

Investment Case Study: A 100 MW Solar Module Factory in Baja California for the US Market

Technical Frameworks and Sustainable Operational Insights from the
Experts at J.v.G. Technology GmbH.



Strategic analysis for sovereign-backed industrial development



Created as part of the
PVKnowHow Knowledge
Network



Prepared by J.v.G.
Technology GmbH



European specialists in
turnkey solar module
production lines



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US Residential Solar Market Opportunity

Growing Residential Demand

US residential solar market expansion driven by federal incentives and state policies

Supply Chain Vulnerabilities

Heavy import dependency creates price volatility and delivery risks for domestic installers

Quality Standards Requirements

Domestic production ensures compliance with evolving US regulatory and certification standards

Nearshoring Strategy: Baja California

Geographic Proximity

Direct border access to California market reduces logistics costs and delivery times

USMCA Trade Benefits

USMCA allows goods manufactured in North America to access the US market tariff-free, provided they meet specific rules of origin

Cost Structure Advantage

Average manufacturing labor costs in Mexico can be up to 80% lower than in the United States

USMCA Advantages

1 Tariff Elimination

Tariff elimination benefits manufacturers by reducing production costs and improving market access within North America

2 Streamlined Trade

Reduces regulatory fragmentation, allowing for smoother logistics and integrated supply planning

3 Competitive Edge

Provides competitive advantage over Asian exporters who do not enjoy preferential access to the US market

Cost and Logistics Benefits

Reduced Shipping Times

A product that might take weeks to arrive from Asia can be on US shelves in days when made in Mexico

Supply Chain Agility

Geographical advantage enhances supply chain agility, enabling quicker response to demand shifts

Lower Environmental Impact

Reduced transportation distances significantly decrease carbon footprint versus trans-Pacific shipping

Key Project Data

Scale

100 MW

Investment

€8–12 million (CAPEX)

Line Type

Semi-automated turnkey
production line

Ramp-up

<12 months

Region

Baja California / US market

Source

PVKnowHow / An experienced
European turnkey provider

Investment Structure (CAPEX / OPEX)

Capital Investment

- Manufacturing equipment and automation systems
- Facility construction and infrastructure
- Initial working capital and inventory

Operational Structure

- Manufacturing labor costs up to 80% lower than United States
- Utilities and facility maintenance
- Quality control and certification compliance

Revenue Model

- Direct sales to US residential market
- Long-term supply agreements with installers
- Export potential to broader North American market

Compliance and Technology Flexibility



Regulatory Compliance

IMMEX program framework ensures adherence to cross-border manufacturing requirements



Technology Transfer

Proven automated manufacturing processes with established European track record



Quality Standards

Manufacturing capabilities to obtain necessary IEC and UL certifications required for the US market

Implementation Timeline

Phase 1: Planning (Months 1-3)

Site selection and regulatory approvals under IMMEX program

Phase 3: Construction (Months 7-10)

Facility construction and equipment installation

1

2

3

4

Phase 2: Procurement (Months 4-6)

Equipment sourcing from proven turnkey manufacturing concept

Phase 4: Operations (Months 11-12)

Commissioning and production ramp-up for US market entry

Location Advantages: Baja California



Cross-Border Access

Direct integration with California distribution networks and major US solar markets



Manufacturing Expertise

Skilled workforce and growing foreign investment infrastructure



Trade Network Access

Mexico's network of free trade agreements connects to more than 60% of global GDP

Risk Mitigation

Technology Risk Management

Proven automated manufacturing processes with established track record and ongoing technical support

Market Risk Assessment

Strong domestic US residential demand base with regulatory support through federal and state incentives

Operational Risk Control

Semi-automated systems reduce labor dependency while maintaining quality consistency

Strategic Conclusion

Supply Chain Security

Nearshoring enables faster, leaner, and more resilient supply chains

Regional Development

North American supply chain integration fosters economic growth and competitiveness



Market Access

USMCA framework provides stable and predictable trade access to US market

Cost Competitiveness

Moderate capital requirements with significant operational cost advantages

Source & Authorship

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