



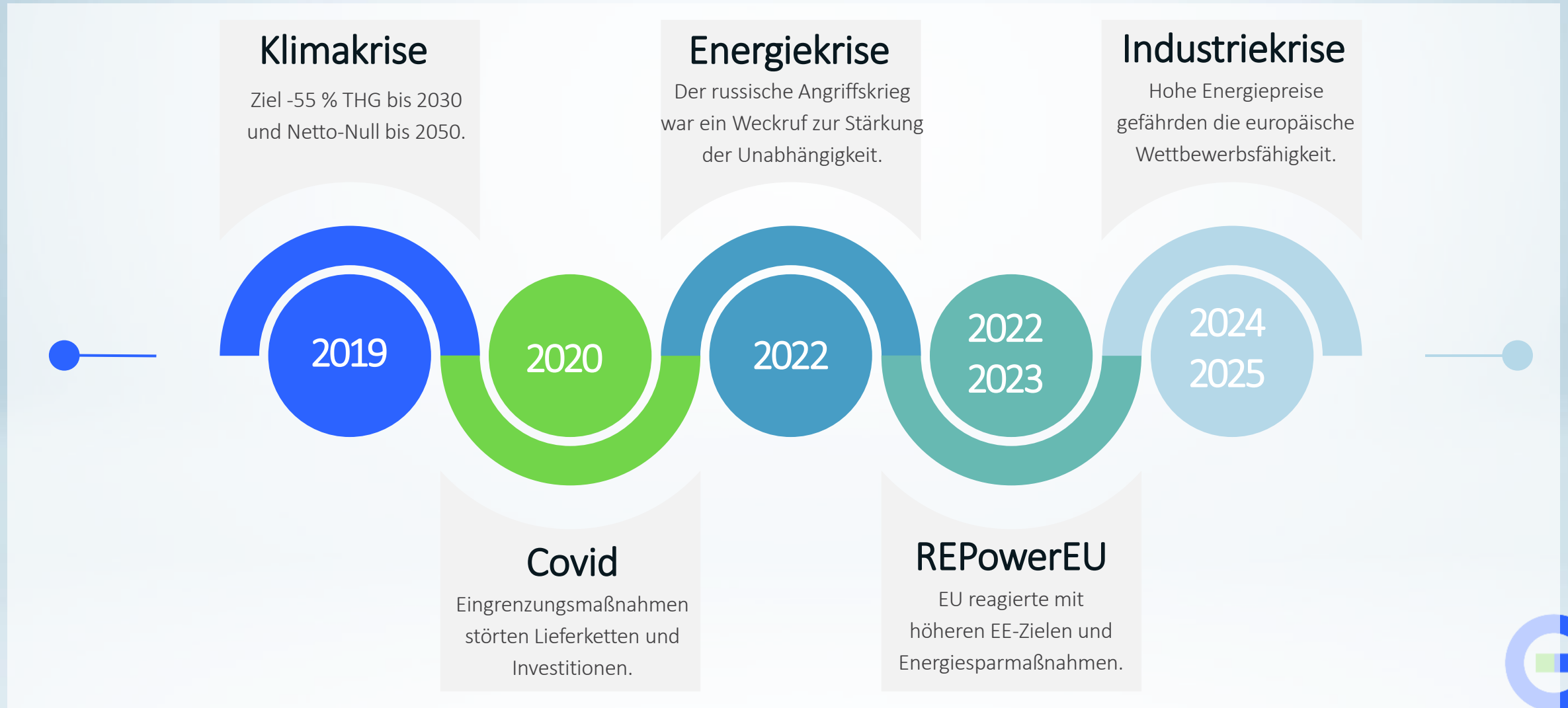
Adrian Lindermuth
Policy Advisor Hydropower

Der Grüne Deal und die Rolle der Wasserkraft

eurelectric

The voice of the European Power Sector

Der Grüne Deal - 5 Jahre geprägt von überregionalen Krisen und europäischen Gegenmaßnahmen

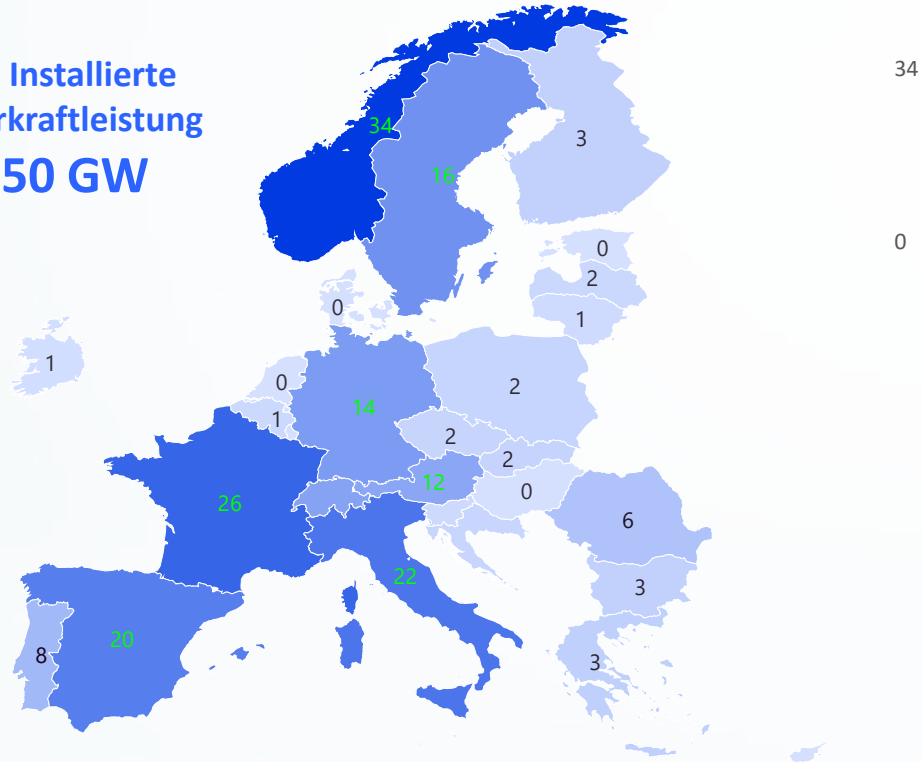


Europäische Wasserkraft – Status quo

Installierte Leistung und Anteil an der Stromerzeugung

Installierte Wasserkraftleistung [GW]

**EU27 Installierte
Wasserkraftleistung
≈150 GW**

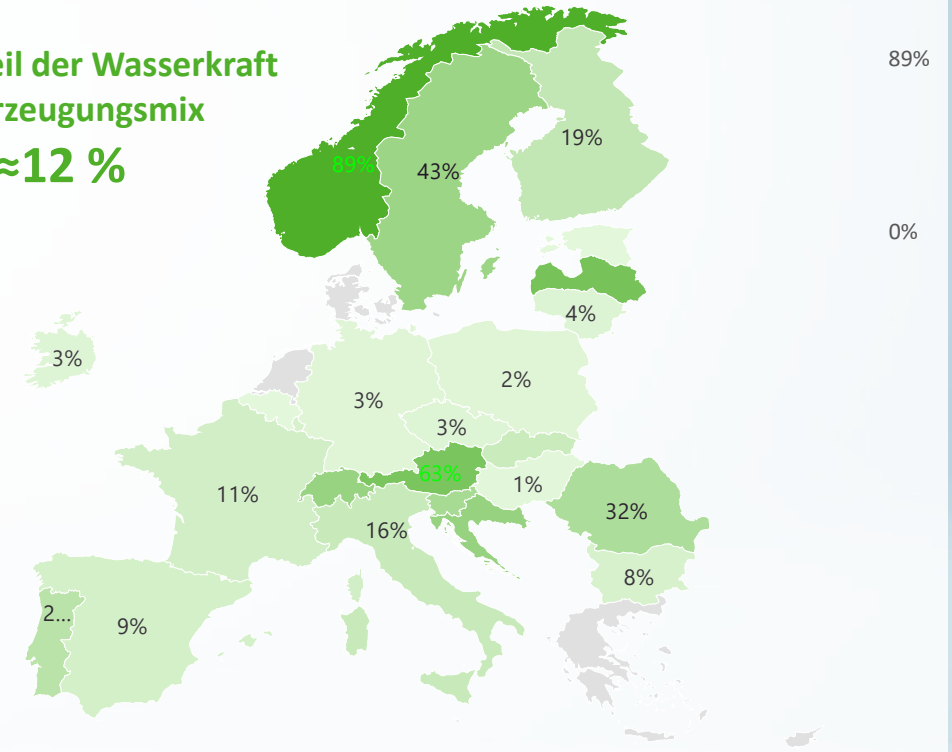


Powered by Bing
© GeoNames, Microsoft, OpenStreetMap, TomTom

Quelle: ENTSOE – Power Statistics 2023

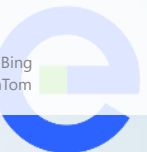
Anteil der Wasserkraft am Erzeugungsmix [%]

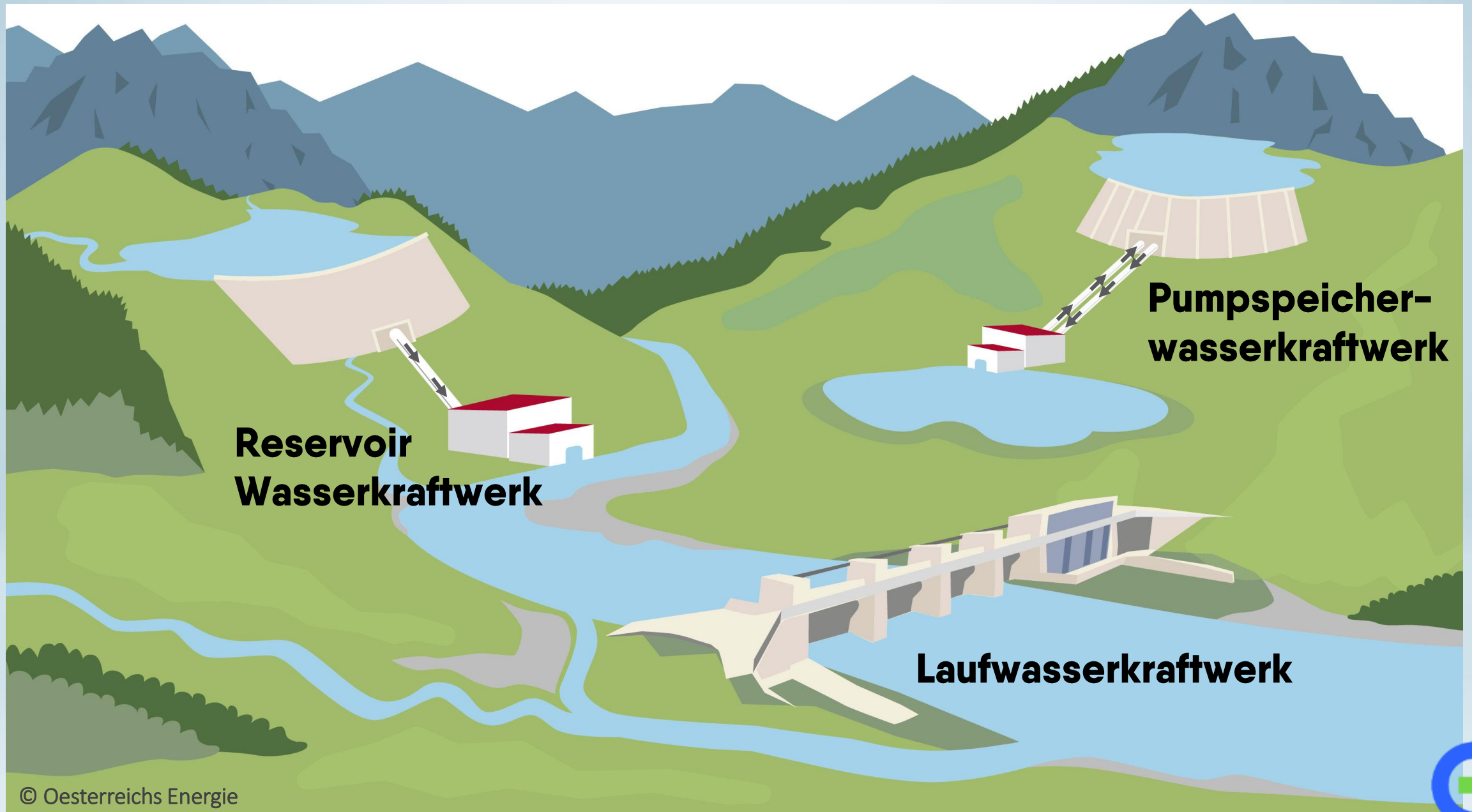
**EU27 Anteil der Wasserkraft
am Erzeugungsmix
≈12 %**



Powered by Bing
© GeoNames, Microsoft, OpenStreetMap, TomTom

Quelle: ENTSOE – Power Statistics 2023



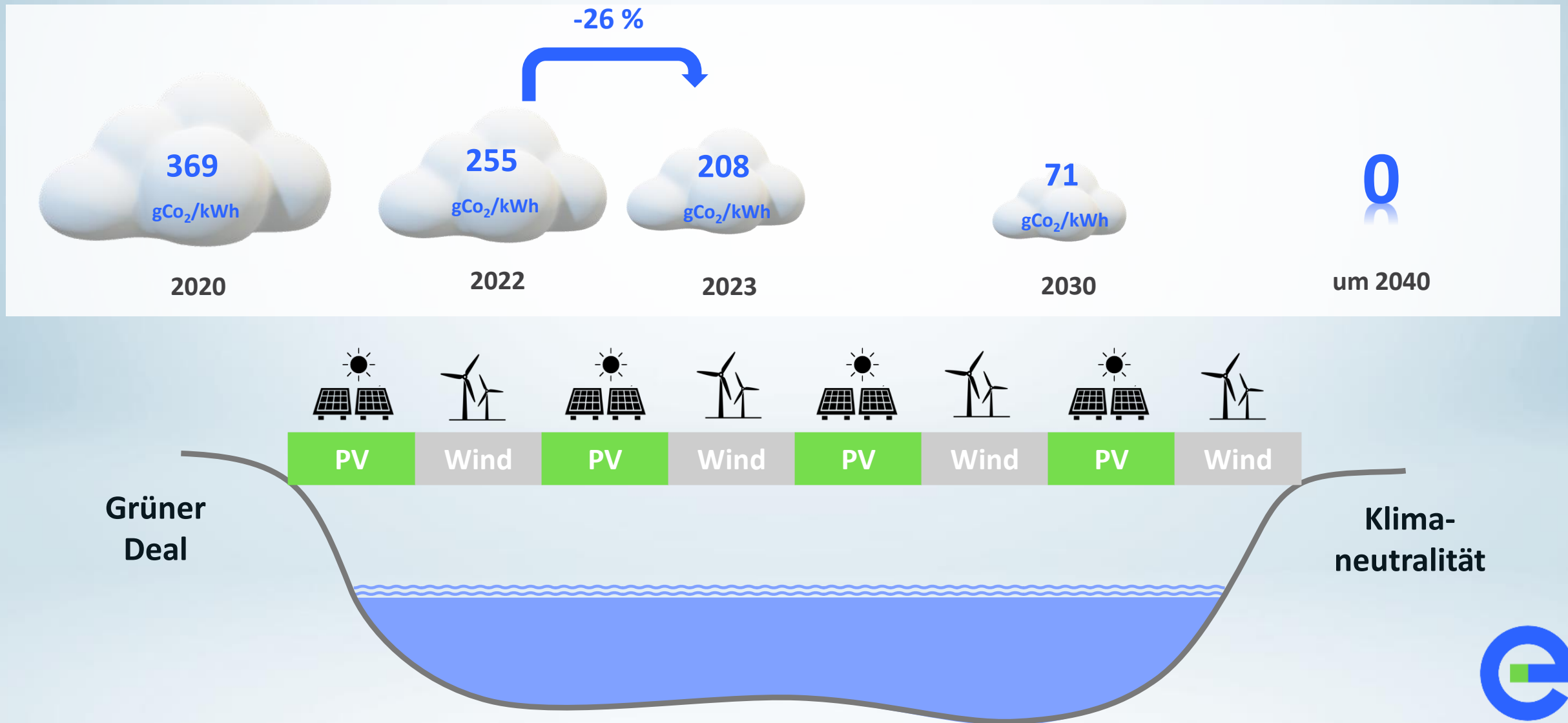


**Reservoir
Wasserkraftwerk**

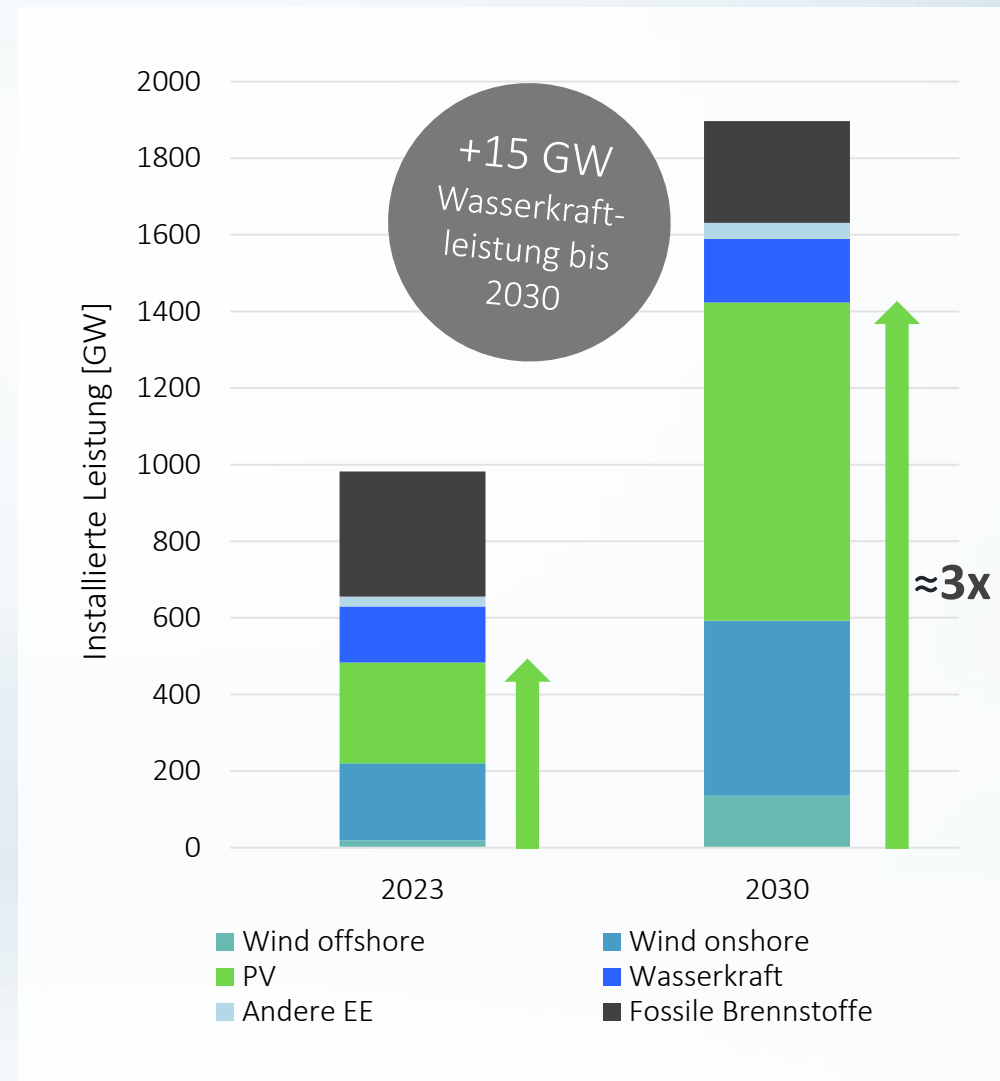
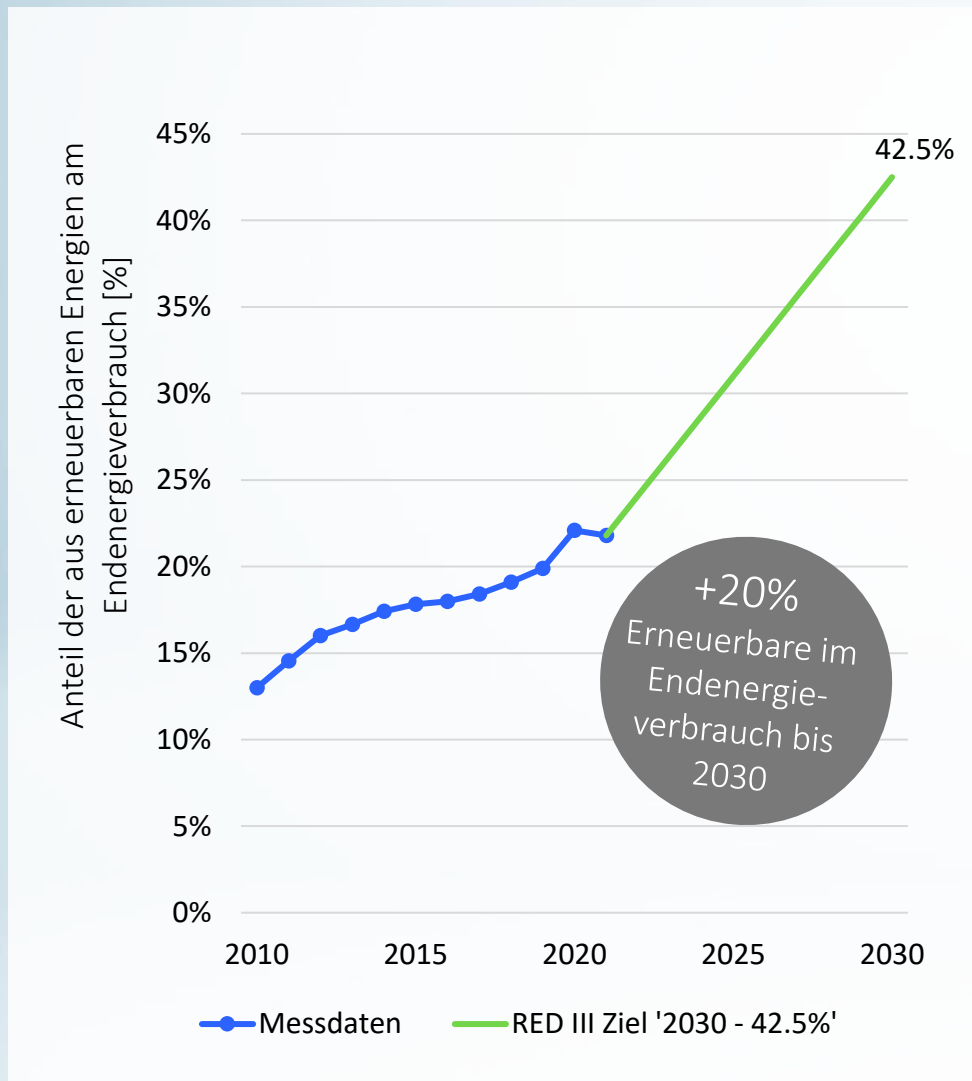
**Pumpspeicher-
wasserkraftwerk**

Laufwasserkraftwerk

„Fit for 55“-Paket – Ausbau der erneuerbaren Energien mit dem Ziel der Emissionsreduktion

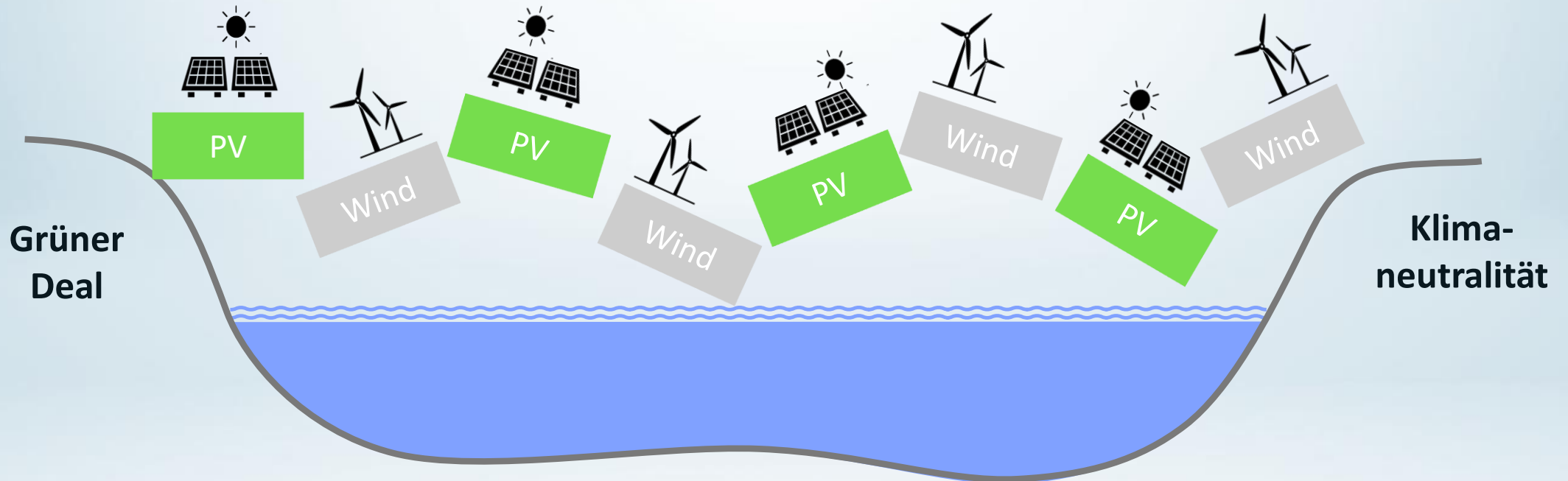


„REPowerEU“-Paket – Ausbau der erneuerbaren Energien mit dem Ziel, die Abhängigkeit von fossilen Importen zu verringern



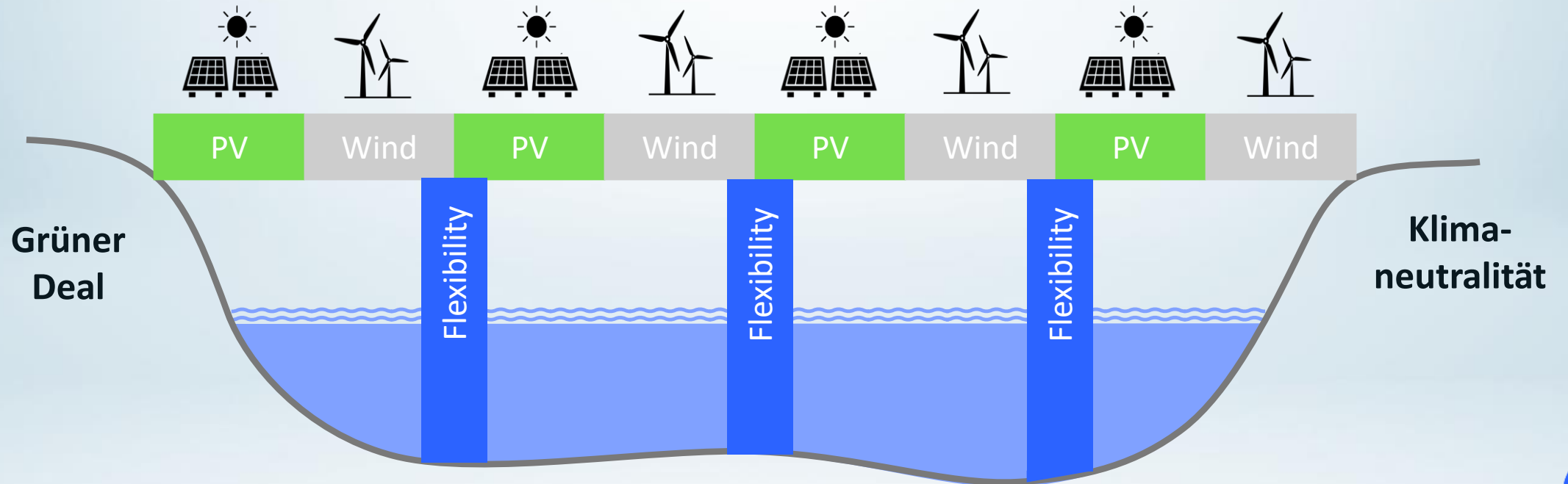
Zur Erreichung des Klimaziels und Sicherstellung der Versorgungssicherheit ist eine Erhöhung der Wind- und PV-Leistung nicht ausreichend

Da diese variablen Technologien in hohem Maße wetterabhängig sind, entstehen im Stromsystem Diskrepanzen zwischen Erzeugung und Verbrauch.

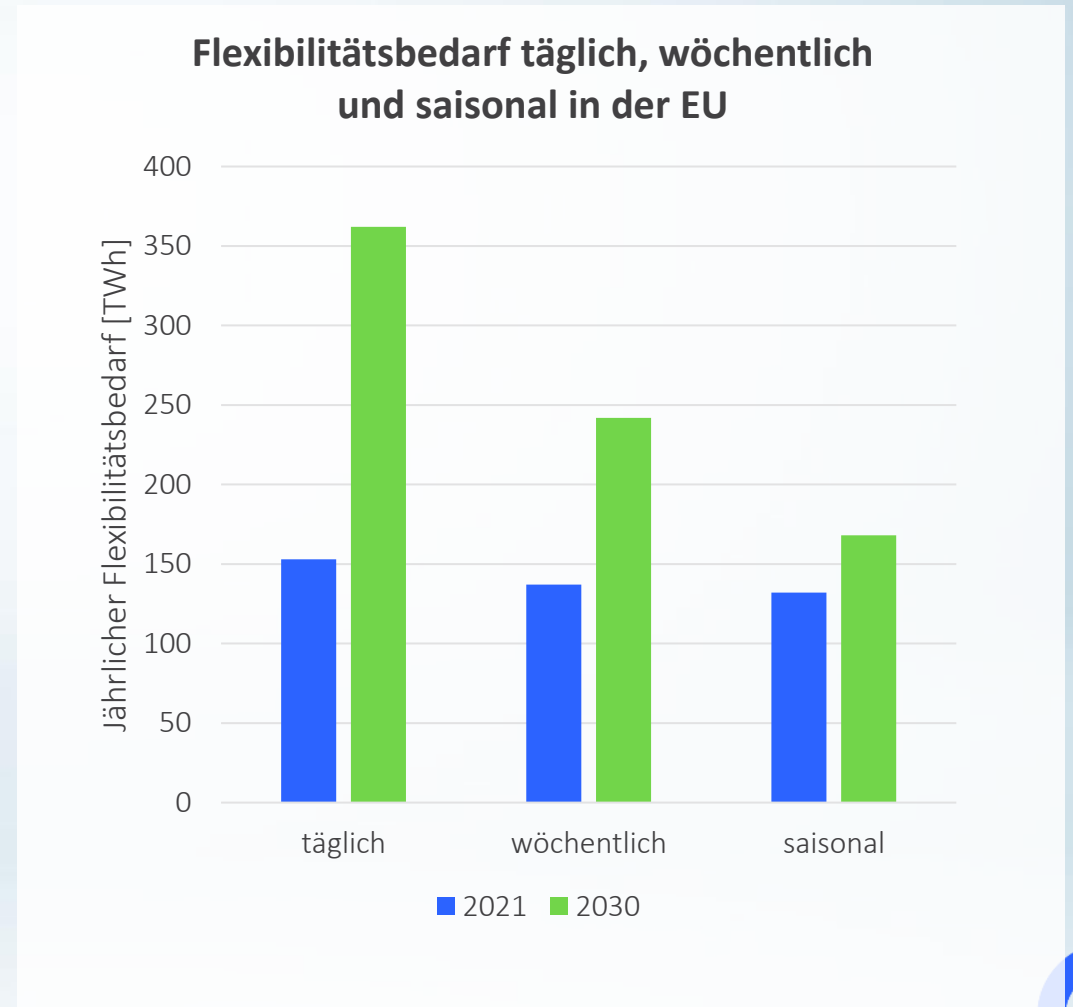
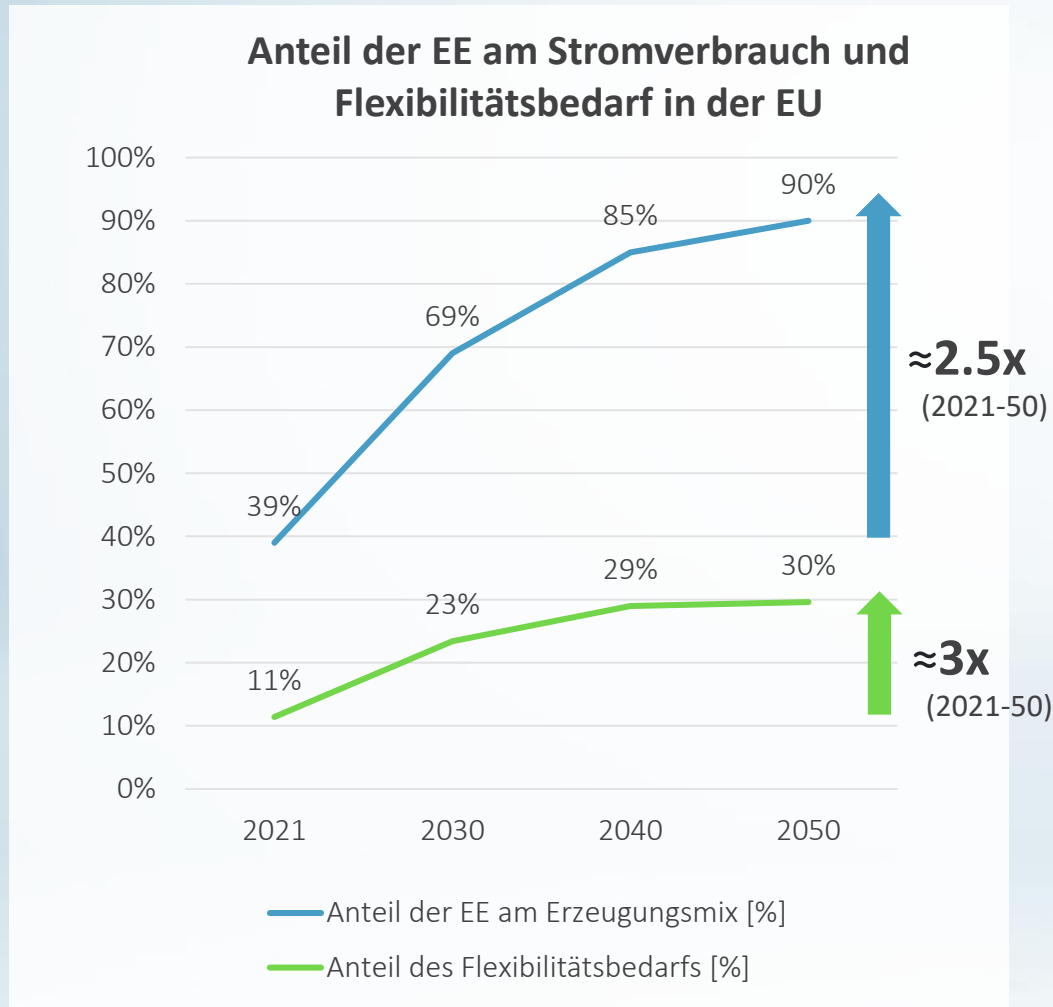


Flexibilität ist entscheidend, um variable Erzeugung effizient und zuverlässig in das Stromsystem zu integrieren

Für ein stabiles und zuverlässiges Stromsystem ist ein ständiges Gleichgewicht von Stromerzeugung und -verbrauch unerlässlich.



Eine Verdopplung der erneuerbaren Energien (EE) erfordert eine Verdreifachung der Flexibilität



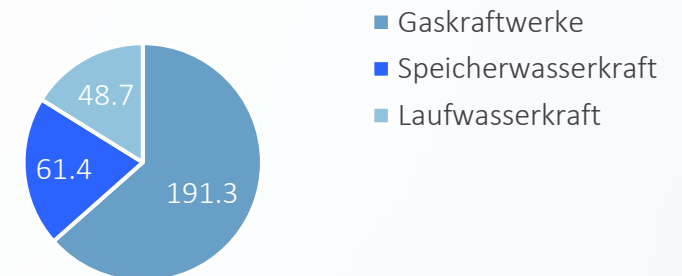
Flexibilität, d.h. der Ausgleich zwischen Erzeugung und Verbrauch, kann von verschiedenen Technologien bereitgestellt werden

Um den Flexibilitätsbedarf eines zunehmend dekarbonisierten EU-Stromsystems zu decken, werden alle Technologien benötigt.

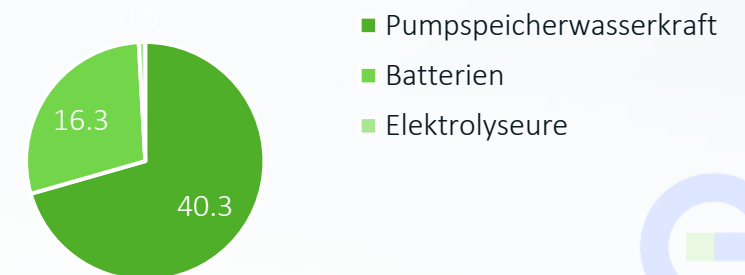


* Stromspeicher ermöglichen flexiblen Verbrauch und Erzeugung

Installierte flexible Erzeugungstechnologien [GW]

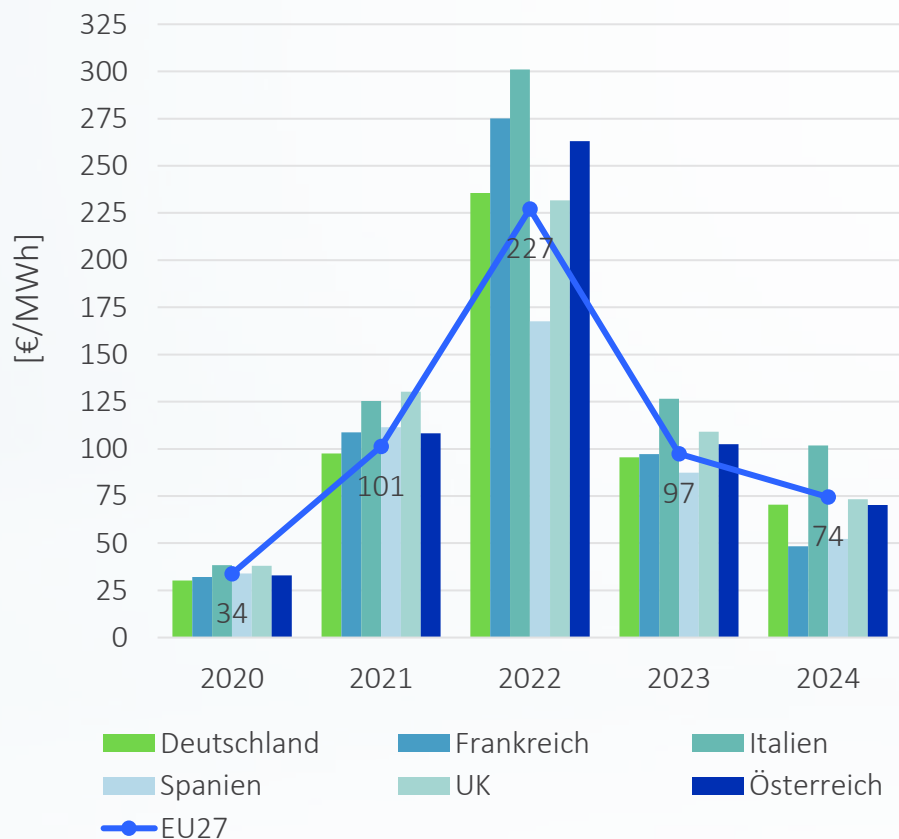


Installierte Stromspeichertechnologien [GW]

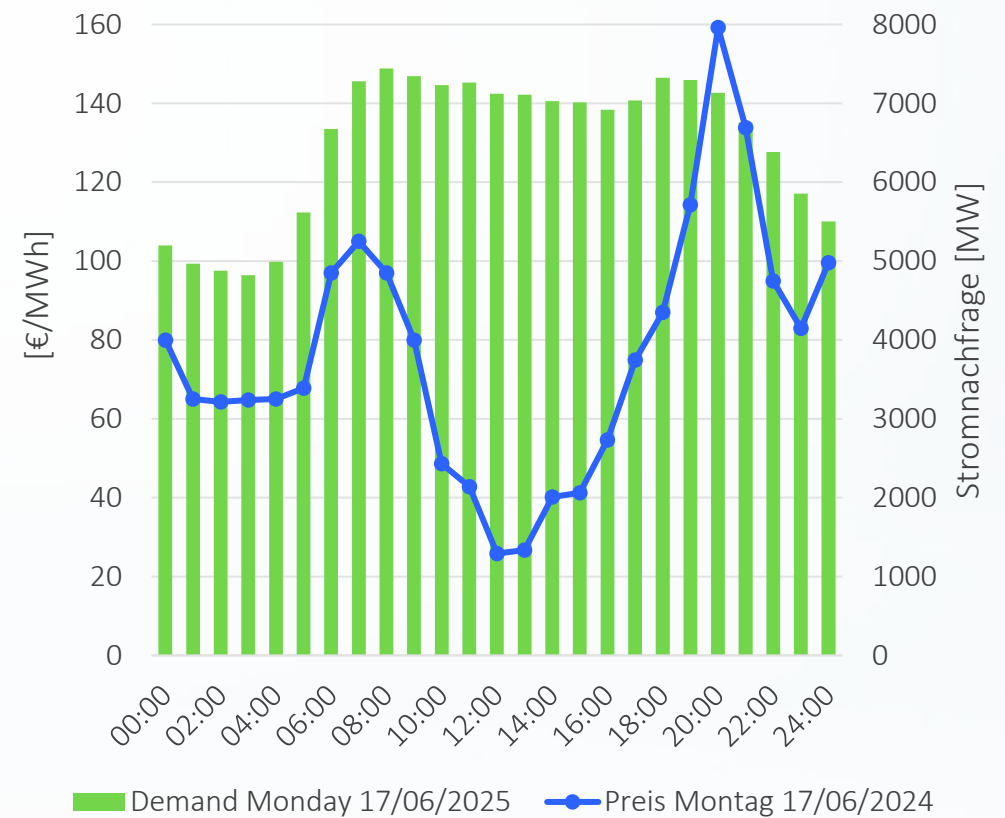


Entwicklungen an den Strombörsen – Preise stabilisieren sich, aber die Volatilität (Preisspanne) nimmt deutlich zu

Durchschnittliche Day-Ahead-Strompreise

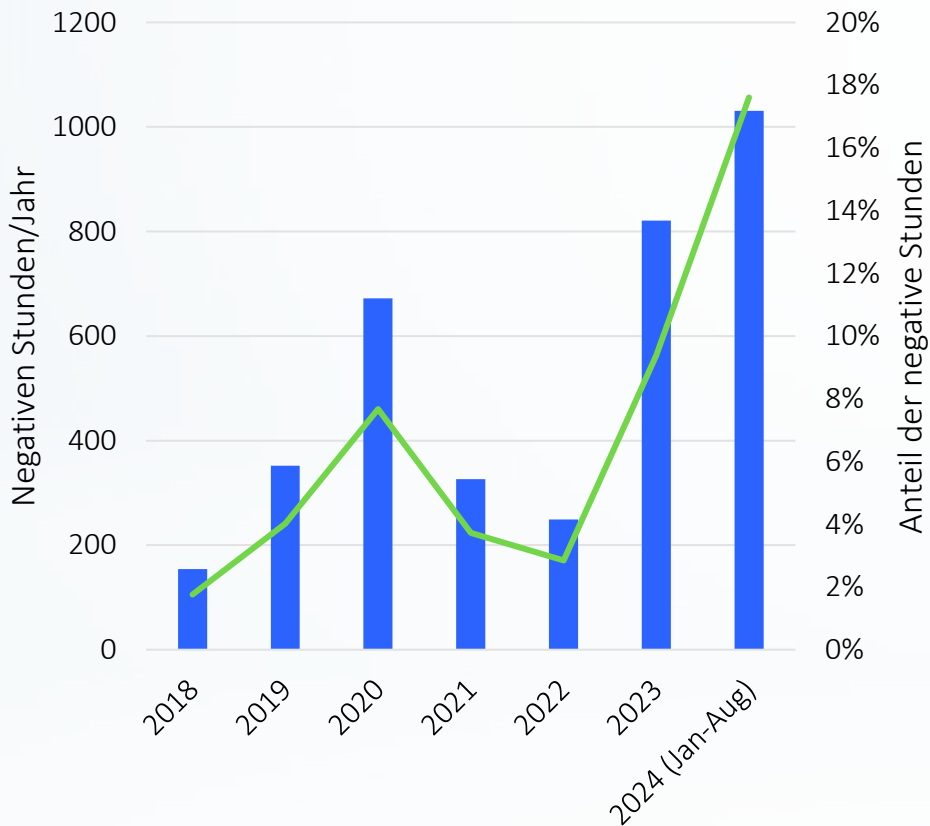


Stündlicher Strompreis in AT



Der Mangel an Flexibilität im Stromsystem zeigt sich durch die deutliche Zunahme von Stunden mit negativen Preisen auf den Märkten

Stunden, in denen mindestens ein EU-Land einen negativen Preis aufwies



Quelle: ENTSO-E Transparency Platform



Quelle: Eurelectric Survey 2024



Resümee aus Perspektive der Wasserkraft



Entwicklung der EU-Wasserkraft

Nur geringfügige Erhöhung der Erzeugungsleistung von Speicherkraft- und Laufkraftwerken.

Signifikanter Ausbau der Pumpspeicherkapazitäten erwartet.

1



Die Marktdynamik

Der Ausbau von Wind- und Photovoltaikanlagen führt zu einer **Kannibalisierung der unflexiblen Laufkraftwerke**.

Die zunehmende Preisvolatilität eröffnet jedoch **Chancen für flexible Wasserkraftanlagen**.

2



Unterstützende EU-Gesetzgebung

Erneuerbare Energien Richtlinie: Beschleunigte Genehmigungsverfahren und Annahme des übergeordneten öffentlichen Interesses für Wasserkraftprojekte.

Revision des Strommarktdesigns: Förderprogramme für variable und flexible Technologien können die Modernisierung/Neubau von Wasserkraftanlagen unterstützen.

3



Ungünstige EU-Gesetzgebung

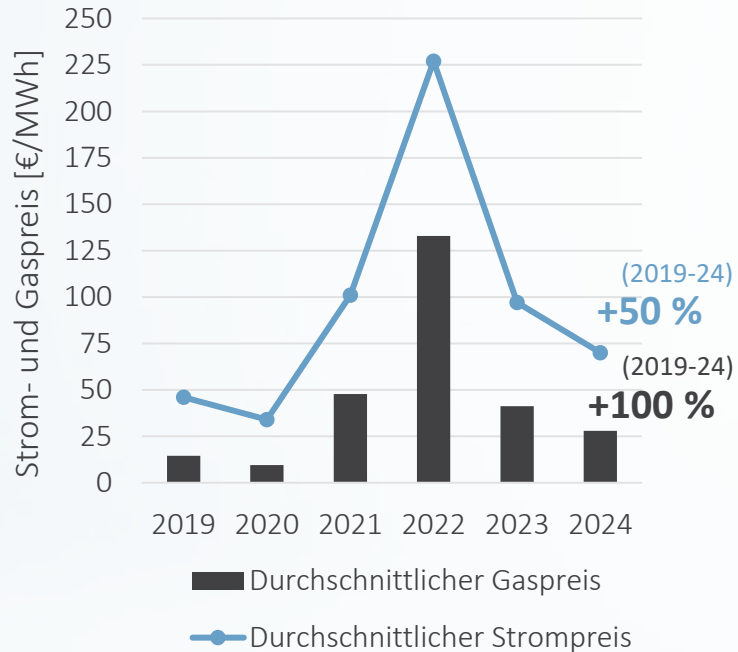
Verordnung zur Wiederherstellung der Natur: Strengere Anforderungen bezüglich Umweltschutz- und Wiederherstellungsbestimmungen können sich negativ auf die Entwicklung und den Betrieb von Wasserkraftanlagen auswirken

4

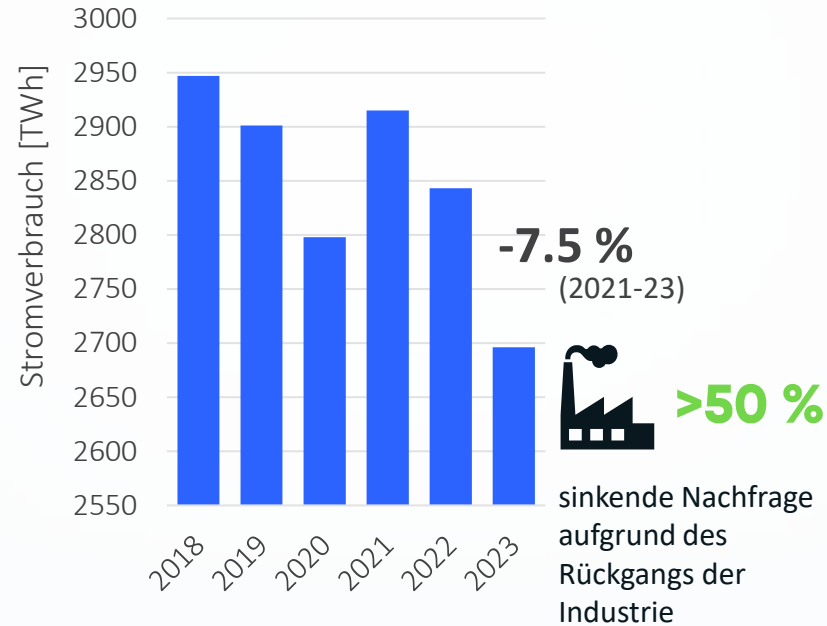


Grüner Deal 2.0 – Ein „Clean Industrial Deal“ soll innerhalb der ersten 100 Tage präsentiert werden

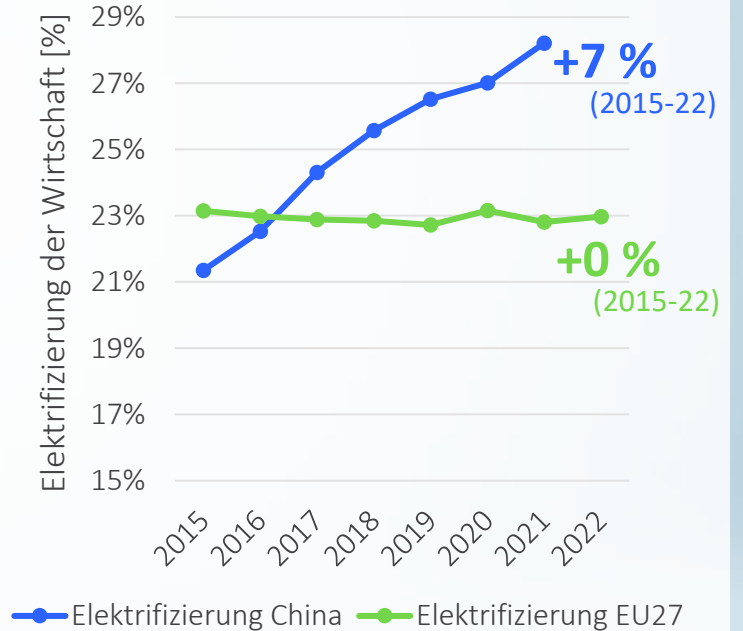
Energiepreise



Stromverbrauch



Elektrifizierung



01

Umkehrung des Deindustrialisierungstrends

02

Wichtige Wertschöpfungsketten zurückholen

03

Erreichen der Klimaziele



Follow. Empower. Advocate.

[in](#)



eurelectric



Eurelectric

34 National associations

32 European countries

+3500 Companies

1000 Utility experts

The Union of the Electricity Industry – Eurelectric is the sector association which represents the common interests of the electricity industry at pan-European level, plus its affiliates and associates on several other continents

Organisational Structure



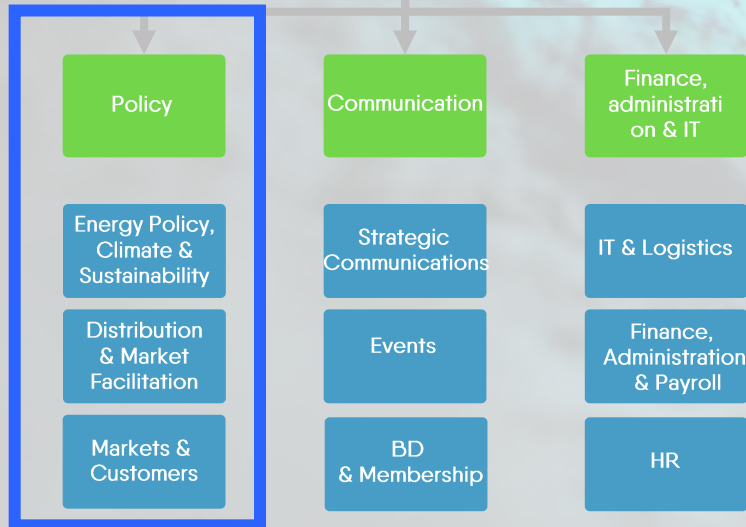
Kristian Ruby
Secretary-General



Secretariat

45 staff members based in Brussels

Management



Leonhard Birnbaum
President
CEO of E.ON SE



+3500 Utilities

+1000 experts

Board of Directors

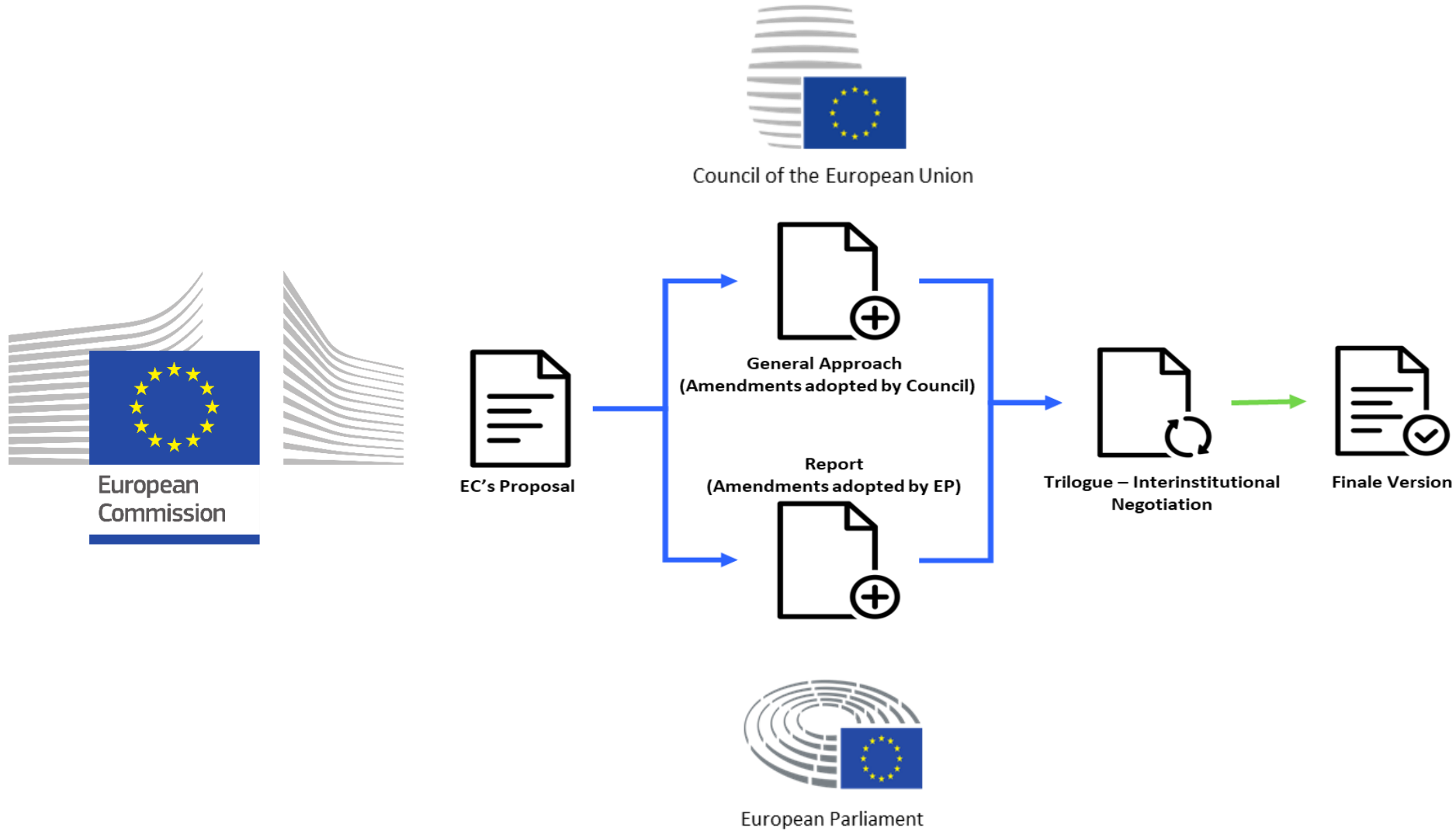
Coordination Committee

Electrification & Sustainability Committee	Generation & Environment Committee	Markets & Investments Committee	Distribution & Market Facilitation Committee	Customers & Retail Services Committee
---	---	--	---	--

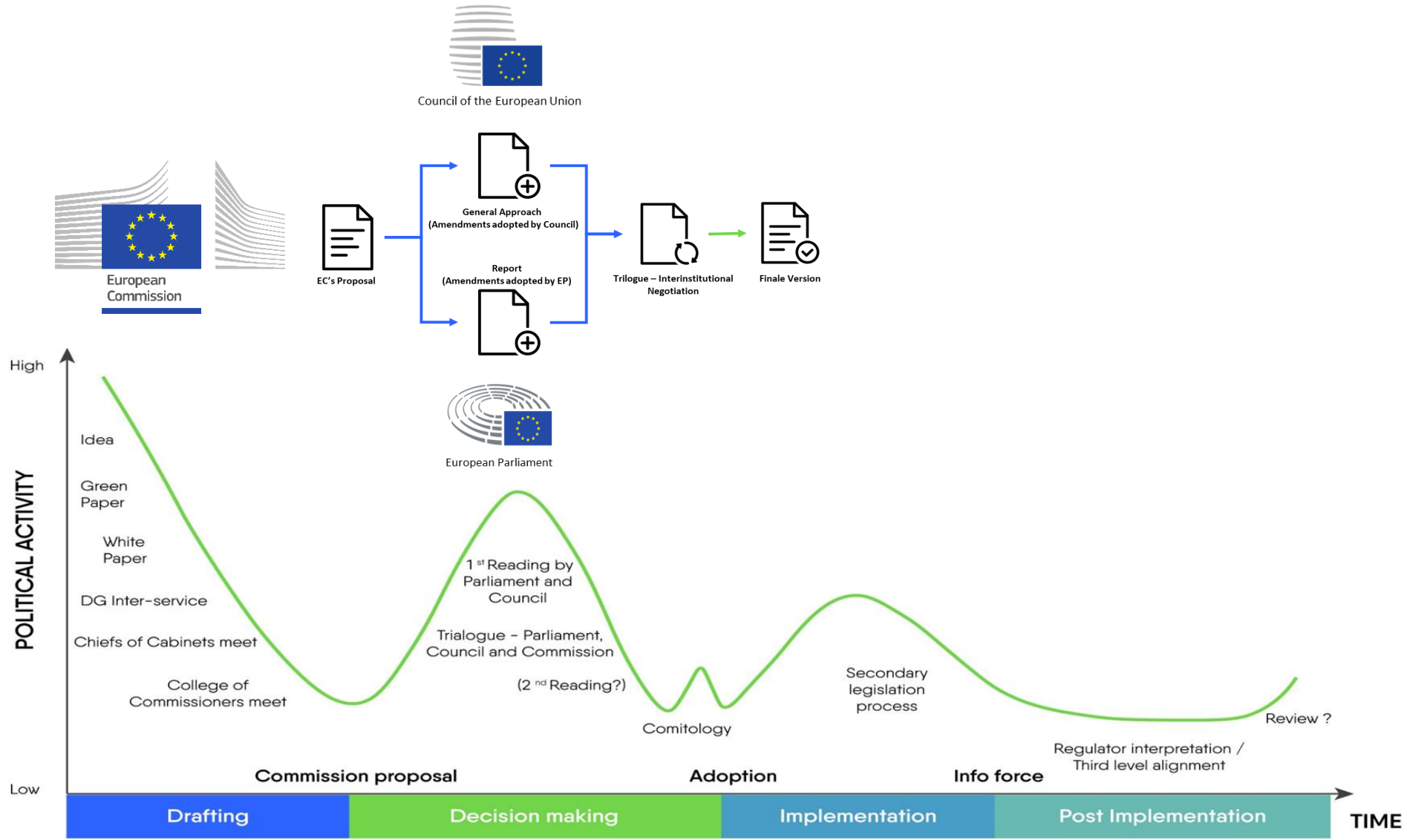
16 Policy Working Groups:

Electrification & Energy Efficiency	Climate Change & Decarbonisation	Wholesale Market & Investment frames	Regulation & Network Customers	Retail Market Design
E-mobility	Thermal & Nuclear	Market Integration & Network Codes	Sustainable Network Technology	Customers & New Services
Industrial Competitiveness and Innovation	RES & Storage	Financial Regulation & Market Integrity		
Task Force Social Dialogue	Hydropower	Power and Gas		
		Sustainable Finance		

Ordinary legislative procedure (Co-decision)



Eurelectric's Engagement with EU Institutions



Eurelectric's activities



1



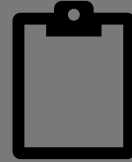
Monitoring
Regulatory
Initiatives &
Actions

2



Engagement with
EU Policymakers

3



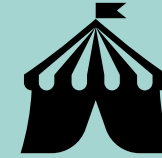
Development of
Position Papers

4



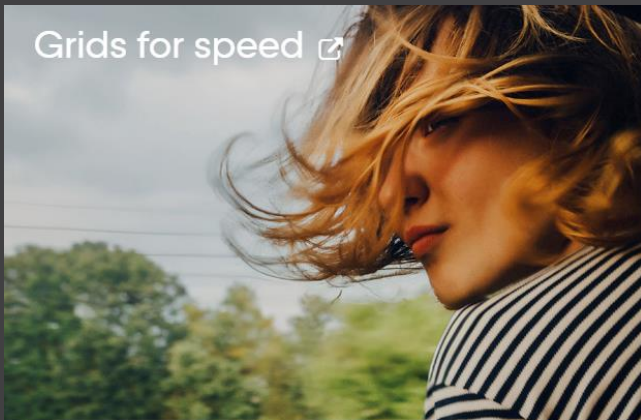
Flagship Reports
and Studies

5



Events &
Meetings

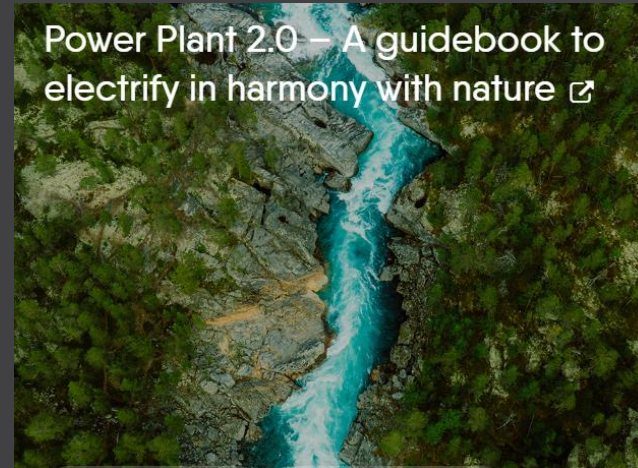
Grids for speed [↗](#)



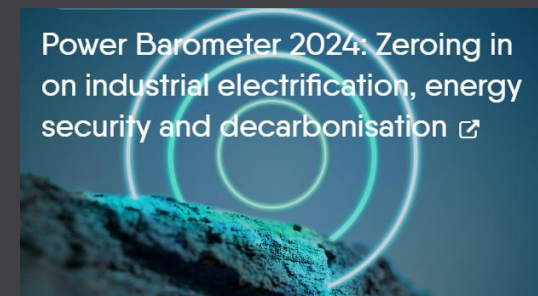
Decarbonisation Speedways [↗](#)



Power Plant 2.0 – A guidebook to
electrify in harmony with nature [↗](#)



Power Barometer 2024: Zeroing in
on industrial electrification, energy
security and decarbonisation [↗](#)



EU Hydropower: Ensuring security of supply by providing flexibility on a large scale

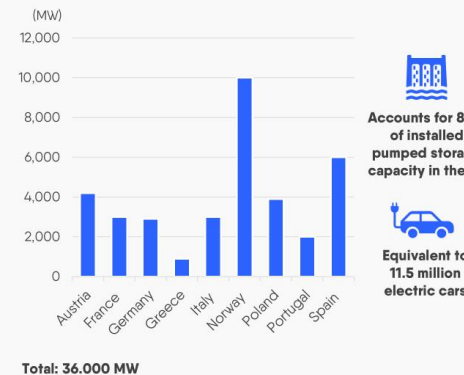
Upgrading EU Hydropower for future needs

Flexible generation and storage capacity is increasing all over Europe

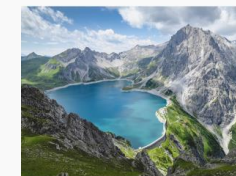
<p>Mauranger II (Norway) – Reservoir HP</p> <p>Investment: € 330 million</p> <p>Year of completion: Phase 1: 2030 Phase 2: 2040</p> <p>Capacity: 290 MW</p> <p>Phase 1: +300 MW (100%) Phase 2: +300 MW (100%)</p> <p>Details: By making the most out of an existing reservoir, an operating HP is extended by a new one, tripling the flexible capacity.</p>	<p>Rengård (Sweden) – Reservoir HP</p> <p>Investment: € 100 million</p> <p>Year of completion: 2024</p> <p>Capacity: 36 MW +35 MW (100%)</p> <p>Details: By adding another turbine, the capacity of an existing HP was doubled, resulting in greater flexibility of the plant itself and downstream ones.</p>	<p>Kühtai II (Austria) – Reservoir and pumped storage HP</p> <p>Investment: € 1.1 bn</p> <p>Year of completion: 2026</p> <p>Capacity: +130 MW</p> <p>Details: In addition to a reservoir with natural inflow, a new pumped storage HP is being built and integrated into an existing HP scheme.</p>
<p>Frades II (Portugal) – Pumped Storage HP</p> <p>Year of completion: 2017</p> <p>Capacity: +799 MW</p> <p>Details: By utilising existing reservoirs and employing variable speed technology, the new pumped storage HP can meet flexibility requirements both in generation and pumping mode.</p>	<p>Limberg III (Austria) – Pumped Storage HP</p> <p>Investment: € 500 million</p> <p>Year of completion: 2025</p> <p>Capacity: +480 MW</p> <p>Details: An exiting scheme of reservoir and pumped storage HPs is extended by a new pumped storage HP doubling the pumping capacity.</p>	<p>Čierny Váh (Slovakia) – Pumped Storage HP</p> <p>Investment: € 173 million</p> <p>Year of completion: 2030</p> <p>Capacity: 735 MW +70 MW (10%)</p> <p>Details: To increase the flexibility of an existing pumped storage HP, two of six units will be upgraded to variable speed technology and hybridised with battery storage.</p>

Pumped storage projects are waiting to be unleashed across Europe

Potential capacity of selected European countries*



Examples of planned projects



- Lünerseewerk II (Austria)**
- ✓ A new pumped storage plant will be built using an existing reservoir
 - ✓ Generation capacity: **1,000 MW**
 - ✓ Pump capacity: **1,000 MW**
 - ✓ Starting operation: **2037**
 - ✓ Investment: **€ 2 bn**



- Alto Lindoso (Portugal)**
- ✓ An old turbine is replaced with a reversible unit able to pump and generate
 - ✓ Generation capacity: **630 MW**
 - ✓ Pump capacity: **315 MW**
 - ✓ Starting operation: **2027**
 - ✓ Investment: **€ 96 mn**

*Potential capacity of new pumped storage plants using existing hydropower schemes based on information provided by Eurelectric Members

Photo Lünerseewerk II (Austria) - credits: illwerke vkw AG, Stefan Kofner Photography
Photo Alto Lindoso (Portugal) - credits: EDP Produção

EU Hydropower: A sector contributing to nature conservation and restoration

The EU Hydropower sector is taking its responsibility seriously

Aware that hydropower impacts rivers, their habitats and species, the sector is committed to minimising negative effects during development, construction and operation, aiming for a positive outcome for nature.

This commitment is demonstrated through:



Adherence to the Mitigation Hierarchy: Prioritising actions that avoid, minimise, restore and offset environmental impacts.



Community involvement and engagement: Actively involving local communities in the project development and decision-making processes.



Strict compliance with regulatory requirements: Plant design, construction and operation adhere to EU and national regulations and standards.



Finding synergies and maximise benefits: Cross-sector cooperation aims to generate the most beneficial outcome for the environment.



Prioritising refurbishment and upgrades: Focusing on impaired river stretches and utilising existing infrastructure for powering, repowering and upgrading instead of constructing new facilities.



Conducting extensive research and monitoring: Engaging in comprehensive studies to understand and mitigate negative impacts, while sharing the gained scientific knowledge.



Habitats, species and river continuity...



Spjutmo (34 MW), Blyberg (15 MW), Våsa (15 MW) – Sweden

Measure: River continuity restoration
Investment: € 36 million
Details: Three fish ladders are being constructed to facilitate both up- and downstream fish migration. The ladder features a space-saving, ramp-like structure that loops over itself, similar to a parking garage design. To guide fish to the entrance, an innovative mammoth pump is installed using air and water pressure to generate a strong attraction flow.



Jochenstein (132 MW), Passau-Ingling (96 MW), Schärding-Neuhaus (96 MW) – Austria

Measure: Habitat and river continuity restoration
Investment: € 65 million
Details: The installation of fish migration facilities at three hydropower plants, along with the restructuring of riverbanks, will reconnect previously isolated habitats. These efforts will enhance biodiversity and increase species populations.



Kühtai (190 MW) – Austria

Measure: Hydropeaking mitigation and habitat restoration
Investment: € 22 million + € 13 million
Details: A retention basin with a capacity of 300,000 m³ was constructed to reduce discharge fluctuations from the hydropower plant into the downstream river, thereby mitigating the effects of hydropeaking. In addition, over a stretch of 3 kilometers, the existing bank protection was removed and the riverbed widened, promoting the development of a side channel, backwater zones, and a natural riverbank.



Romanche-Gavet (94 MW) – France

Measure: River continuity and habitat restoration
Investment: € 400 million
Details: Five consecutive barriers were removed and replaced with a single, upgraded facility. In addition to significantly increasing capacity, this initiative restored a free-flowing river stretch and revitalised terrestrial and fluvial habitats.

...are restored all over Europe



La Florida (7.5 MW) – Spain

Measure: River continuity restoration and habitat conservation
Investment: € 3 million
Details: The installation of a fish-friendly Archimedes screw turbine allows for the controlled release of the necessary ecological flow to preserve downstream habitats and species. In addition, the river continuity was enhanced by installing a technical fish pass.



Ottensheim-Wilhering (179 MW) – Austria

Measure: Habitat and river continuity restoration
Investment: € 250 000
Details: In the estuary area of the tributary "Große Rodl" near the hydropower plant, an obsolete barrier was removed to allow fish migration. In addition, around 200 meters of hard shoreline were removed and shallow gravel banks restored.



Several Hydropower Plants – Spain

Measure: Species conservation
Investment: € 200 000
Details: By using light sensors, camera traps and sound recording devices, this initiative aims to assess and minimize the impact of human presence in caves associated with hydropower plants on bat colonies with the aim of conserving the bat populations and improving their habitat.



Marieberg (0.9 MW) – Sweden

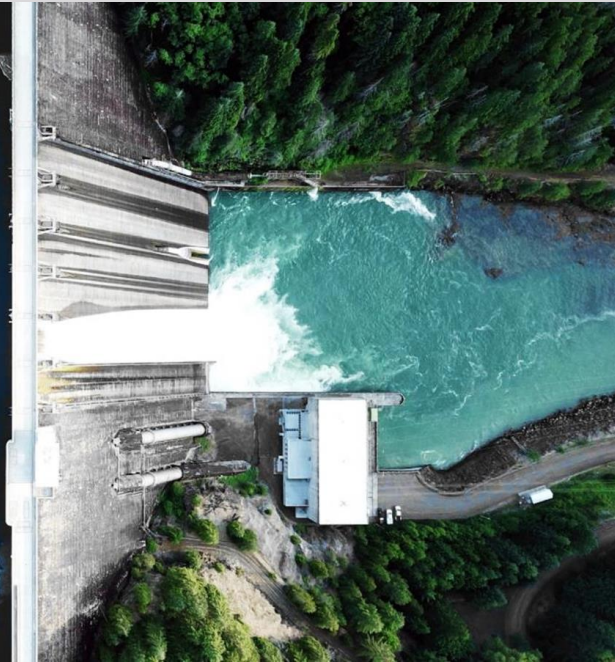
Measure: River continuity restoration
Investment: € 1.5 million
Details: By removing the hydropower plant, both longitudinal and lateral connectivity were restored, leading to improved habitat conditions. The loss of power generation was deemed acceptable considering the environmental improvements.



eurelectric

EU Hydropower:

A vital force for preserving climate and environment



eurelectric

EU Hydropower:

Offers far more benefits than just renewable electricity and flexibility



Win-Win Projects are Implemented Across Europe

Töging-Jettenbach (Germany)

Year of completion: **2022**
Investment: **€ 250 million**

- Renewable electricity increase:
- Capacity: **33 MW (+40%)**
 - Generation: **140 GWh (+25%)**

- Biodiversity enhancements:
- Restoration of **aquatic habitats**
 - Restoration and creation of **grass- and wetland habitats**
 - Improved river continuity through **up- and downstream migration facilities** and **reconnection of floodplains**



Romanche-Gavet (France)

Year of completion: **2022**
Investment: **€ 400 million**

- Renewable electricity increase:
- Capacity: **15 MW (+20%)**
 - Generation: **160 GWh (+40%)**

- Biodiversity enhancements:
- Restoration and creation of **aquatic and terrestrial habitats**
 - Improved river continuity through **dam removal** and **up- and downstream migration facilities**



Aguieira - Portugal
336 MW | 190 GWh



Freudenau - Austria
172 MW | 1100 GWh



Roßhaupten - Germany
49 MW | 80 GWh



Schluchsee - Germany
480 MW | 520 GWh



Serre Ponçon - France
380 MW | 650 GWh



Susqueda - Spain
86 MW | 140 GWh



Tokke Cascade - Norway
1017 MW | 4400 GWh



Zlatoličje - Slovenia
136 MW | 580 GWh



Water supply for households and industry



Flood and drought protection



Recreational activities



Water supply for agriculture



Water supply for firefighting



Water management for navigation



eurelectric



Eurelectric's latest hydropower publications:

- [1st Hydropower Short Story, Upgrading EU Hydropower for future needs](#)
- [2nd Hydropower Short Story, EU Hydropower: A Vital Force in Preserving Climate and Environment](#)
- [3rd Hydropower Short Story, EU Hydropower: Benefits for People, Communities, and the Economy beyond Power Generation](#)
- [4th Hydropower Short Story, EU Hydropower: Ensuring Security of Supply by providing Flexibility on a large scale](#)
- [5th Hydropower Short Story, EU Hydropower: A sector contributing to nature conservation and restoration](#)
- [EU Hydropower Election Manifesto](#)

Contact:

Adrian LINDERMUTH
Advisor Hydropower & Social Sustainability
alindermuth@eurelectric.org