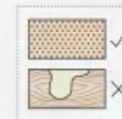
HIGH NAIL
RETENTION



NO INSECT INFESTATION
(NO SIREX TREATMENT
REQUIRED)



NO
CRACK FORMATION



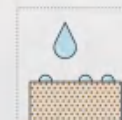
NO
MOULD INFESTATION



SHAPE RETENTION
AT TEMPERATURE
FLUCTUATION



SIZE ACCURACY
AT CONSTANT
MOISTURE CONTENT



WATERPROOF
GLUEING



CAN BE RECYCLED
OR THERMALLY UTILISED
IN AUTHORISED PLANTS
AFTER USE (WASTE WOOD
CATEGORY A1)



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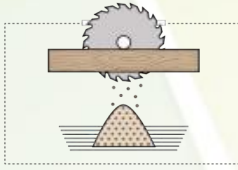
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introduction of Pallet Blocks

PRODUCTION

Pallet blocks made from sawmill residue

SAWMILL & HAMMER MILL
Cutting round timber and subsequent chipping of wood chips in the hammer mill to reach exactly defined size



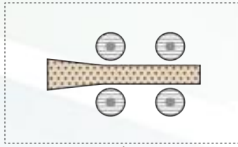
DRYER
Technical drying to desired final moisture content of less than 5 %



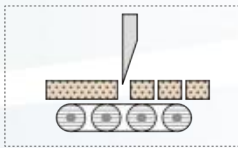
GLUE ADDITION
Mixing of coarse and fine chips, addition of glue and hardener



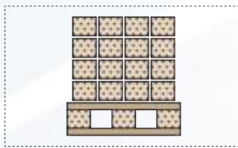
PRESS
Pressing material to an endless strand



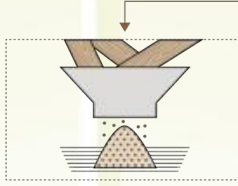
SAW
Cuts strand to desired block height, followed by size accuracy and density check of every single block



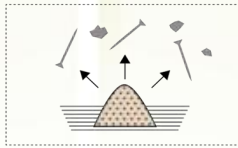
PALLETISATION
Cooling, stacking and packaging of blocks in protective wrap

*Pallet blocks made from recycled wood***CHIPPING**

The delivered recycled wood is pre-sorted and shredded to the desired chip size

**FOREIGN MATERIAL REMOVAL**

All foreign material and non-wood content is removed by means of industrial scanners and magnet technology

**DRYER**

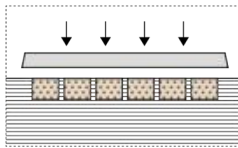
Technical drying to desired final moisture content of less than 5 %

**GLUE ADDITION**

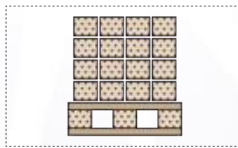
Mixing of coarse and fine chips, addition of glue and hardener

**PRESS**

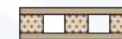
Pressing the material using dies and a moulding cycle process, followed by size accuracy and density check of every single block



PALLETISATION
Cooling, stacking and packaging of blocks in protective wrap

**THE RETURN OF THE PALLET**

Mostly used pallets and those not suitable for repair are integrated into the recycling process. They are turned into new pallet blocks.





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Plant information



Daily Maximum Production Capacity
- Start from 200 cbm /day
Annual Maximum Production Capacity
- min. 60.000 cbm /year



Raw Material Sources
- Palm Trees and Fronds
- Recycled Woods
- Soft-Hard Woods Logs and Chips



End Product Size
- 70x70 to 150 x 150 mm



Total Land Area
- min 20.000 sqm

BUA
- min 10.000 sqm



Suggested Factory Location
- Free Zones



Construction Partner



Total Workforce
- min 50



No. of Work Shifts
- 3 shifts



MDF Plant Machinery & Equipments Cost
- Start from \$ 17 Mn

Factory Construction Cost

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Sample Factory



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Project Restoration & Upgrade
المشروع الترميم والتطوير

Plywood Factory



Projects

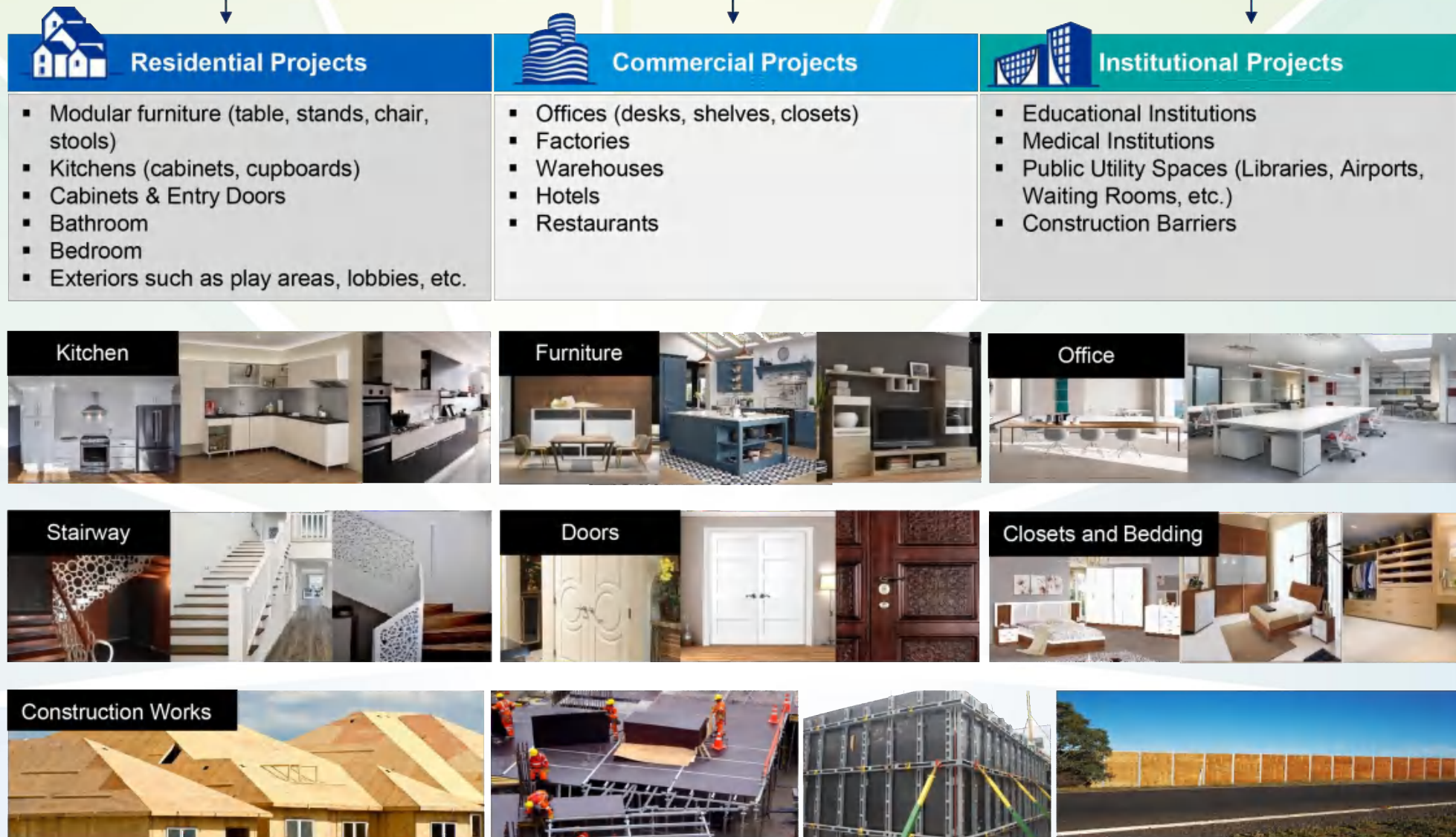
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introduction of Plywood

Applications of PLYWOOD (all types) in different real estate sectors



Plant information



Daily Maximum Production Capacity
- Start from 100 cbm/day
Annual Maximum Production Capacity
- 32.500 cbm / year



Raw Material Sources
- Soft-Hard Woods Logs



Product Type
- Plain and Laminated Sheets



End Product Size
- 4` x 8`



Typical Sheet Thicknesses
- Medium (6 mm to 9 mm)
- Large (10 mm to 18 mm)



Total Land Area
- min 25.000 sqm
BUA
- min 10.000 sqm



Suggested Factory Location
- Free Zones



Construction Partner



Total Workforce
- min 50



No. of Work Shifts
- 3 shifts



MDF Plant Machinery & Equipments Cost
- Start from \$ 9 Mn.

Factory Construction Cost



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Demand Analysis

| Plywood Importing Countries | Value Imported (USD Mn.) | Volume Imported (MT) | Volume Imported (M3) |
|-----------------------------|---------------------------|------------------------|------------------------|
| ▪ Qatar | 33,8 | 58.289 | 89.765 |
| ▪ KSA | 240,6 | 364.133 | 560.765 |
| ▪ UAE | 172,3 | 252.600 | 389.004 |
| ▪ Egypt | 169,7 | 145.382 | 223.888 |
| ▪ Iraq | 115,8 | 149.483 | 230.204 |
| ▪ Yemen | 72,6 | 101.674 | 156.578 |
| ▪ Turkey | 59,2 | 59.307 | 91.333 |
| ▪ Oman | 55,9 | 77.156 | 118.820 |
| ▪ Jordan | 36,5 | 26.944 | 41.494 |
| ▪ Kuwait | 31,1 | 46.933 | 72.277 |
| ▪ Bahrain | 20,0 | 32.815 | 50.535 |
| ▪ Lebanon | 3,0 | 4.068 | 6.265 |
| TOTAL | 1.010,5 | 1.318.784 | 2.030.927 |



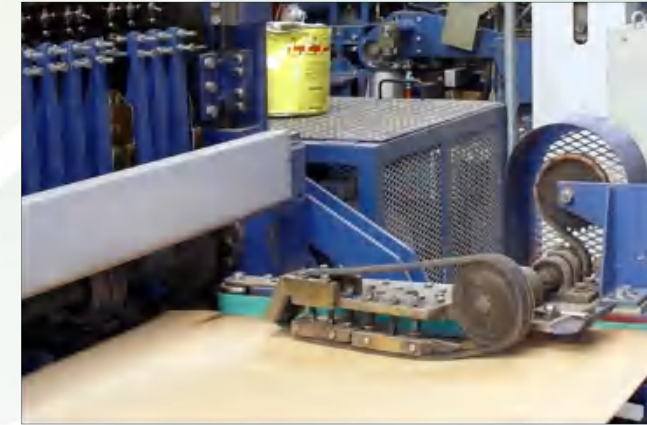
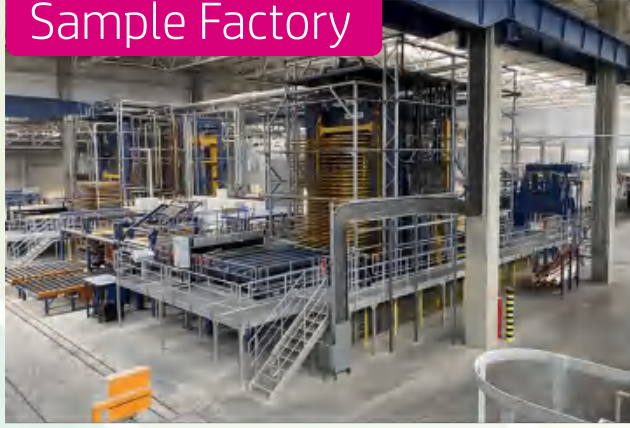
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Sample Factory





Sample Factory



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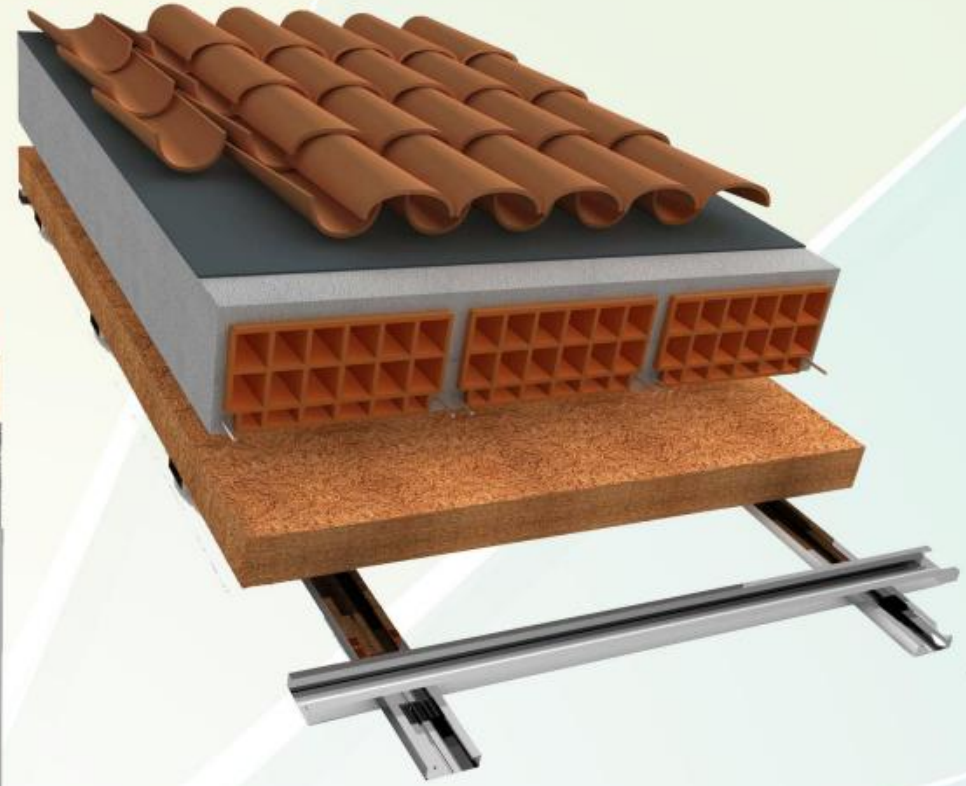


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Wood-Fiber Insulation Board Factory



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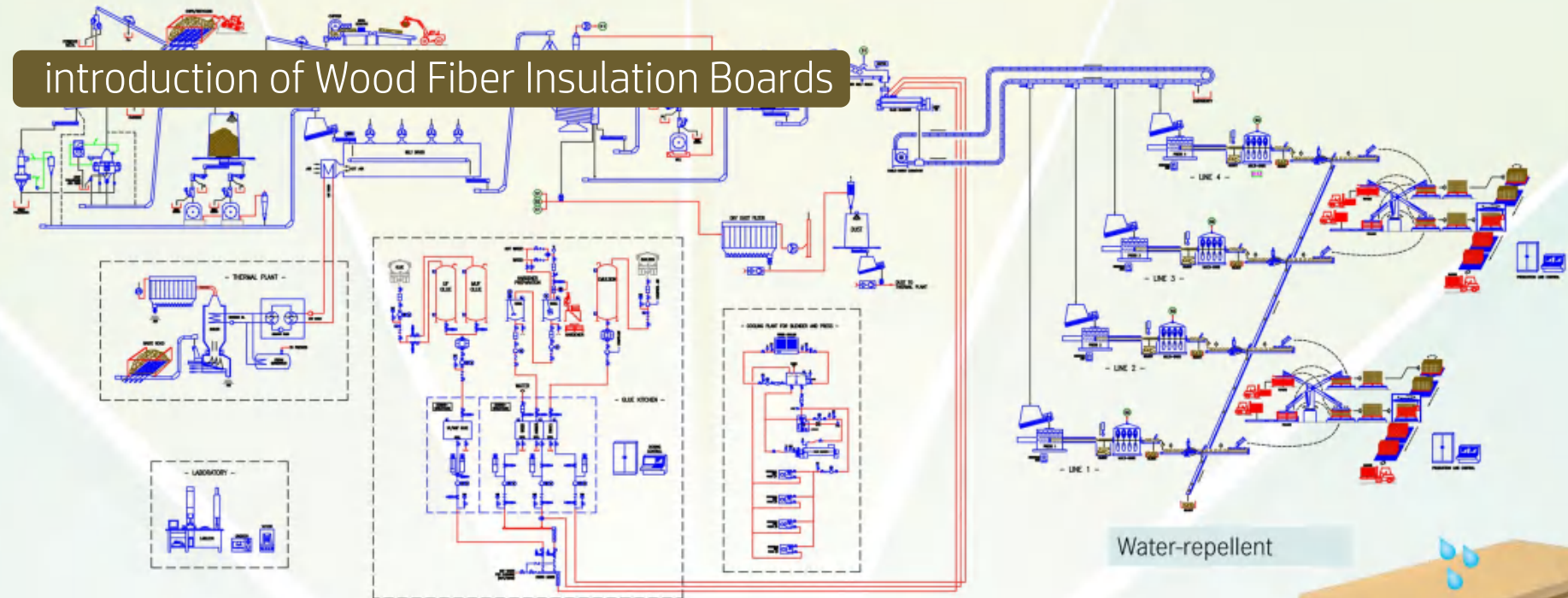
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introduction of Wood Fiber Insulation Boards



Materials like rock wool, glass wool and polystyrene (EPS) have been utilized for years to produce insulation board all over the world, offering a purely winter insulation and often not allowing the dwelling to "breathe" properly. The IMAL-PAL group has designed a simple, modular system to produce insulation board from wood fibre, with production capacities ranging from 100 to 1000 m³/day and of varying size and thickness.

The technology has been designed to exploit, in particular, secondary raw materials, which can even include recycled wood.

The "wood fibre" insulation board is a true innovation in the industry, both from the ecological point of view as well as in terms of performance. The board properties not only protect the home from the cold winter temperatures but also from the summer heat. Furthermore, it is an excellent acoustic insulator, ideal for application in the green building/construction industries, in the furniture industry and for door manufacturing.

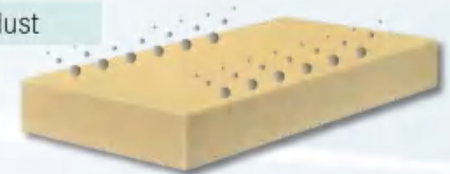
Water-repellent



Slip resistant



Reduction of dust



Edge Profiles



stump

shiplap edge

tongue and groove





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Plant information



Daily Maximum Production Capacity

- Start From 4 ton / hour

Annual Maximum Production Capacity

- min. 28.600 tons /year



Raw Material Sources

- All kind of woods
- All kind of Recycled woods



Product Type

- Plain Sheets



End Product Size

- 120 x 60 cm
- 120 x 120 cm
- 120 x 240 cm



Typical Sheet Thicknesses

- 10 to 250 mm



Total Land Area

- min 15.000 sqm

BUA

- min 7.000 sqm



Suggested Factory Location

- Free Zones
- Industrial Areas



Construction Partner



Total Workforce

- min 40



No. of Work Shifts

- 3 shifts



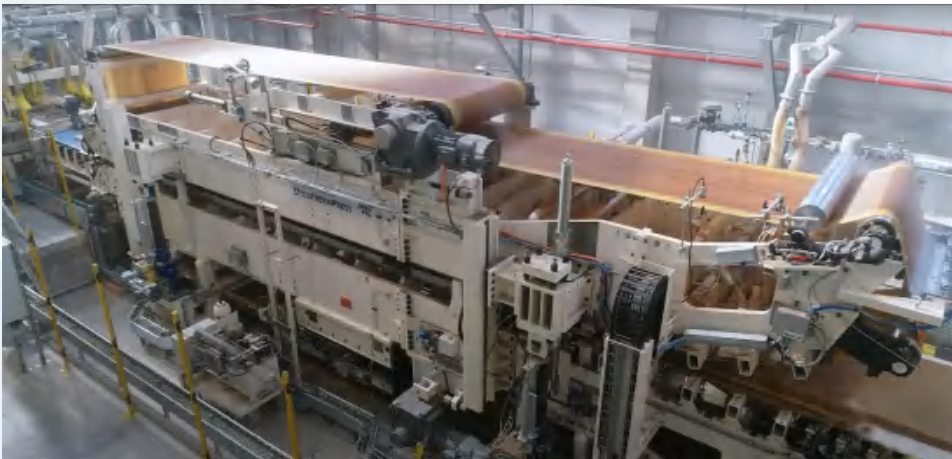
MDF Plant Machinery & Equipments Cost

-Start from \$ 30 Mn

Factory Construction Cost



Sample Factory





Sample Factory





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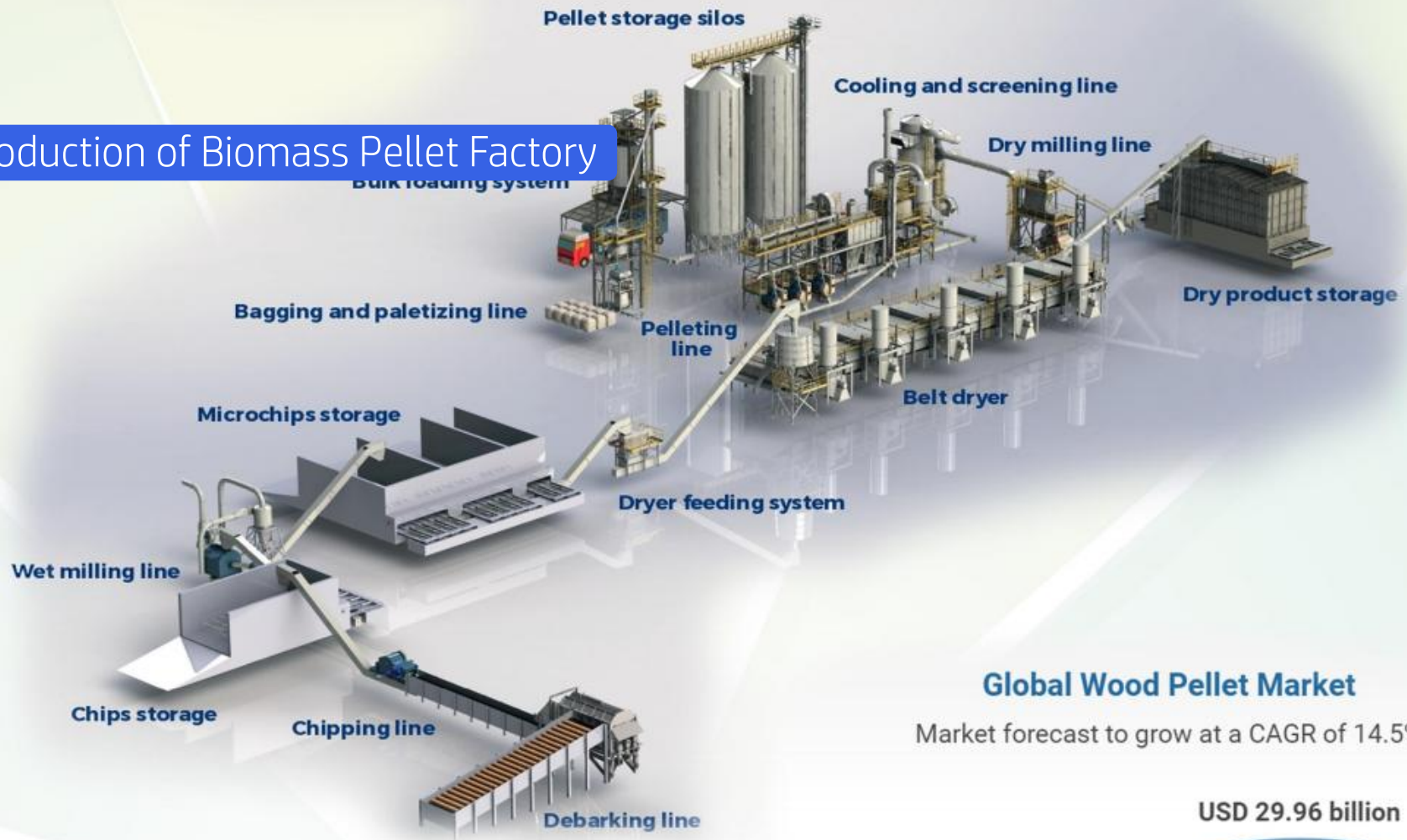
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Biomass Pellet Factory

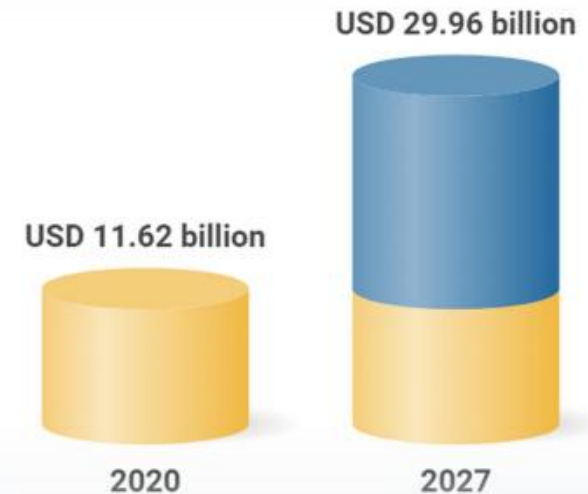


introduction of Biomass Pellet Factory



Global Wood Pellet Market

Market forecast to grow at a CAGR of 14.5%



Biomass pellet is one kind of biofuel resources. Biofuel or biomass energy, refers to renewable energy sources such as solar energy, wind energy, etc. which can both generate heat or electricity for human life and produce little damage to the environment at the same time. Bio-pellets are commonly made by biomass pellet machine with the biomass materials. Before turning into pellets, a series of processes, including crushing to required size, reducing water content, pelletizing, cooling, packaging, are needed. After processing, the combustion and automation operation performance of biomass materials has been increased sharply. With features of high combustion value, uniform size, biofuel pellets have wide range application in boiler, stove, power plants, factories and household heating, etc. As the biomass energy is recognized by more and more people, bio-pellet shares an increasing percent in fuel market. That is to say, biomass pellet industry is a sunrise industry which is worth investing.



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Plant information



Daily Maximum Production Capacity
- Start from 4 tons/h
Annual Maximum Production Capacity
- min. 28.600 tons / year



Raw Material Sources

- All kind of woods
- All kind of Recycled woods



Construction Partner



Total Land Area

- min 10.000 sqm

BUA

- min 6.000 sqm



Suggested Factory Location

- Free Zones



Total Workforce

- min 80



No. of Work Shifts

- 3 shifts



MDF Plant Machinery & Equipments Cost

- Start from \$ 6 Mn.

Factory Construction Cost





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Demand Anaylsis

| Pellet Importing Countries | Quantity (Tons) | Total Value USD (.000) |
|----------------------------|-------------------|------------------------|
| WORLD | 28.216.467 | 5.231.266 |
| United Kingdom | 9.199.461 | 1.794.802 |
| Japan | 3.116.767 | 563.584 |
| Denmark | 2.865.680 | 524.420 |
| Netherlands | 2.717.215 | 505.737 |
| Italy | 2.124.089 | 472.613 |
| Korea, Republic of | 3.356.640 | 439.379 |
| Belgium | 948.194 | 159.103 |
| France | 663.940 | 151.571 |
| Germany | 403.582 | 77.352 |
| Austria | 413.542 | 72.450 |
| Latvia | 592.334 | 65.435 |
| United States of America | 195.951 | 46.823 |

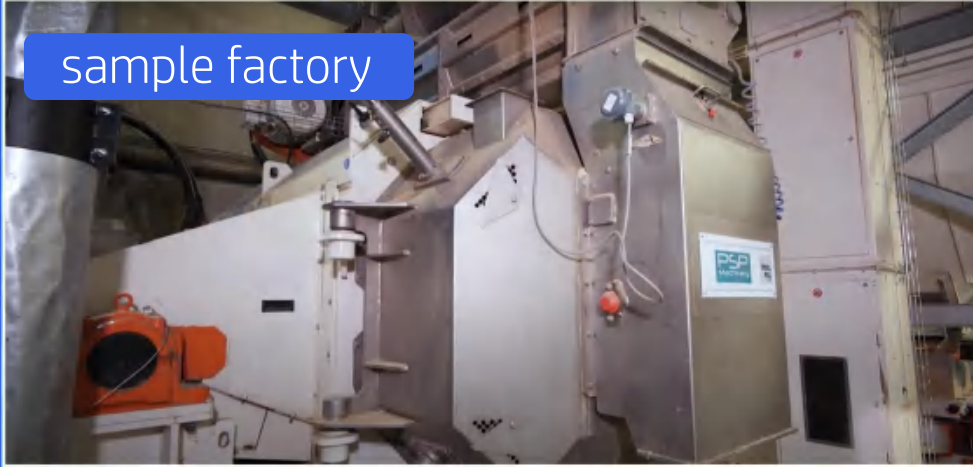


sample factory





sample factory





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Palm Tree Waste Management

Palm Trees as Raw Material

MDF - Pallet Blocks - Pellet - Insulation Boards



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Palm Tree Wood Waste Management

SCHEMATIC DIAGRAM OF THE DATE PALM

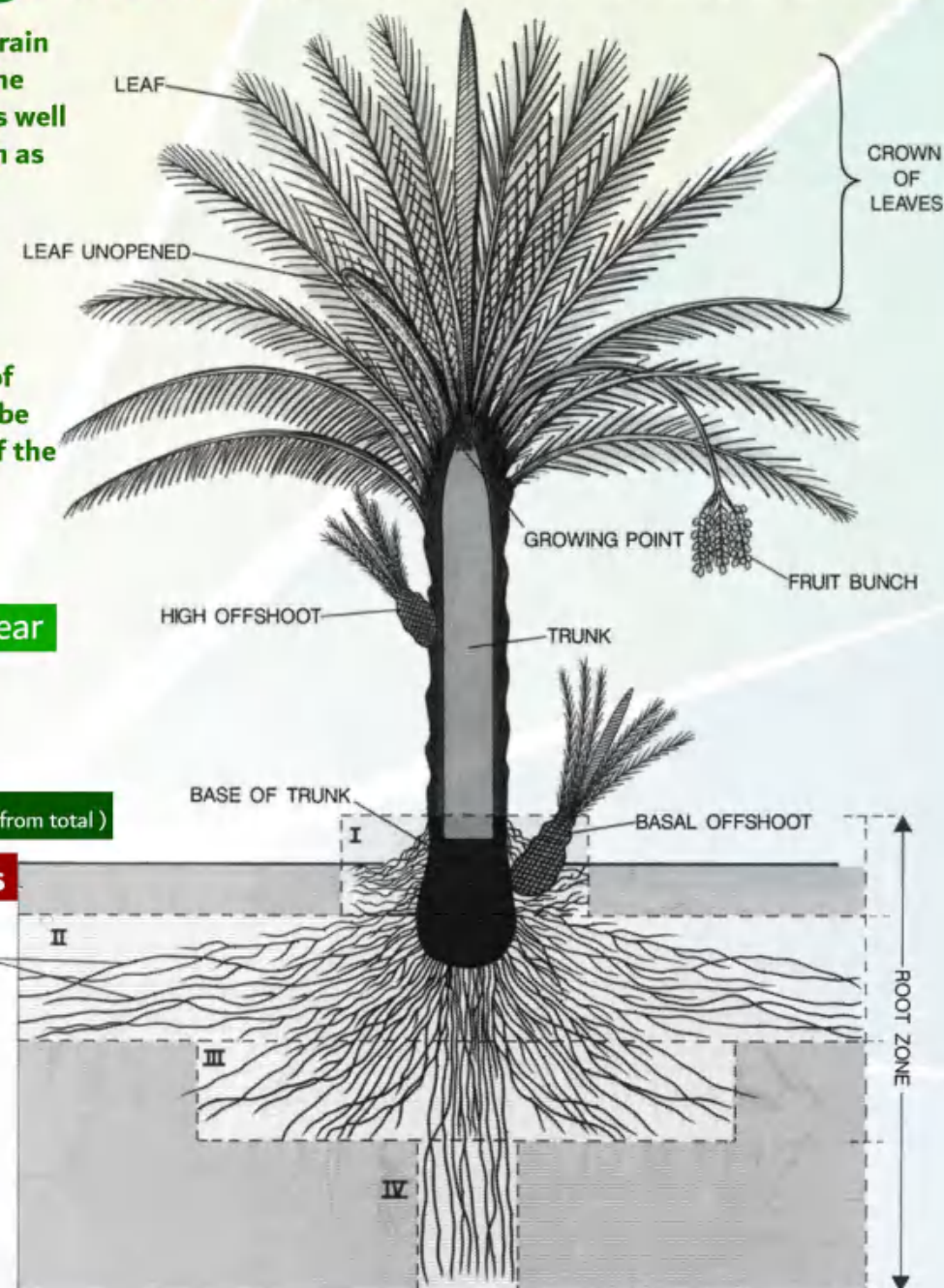
Especially United Arab Emirates, Kingdom of Saudi Arabia, Qatar, Bahrain and other countries in GCC where Palm trees are considered as one of the main nation's treasures, it's essential to find ways to sustain the tree, as well as its wood waste by recycling it into other useful forms of material such as Fertilizers or even Wooden Boards.

Using an innovative way of recycling palm tree and wood scrap, Some companies developed a sustainable and environmentally clean way of meeting the GCC's high demand board products.

The GCC annually generates around 2.400.000 tons of palm waste - waste that can be used to wooden products, cpecifically from the fiber of palm tree. So, instead of burning or dumping in landfills, this waste can be collected and recycled to resourceful material for a better reservation of the ecosystem

- Total Palm Trees in GCC : ~ 102.000.000 pcs
- Palm Trees Fronds (Leaf) Waste for each tree : ~ 20 kg / year
- Palm Trees Lifespan : ~ 40-50 years
- Weight of Palm Trees : ~ 350 kg
- Palm Trees mortality percentage / year : ~ % 1.0 (1.000.000 from total)
- Total Wastage from Palm Trees in GCC : ~ 2.400.000 tons

* Research is just for Date Palms. Other palm trees also can be use as raw material but didn't include the study.



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Recycle Wood

- MDF - Pallet Blocks - Pellet
- Insulation Boards



Recycling wood types

Classification

- **Class A – SUITABLE – virgin wood, only mechanically treated**
Chemically untreated by-products or residues from forest and wood processing industry
Chemically untreated used wood
Classification according EN 14961-1
No waste incineration directive to be applied
- **Class B – ONLY PARTIALLY SUITABLE – coated, lacquered or otherwise chemically treated and coating does not contain halogenated organic compounds (for example PVC) and preservatives, no demolition wood**
Chemically treated by-products and residues from forest and wood processing industry
Chemically treated used wood excluding demolition wood
- **Class C – NOT SUITABLE – Halogenated organic compounds for example PVC in the coating**
Difficult to verify the origin of the material e.g. demolition wood
Does not contain preservatives
Demolitions wood is mainly classified in this category
Classification according to prEN 15359-Solid recovered fuels
Class C wood is solid recovered fuel and waste incineration directive to be applied
- **Class D – NOT SUITABLE – Preservative-treated wood**
Railway sleepers
transmission and telephone line poles
class D wood is hazardous waste



Recycle Wood

- MDF - Pallet Blocks - Pellet
- Insulation Boards



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- 1- Pallets
- 2- Fruit Boxes
- 3- Furniture made of Massive Woods
- 4- Cable Drums

- 5- Building Construction Woods
- 6- Painted Furniture
- 7- Wooden Wall Coverings
- 8- Pallet with Pallet Blocks



Recycle Wood

- MDF - Pallet Blocks - Pellet
- Insulation Boards

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المشاوره والتطوير



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INLET MATERIAL



CLEANED MATERIAL



POLLUTANTS REMOVED



Recycle Wood

- MDF - Pallet Blocks - Pellet
- Insulation Boards

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Solar Panel Factory



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TURNKEY LINES



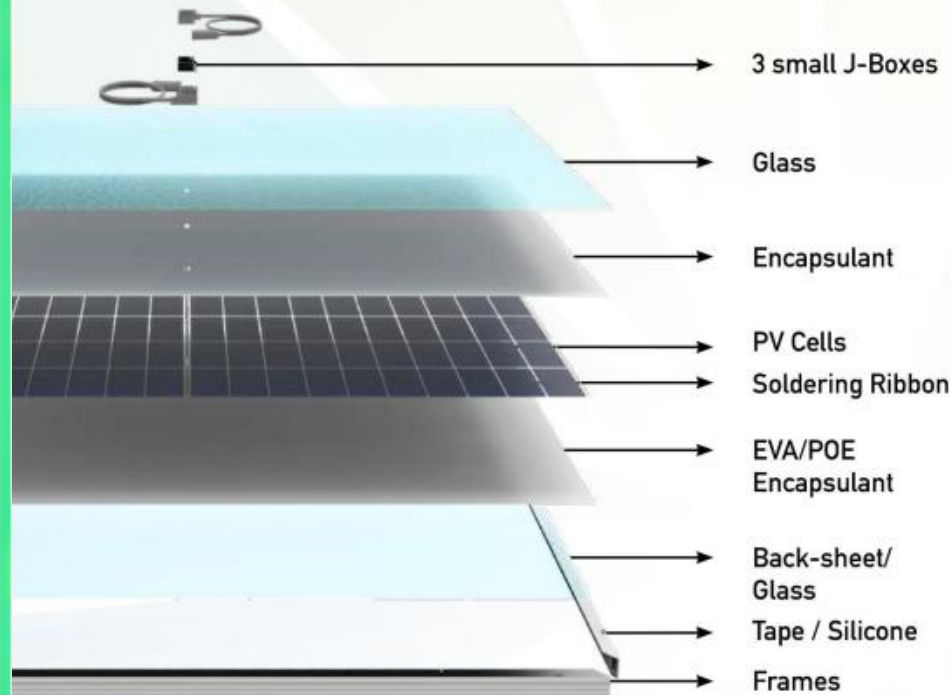


PHOTOVOLTAIC PANEL

THE MAIN COMPONENTS OF A PV PANEL

STRUCTURE OF A PV MODULE

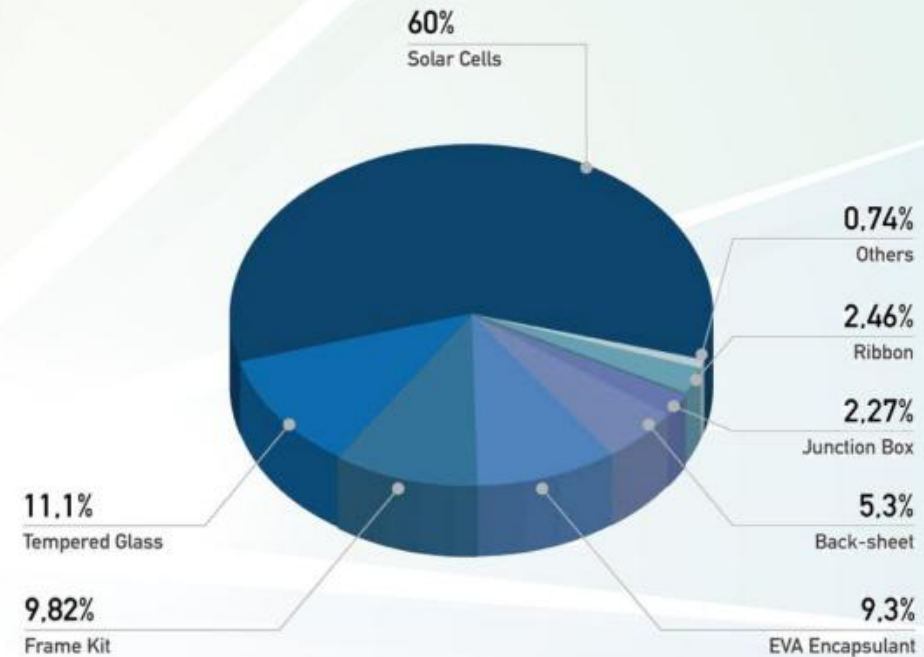
Example: Half cut cells, Centralized panel

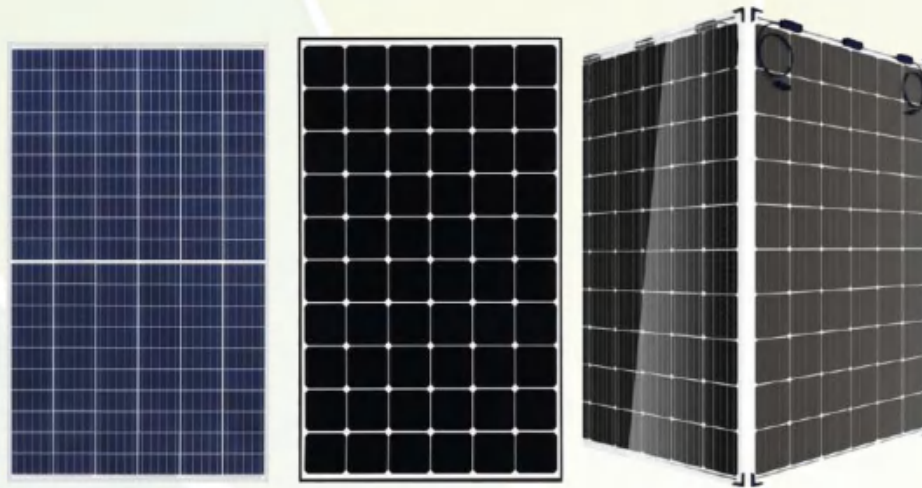


MATERIAL CONTRIBUTION

550W Glass Glass Panel

Based on data from August 2022

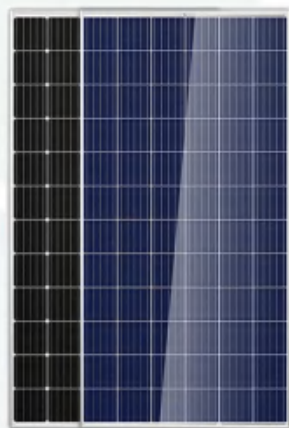




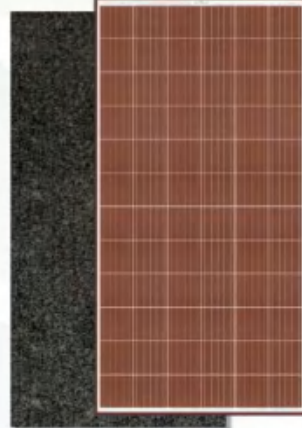
HALF CUT, TWIN PEAK

BACK CONTACT

BIFACIAL, GLASS GLASS



POLY & MONOCRYSTALLINE



COLORLED PV AND BIPV



CURVED AND CUSTOM DESIGN



SOLAR STREET LIGHTS



SOLAR ROOF TILE



FLEXIBLE PANELS

30W 100W 160W 270W 360W 600W

PV MODULE PRODUCTION LINES

COMPLETE MANUFACTURING SOLUTIONS



TAILOR MADE AND CUSTOMIZED PRODUCTS

- The customer's needs in the offered solutions.
- Complete design of the manufacturing facility.
- Solution for standard production or dedicated to custom technology.

PLUG AND PLAY

- Delivery of "ready to start" solutions.
- User friendly technology.
- Low and easy maintenance level.
- Low cost of spare part and consumables.

ACCESSORY AND SERVICES

- Installation, start-up, commissioning, remote assistance.
- A single reference for a prompt 360° feedback regarding the process, material, innovations, R&D and more.



Projects

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SOLAR PANEL APPLICATIONS

PANELS PRODUCED WITH ECOPROGETTI'S PRODUCTION EQUIPMENT

ANYTHING IS POSSIBLE



CARPOT



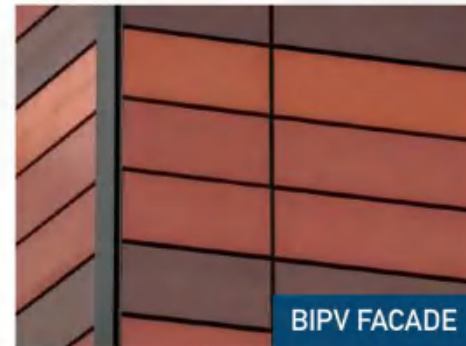
BIPV



AGRIVOLTAIC



FLOATING PV



BIPV FACADE



VEHICLE INTEGRATED



SOLAR PARK



BIPV



INDUSTRIAL ROOFTOP



PV MODULE PRODUCTION PROCESS

RAW MATERIAL PREPARATION

- GLASS WASH
- CELLS TEST
- EVA FOIL CUT
- BACKSHEET CUT
- RIBBON CUT&BEND

STRING & LAYUP

- STRINGER MACHINE
- LAYUP STATION

INTERCONNECTION & INSPECTION

- BUSSING STATION
- AUTOMATIC BUSSING
- EL TEST
- DARK I-V TEST
- ELECTRICAL TEST
- QUALITY INSPECTION

LAMINATION

- LAMINATION
- COOLING
- GEL CONTENT TEST

FRAMING

- TRIMMING
- FRAMING
- CORNER PUNCHING
- SILICONE DISPENSER
- J-BOX APPLICATION

TESTING

- I-V MEASUREMENT
- POWER RATING
- EL TESTER
- HI-POT TESTING
- SUN SIMULATION



RAW MATERIAL



STRINGING



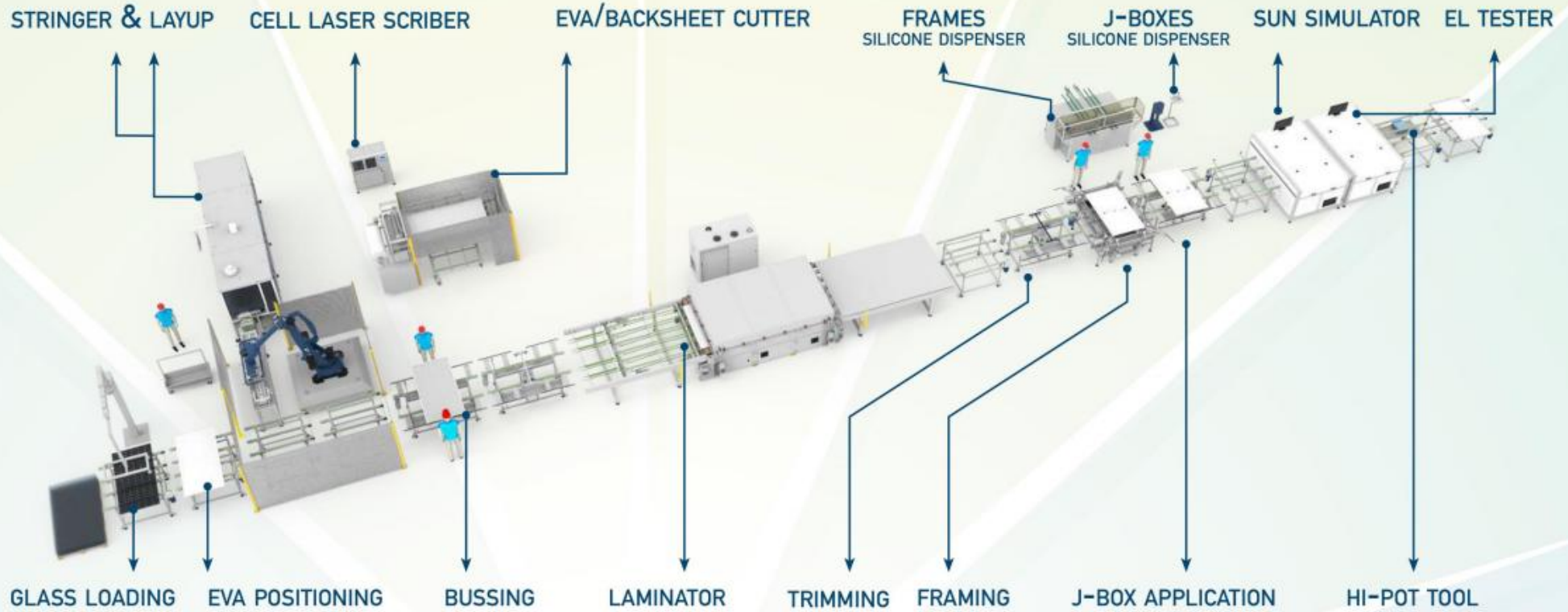
AUTOMATION



BUSSING



EL TESTING



LAMINATION



TRIMMING



FRAMING



SUN SIMULATION



PACKING



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20MW MODULE PRODUCTION LINE

COMPLETE SOLUTION FOR PV MODULE MANUFACTURING



20
MW/Year



10
panels/h



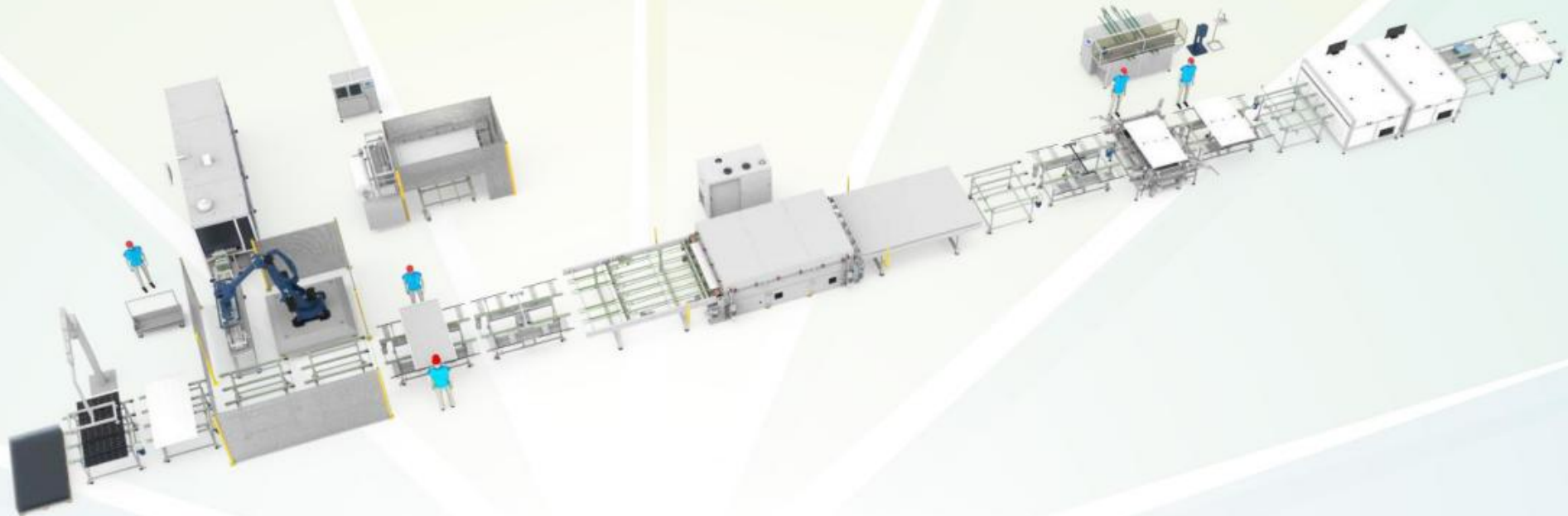
5 workers
per shift



150 kW/h
6bar | 900 nL/1'



750 sqm
area required



EQUIPMENT LIST

1. Glass loader ECO WEIGHTLESS
2. Stringer machine ETS 2500
3. Robotic Layup ECOLAYUP R
4. In-line manual bussing station
5. Foil cutter machine ECOCUT 20
6. Cell laser ECOLAS CELL
7. Laminator ECOLAM MAX 3
8. In-line manual Trimming
9. Semi automatic Framing ECOFRAME H
10. J-box silicone station
11. LED Sun Simulator ECOSUN PLUS
12. EL tester ECOLAB EL
13. Hi-pot tool
14. All accessories and spare parts included

HALF CELL



M10 - M12
182mm - 210mm



550-600 W
per module



1 shifts
of 8 hours



330
days/year



Projects

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60MW MODULE PRODUCTION LINE

COMPLETE SOLUTION FOR PV MODULE MANUFACTURING



60

MW/Year



15

panels/h



6

workers
per shift

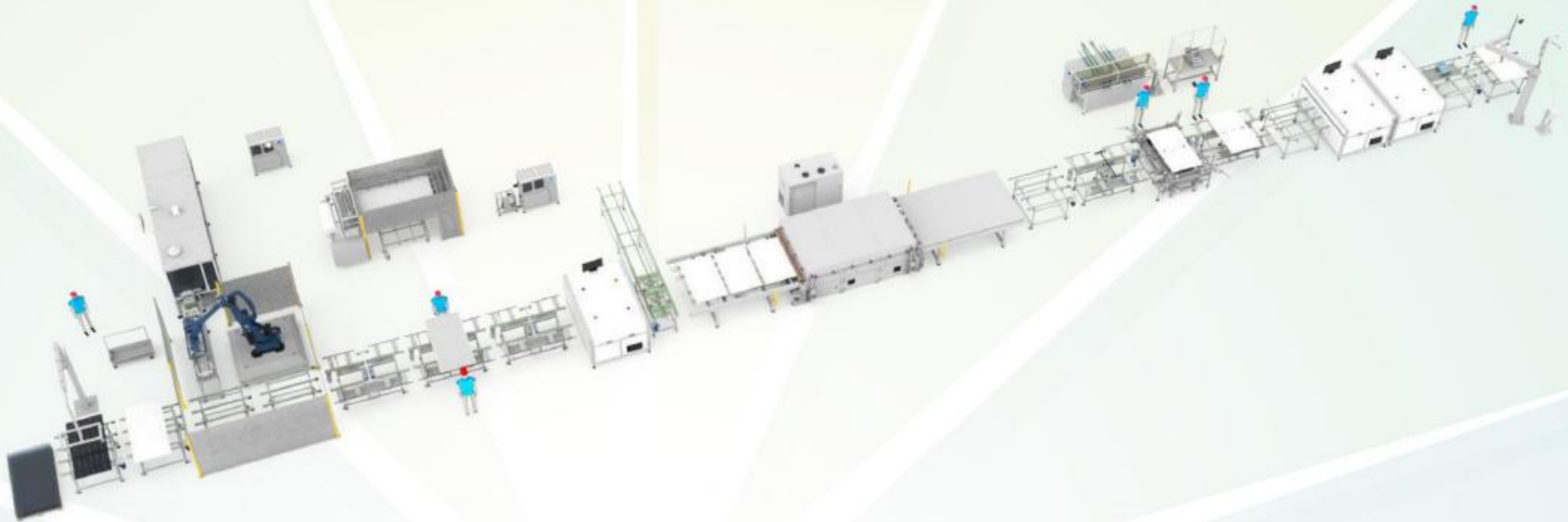
160

kW/h

6bar | 1000 nL/1'



900

sqm
area required

EQUIPMENT LIST

1. Glass loader ECO WEIGHTLESS
2. Stringer machine ETS 2500
3. Robotic Layup ECOLAYUP R
4. Cell laser ECOLAS CELL
5. Ribbon cut & Bend
6. In-line manual bussing stations
7. Foil cutter machine ECOCUT 20
8. EL tester pre-lamination ECOLAB EL

9. Laminator ECOLAM MAX 3
10. In-line manual Trimming
11. Semi automatic Framing ECOFRAME HA
12. Frame silicone dispender ECOSIL 14
13. Semi-automatic j-box station ECO J-BOX S
14. LED Sun Simulator ECOSUN PLUS
15. EL tester post-lamination ECOLAB EL
16. Manual Hi-pot tool
17. Manual j-box Potting tool

HALF CELL



M10 - M12

182mm - 210mm



550-600 W

per module

3 shifts
of 8 hours31
days/year



Projects

48



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100MW HC SMART - SEMI AUTOMATIC PRODUCTION LINE

COMPLETE SOLUTION FOR PV MODULE MANUFACTURING



100
MW/Year



25
panels/h



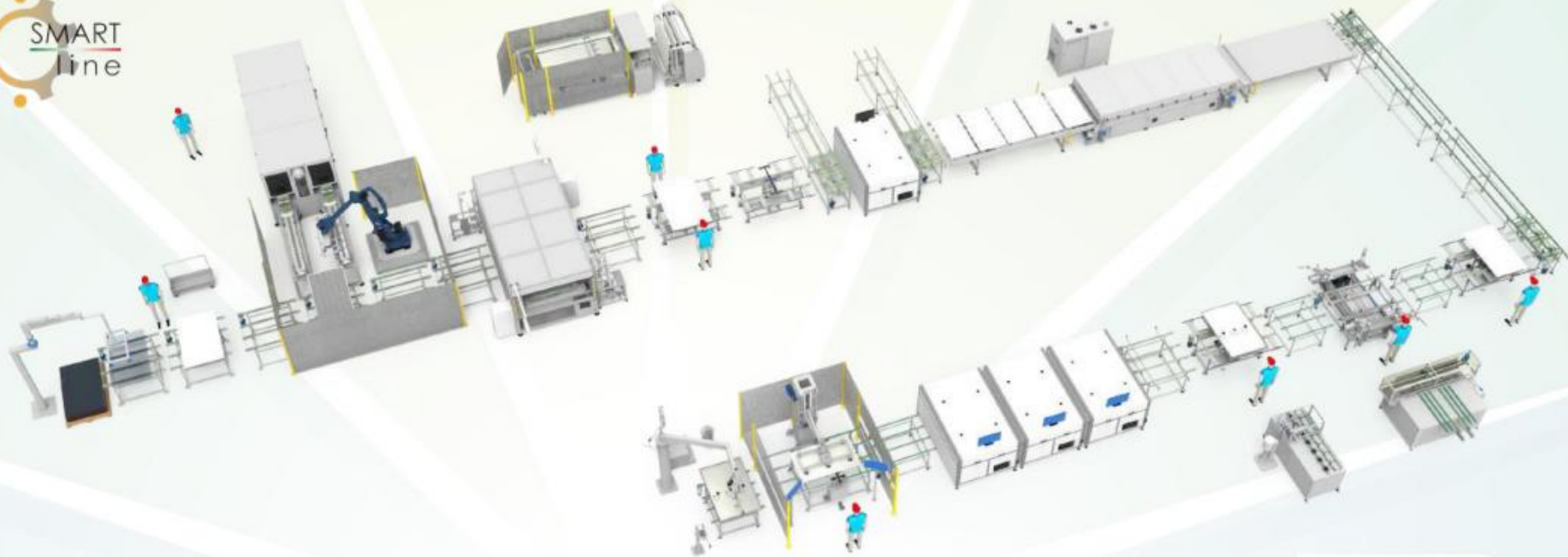
8 workers
per shift



200 kW/h
6bar | 2600 nL/1'



1300 sqm
area required



EQUIPMENT LIST

1. Glass loader ECO WEIGHTLESS
2. Stringer Machine ETS 4000
3. Layup ECOLAYUP R
4. Automatic bussing machine
5. Foil cutter machine ECOCUT 20
6. In-line EL tester before lamination
7. Laminator ECOLAM MAX 5
8. Manual trimming station
9. Semi-automatic framing station
10. Frame silicone dispenser ECOSIL 14
11. Automatic j-box station ECO J-BOX A
12. LED sun simulator + EL tester + Hi-pot
13. Visual inspection station 90°
14. Manual j-box Potting tool

HALF CELL



M10 - M12
182mm - 210mm



550-600 W
per module



3 shifts
of 8 hours



330
days/year



Projects

49



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200MW HC NEXT - FULLY AUTOMATIC PRODUCTION LINE

COMPLETE SOLUTION FOR PV MODULE MANUFACTURING



200
MW/Year



50
panels/h



4 workers
per shift



360 kW/h
6bar | 4600 nL/1'



3000 sqm
area required

NEXT
LINE



EQUIPMENT LIST

1. Glass layup ECOGLASS R
2. x3 Inline foil cutter machine
3. x2 Stringer Machine ETS 4000
4. x2 Layup ECOLAYUP R
5. Automatic bussing machine
6. Inline EL tester before lamination
7. x2 Module storage system BUFFER FIFO 30
8. Laminator double step ECOLAM MAX 5 DS
9. Fully Automatic Trimming and Framing
10. Automatic J-box station and Potting
11. Modules curing tunnel ECO CURING
12. Corner chamfering machine ECO GRINDING
13. LED sun simulator + EL tester + Hi-Pot
14. Visual inspection station 90°
15. Fully auto packaging and sorting robot

HALF CELL



M10 - M12
182mm - 210mm



550-600 W
per module



3 shifts
of 8 hours



330
days/year



Projects

50



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500MW HC - FULLY AUTOMATIC PRODUCTION LINE

COMPLETE SOLUTION FOR PV MODULE MANUFACTURING



500
MW/Year



100
panels/h
net of downtime



3 workers
per shift

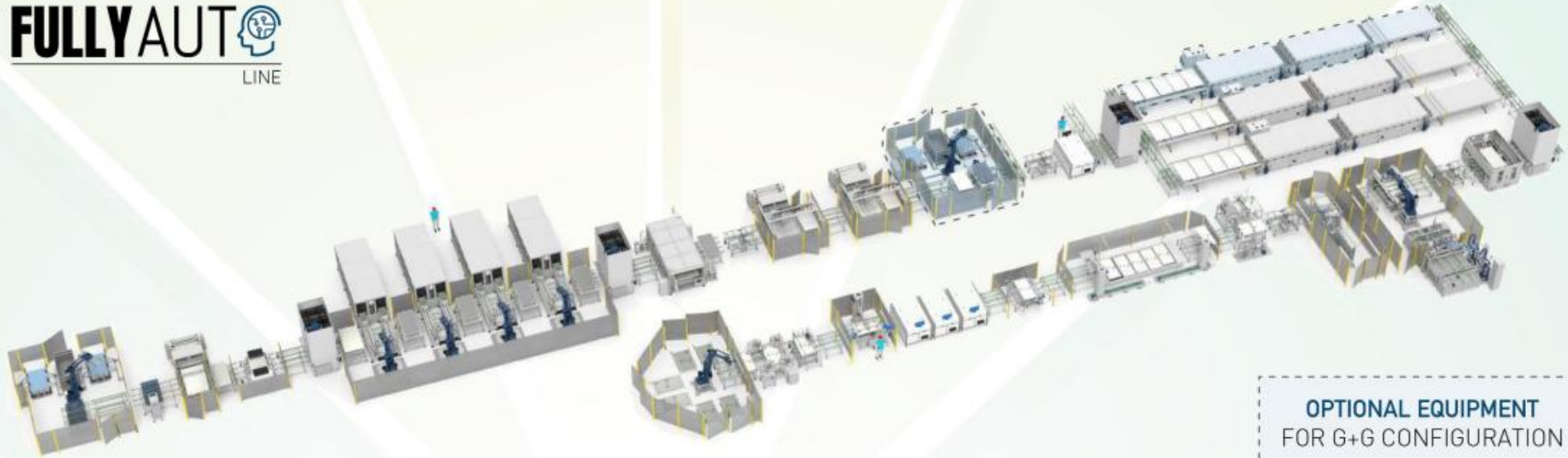


600 kW/h
6bar | 7800 nL/1'



3800 sqm
area required

FULLY AUT
LINE



OPTIONAL EQUIPMENT
FOR G+G CONFIGURATION

EQUIPMENT LIST

1. Glass layup ECOGLASS R
2. Glass marker machine
3. x3 Inline foil cutter machine
4. EPE stripe machine
5. x4 Stringer Machine ETS 4000
6. x4 Layup ECOLAYUP R
7. Module storage system BUFFER FIFO 30
8. Automatic bussing machine
9. 2nd Glass layup ECOGLASS R
10. Inline EL tester before lamination
11. x3 Laminators ECOLAM MAX 5 DS
12. Fully Automatic Trimming and Framing
13. Automatic J-box station and Potting
14. Modules curing tunnel ECO CURING
15. Corner chamfering machine ECO GRINDING
16. LED sun simulator + EL tester + Hi-Pot
17. Visual inspection station 90°
18. Automatic labelling station ECO LABELLING
19. Corner positioner for packaging
20. Fully auto packaging and sorting robot

HALF CELL



M10 - M12
182mm - 210mm



550-600 W
per module



3 shifts
of 8 hours



330
days/year



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Projects



GHASE

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مديرية إدارة المشاريع والاستشارات

EPS Beads Resin Factory



Projects

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introduction of EPS Resin



Expandable PolyStyrene (EPS) is a white foam plastic material produced from solid beads of polystyrene. It is primarily used for packaging, insulation etc. It is a closed cell, rigid foam material derived basically from two main raw materials.

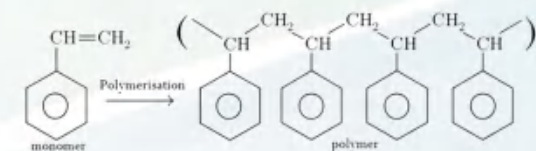
Styrene – which forms the cellular structure

Pentane – which is used as a blowing agent

Both styrene and pentane are hydrocarbon compounds and obtained from petroleum and natural gas byproducts.

EPS is very lightweight with very low thermal conductivity, low moisture absorption and excellent cushioning properties. Its physical properties do not change within its service temperature range (i.e. up to 75°C) for long term temperature exposure.

MOLECULAR FORMULA OF POLYSTYRENE



Number of styrene moles (n) = 2352.38

Types of EPS





Projects

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features



Cost Effective



Anti Termite



Ship Lapped



Corrosion Free



Recyclable

CFC, HCFC
Free

Lightweight



Ozone Friendly

Sustainable/
ReusableEndless
Design
Possibilities

Floating Ability



95% Air

High Thermal
InsulationHigh Compressive
Strength

Resilient



Cooling Efficiency



Shock Absorption



Flexibility



Higher Stability



Load Bearing



Fast Production



Non Flammable



Long Lasting



Light Reflection



Durability



UV Resistant

Environmentally
SafeEasy
FixingUnlimited
Applications

ECO Friendly



Rustproof



Customized



Non Magnetic



Alkali Proof



Multiple Colors



Loose Fill



Chemically Inert



Vapor Tight

Dimensionally
Stable

Sculpture Shaping

HVAC

Used in
HVAC IndustryHot Water
InsulationHigh Temp.
Endurance

Energy Saving



Projects

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Plant information



Daily Maximum Production Capacity

- 15 mt to 450 mt

Annual Maximum Production Capacity

- 5.000 mt to 144.000 mt



Raw Material Sources

- Styrene Monomer
(From KSA or Kuwait)



Product Type

- Fire Rated
- Standart
- Black



Product Sizes

- 0.4 - 0.8 mm
- 0.9 - 1.2 mm
- 1.25 - 2.4 mm



Total Land Area

- min. 2.200 sqm
- max. 20.000 sqm

BUA

- min 1.000 sqm
- max. 12.000 sqm



Suggested Factory Location

- Free Zones



Construction Partner



Total Workforce

- min 16 to 50



No. of Work Shifts

- 3 shifts



MDF Plant Machinery & Equipments Cost

- Min. \$ 4.8 Mn.
- Max. \$ 26 Mn.

Factory Construction Cost



Projects

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Demand Analysis

MIDDLE EAST IMPORTING COUNTRIES FOR EPS (TONS)

| MIDDLE EAST IMPORTS | 2017A | 2018A | 2019A | 2020A | 2021A |
|--------------------------------|----------------|----------------|----------------|----------------|----------------|
| Middle East aggregation | 199,026 | 173,070 | 127,983 | 186,677 | 136,033 |
| United Arab Emirates | 27,460 | 23,131 | 25,657 | 53,584 | 45,880 |
| Egypt | NA | NA | NA | 35,465 | 26,492 |
| Turkey | 90,735 | 83,764 | 29,387 | 27,973 | 26,376 |
| KSA | 12,844 | 8,267 | 14,811 | 21,145 | 16,954 |
| Iraq | 4,000 | 4,520 | 5,607 | 4,680 | 6,746 |
| Syrian Arab Republic | 6,931 | 6,997 | 7,300 | 6,165 | 3,824 |
| Jordan | 6,774 | 6,522 | 6,047 | 5,884 | 2,579 |
| Kuwait | 12,117 | 12,654 | 10,840 | 5,473 | 2,564 |
| Qatar | 10,943 | 6,891 | 7,168 | 4,573 | 2,235 |
| Lebanon | 1,901 | 1,586 | 1,542 | 1,057 | 1,052 |
| Bahrain | 2,017 | 2,396 | 2,630 | 2,617 | 699 |
| Oman | 1,520 | 1,553 | 1,476 | 1,909 | 521 |
| Yemen | NA | 201 | 31 | 4 | 68 |
| Iran, Islamic Republic of | 7,680 | 856 | 76 | 30 | 43 |
| Israel | 14,104 | 13,732 | 15,411 | 16,005 | NA |
| Palestine, State of | NA | NA | NA | 113 | NA |

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Sample Factory





Floating House



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Introducing GHASE 75

Urban growth, rising seas and energy independence are key challenges for our generation. Our solution is a unique avant-garde concept of life on the water.

A combination of research in renewable energy, technological innovation and cutting-edge design and style, the Ghase livable yacht has systems for rainwater harvesting, water purification, and waste management. Its mobility and resilience mean it can adapt to changing circumstances with ease.

Self-contained, sustainable and mobile

Next - Generation Floating House



Swim platform & boat lift

Connected to the Water

The swim platform can be used as a private ocean pool and provides easy access to explore the surrounding waters with the next-generation luxury sea toys, while the boat lift enables to carry a yacht tender.

The Ghase livable yacht has three en-suite bedrooms on its upper deck, accessed by a stairway from the foyer. The master bedroom features a freestanding bathtub and walk-in closet.

The master and VIP-guest bedrooms have plenty of space for king-size beds. They also have balconies and floor-to-ceiling windows to keep you constantly immersed in the view.



State-of-the-art design, high-end materials and custom finishes

Ample Room to Relax



SCAN ME



Electric propulsion, no noise, no vibrations Cruising in Silence

The Ghase livable yacht moves silently and without vibration thanks to electric propellers, with energy provided by its advanced solar-energy system. The zero emission propulsion turns cruising onboard this vessel as enjoyable as it gets, without any impact on the marine eco-system.

Two azimuth electric thrusters of 136 horsepower each move the vessel at speeds of as much as 5 knots. The thrusters rotate 180 degrees and are combined with a bow thruster for ease of navigation and maneuverability.

A key feature of the Ghase livable yacht is its sophisticated system for elevating the vessel completely above water level and making it feel as stable as a house on land.

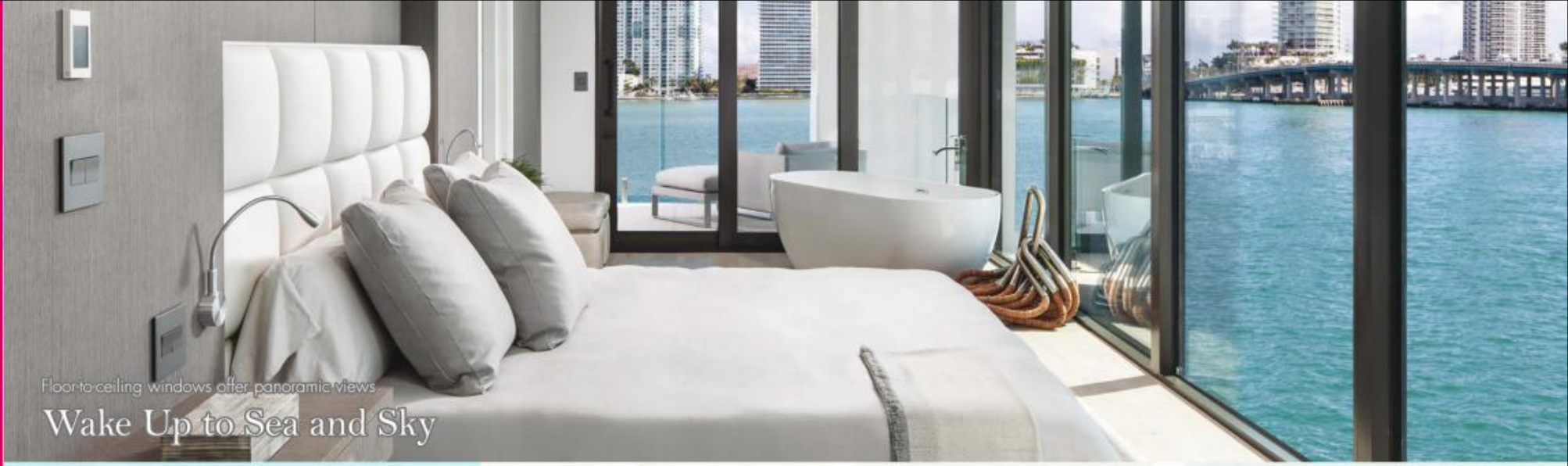
The four 40-foot-long hydraulic piling, or "spuds" in marine terminology, level the floating home, creating a sturdy foundation in depths of as much as 20 feet. In addition to the added security in rough weather, this system eliminates the effect of the rolling of the sea, and, for those affected by it, seasickness.



Rising above the water A Unique Foundation



SCAN ME



Floor-to-ceiling windows offer panoramic views

Wake Up to Sea and Sky

The Ghase livable yacht has three en-suite bedrooms on its upper deck, accessed by a stairway from the foyer. The master bedroom features a freestanding bathtub and walk-in closet.

The master and VIP-guest bedrooms have plenty of space for king-size beds. They also have balconies and floor-to-ceiling windows to keep you constantly immersed in the view.

Every aspect of the Ghase livable yacht is designed with comfort in mind. The four full bathrooms epitomize this approach, with abundant space, large windows providing natural light, and luxury fixtures, like the deluxe rain showers.

The ability to choose custom finishes and the materials of your choice guarantee satisfaction and a fully-realized sense of your personal style.



Natural light, abundant space and luxurious appointments

Perfection in the Details



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Projects

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Enjoy nature's best gift

Living in the View

The design of the Ghase livable yacht was conceived to maximize the advantages of being in a tropical or semi-tropical zone, where indoor / outdoor living is the natural lifestyle. Balconies, terraces, and the floor-to-ceiling windows allow you to be part of the beauty around you.

Even when the vessel is in motion, silence and calm reign, without any vibration thanks to the electric propulsion system. An oversized terrace with outdoor kitchen can be expanded to nearly double its size with a retractable extension. A sun deck with a lifting platform can be immersed to create a sheltered pool for an easy dip.

The Ghase livable yacht has the resilience and flexibility to deal with changing conditions in term of weather, sea level and energy for the years ahead. Owners of Ghase livable yachts will be independent from utility providers.

The solar roof generates 40 kilowatts of power, and the floating villa's batteries can hold as much as 800 kilowatt hour of power storage, ensuring enough energy to operate vessel propulsion and household needs indefinitely with sufficient sunlight. Systems for rainwater harvesting and purification provide all water needs.

Living green and connected with nature

Self - sustaining Luxury





Projects

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Main Specifications *

GHASE 75



| | |
|------------|--------------------|
| LENGTH | 75 ft - 22,9 m |
| BEAM | 32 ft - 9,8 m |
| DRAFT | 5 ft - 1,4 m |
| PROPULSION | 2x 100 kW - 272 hp |
| SPEED | 5 kts max |

| | |
|-----------------|------------------------------|
| TYPE | Livable Yacht (coastal) |
| BUILDER | Arkup LLC |
| ARCHITECT | Koen Olthuis, Waterstudio.NL |
| BUREAU VERITAS | Certified modular steel hull |
| USCG REGISTERED | Recreational vessel |
| NAVAL ENGINEER | Donald L. Blount & Ass. |

| | |
|------------------|-----------------------|
| SOLAR ROOF POWER | 36 kW |
| BATTERY CAPACITY | 182 kWh |
| SELF-ELEVATING | 40 ft hydraulic spuds |
| GROSS TONNAGE | 123 GRT |
| AIR DRAFT | 34 ft - 11 m |

| | |
|----------------|---------------------------------|
| LIVING SPACE | 4,350 sqft - 404 m ² |
| LIVING INDOOR | 2,700 sqft - 251 m ² |
| LIVING OUTDOOR | 1,650 sqft - 153 m ² |
| BEDROOMS | 4 - for 8 people |
| BATHROOMS | 4.5 |

| | |
|--------------------|-----------------------------------|
| RETRACTABLE DECK | 455 sqft - 42 m ² |
| SWIM PLATFORM | 125 sqft - 12 m ² |
| WINDOWS | Floor to ceiling impact resistant |
| BOAT LIFT CAPACITY | 30 ft 5 tons (removable) |
| FRESH WATER TANK | 4,000 GAL - 15 m ³ |
| HOLDING TANK | 4,000 GAL - 15 m ³ |

* based on hull #1

Find out how evolutive and bespoke our livable yachts can be. Choose your own technological features and design the floating house of your dreams according to your budget.

TAILOR YOUR LIVABLE YACHT'S DESIGN TO YOUR NEEDS AND DESIRES

Turn your roof into a solar farm or a lounge deck
Opt for off-the-grid or connected living
Customize battery capacity and navigation range
Choose hydraulic spuds or regular anchors
Customize the finishes of the indoor/outdoor spaces
Add toys, and more...

MAIN CUSTOMIZABLE ITEMS

Hull & roof configuration
1st & 2nd floor layouts
Exterior superstructure & cladding
Kitchen features and finishes
Interior design finishes
Furnishing & decoration
Windows & shading system
Entertainment
Outdoor kitchen & lighting

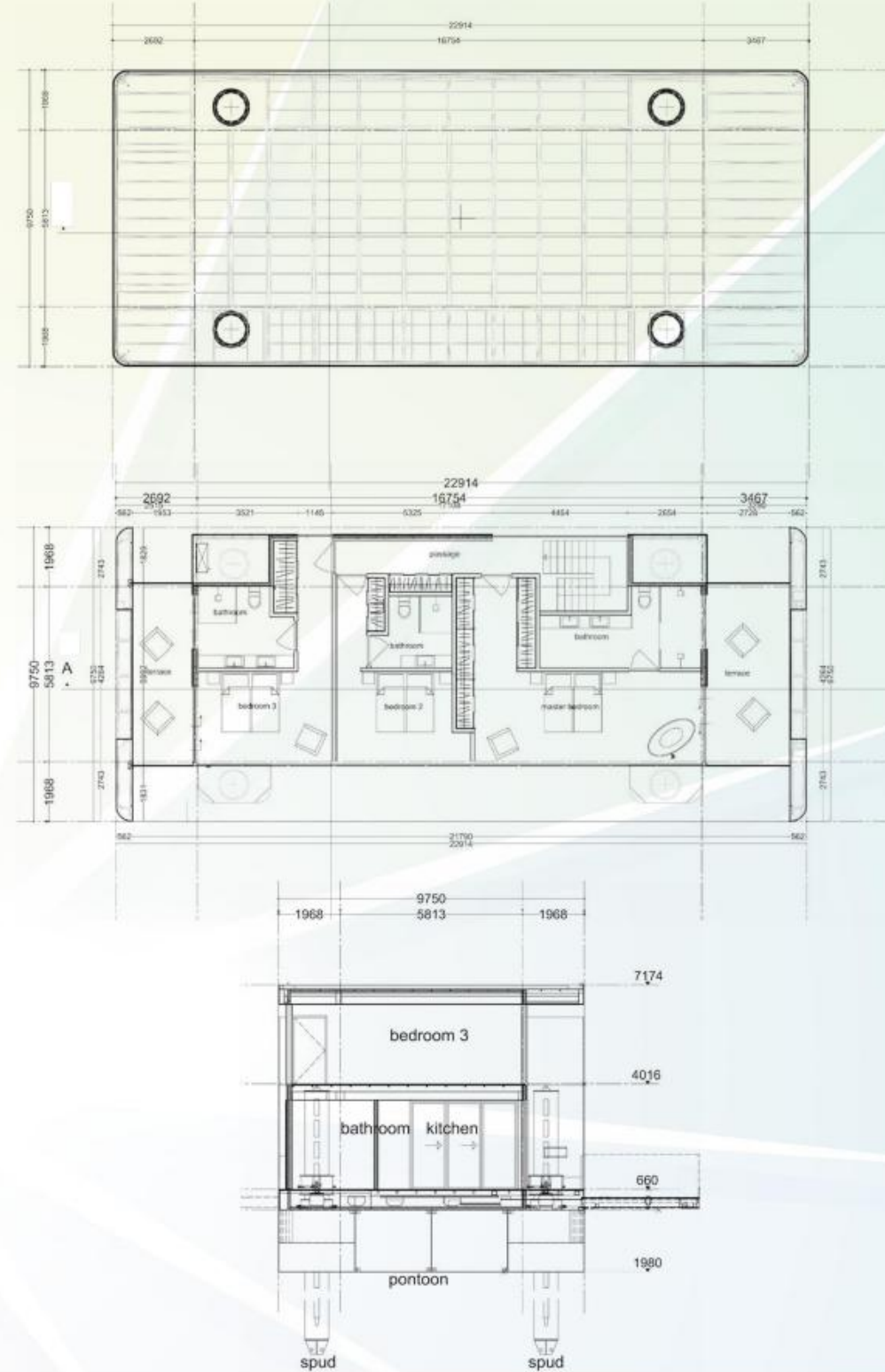
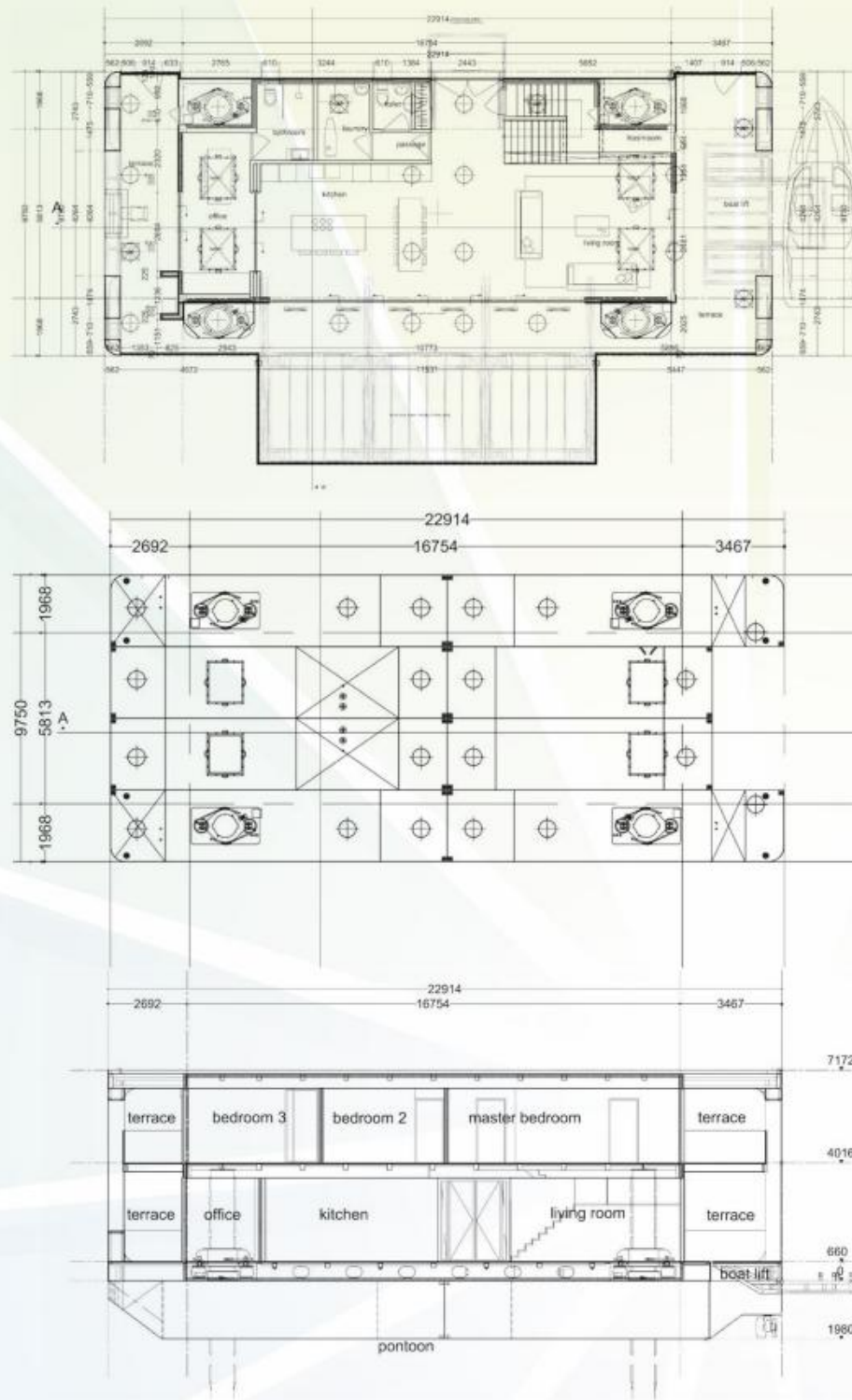
Propulsion & navigation
Stabilization & self-lifting
Solar power generation
Power storage
Power back-up
Fresh water supply
Waste water management
Retractable deck & access platform
Boat lift / swim platform

High grade insulation
Energy recovery ventilation
6 independent reverse AC zones
AC healthy/soothing interior climate
Smart house automation
Smart navigation & operating system
Hull & super-structure in steel
Exterior decking by Esthec



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GHASE

Project Development & Consultancy
المشاوره والتطوير

Tyre Recycle Factory



SCAN ME

Crumb



Granule



Fibre



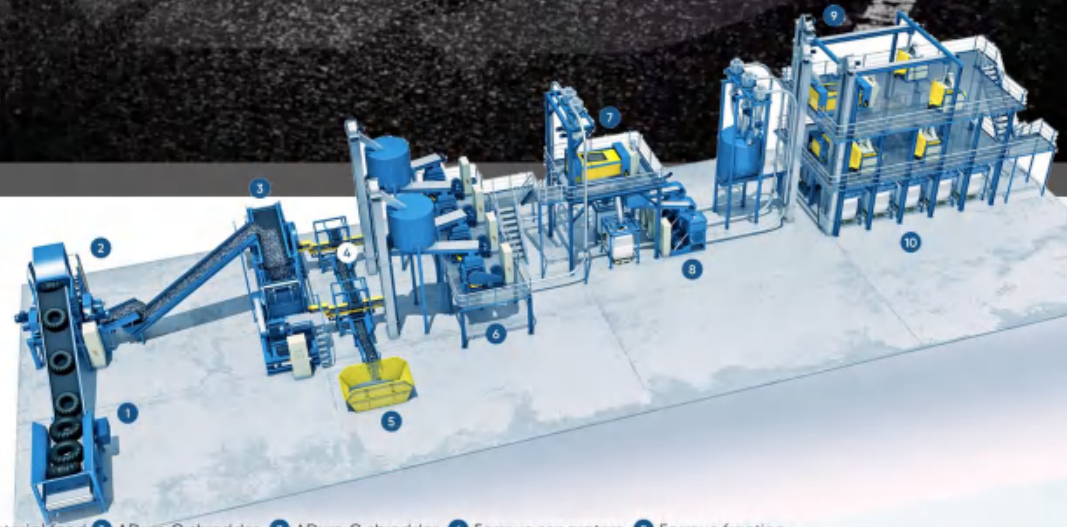
Steel



Fuel



Oil



- 1 Material feed 2 ADuro C shredder 3 ADuro G shredder 4 Ferrous separators 5 Ferrous fraction
- 6 ADuro G shredder 7 Separation/cleaning process 8 ADuro M shredder 9 Separation/cleaning process
- 10 Output: Rubber granules, rubber powder