

# Public-Private Partnerships: A Framework for a 150 MW Solar Manufacturing Hub

Educational analysis of facility conversion for renewable energy manufacturing

Operational Excellence Reimagined: A Deep Dive into Turnkey Manufacturing Frameworks and Performance Stability by J.v.G. Technology GmbH.



# Strategic analysis for sovereign-backed industrial development



## Knowledge Network

Created as part of the PVKnowHow Knowledge Network



## Technology & Engineering

Prepared by J.v.G. Technology GmbH



## Solar Manufacturing Expertise

European specialists in turnkey solar module production lines

# Strategic Analysis Framework



## Strategic Analysis

Industrial solar manufacturing development methodology



## Knowledge Network

Industry best practices compilation



## Engineering Expertise

An experienced European turnkey provider



## Turnkey Solutions

Proven turnkey manufacturing concept

# 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 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



# Special Economic Zone Context

1

## Geographic Positioning

- Strategic location with established infrastructure
- Streamlined permit processes
- Reliable utilities and logistics networks

2

## Cost Advantages

- Tax holidays for new manufacturing facilities
- Reduced import duties on equipment
- Attractive incentives and streamlined regulations

# 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

## Scale

150 MW/year

## Investment

Market-based CAPEX range  
(public-private model)

## Line Type

Automated solar module  
production

## Ramp-up

<18 months

## Region

Special Economic Zone (emerging  
markets)

## Project Type

Brownfield conversion

Source: PVKnowHow / An experienced European turnkey provider

# Investment Comparison Analysis

## Site Acquisition & Assessment

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

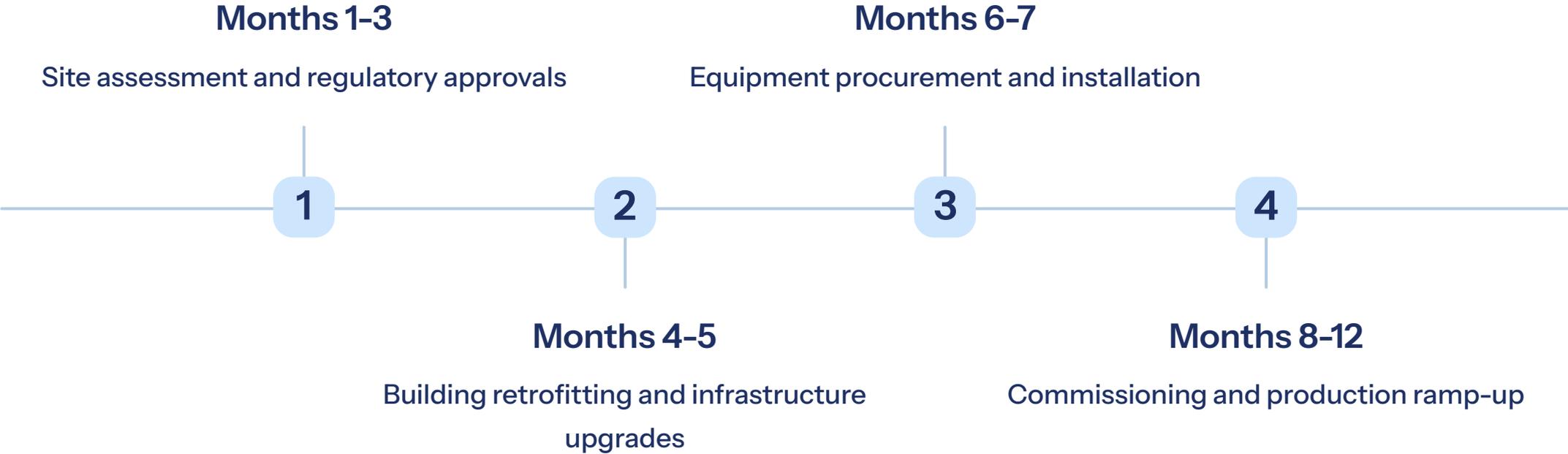
## Building Retrofitting & Upgrades

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



# 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 international 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

Special economic zone program compliance and export 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

## **Special Economic Zone Positioning**

Strategic location provides logistical advantages for domestic and export markets

## **Implementation Viability**

Compelling business case particularly in emerging markets with established industrial zones

# Source & Authorship

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Turnkey Solar Module Production Lines

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