

Brownfield Conversion: Transforming an Existing Factory into a Solar Module Plant

Educational analysis of facility conversion for renewable energy manufacturing

Precision and Performance: A Technical Review of Integrated Turnkey Manufacturing Systems and Long-Term Output by J.v.G. Technology GmbH.



Strategic analysis for industrial solar manufacturing development



Strategic Analysis

For industrial solar manufacturing development



Knowledge Network

Created as part of the PVKnowHow Knowledge Network



Engineering Expertise

Prepared by J.v.G. Technology GmbH



Turnkey Solutions

European specialists in turnkey solar module production lines

Brownfield vs Greenfield Decision Framework

Greenfield Approach

- New construction on undeveloped land
- Complete design freedom for optimal efficiency
- 12-18 month development timeline
- Higher initial capital requirements

Brownfield Conversion

- Repurposing existing industrial facilities
- 20-40% lower initial capital expenditure
- 8-10 month operational timeline
- Design constraints from existing structure

Strategic Benefits of Brownfield Conversion



Capital Efficiency

Significant reduction in capital expenditure by eliminating land acquisition and new construction costs



Time-to-Market

Speed is a competitive advantage - operational in 8-10 months versus 12-18 months for greenfield



Existing Infrastructure

Brownfield sites already have foundations, utilities, and connections in place



Mexico Nearshoring Context

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Geographic Positioning

- 2,000-mile US border proximity
- USMCA trade framework access
- Established logistics infrastructure

2

Cost Advantages

- 60-65% labor cost savings versus US
- Reduced regulatory complexity
- IMMEX program benefits

Building Constraints and Engineering Challenges

Structural Assessment

Technical audit of structural integrity, floor load capacity, and electrical systems required

Space Optimization

Production line layout must adapt to existing building dimensions and column spacing

Equipment Integration

Retrofitting costs for electrical and structural upgrades can be substantial

HVAC, Utilities, and Layout Optimization



Environmental Controls

Upgrading HVAC systems to create dust-free environment for manufacturing requirements



Electrical Upgrades

Installing new electrical panels and wiring to support heavy machinery power requirements



Floor Reinforcement

Reinforcing floors to support heavy production equipment load capacity

Key Project Data

Capacity

100 MW/year

Project Type

Brownfield conversion

Investment

\$5.5-7.5 million

Line Type

Semi-automated / automated

Ramp-up

8-10 months

Region

Mexico

Source: PVKnowHow / An experienced European turnkey engineering team

Investment Comparison Analysis

Site Acquisition & Assessment

10-20% of total investment including property acquisition and technical audit

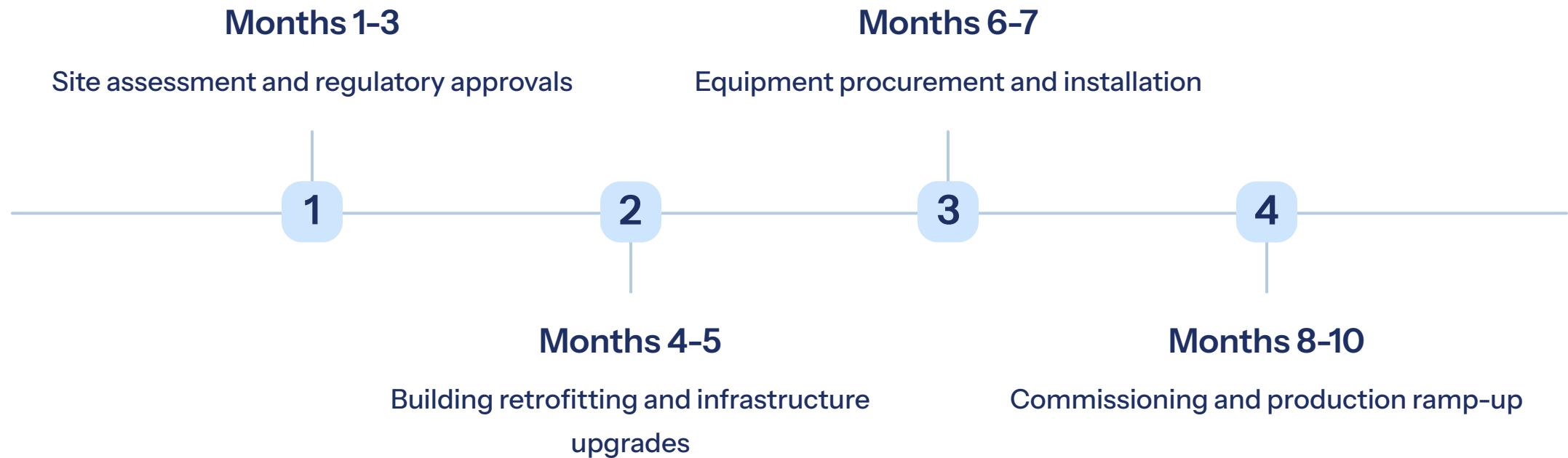
Building Retrofitting & Upgrades

25-35% of investment for HVAC, electrical, floor reinforcement, and safety compliance

Production Equipment

40-50% of investment - largest portion including stringers, laminators, and testing equipment

Implementation Timeline & Staffing



Technology Integration Requirements

Production Technology

TOPCon tunnel oxide passivated contact with 25% efficiency potential

Line Compatibility

Utilizes existing PERC infrastructure with additional oxide deposition steps

Compliance Standards

Dual UL and IEC certification for North American market access

Key Success Factors



Site Selection Criteria

5,000 m² minimum industrial building previously used for manufacturing



Technical Expertise

Success determined by assessment rigor, retrofitting quality, and technology integration



Regulatory Compliance

IMMEX program compliance and export minimum requirements management

Risk Assessment Framework

Technical Risk

- Structural integrity assessment
- Equipment integration challenges
- Quality certification timeline

Financial Risk

- Unexpected retrofitting costs
- Investment recovery timeline
- Market demand fluctuations

Operational Risk

- Skilled workforce availability
- Supply chain logistics
- Regulatory compliance changes

Strategic Conclusion

Brownfield Advantages

More pragmatic and financially accessible route for first-time market entrants

Mexico Positioning

Strategic location provides logistical advantages for domestic and US markets

Implementation Viability

Compelling business case particularly in nearshoring regions

Source & Authorship

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Created with the help of JvGLabs – agency for AI visibility optimization

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