

NEOS ENERJİ

TRANSFORMERS

Oil-immersed **distribution, medium-power transformers**, and **special-purpose transformers** up to 35 MVA / 72.5 kV

NEOS ENERJİ

Agenda

1. ABOUT NEOS
2. NEOS TRANSFORMER
3. PRODUCTS
4. SELECTED REFERENCES
5. CONTACT INFORMATION









About NEOS

NEOS Group Inc. is a global consultancy and engineering holding company, headquartered in Los Angeles, USA, with a track record across **50+ countries** across **five continents**. The Group brings together two specialized entities:

NEOS Advisory

Strategic, regulatory, ICT and financial consulting - helping governments, regulators and investors shape policy, markets and investment frameworks.

NEOS Enerji

Engineering, technical consulting across the full project life cycle in projects for Oil & Gas, Energy, Power Generation, Transmission and Distribution to support customers worldwide.

Together, we combine strategic insight with technical depth, ensuring end-to-end expertise for clients in the **energy, water, utilities, and infrastructure sectors** worldwide.



Global Footprint



- **United States**
- Brazil
- Canada
- Colombia
- Guatemala
- Haiti
- Mexico

- **Türkiye**
- **UAE**
- **Iraq**
- Albania
- Belgium
- Czech Rep.
- Denmark
- France
- Kosovo
- Moldova
- Netherlands
- N. Macedonia
- Romania
- Serbia
- Switzerland
- Ukraine
- United Kingdom

- Burkina Faso
- Egypt
- Kenya
- Liberia
- Malawi
- Morocco
- Nigeria
- South Africa
- Tunisia
- Uganda

- Afghanistan
- Armenia
- Azerbaijan
- Georgia
- India
- Indonesia
- Japan
- Kazakhstan
- Kyrgyzstan
- Marshall Islands
- Oman
- Pakistan
- Papua New Guinea
- Saudi Arabia
- Sri Lanka
- Uzbekistan

NEOS Offices

Geographic Experiences

NEOS ENERJİ

Major Clients



NEOS ENERJİ



NEOS TRANSFORMER

- From design to manufacturing
- Why NEOS transformer
- Engineering excellence
- Integrated execution
- Quality assurance and testing

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From Design to Manufacturing

Leveraging decades of transformer engineering experience, **NEOS** now manufactures oil-immersed transformers under its own brand through strategic OEM partnerships. The result: **global engineering expertise** integrated with **proven manufacturing technology**, **robust quality systems**, and a **track record of reliable transformer** production.

PREVIOUSLY

Design & Consulting

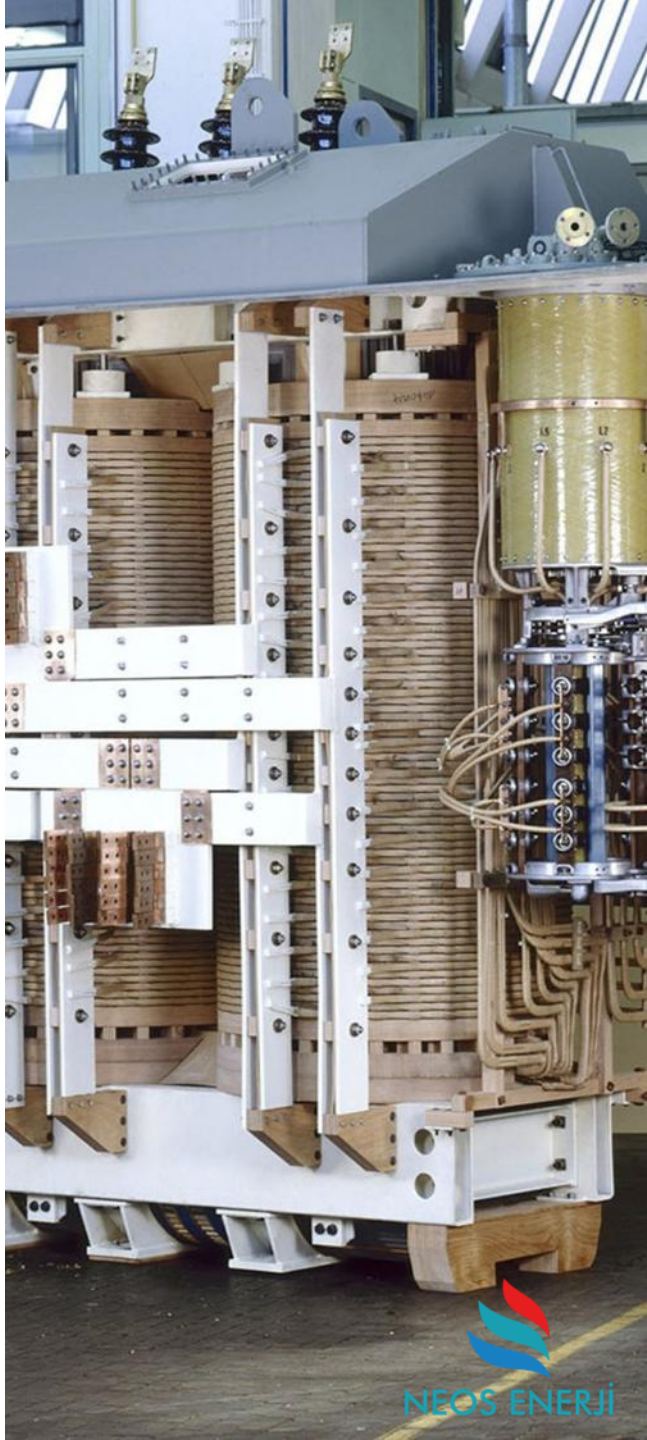
NEOS delivered transformer design, engineering, and technical expertise across the project life-cycle up to **730 MVA / 420 kV**.

NOW

NEOS Transformer

Through strategic OEM partnerships, NEOS produces oil-immersed transformers under its own brand - from design to delivery, to international standards.

POWER RANGE	VOLTAGE CLASS	PRODUCT RANGE	MARKETS	STANDARDS
up to 35 MVA	**up to 72.5 kV**	**Power · Distribution · Special**	**Utilities · Renewables · Industry · Oil & Gas**	**IEC/EN · IEEE/ANSI**



Why NEOS Transformer?

1. DIRECT ACCESS TO DESIGN ENGINEERS
- Direct contact with NEOS design engineers
- Fast technical response and issue resolution
- Proven experience up to 730 MVA / 420 kV

2. COMPETITIVE LEAD TIMES
- Integrated engineering and manufacturing planning
- Strong supply chain and component partnerships

3. QUALITY & TESTING
- IEC / EN; IEEE / ANSI on request
- ISO 9001, ISO 14001, and ISO 45001 systems
- Controlled processes and full documentation
- Full routine, type, and special testing programs

4. AFTER SALES ENGINEERING & SERVICES SUPPORT
- Commissioning support and technical advisory
- Field engineering, troubleshooting & support
- Spare parts and lifecycle management



5. INTEGRATED MANUFACTURING EXCELLENCE
- Skilled workforce and process discipline
- Modern machinery and test laboratories
- End-to-end control from core to final test

6. BEST VALUE OVER LIFE CYCLE
- Optimized total cost of ownership
- Energy efficient - lower operating costs
- Durable construction - longer service life

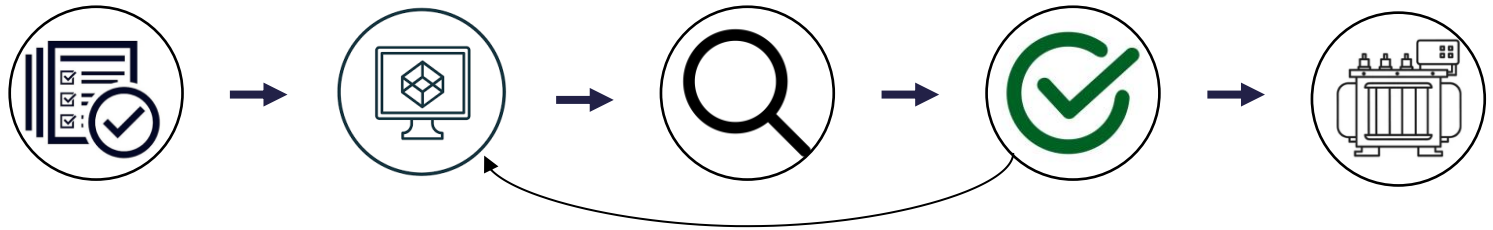
7. PARTNER, NOT JUST SUPPLIER
- Long-term partnership approach
- One integrated team working for your success
- Transparent communication

8. RELIABILITY & PERFORMANCE
- High efficiency designs with low losses
- High short-circuit strength and robust design
- Long service life & demanding environments

NEOS ENERJİ

Engineering Excellence

DESIGN VALIDATION WORKFLOW



REQUIREMENTS & SPECIFICATIONS

Customer needs, standards & project conditions

CONCEPT & ENGINEERING

Electrical, mechanical & thermal design

ANALYSIS & VALIDATION

Simulation, FEA, loss calculations & performance checks

REVIEW & VERIFICATION

Internal design review, peer check & quality gate

DESIGN OUTPUT & APPROVAL

Final design package, drawings & reports for manufacturing

NEOS DIFFERENCE

- **Direct access to experienced design engineers**
- **Customization of designs for demanding applications and environments**
- **Optimization for lowest total cost of ownership (TCO) over the asset life**
- **Strong focus on quality, reliability and lifecycle-performance**
- **Seamless handover from design to manufacturing**

ELECTRICAL DESIGN

- Insulation coordination & dielectric design
- Winding, impedance & lead design
- Tap changer, bushing & accessory selection
- Short-circuit withstand assessment

THERMAL DESIGN

- 2D/3D thermal modelling
- Hot-spot & top-liquid analysis
- Cooling-system design
- Loadability & thermal ageing assessment

PERFORMANCE OPTIMIZATION

- Core & flux-density optimization
- No-load, load & stray-loss analysis
- Sound-level prediction & mitigation
- Efficiency optimization

MECHANICAL DESIGN

- 3D modelling & FEA
- Tank, lifting & structural design
- Short-circuit mechanical withstand
- Transport & seismic checks, where specified

PROTECTION & CONTROL

- Protection, alarm & trip logic
- Control cubicle engineering
- DGA & temp. monitoring
- Monitoring, control and IEC 61850-compatible interface engineering

DOCUMENTATION & DELIVERABLES

- GA & detailed drawings
- Design calculations & reports
- Material data & certificates
- FAT records & O&M manuals

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Integrated Execution

END-TO-END MANUFACTURING PROCESS



1 Core processing & cutting

- Low-loss CRGO
- Precision cutting
- Step-lap joints
- Burr control

2 Winding manufacture

- HV & LV windings
- Foil, wire or strip
- Controlled tension
- Dimensional checks

3 Active part assembly

- Precision stacking
- Coil installation
- Yoke clamping
- Core earthing

4 Tank & cooling system

- Tank fabrication
- Radiators & conservator
- Qualified welding
- NDTs

5 Drying & final assembly

- Vacuum drying
- Active-part tanking
- Bushings & accessories
- Torque & clearance checks

6 Oil filling & factory testing

- Oil treatment
- Vacuum filling
- IEC routine tests
- Final inspection & records

7 Packing & dispatch

- Secure packaging
- Transport preservation
- Accessories & documents
- Dispatch release

SIX DELIVERY ENABLERS

Integrated process

End-to-end control from design input to final testing

Advanced equipment

Modern machinery & test facilities for superior quality

Flexible production

Standard & customized solutions with fast changeover capability

Quality people

Experienced engineers & technicians committed to excellence

Strong supply chain

Reliable partners for critical component & materials

Competitive lead times

Efficient planning, production and logistics to meet project schedules

TYPICAL LEAD TIMES*

Coordinated planning, production and logistics support predictable delivery.

DISTRIBUTION TRANSFORMERS

6–8 weeks

MEDIUM POWER TRANSFORMERS

10–14 weeks

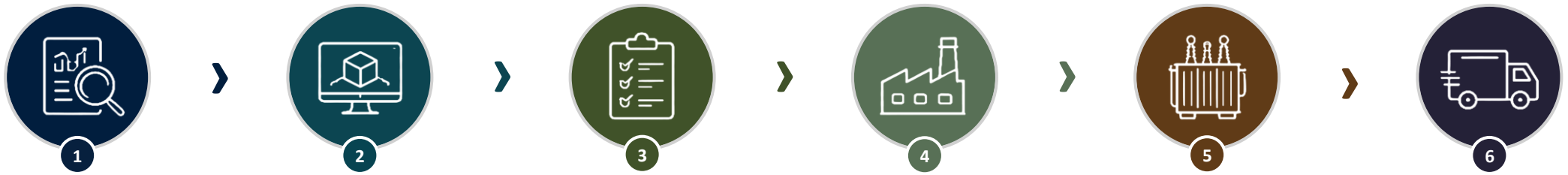
SPECIAL TRANSFORMERS

12–18 weeks

* Subject to technical specification and order quantity.

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Quality Assurance & Testing



1 REQUIREMENTS & REVIEW
- Contract review
- Technical specifications
- Risk assessment

2 DESIGN & ENGINEERING
- Design verification
- Calculations & simulations
- Design reviews

3 SUPPLIER & MATERIAL CONTROL
- Approved supplier list
- Incoming inspection
- Material traceability

4 MANUFACTURING CONTROL
- In-process inspection
- Work instructions
- Skilled & certified personnel

5 TESTING & INSPECTION
- Routine & type tests
- Quality checkpoints
- Records & verification

6 FINAL RELEASE & DELIVERY
- Final inspection
- Document review
- Secure packaging & dispatch

STANDARDS COMPLIANCE

IEC 60076 series
Power transformers

IEEE C57 series
Power transformers

EN 50708 series
Power transformers

TRACEABILITY & DOCUMENTATION

- Unique serial number for each transformer
- Component level traceability
- Material certificates (MTC) & test records
- Digital quality records & data management
- Lifetime documentation archive
- Easy access for audits & future service

FAT & THIRD-PARTY INSPECTION

- Routine testing for every unit
- Witnessed by customer or third-party
- Inspection & testing in line with IEC / IEEE
- Full test reports and photo documentation
- Release after FAT, inspection & documentation

TESTING PROGRAM

100%
of units receive routine testing

✓ **Routine tests**
EVERY UNIT

○ **Type & Special tests**
AS SPECIFIED or AGREED

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PRODUCTS

- Medium power transformers
- Distribution transformers
- Special-purpose transformers
  - Inverter (Solar, BESS) & GSU transformers
  - Earthing (zig-zag) & test transformers
  - Reactors & other application-specific transformers

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PRODUCTS

Medium Power Transformers

Medium-power and substation transformers for distribution and industrial grids.

- Ratings up to 35 MVA; voltage class up to 72.5 kV
- ONAN / ONAF cooling; hermetic or conservator-type
- On-load or off-circuit tap changers
- Project-specific protection and monitoring packages
- Compliant with IEC 60076 (IEEE C57 on request)
- Delivered for substations across 3 continents



PRODUCTS

Distribution Transformers

Hermetically-sealed, oil-immersed distribution transformers - the reliable backbone of MV/LV networks

— Ratings 25 kVA – 2,500 kVA; primary voltage up to 36 kV

— Hermetically-sealed or conservator-type designs

— Grain-oriented low-loss silicon-steel core; Cu or Al windings

— Corrugated-fin tanks for reduced-maintenance ONAN cooling

— EU Ecodesign Tier 2 loss levels



PRODUCTS

Inverter (Solar/BESS) & GSU Transformers

INVERTER (SOLAR / BESS) TRANSFORMERS

Purpose-built transformers for renewable energy and power conversion applications

- Multi-winding designs for central and utility-scale inverter systems
- Optimized for harmonic-rich operation and cyclic loading
- Engineered for high efficiency, low losses and thermal performance
- Custom vector groups, phase shifts and auxiliary windings
- Designed in accordance with IEC 60076, and IEEE C57 standards

GSU TRANSFORMERS

Reliable generator interface transformers for conventional and renewable power plants

- Designed for gas, steam, hydro, wind and solar generation
- High short-circuit strength and continuous full-load capability
- Optimized for generator voltage regulation and overexcitation duty
- Low-loss magnetic design for maximum plant efficiency
- Tailored cooling, monitoring and protection solutions



PRODUCTS

Earthing (Zig-Zag) & Test Transformers

EARTHING (ZIG-ZAG) TRANSFORMERS

Specialized grounding solutions for safe and reliable power system operation

- Artificial neutral creation for delta and ungrounded networks
- Designed to achieve specified earth-fault current levels
- Compatible with Neutral Earthing Resistors (NER) and Petersen Coils
- Optimized zero-sequence impedance for protection coordination
- Suitable for industrial plants, substations and renewable facilities

TEST TRANSFORMERS

High-performance transformers for electrical testing and laboratory applications.

- AC high-voltage testing and insulation verification
- Custom voltage, current and duty-cycle configurations
- Low partial discharge and high insulation integrity
- Single-stage and cascade arrangements available
- Suitable for factory, laboratory and field testing applications



PRODUCTS

Reactors & Other Application-Specific Transformers

REACTORS

Engineered reactors for fault current control and power quality improvement.

- Neutral grounding and earth-fault current limitation
- Series reactors for short-circuit current reduction
- Harmonic filter and damping reactor applications
- Custom inductance and thermal ratings based on system studies
- Designed according to IEC 60076-6 and project-specific requirements

OTHER APPLICATIONS

Engineered-to-order transformer solutions for demanding industrial applications.

- Isolation, rectifier and electrolysis transformers
- Motor starting and variable-voltage transformers
- Furnace and special industrial process transformers
- Marine, offshore and harsh-environment designs
- Fully customized electrical, mechanical and thermal configurations





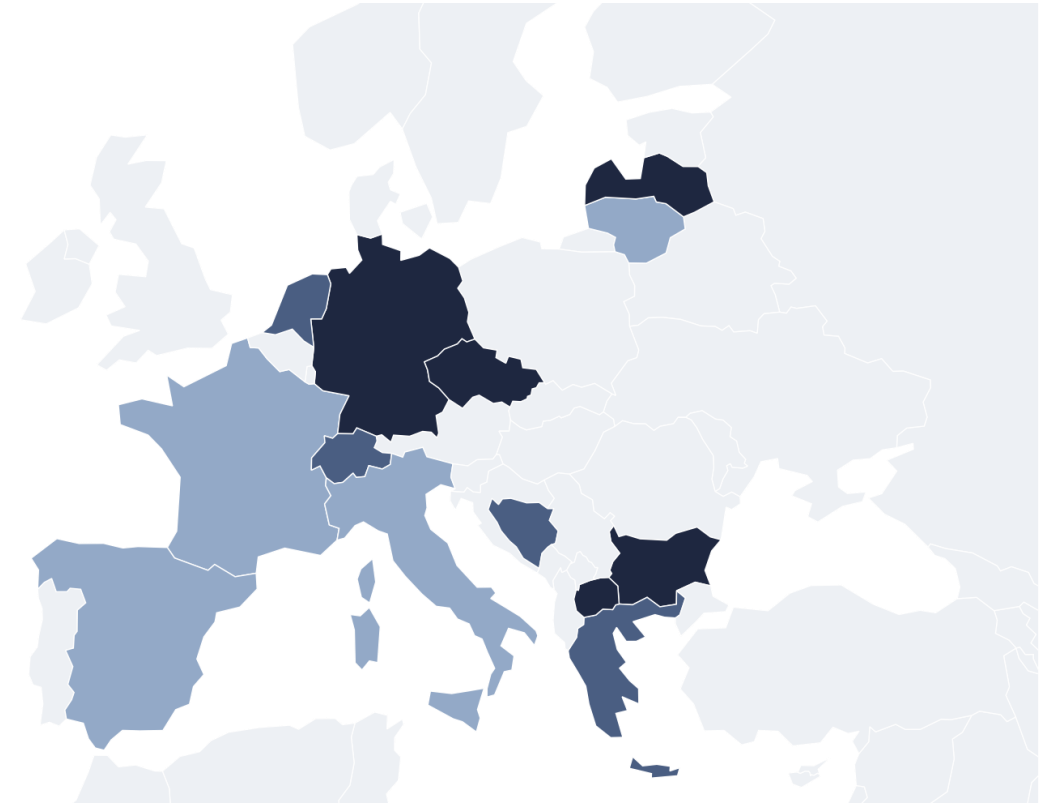
SELECTED REFERENCES

- Distribution & Medium Power Transformers
- Selected VFD & Inverter Duty Transformers
- Engineering Services
- Root-Cause Analysis and Repair Studies

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SELECTED REFERENCES

References at a Glance (since 2021)



MANUFACTURING & SUPPLY

1,300+
Transformers delivered

20+
Countries served

480+
PV & renewable units

Ratings 25 kVA – 35 MVA · up to 72.5 kV · IEC 60076

ENGINEERING SERVICES

23
Projects completed

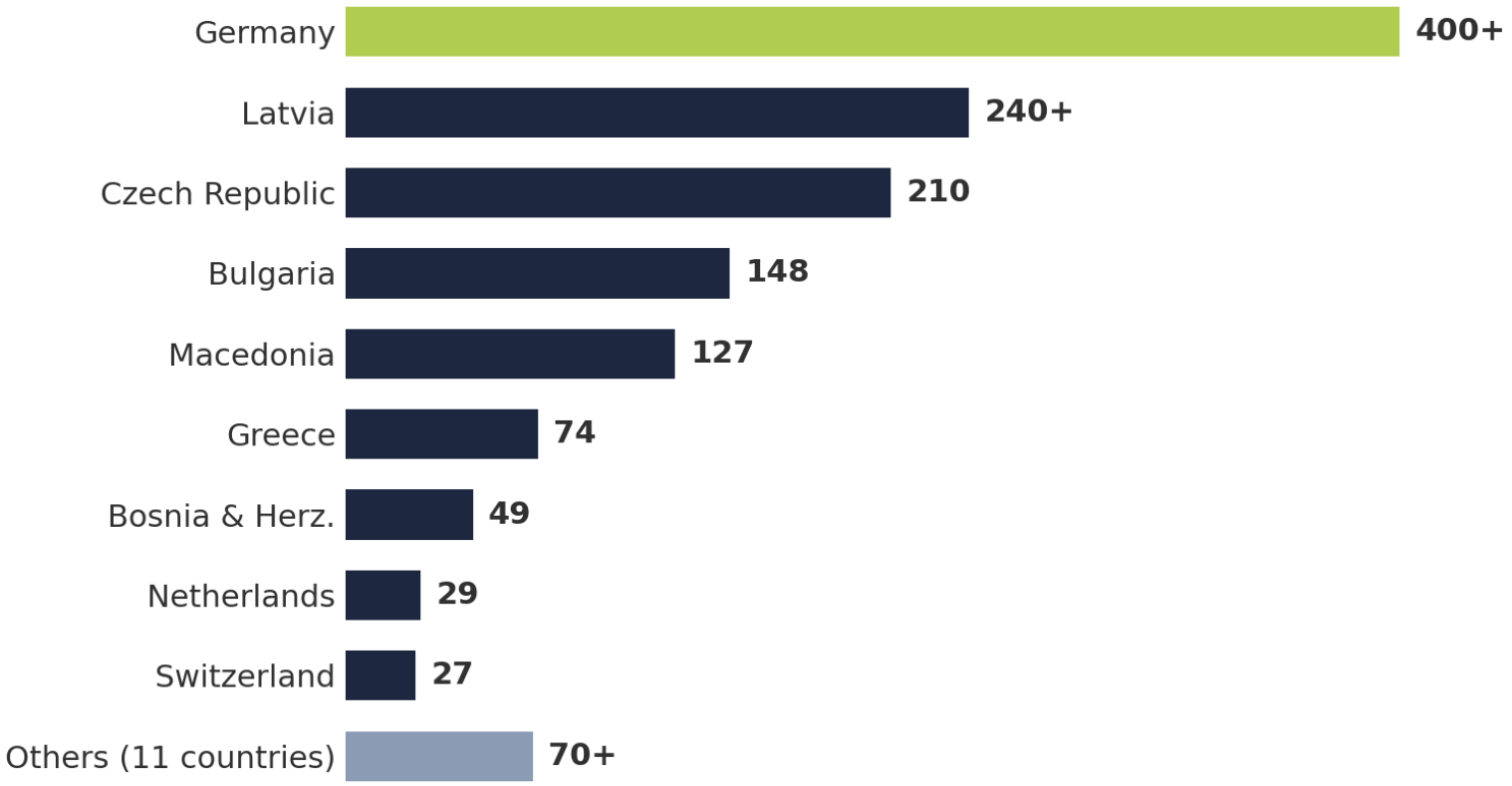
730 MVA
Largest unit engineered

BEYOND EUROPE

Azerbaijan · Chile · Georgia · Iraq · Jamaica · Tunisia · Turkmenistan · Uganda

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Delivered Transformers by Country



BY APPLICATION

Utility distribution
majority of units

PV & renewables
480+ units

Substation power
MVA-class, 8 countries

Industrial & special
MV/MV up to 7.2 MVA

AT A GLANCE

Ratings: 25 kVA – 35 MVA
Voltage: up to 72.5 kV
Standards: IEC 60076

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SELECTED REFERENCES

Selected VFD & Inverter-Duty Transformers

820+
Transformers delivered

7
Countries

Up to 10 MVA
Unit ratings

Ratings 200 kVA – 10 MVA · 5.5 – 33 kV systems · 50 Hz, oil-immersed

Country	kVA	type	kV	pcs
GERMANY	630	hermetic	20 / 0.4	37
	1000	hermetic	20 / 0.4	45
	1250	hermetic	20 / 0.4	19
	630	hermetic	20 / 0.6	48
	1000	hermetic	20 / 0.6	30
	1250	hermetic	20 / 0.6	25
	630	hermetic	20 / 0.8	18
	1000	hermetic	20 / 0.8	40
	1250	hermetic	20 / 0.8	45
	1600	hermetic	20 / 0.8	32
	2500	hermetic	20 / 0.8	30
	800	hermetic	10–20 / 0.4	4
	1250	hermetic	10–20 / 0.4	17
	1600	hermetic	10–20 / 0.4	12
	2500	hermetic	10–20 / 0.4	4
GEORGIA	1600	hermetic	10 / 4	14
	10000	conservator	33 / 15 (main line)	4
SPAIN	2500	hermetic	20 / 0.8	1
TURKMENISTAN	1250	conservator	20 / 0.4	10
	2000	conservator	20 / 0.4	5
	5000	conservator	33 / 15 (main line)	1
	7000	conservator	33 / 10 (main line)	11

Country	kVA	type	kV	pcs
TUNISIA	1250	hermetic · 3-leg	5.5 / 0.715	8
	2500	hermetic · 3-leg	5.5 / 0.715	5
	350	hermetic · 3-leg	5.5 / 0.4	13
	3150	hermetic · 3-leg	5.5 / 0.4	8
	5000	conservator · 3-leg	33 / 11 (main line)	4
	10000	conservator · 3-leg	33 / 20 (main line)	2
	200	hermetic · 4-leg	5.5 / 0.69	13
	630	hermetic · 4-leg	33 / 11 (main line)	4
	1000	hermetic · 4-leg	33 / 11 (main line)	2
BULGARIA	630	hermetic	20 / 0.4	40
	1000	hermetic	20 / 0.4	35
	1250	hermetic	20 / 0.8	38
	1600	hermetic	20 / 0.8	15
	2000	hermetic	20 / 0.8	12
	2500	hermetic	20 / 0.8	8
	800	hermetic	10.5–21 / 0.42	8
	1000	hermetic	10.5–21 / 0.42	8
	1600	hermetic	10.5–21 / 0.42	8
	2000	hermetic	10.5–21 / 0.42	8
N. MACEDONIA	630	hermetic	20 / 0.4	55
	1250	hermetic	20 / 0.8	25
	1600	hermetic	20 / 0.8	35
	2000	hermetic	20 / 0.8	8
	2500	hermetic	20 / 0.8	4

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SELECTED REFERENCES - POWER TRANSFORMERS

Engineering Services

730 MVA
Largest GSU engineered — 420 / 21 kV

14
Projects since 2021

420 kV
Highest system voltage

Rating	Voltage	Type / scope	Client	Period
730 MVA	420 / 21 kV	GSU	Limak	Dec 2024 – Mar 2026
705 MVA + 27 MVA	400 / 21 · 21 / 6.9 kV	GSU + auxiliary	Limak	Jan 2021 – Apr 2021
675 MVA	400 / 21 kV	GSU – manufacturing QA/QC	STEAG	Mar 2024 – Jun 2024
2 × 330 MVA	132 / 15 kV	GSU	Onex Holding / Taurus Arm	May 2022 – Jun 2022
322 MVA	132 / 15 kV	GSU	Onex Holding / Taurus Arm	Mar 2026 – Apr 2026
280 MVA	400 / 15.75 kV	GSU	Limak	Jul 2022 – Dec 2022
267 MVA	132 / 20 kV	GSU	Onex Holding / Taurus Arm	Sep 2022 – Mar 2023
253 MVA	400 / 15.75 kV	GSU – repair	Limak	Mar 2023 – Jul 2023
250 MVA	220 / 33 – 33 kV	Power – solar plant	Entek	Nov 2024 – Dec 2025
2 × 125 MVA	110 / 15 – 15 kV	GSU	GCIL	Dec 2023 – Jun 2024
4 × 80 MVA	121 / 11 kV	GSU	Aday Group	Apr 2024 – Jan 2025
62.5 MVA	154 / 33 kV	Power – solar plant	Limak	Jan 2025 – May 2025
2 × 40 MVA	110 / 20 kV	Power – wind plant	Calik Renewables	Nov 2024 – Jun 2025
2 × 35 MVA	15 / 6.9 kV	Unit auxiliary	Onex Holding / Taurus Arm	May 2022 – Jun 2022

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Root-Cause Analysis & Repair Studies

705 MVA
Largest failure investigated

9
Studies since 2021

420 kV
Highest system voltage

Rating	Voltage	Application / failure	Client	Period
705 MVA	400 / 21 kV	GSU + LV bushing failure	Limak	Jun 2022 – Jul 2022
295 MVA	400 / 15.75 kV	GSU failure	ENKA	Dec 2021
280 MVA	400 / 15.75 kV	GSU failure	Limak	Jul 2022 – Aug 2022
250 MVA	400 / 164 kV	Autotransformer failure	ELTAS	Feb 2021 – Mar 2021
2 × 10 + 1 × 5 MVA	34.5 / 0.69 – 0.69 kV	Solar step-up failures	Cengiz Enerji	Apr 2023 – May 2023
10 MVA	34.5 / 0.69 – 0.69 kV	Solar step-up failure	Cengiz Enerji	Oct 2022 – Nov 2022
5.5 MVA	34.5 / 0.6 – 0.6 kV	Utility-scale failure	Artıbir Enerji	Aug 2024 – Oct 2024
2,064 kVA	—	Traction transformer	Libra Global	Dec 2022 – Jan 2023
3 units	—	Cast-resin excitation transformers	ABB Switzerland	May 2023 – Jul 2023

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