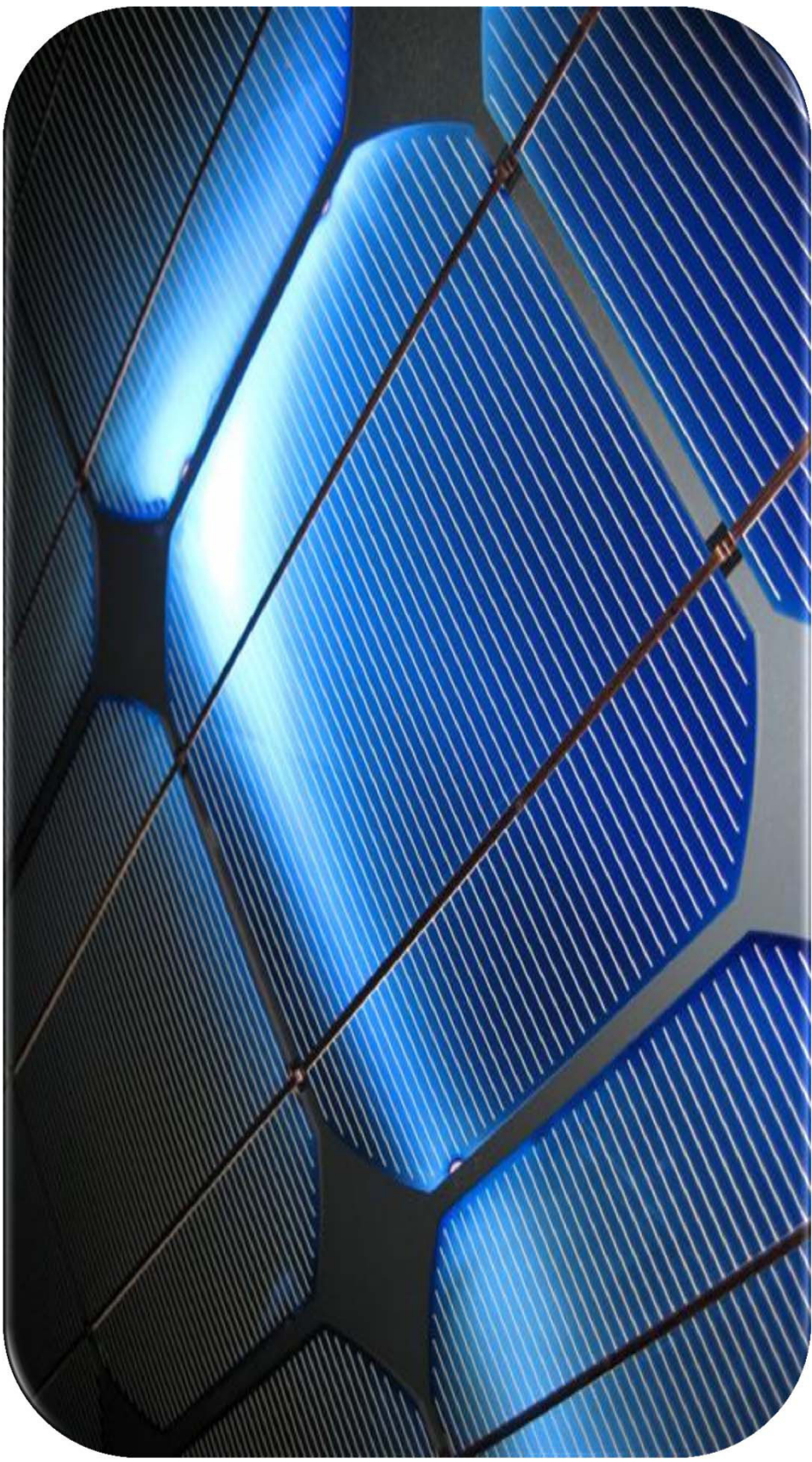
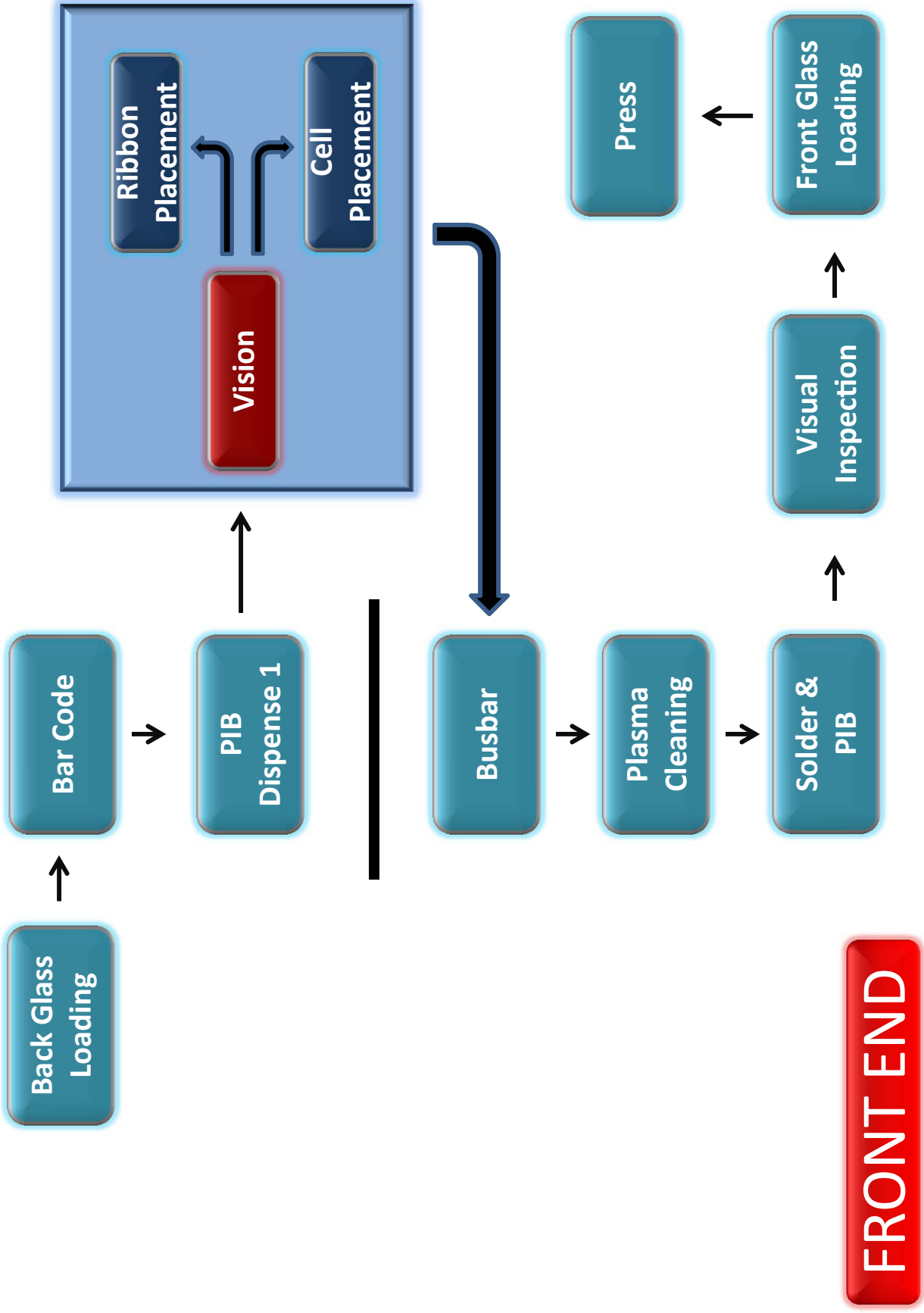
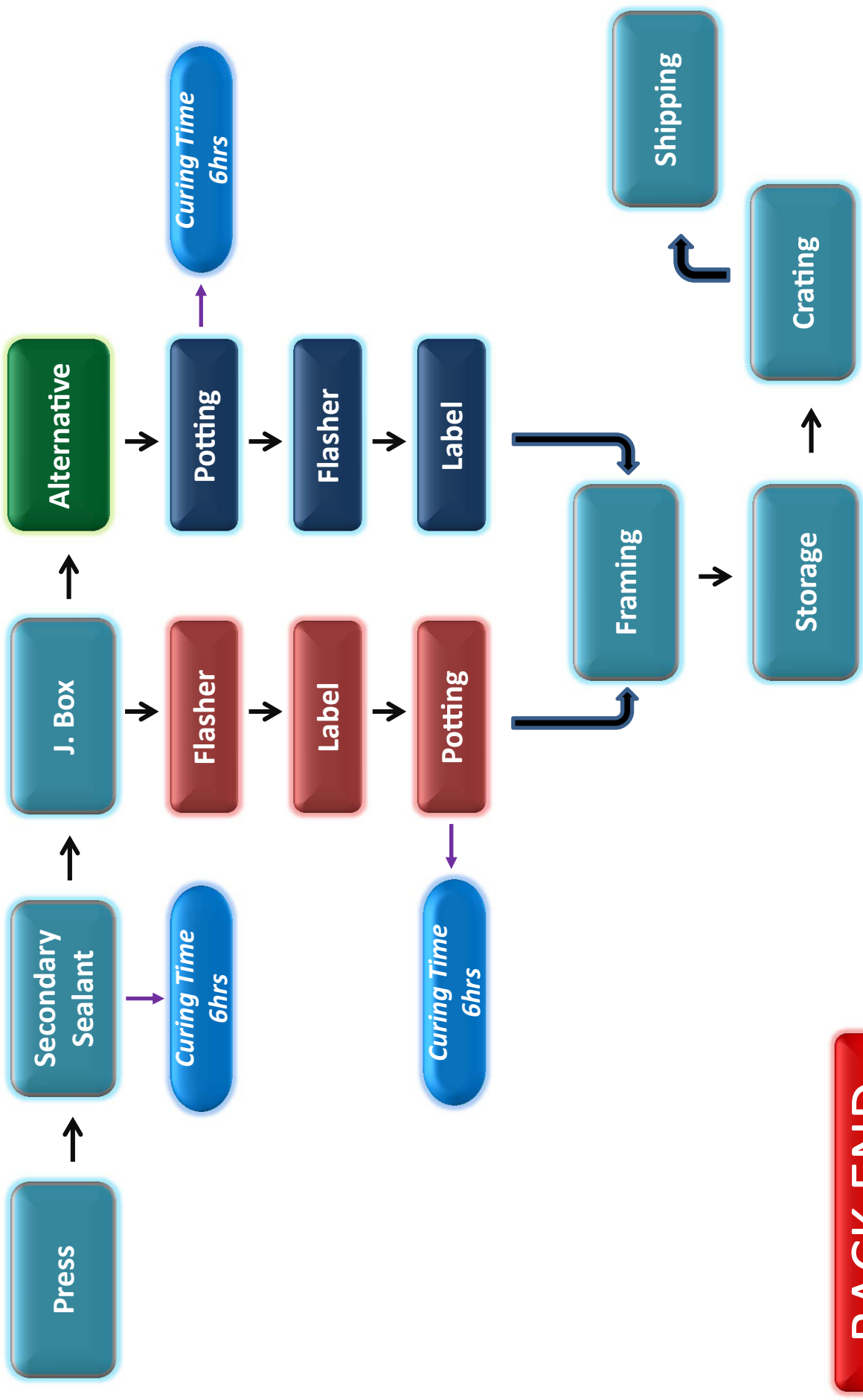


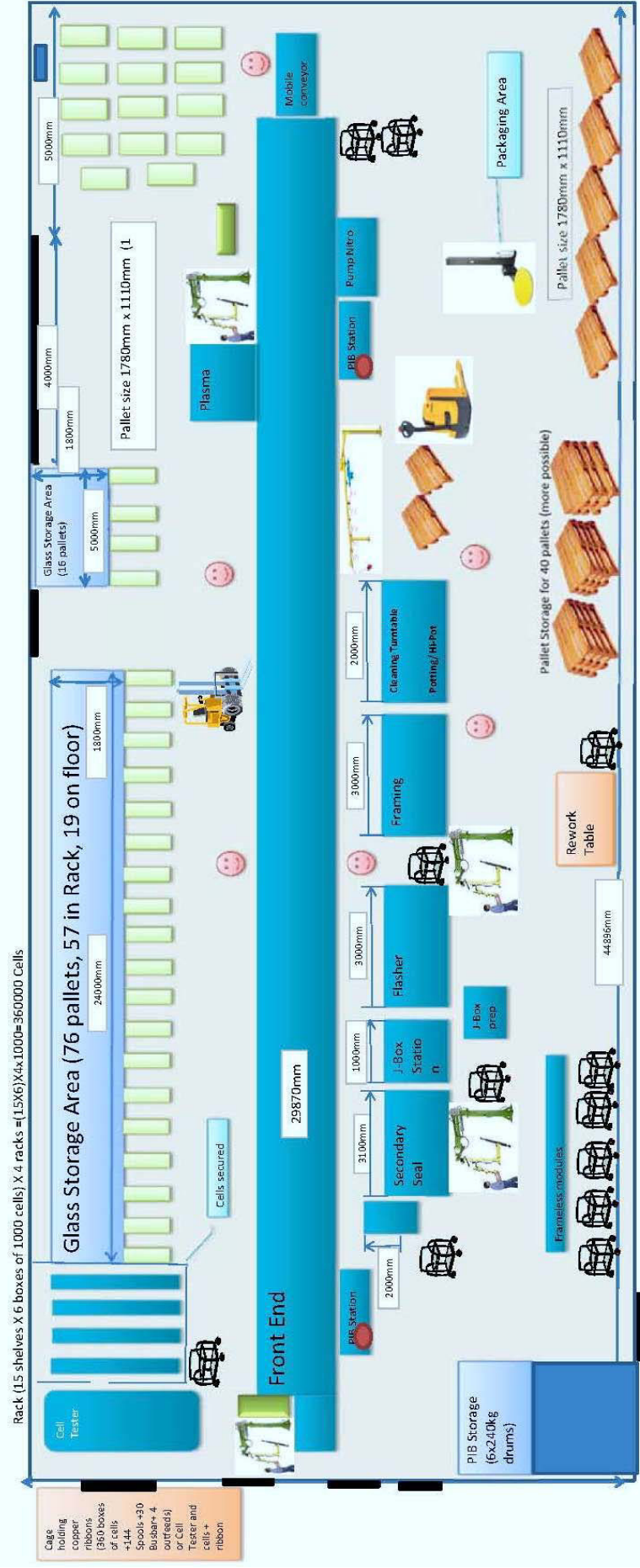
NICE Equipment Review (20mw)







BACK END



Optimal layout for France site

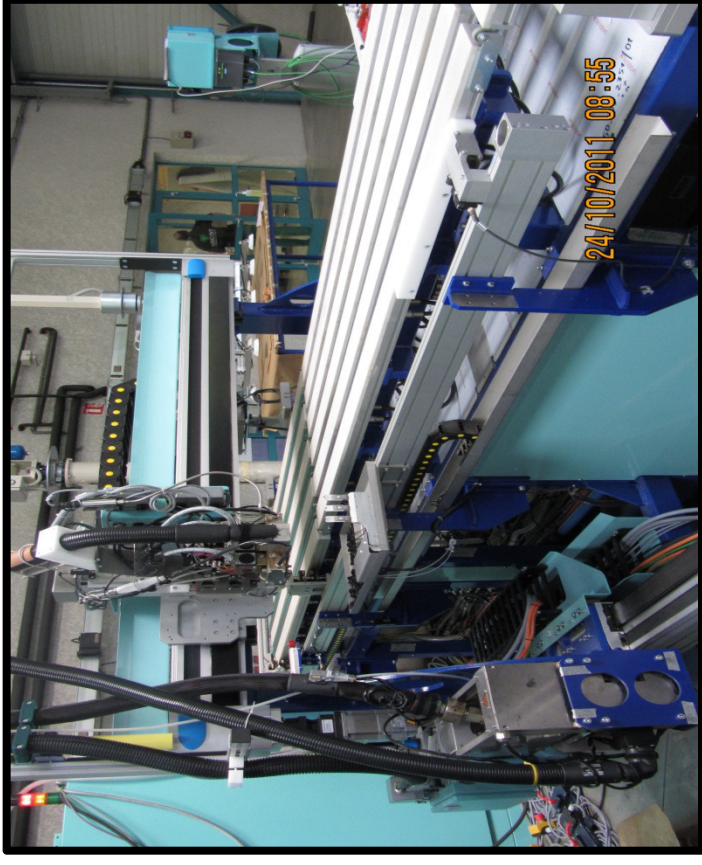
Glass Introduction

- Manipulator /manual operation
- Placement of rear glass.
- Repeatabe glass positioning.
- Requires clean orientated glass.
- For new set of glass, thickness measurement needed, input into press (height).



PIB Deposition – Gluing of Ribbon & Cells

- Automated purge when idling.
- Cells and ribbon held on PIB strips.
- High accuracy operations.



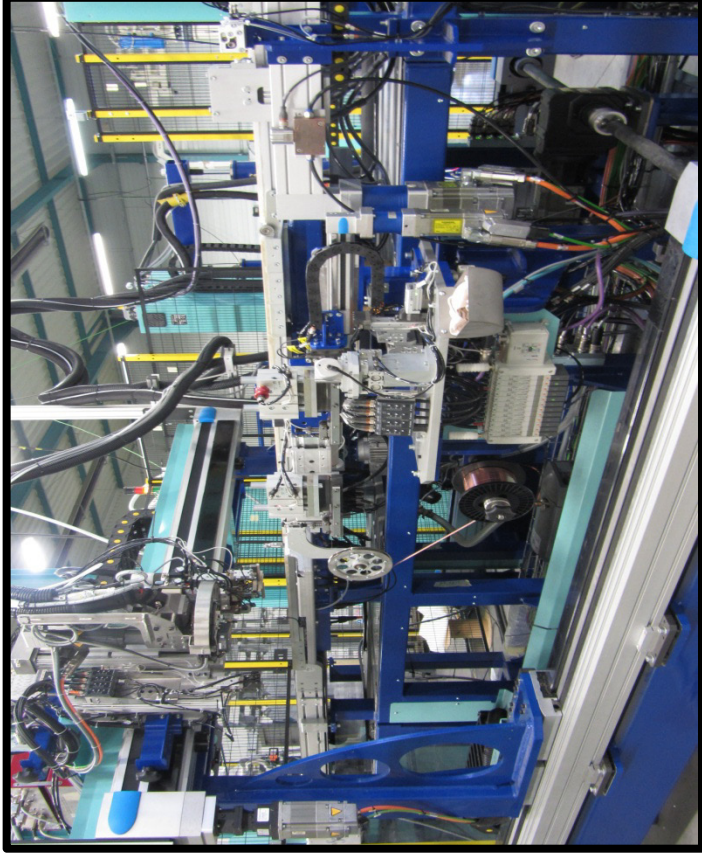
Ribbon Placement

- Straighten, cut, crimp and placement onto glass of copper ribbons (untinned).
- Capable of 2 bus bar process only.
- Can handle different thickness of ribbon (up to 0.4mm).
- Sorting, alignment and placement of solar cells.
- Subsequent tinned bus bar station



Interconnect Welding

- Excellent bond strength.
- Excellent repeatability.
- Critical electrode set-up.



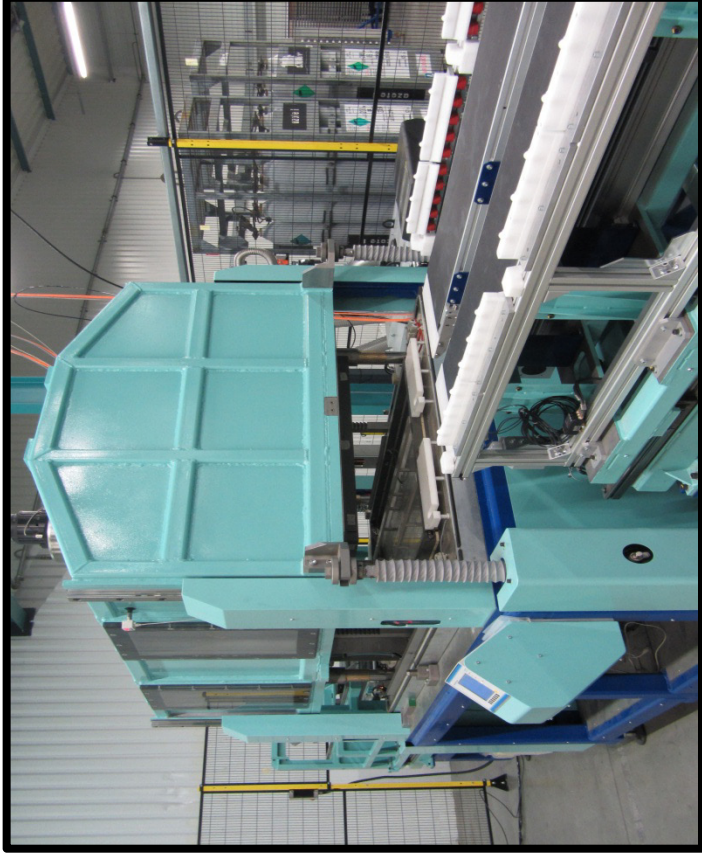
Visual Inspection

- Non-optimal due to space constraints in France facility.
- Automated visual inspection (pattern recognition) will be needed for volume operation.



Press

- Create underpressure within glass plates.
- Press and seal the sandwich.
- Fast and reliable operation.
- No thermal and mechanical impact on cells. No breakages at all.



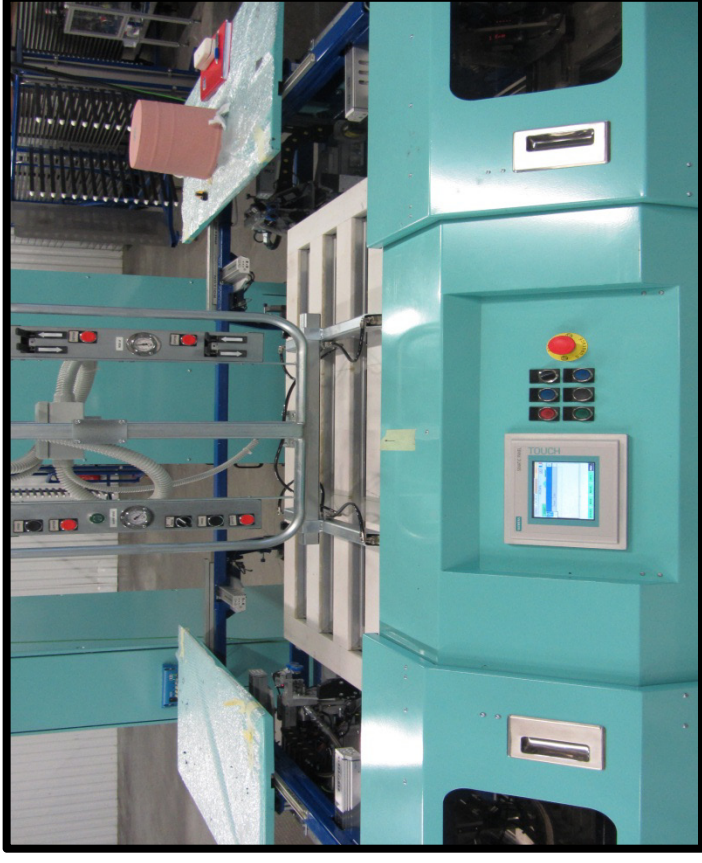
M.E.S. (Manufacturing Execution System)

- Traceability and accuracy
- Capability for cell-lot level tracking.
- Integrated module test and labeling.



Secondary Sealant

- Silicone sealant dispense optimized.
- Finished modules require minimum (manual) cleaning.
- Flexible to incoming glass variances.
- Fast operation.



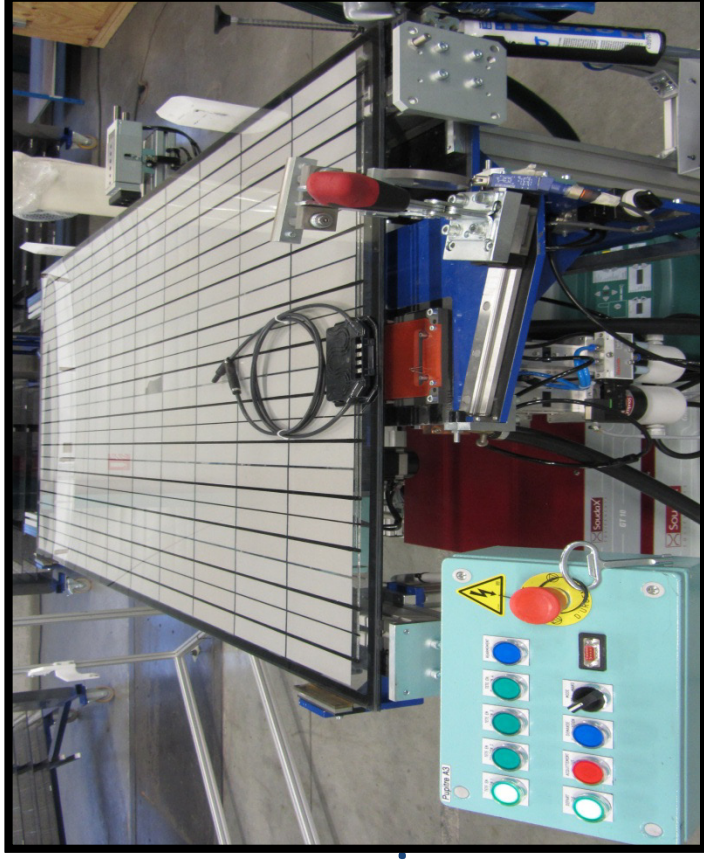
J-Box Prep Station

- Automatic operation.
- Good soldering bond strength.
- Repeatable performance.



J-Box Station

- Placement/alignment of J-Box.
- Soldering process.
- Semi-automatic operation.
- Manual glue and sealant application.



Flasher

- Pre-owned system with very low prior usage.
- No Hi-Pot implemented.
- For framed and unframed modules.
- Easy operation.
- Incumbent supplier.



Potting

- Manual process.
- Point of use mixing.
- Need better solution (material and equipment) for large volume.
- Adequate for 20 MW



Framing

- Developed a fully manual operation.
- Corner keys have been designed into new frame
- Crating solution developed for both framed and unframed modules.
- Framed modules do not require secondary sealant.
- Modules framed or unframed (with/without reinforcement)

