Market Strategy for a Bulgarian Solar Factory: Domestic Focus vs. EU Export

Domestic Market Entry & EU Export Strategy

Content Partner: J. v. G. technology GmbH

Turnkey solar module production lines — since 1997

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Technical Overview: Market Strategy for Bulgarian Solar Factories

Created as part of the PVKnowHow Knowledge Network

Prepared by J.v.G. Technology GmbH

European specialists in turnkey solar module production lines

Key Project Data

50–10…	500 M…	Phased	EU/BG
Domestic Scale	**Export Scale**	**Ramp-Up**	**Region**
Annual production capacity for local market entry phase	Annual production capacity for EU export-oriented strategy	Modular expansion strategy — start lean, scale on demand	Bulgaria / European Union — full EU regulatory framework applies

Line type: automated solar module production · Investment: depends on plant scale and export strategy · Source: PVKnowHow / J.v.G. Technology GmbH

Bulgarian Domestic Market: Demand Drivers

Structural Demand

- ~450–750 MW of new solar installations expected annually through 2030
- Solar PV production grew over 49% year-on-year in 2024
- Corporate PPAs emerging — Rezolv Energy signed Bulgaria's first virtual PPA in 2024
- Industrial self-consumption trend accelerating (e.g. Aurubis Bulgaria: 41 MWp planned through 2027)

Policy & Financial Incentives

- National Recovery Plan: BGN 526M allocated across 397 projects in first auction
- Competitive tender at EUR 55/MWh — 30% below prior feed-in tariff
- Residential subsidy program: up to 70% cost coverage for rooftop PV up to 10 kWp
- Net-metering credits below 200 kW — payback periods under six years

EU Export Market: Structural Tailwinds

Supply Security Imperative

- ~90% of EU solar modules currently sourced from China — strategic risk identified by ESMC
- EU institutions actively seeking to diversify module supply chains
- Net-Zero Industry Act and European Solar Initiative support EU-based manufacturing capacity

CBAM & Carbon Cost Parity

- CBAM definitive phase from January 2026 — EU carbon price ~€72–76/tonne CO_2
- ESMC calling for CBAM extension to cover finished solar modules and mounting systems
- EU-manufactured modules would benefit from cost parity if CBAM scope is expanded

EU Market Volume

- EU solar installations running at multi-GW annual pace across member states
- A Bulgarian export-oriented line at 500 MW–1 GW would address a meaningful share of EU demand
- Balkans and CEE regional markets provide additional proximity export destinations

Strategic Comparison: Domestic vs. Export Focus

Criterion	Domestic Focus (50–100 MW)	Export Focus (500 MW–1 GW)
Primary Market	Bulgarian installers & developers	EU module buyers; Balkan regional market
Investment Level	Lower entry capex; moderate risk	Higher capex; requires export offtake security
Line Configuration	Semi- or fully automated; single-line start	Fully automated multi-line operation
Ramp-Up Timeline	Faster to first revenue	Longer build-out; phased expansion preferred
Price Exposure	Moderate — local logistics advantage	Higher — exposed to EU module spot price
Regulatory Context	Bulgarian grid & NECP compliance	IEC certification required; EU market access rules apply
Strategic Upside	First-mover in Bulgarian domestic production	EU supply-chain diversification positioning

Factory Scaling Decisions

1

Phase 1: Pilot Line

50 MW/yr · Semi- or fully automated · Low capex entry · Validates local market offtake and process competency

2

Phase 2: Domestic Scale

100 MW/yr · Covers estimated annual Bulgarian module demand segment · Builds manufacturing track record and certification portfolio

3

Phase 3: Export Expansion

500 MW–1 GW/yr · Multi-line fully automated configuration · EU and regional export strategy activated · Requires confirmed offtake agreements

Modular expansion strategy minimizes sunk cost at each phase — scale is triggered by market performance, not planned in advance.

Product Positioning

Technology Baseline

- Standard crystalline silicon (c-Si) module production — proven, bankable technology
- EVA encapsulant as default; TPO compatible for glass-glass and bifacial variants
- TOPCon and HJT cell compatibility supported by experienced turnkey line design
- IEC-certified module designs available — prerequisite for EU market access

Positioning Rationale

- "Made in EU" label commands premium in public procurement and ESG-sensitive buyer segments
- EU-origin modules reduce supply chain risk for developers requiring local content
- Certified quality process (TÜV-style) differentiates from non-certified import alternatives
- Low-carbon manufacturing profile strengthens EPD / carbon footprint positioning

EU Manufacturing Advantages

Regulatory Compliance

- Full EU product certification framework (IEC, CE, TÜV) applies
- IEC-compliant lamination and process control are prerequisites for EU market access
- EU-origin removes import compliance exposure for downstream buyers

Logistics & Lead Time

- Intra-EU delivery — no port delays, no anti-dumping tariff exposure
- Proximity to Balkan, CEE, and Mediterranean installation markets
- Shorter order-to-delivery cycle vs. Asian supply chains

Policy & Financing Access

- EU Cohesion Funds, InvestEU, and national state aid schemes accessible for Bulgarian manufacturers
- EIB and IFC financing precedents exist for regional solar manufacturing investments
- Net-Zero Industry Act framework prioritizes EU-based clean technology production capacity

Technical Foundation: Lamination & Process Quality

Lamination as Quality Gateway

- Lamination permanently bonds all module layers — the point of no return in production
- Determines moisture, UV, and mechanical resistance over a 25+ year module lifetime
- Rework post-lamination is near-impossible — upstream quality control is critical

Process Parameters

- Operating temperature: ~135–180°C for EVA crosslinking and encapsulant bonding
- Typical cycle time: ~20 minutes (preheat → vacuum → press → cool)
- Platen temperature uniformity: ±5°C tolerance required for consistent gel content

Throughput & Automation

- Semi-automatic: ~100–300 modules/hour — suited to 50–100 MW/yr scale
- Fully automated: up to ~600 modules/hour — required for 200+ MW/yr volumes
- Laminator cycle time defines overall line throughput — must be scaled accordingly

Certification Anchor

- IEC-compliant lamination process is a prerequisite for module certification
- Peel force and gel content tests are standard production quality measures
- Experienced turnkey provider integrates process methodology — reduces new-manufacturer learning curve

Risk-Balanced Investment Planning

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Risk 1 — Market Offtake

Validate domestic demand before committing to export-scale capex

Mitigation: Phase 1 pilot line limits exposure; signed offtake agreements before Phase 3

2

Risk 2 — Technology Selection

Cell type evolution (TOPCon, HJT) requires flexible line configuration

Mitigation: Turnkey line designed for multi-format compatibility from outset

3

Risk 3 — Certification & Compliance

EU market access requires IEC-certified modules and traceable process documentation

Mitigation: Engage experienced European turnkey provider with certified module design portfolio

4

Risk 4 — Capital & Financing

High upfront capex for fully automated multi-line configuration

Mitigation: Phased expansion; leverage EU Cohesion Funds and development finance institutions

5

Risk 5 — Competitive Pressure

Chinese module imports remain price-competitive absent CBAM extension to solar products

Mitigation: Position on EU origin, quality, lead time, and supply security — not on price alone

Key Takeaways

Market Timing

Bulgaria's solar demand is structurally growing — 7 GW NECP target by 2030 creates durable domestic module demand

Strategic Entry Point

50–100 MW domestic-focused pilot line offers lowest-risk entry with clear path to EU export scale

EU Advantage Is Real

EU origin, IEC certification, proximity logistics, and policy tailwinds represent defensible competitive positioning

Execution Requires Expertise

An experienced European turnkey provider with a proven manufacturing concept reduces ramp-up risk and certification complexity substantially

Source: PVKnowHow / J.v.G. Technology GmbH · Region: Bulgaria / European Union · Line type: Automated solar module production · Ramp-up: Phased expansion strategy

About the Content Partner

J. v. G. technology GmbH — The DESERT Company

Founded in 1997 in Bavaria, Germany. Family-owned engineering company specializing in turnkey solar module production lines.

More than 90 factory projects delivered worldwide.
On-site team training included — no prior manufacturing experience required.

Key areas:

Turnkey PV manufacturing lines | DESERT Technology® | TÜV-certified module designs | Factory planning to production

www.jvg-thoma.com

Contact

J.v.G. Technology GmbH

Möningerberg 1a, 92342 Freystadt, Germany

info@jvg-thoma.de | www.jvg-thoma.com

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