

Abbreviations

AC	alternating current
ACC	advanced clean car
ACER	European Agency for the Cooperation of Energy Regulators
ACS	average cost of supply
ADAC	Allgemeiner Deutscher Automobil-Club e. V. (German Automobile Association)
ADE	accelerated demand electrification
AECL	Ahmedabad Electricity Company
AEG	Allgemeine Elektrizitäts-Gesellschaft (company)
AEL	alkaline electrolysis
AEM	anion exchange membrane
aEMT	aktiver externer Marktteilnehmer (active external market participants)
AEO	Annual Energy Outlook
AEVO	Ausbilder-Eignungsverordnung (German Trainer Aptitude Ordinance)
aFRR	automatic frequency restoration reserves
AGIL	adaptation, goal attainment, integration and latency
AI	artificial intelligence
AIB	Association of Issuing Bodies
AIP	asset investment planning
AMI	advanced metering infrastructure
APDP	Accelerated Power Development Programme
APDRP	Accelerated Power Development and Reforms Programme
APG	Austrian Power Grid
API	application programming interface
APM	asset performance management
AR	augmented reality
ARegV	Verordnung über die Anreizregulierung der Energieversorgungsnetze (Incentive Regulation Ordinance)
ARR	average revenue realized
ASEW	Arbeitsgemeinschaft für sparsame Energie- und Wasserverwendung im VKU (German municipal utilities initiative)
ASM	ancillary services market
AT&C	aggregate technical and commercial
ATES	thermal energy storage system
ATM	automated teller machine
AutoML	automated machine learning
AÜW	Allgäuer Überlandwerk GmbH (company)
B2B	business-to-business
B2C	business-to-consumer
B2G	business-to-governance
B2P	business-to-prosumer
BABS	Bundesamt für Bevölkerungsschutz (Swiss Federal Office for Civil Protection)
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht (German Federal Financial Supervisory Authority)
BANG	Berufliches Ausbildungsnetzwerk im Gewerbebereich (Vocational Training Networks in the Commercial Sector)
BAS	Beheerder Afspraken Stelsel
BAU	business-as-usual

BauGB	Baugesetzbuch (German Building Code)
BBK	Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (German Federal Office of Civil Protection and Disaster Assistance)
BBPlG	Gesetz über den Bundesbedarfsplan (German Federal Requirements Plan Act)
BC	boundary clock
BCM	business continuity management
BCMS	business continuity management system
BDEW	Bundesverband der Energie- und Wasserwirtschaft e. V. (German Association of Energy and Water Industries)
BDSG	Bundesdatenschutzgesetz (German Federal Data Protection Act)
BESS	battery energy storage system
BEV	battery electric vehicle
BF-BOF	blast furnace basic oxygen furnace
BIA	business impact analysis
BTG	Bundesimmobiliengesellschaft (Federal Real Estate Company)
BTM	building information modeling
BIPM	Bureau International des Poids et Mesures
bK	beeinflussbarer Kostenanteil (controllable costs)
BMBF	Bundesministerium für Bildung und Forschung (German Federal Ministry of Education and Research)
BMIL	blockchain machine identity ledger
BMLV	Bundesministerium für Landesverteidigung (Austrian Federal Ministry of National Defense)
BMS	building management system
BMWFJ	Bundesministerium für Wirtschaft, Familie und Jugend (Austrian Federal Ministry of Economy, Family and Youth)
BMWK	Bundesministerium für Wirtschaft und Klimaschutz (German Federal Ministry for Economic Affairs and Climate Action)
BNetzA	Bundesnetzagentur (German Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway)
BoA	Board of Appeal
BPL	below poverty line
BRP	balance responsible party
BSES	Brihanmumbai State Electricity Supply
BSH	Bundesamt für Seeschifffahrt und Hydrographie (Federal Maritime and Hydrographic Agency of Germany)
BSI	Bundesamt für Sicherheit in der Informationstechnik (German Federal Office for Information Security)
BSIG	BSI-Gesetz (Federal Office for Information Security Act)
BTU	British Thermal Unit
BVO	Bewirtschaftungsverordnungen Elektrizität (Swiss Electricity Management Regulations)
C2C	cradle-to-cradle
CACM	Capacity Allocation and Congestion Management
CAIDI	customer average interruption duration index
CAPEX	capital expenditure
CAS	compressed air storage
CBA	cost benefit assessment
CC	common criteria
CCA	capital cost adjustment
CCD	controllable consumption device

CCM	customer consent management
CCP	central counterparty
CCPA	California Consumer Privacy Act
CCS	carbon capture and storage
CCU	carbon capture and utilization
CCUS	carbon capture, utilization and storage
CDIO	chief digital and information officer
CDO	chief digital officer
CDP	Carbon Disclosure Project
CDTO	chief digital and technology officer
CEA	Central Electricity Authority
CEC	citizen energy communities
CEMS	customer energy management system
CERC	Central Electricity Regulatory Commission
CESC	Calcutta Electric Supply Corporation
CfD	contracts for difference
CH ₄	methane
CHP	combined heat and power
CI	critical infrastructure
CIA	Central Intelligence Agency
CIGRÉ	Conseil International des Grands Réseaux Électriques
CIM	common information model
CIM	computer integrated manufacturing
CIO	chief information officer
CIS	charging infrastructure
CLS	controllable local system
CMNAP	Common Minimum National Action Plan for Power
cMPO	competitive metering point operator
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CoA	cost of acquisition
COP	coefficient of performance
COP21	21st Conference of the Parties to the United Nations Framework Convention on Climate Change
COP27	27th Conference of the Parties to the United Nations Framework Convention on Climate Change
COP28	28th Conference of the Parties to the United Nations Framework Convention on Climate Change
COVID-19	coronavirus SARS-CoV-2
CP	charging point
CPO	charge point operator
CRITIS	critical infrastructure
CRM	customer relationship management
CSC	collective self-consumption
CSH	complexity science hub
CSP	concentrated solar power
CtS	cost-to-serve
CTU	central transmission utility
CTUIL	Central Transmission Utility of India Limited
CV	curriculum vitae
CX	customer experience

DA	day-ahead
DA/RE	Datenaustausch/Redispatch (data exchange and redispatch)
DAC	direct air capture
DACH	Deutschland, Österreich und die Schweiz (Germany, Austria and Switzerland)
DAG	directed acyclic graph
DAO	decentralized autonomous organization
DARPA	US Defence Advanced Research Project Agency
DC	direct current
DCS	distributed control system
DDUGJY	Deen Dayal Upadhyaya Gram Jyoti Yojana
dena	Deutsche Energie-Agentur GmbH (German Energy Agency)
DER	distributed energy resource
DERM	distributed energy resource management
DERMS	demand energy resources management systems
DF	distribution franchisee
DFIG	double-fed induction generator
DKE	Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE (German Commission for Electrotechnical, Electronic & Information Technologies of DIN and VDE)
DLT	distributed ledger technology
DME	dimethyl ether
DMS	distribution management system
DNA	deoxyribonucleic acid
dnbK	dauerhaft nicht beeinflussbarer Kostenanteil (permanently non-controllable costs)
DNO	distribution network operators
DOE	U. S. Department of Energy
DoEAP	Digitalization of Energy Action Plan
DPP	digital product passport
DPSC	Dishergarh Power Supply Company
DQR	Deutscher Qualifikationsrahmen (German Qualification Framework)
DR	demand response
DRI	direct reduced iron
DRK	Deutsches Rotes Kreuz e. V. (German Red Cross)
DRM	demand response management
DS	distribution system
DSG	Bundesgesetz über den Datenschutz (Swiss Federal Act on Data Protection)
DSM	demand side management
DSO	distribution system operator
DSR	demand side response
DVGW	Deutscher Verein des Gas- und Wasserfaches e. V. (German standardization body for the gas and water industry)
EA	energy availability
EAF	electric arc furnace
EAM	enterprise asset management
EB GL	Electricity Balancing Guideline
EC	European Commission
EC	European Community
ECC	European Commodity Clearing
ECCS	European Energy Certificate System
ECJ	European Court of Justice

ECW	Energiecampus Wildpoldsried
EDI	electronic data interchange
EDPB	European Data Protection Board
EEA	European Economic Area
EED	EU Energy Efficiency Directive
EEG	Erneuerbare-Energien-Gesetz (German Renewable Energy Sources Act)
EEX	European Energy Exchange
EFZ	Eidgenössisches Fähigkeitszeugnis (Swiss federal certificate of competence)
EHS	environment, health & safety
EHV	extra-high voltage
EIWOG	Elektrizitätswirtschafts- und -organisationsgesetz (Austrian Electricity Industry Organization Act)
EJ	exajoule
EL	electrified scenario
ElCom	eidgenössische Elektrizitätskommission (Swiss Federal Electricity Commission)
EMD	earth mover's distance
EMD	electricity market design
EMD	Electricity Single Market Directive
EMI	equated monthly instalment
EMP	Engpass Management Plattform (congestion management platform)
EMT	externer Marktteilnehmer (external market participants)
EnBW	Energie Baden-Württemberg AG (company)
ENISA	European Union Agency for Cybersecurity
ENLAG	Energieleitungsausbaugesetz (German Power Grid Expansion Act)
EnLG	Energielenkungsgesetz (Austrian Energy Intervention Powers Act)
EnSiG	Gesetz zur Sicherung der Energieversorgung (German Energy Security of Supply Act)
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
EnWG	Energiewirtschaftsgesetz (German Energy Industry Act)
EPEX	European Power Exchange
EPSS	emergency power supply system
EROI	energy return on investment
ERP	enterprise resource planning
ESA	energy service provider
ESG	environmental, social and governance
ESMA	European Securities and Markets Authority
ESPR	Ecodesign for Sustainable Products Regulation
EU	European Union
EU-DSO	European Organization of Distribution System Operators
EU-ETS	European Union Emissions Trading System
EUR	Euro (European currency)
EV	electric vehicle
EXAA	Energy Exchange Austria
FACTS	flexible alternating current transmission system
FERC	U. S. Federal Energy Regulatory Commission
FF	fill factor
FMEA	failure mode and effects analysis
FMECA	failure mode, effects and criticality analysis
FRP	Financial Restructuring Package

GABi Gas	Grundmodell der Ausgleichs- und Bilanzierungsregeln im Gasmarkt (Basic Model for Compensatory and Balancing Rules in the Gas Market)
GDEW	Gesetz zur Digitalisierung der Energiewende (German Act on the Digitization of the Energy Transition)
GDP	German Grid Development Plan
GDP	gross domestic product
GDPR	General Data Protection Regulation
GEC	Green Energy Corridor
GEIG	Gebäude-Elektromobilitätsinfrastruktur-Gesetz (Building Electric Mobility Infrastructure Act)
GfKV	Gesellschaft für Krisenvorsorge (Society for Crisis Preparedness)
GG	Grundgesetz (Basic Law for the Federal Republic of Germany)
GHG	greenhouse gas
GIS	gas-insulated switchgear
GIS	geographical information system
GMC	grand master clock
GME	Gestore dei Mercati Energetici
GMT	Greenwich Mean Time
GNA	general network access
GNDEW	Gesetz zum Neustart der Digitalisierung der Energiewende (Act to Restart the Digitization of the Energy Transition)
GO	Guarantees of Origin
GPKE	Geschäftsprozesse zur Kundenbelieferung mit Elektrizität (Business Processes for the Supply of Electricity to Customers)
GPRES	general packet radio service
GPS	Global Positioning System
GW	gigawatt (equal to 1,000,000,000 watts)
GWA	gateway administration
GWh	gigawatt hours
GWP	global warming potential
H ₂	molecular hydrogen, hydrogen
H ₂ O	water
HAN	home area network
HC	hybrid clock
HCC	heating and cooling center
HeizKV	Heizkostenverordnung (heating costs ordinance)
HFO	heavy fuel oil
HILP	high-impact low probability
HKNR	Herkunftsnachweisregister (registry for Guarantees of Origin for electricity)
HMI	human-machine-interface
HR	human resource
HSR	high availability seamless redundancy
HT	high tariff
HT	high-temperature
HT heat	high-temperature heat
HV	high voltage
HVAC	heating, ventilation, and air conditioning
HVDC	high-voltage direct current
Hz	hertz
IAA	identification, authentication, authorization

IaaS	infrastructure-as-a-service
IAS	International Accounting Standard
IBM	International Business Machines Corporation, IBM Corp. (company)
IBR	inverter-based resource
ICE	Intercontinental Currency Exchange
ICHPS	innovative combined heat and power system
ICT	information and communication technology
ID	identification number
ID	intraday
IDCF	intraday congestion forecast
IEA	International Energy Agency
IEA EBC	IEA Energy in Buildings and Community Programme
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IEM	internal energy market
IERS	International Earth Rotation and Reference Systems Service
IIoT	Industrial Internet of Things, Industrial IoT
IKUWU	Intelligente Wärme- und Kälteversorgung der Universität Bayreuth (Innovative Heating and Cooling Supply at the University of Bayreuth)
IMA	Investitionsmaßnahme (investment measure)
iMSys	intelligentes Messsystem (intelligent metering system)
InDEED	Infrastructure for Decentralized Energy Data
InSTS	Intra-State Transmission System
IoE	Internet of Energy
IoT	Internet of Things
IP	internet protocol
IPCC	Intergovernmental Panel on Climate Change
IPCEI	Important Projects of Common European Interest
IPDS	Integrated Power Development Scheme
IPP	independent power projects
IRP	integrated resource planning
ISMS	information security management system
ISO	independent system operator
ISO	International Organization for Standardization
ISS	International Space Station
ISTS	Inter-State Transmission System
IT	information technology
ITU	International Telecommunication Union
iWM	intelligente Wärme München (intelligent heat Munich)
J	joule
km	kilometers
KPI	key performance indicator
KRITIS	kritische Infrastruktur (critical infrastructure)
KSG	Bundesklimaschutzgesetz (German Federal Climate Protection Act)
kW	kilowatt (equal to 1,000 watts)
kWh	kilowatt hours
KWKG	Kraft-Wärme-Kopplungsgesetz (Combined Heat and Power Act)
kWp	kilowatt peak
LAN	local area network

LBO	Landesbauordnung (Building Code)
LCC	life cycle cost
LCOE	levelized cost of energy, levelized cost of electricity
LDC	load dispatch center
LDSG	Landesdatenschutzgesetz (State Data Protection Act)
LED	light emitting diode
LEM	local energy market
LFC	load-frequency control
LMN	local metrological network
LMP	locational marginal price
LNG	liquefied natural gas
LOHC	liquid organic hydrogen carriers
LoRaWAN	long range wide area network
LPWAN	low power wide area network
LPX	Leipzig Power Exchange
LT heat	low-temperature heat
LTC	load tap changer
LTE	long term evolution
LULUCF	land use, land use change and forestry
LV	low voltage
MaBiS	Marktregeln für die Durchführung der Bilanzkreisabrechnung Strom (Market Rules for the Balancing Group Settlement for Electricity)
MaKo	Markt(partner)kommunikation (market communication)
MAPE	mean absolute percentage error
MBC	metering, billing, and collection
MBED	market-based economic dispatch
MBO	Musterbauordnung (German Model Building Code)
MC	master clock
MCP	market clearing price
ME	Messeinrichtung (metering device)
MEAS	Mutual Emergency Assistance Service
MEKH	Hungarian Energy and Public Utility Regulatory Authority
MEMS	microelectromechanical system
MFF	Market Facilitation Forum
MiFID	European Markets in Financial Instruments Directive
MIMS	minimum interoperability mechanisms
ML	machine learning
mME	moderne Messeinrichtung (modern metering device)
MoP	Ministry of Power
MP	metering point
MPO	metering point operator
MsbG	Messstellenbetriebsgesetz (German Metering Point Operation Act)
MSW	municipal solid waste
MU	merging unit
MV	medium voltage
MVR	mechanical vapour recompression
MW	megawatt
MWh	megawatt hours
MX	market experience

N ₂	nitrogen
NABEG	Netzausbaubeschleunigungsgesetz Übertragungsnetz (German Grid Expansion Acceleration Act)
NAPCC	National Action Plan on Climate Change
NASA	National Aeronautics and Space Administration
NASDAQ	National Association of Securities Dealers Automated Quotations
NATO	North Atlantic Treaty Organization
NDC	Nationally Determined Contribution
NEEPCO	North-Eastern Electric Power Corporation Limited
NEP	National Electricity Policy
NEP	Netzentwicklungsplan (German Network Development Plan)
NHPC	National Hydroelectric Power Corporation
NIMBY	not in my backyard
NJ	New Jersey
NLC	Neyveli Lignite Corporation
NPC	Noida Power Company
NPV	net present value
NREL	National Renewable Energy Laboratory
NRW	North Rhine-Westphalia (German federal state)
NSM	National Solar Mission
NT	Niedertarif (low tariff)
NTNU	Norwegian University of Science and Technology
NTPC	National Thermal Power Corporation
NVVN	NTPC Vidyut Vyapar Nigam
NZE	net zero emission
O&M	operations and maintenance
O ₂	oxygen
OC	ordinary clock
OECD	Organization for Economic Co-operation and Development
OERC	Orissa Electricity Regulatory Commission
OKR	objectives and key results
OME	polyoxymethylene dimethyl ether
OPEX	operational expenditure
OSTRAL	Organisation für Stromversorgung in Ausserordentlichen Lagen (Swiss Organization for Power Supply in Extraordinary Situations)
OT	operational technology
OTC	over-the-counter
p	price
P2A	power-to-ammonia
P2F	power-to-fuel
P2G	power-to-gas
P2H	power-to-heat
P2L	power-to-liquid
P2M	power-to-mobility
P2P	peer-to-peer
P2X	power-to-X
PA	Privacy Act
PaaS	platform-as-a-service
PC	personal computer

PCA	principal component analysis
PCF	power capacity factor
PCM	phase change material
PCR	primary control reserve
PDC	phasor data concentrator
PDCA	plan, do, check and act
PEM	proton exchange membrane
pEMT	passiver externer Marktteilnehmer (passive external market participants)
PET	polyethylene terephthalate (thermoplastic polymer)
PFC	Power Finance Corporation
PG&E	Pacific Gas and Electric Company
PGCIL	Power Grid Corporation of India
PIN	personal identification number
PJ	petajoule
PJM	Pennsylvania-New Jersey-Maryland Interconnection
PKI	public key infrastructure
PLC	powerline communication
PMU	phasor measurement unit
PoC	proof of concept
POG	Preisobergrenze (price ceiling)
POSO	Power System Operation Corporation
PP	protection profile
PPA	power purchase agreement
PPM	project and portfolio management
PRP	parallel redundancy protocol
PSDF	Power System Development Fund
PSP	pumped storage project
PTB	Physikalisch-Technische Bundesanstalt (Federal Authority for Physical Technical Aspects)
PURPA	Public Utilities Regulation Act (USA)
PV	photovoltaic
PwC	PricewaterhouseCoopers International (company)
PX	power exchange
q	quantity
Q_{th}	thermal energy
R&D	research and development
R&M	renovation and modernization
RAM	reliability, availability, and maintainability
R-APDRP	Restructured Accelerated Power Development and Reforms Programme
RCM	reliability centered maintenance
RDSS	Revamped Distribution Sector Scheme
RE	renewable energy
REB	Regional Electricity Board
REC	renewable energy certificate
REC	renewable energy communities
REC	Rural Electrification Corporation
RED	Renewable Energy Directive
REMC	Renewable Energy Management Centre
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency
RES	renewable energy source

RFID	Radio Frequency Identification
RFNBO	renewable fuels of non-biological origin
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
RIA	risk analysis
RLDC	Regional Load Dispatch Center
RLM	Registrierende Lastgangmessung (registering power measurement)
RMS	Royal Mail Ship
ROE	return on equity
ROI	return on investment
RPA	robotic process automation
RSC	Regional Security Coordinator
RTM	real time market
RTO	regional transmission organizations
RUL	remaining useful life
RWE	Rheinisch-Westfälisches Elektrizitätswerk, RWE AG (company)
SaaS	software-as-a-service
SAIDI	system average interruption duration index
SAIFI	average interruption frequency index
SAP	Systeme, Anwendungen und Produkte, SAP AG (company)
SC	sector coupling
SCADA	supervisory control and data acquisition
SDH	Synchronous Digital Hierarchy
SDR	social discounting rate
SEB	State Electricity Board
SECI	Solar Energy Corporation of India
SECL	Surat Electricity Company
SEPA	single euro payments area
SERC	State Electricity Regulatory Commission
SF ₆	sulfur hexafluoride
SFDR	European Union's Sustainable Finance Disclosure Regulation
SHARC	Smartes Hafen-Applikationskonzept zur Integration erneuerbarer Energien
SID	Stadtwerke Impact Day (German municipal utilities initiative)
SINTEG	Schaufenster intelligente Energie (smart energy showcase)
SLP	standard load profile
SMA	SMA Solar Technology AG (company)
SMGW	smart meter gateway
SM-PKI	smart metering public key infrastructure
SMWA	Sächsisches Staatsministerium für Wirtschaft, Arbeit und Verkehr (Saxon State Ministry of Economic Affairs and Labor)
SNG	synthetic natural gas
SNTP	simple network time protocol
SO	system operator
SOEC	solid oxide electrolysis cells
SONET	Synchronous Optical Networking
SOR	state of readiness
SPV	special purpose vehicle
SSI	self-sovereign identity
StMWi	Bayerisches Staatsministerium für Wirtschaft, Landesentwicklung und Energie (Bavarian Ministry of Economic Affairs, Regional Development and Energy)

StromGW	Stromgrundversorgungsverordnung (German Electricity Basic Supply Ordinance)
STU	state transmission utility
SWOT	strengths, weaknesses, opportunities, and threats
TAF	Tarifanwendungsfall (tariff use cases)
TAI	Temps Atomique International
TAR	trading agent residential
TC	transparent clock
TCP/IP	transmission control protocol/internet protocol
TEC	techno-economic clearance
TEUR	thousand Euro (European currency)
TFEU	Treaty on the Functioning of the European Union
THD	total harmonic distortion
TM	technology mix
TOM	technical and organizational measures
TOTEX	total expenditure
TP	transaction platform
TPC	Torrent Power Company
TR	technical guideline
TS	transmission system
TSO	transmission system operator
TU	Technische Universität (University of Technology)
TW	Terawatt
TWh	terawatt hours
U. S.	United States
UAE	United Arab Emirates
UBA	Umweltbundesamt (German Environment Agency)
UDAY	Ujwal Discom Assurance Yojana
UE	user experience
UI	user interface
UK	United Kingdom
UMPP	Ultra Mega Power Policy
UN	United Nations
UNFCCC	UN Framework Convention on Climate Change
UPPCL	Uttar Pradesh Power Corporation
UPS	uninterruptible power supply
US	United States
USA	United States of America
USD	United States dollar
UT	Universal Time
UTC	Coordinated Universal Time
UVgO	Unterschwellenvergabeordnung (German Sub-Threshold Procurement Ordinance)
UX	user experience
V2G	vehicle-to-grid
V2H	vehicle-to-home
VALCOE	value adjusted levelized cost of energy
VAR	volt-amperes reactive
VDA	Verband der Automobilindustrie e. V. (Association of the Automotive Industry)
VDE	Verband der Elektrotechnik Elektronik Informationstechnik e. V. (German Technical-scientific Association)

vnbK	vorübergehend nicht beeinflussbarer Kostenanteil (temporarily non-controllable costs)
VOPA+	Vernetzung (networking), Offenheit (openness), Partizipation (participation) and Agilität (agility) plus Vertrauen (trust)
VPN	virtual private network
VPP	virtual power plant
VR	virtual reality
VRE	variable renewable energy
VSE	Verband Schweizerischer Elektrizitätsunternehmen (Association of Swiss Electricity Companies)
VUCA	volatility, uncertainty, complexity and ambiguity
WACC	weighted average cost of capital
WAMPACS	Wide Area Monitoring, Protection and Control System
WAN	wide area network
WEG	Wohnungseigentumsgesetz (German law on home ownership and permanent residence rights)
W _{el}	electrical energy
WEO	World Energy Outlook
WMO	World Meteorological Organization
WPP	wind power plant
ZEV	zero-emission vehicle

