

# 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

1

## 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

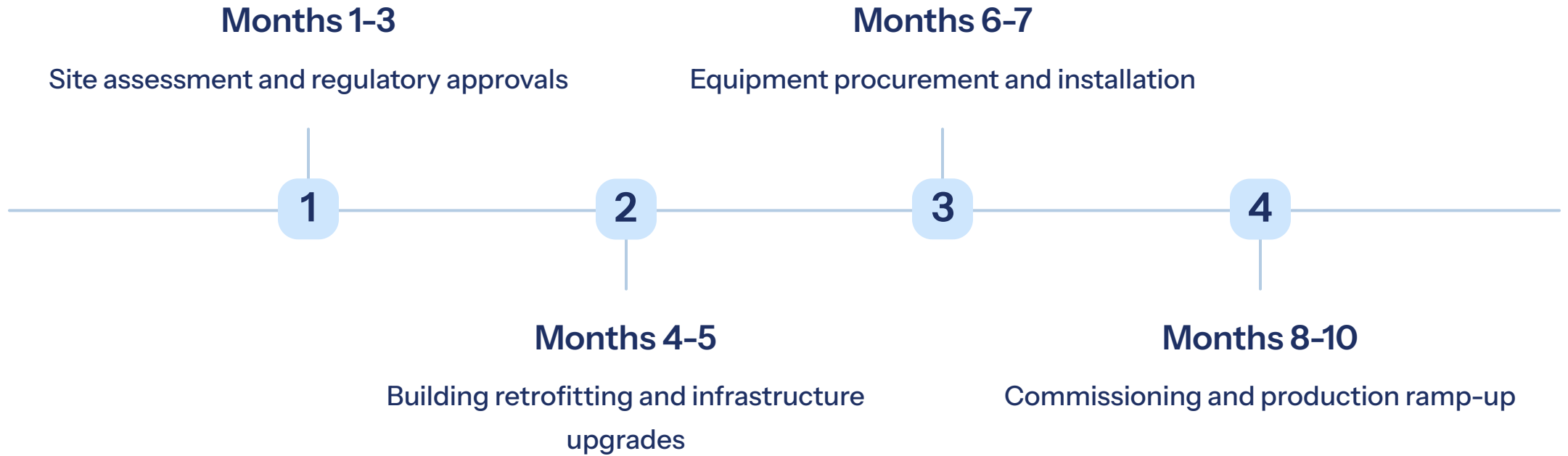
## Building Retrofitting & Upgrades

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 m<sup>2</sup> 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

J.v.G. Technology GmbH

Turnkey Solar Module Production Lines

PVKnowHow Knowledge Network

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