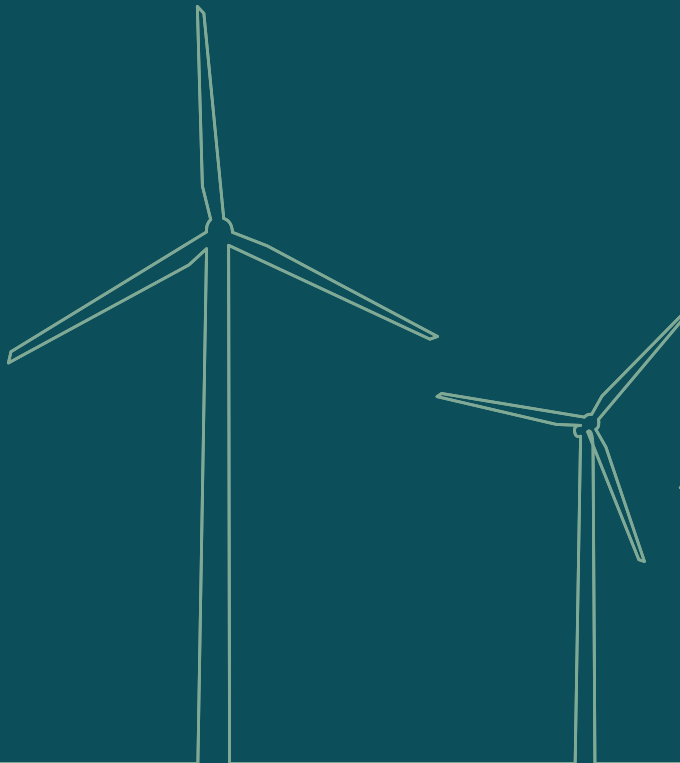


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Wind Energy Finland

Opportunities 2023/24



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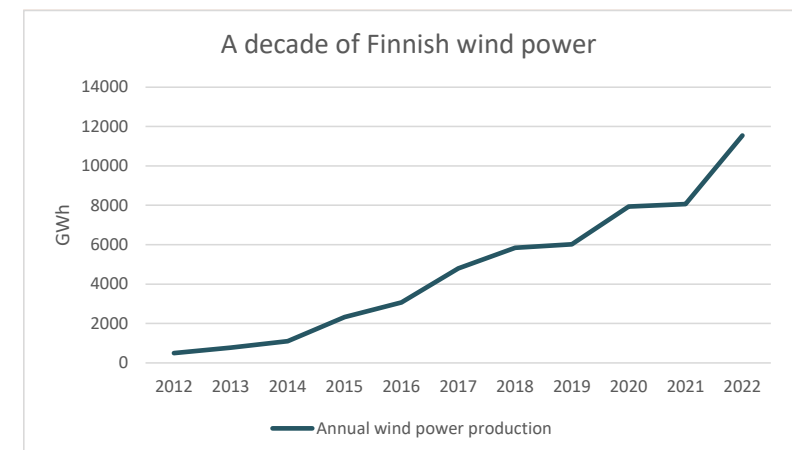
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Claudia Greiner
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Finland as a frontrunner in climate action

Finland is a leader in supporting the energy transition and renewable energy. The objective is to become carbon neutral by 2035 and to create the first welfare society in the world to entirely renounce fossil fuels. Finland has ideal circumstances for achieving this goal thanks to its innovative and dynamic business environment, cutting-edge technology, and outstanding know-how.



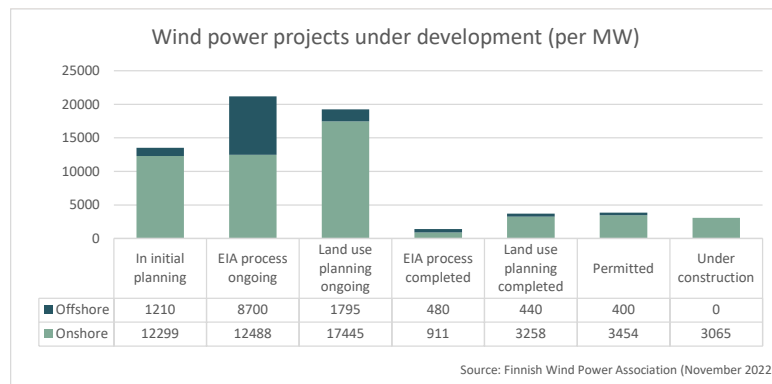
The success story of the wind energy sector is an impressive example. Even though Finnish commercial wind power is only a decade old, it has already surpassed all other forms of electricity generating in terms of cost-effectiveness. Despite the rapid development in recent years, there is still a huge growth potential both onshore and offshore.

The Finnish wind energy sector

Onshore

The majority of developments are onshore. During 2022, 2,430 MW of new capacity was installed, bringing the total installed capacity up to approximately 5.6 GW.

The west coast of Finland and Lapland are perceived as ideal locations for wind power production. These are also the regions with the highest number of wind energy projects under



planning and construction. The future trend is that the project development is expanding also to other areas.

Project size and capacity have increased considerably within recent years. Wind farms with a capacity of 50 MW or more make up roughly 40 percent of all operational projects commissioned in 2019–2022. Out of the projects that came online in 2022, more than a quarter have a capacity of 100 MW or more. The average size of installed turbines in 2022 is around 5.4 MW, and sizes upwards of 6 MW are quite standard for projects under development.

The favourable market conditions have attracted a significant number of foreign developers and investors. International players own approximately half of the capacity currently installed.

Offshore

Finland’s ambitious climate goals together with the geopolitical incentive for energy self-sufficiency are causing wind energy to gain momentum also offshore. Finland’s Climate and Energy Strategy greatly relies on offshore wind to enable the electrification and decarbonisation of industry and transport.

On a strategic level, several potential areas for development have been identified in the Maritime Spatial Plan 2030, which was approved in 2020. Especially the Gulf of Bothnia is seen as having good prerequisites for large-scale offshore wind power construction.

An increasing number of actors are setting their sights on the vast potential of the Finnish territorial sea and the exclusive

economic zone. The Finnish project pipeline covers approximately 10,000 MW and 1,000 WTGs worth of offshore wind power.

The state-owned sea areas are administered and leased out by the state-owned company Metsähallitus. In July 2022, the government granted permission to lease state-owned water resources for the Tahkoluoto offshore wind farm expansion, which will significantly enlarge the only existing operational windfarm with sub-sea foundations (from currently 10 to 43 turbines). In addition, Metsähallitus is developing the first large-scale offshore wind farm with a capacity of at least 1,300 MW near Korsnäs. Additional offshore sites will be allocated to developers via an auction model, with the first auctions expected in 2023 and 2024.

Further out in the exclusive economic zone, wind farms operate under government-granted construction permits, preceded by exploration permits for conducting the necessary studies. No construction permits are in place yet, but 2022 witnessed

the granting of the first exploration permits for three offshore projects. Additional projects are already being planned, and a procedural reform aimed to improve the regulatory environment and investment certainty is under way.

Common business models

Thanks to advantageous wind conditions and constantly evolving technology, wind power has become the most competitive form of electricity production in Finland. As a result, projects do not need to rely on governmental support anymore but are regularly implemented subsidy-free.

Some of these projects will be operated following the so-called “Mankala”-model, whereby electricity is generated for the benefit of the company shareholders at cost price. This is a model commonly used by Finnish utilities.

Most commonly, long-term revenues are being secured with the help of PPAs. The first corporate PPAs were concluded with large multinational companies (such as Google), but in recent years PPAs have become more and more attractive for Finnish industrial offtakers. In addition to meeting their green agenda and sustainability goals, the decision to procure green energy is increasingly driven by commercial considerations and the desire to protect against bullish spot prices and price volatility. This has also resulted in a considerable uptick in long-term PPAs being concluded by utilities and other suppliers.

While some developers procure PPAs as part of the project development, it is increasingly common for projects to be sold without a PPA, either at ready-to-build stage or as a



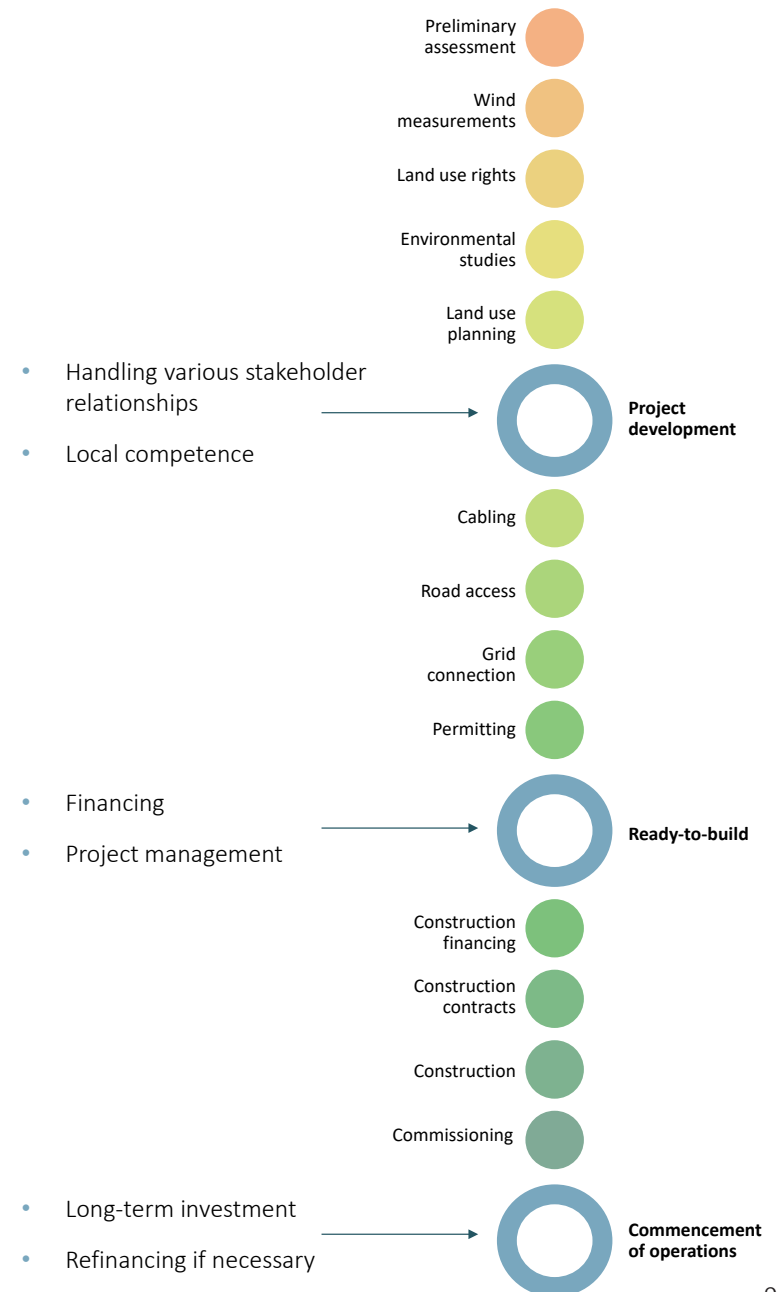
turnkey project upon completion. It will often be the investors who conclude a PPA for the operation phase based on their requirements and risk appetite. Given the recent electricity price development, running projects as purely merchant is also becoming an increasingly attractive option.

Wind farm development

Project development calls for working dialogue with local landowners, grid operators, municipalities and environmental authorities. Key development activities include environmental assessments and wind measurements, securing of land rights and grid connection capacity, spatial planning and permitting, as well as the conclusion of project agreements. For medium-sized wind farms, the average time-span from preliminary feasibility studies to commercial operation is approximately 4-6 years.

Finland has no “one-stop-shop” permit for wind farms. Several individual permits and statements from different state and municipal authorities are therefore required, with only limited procedural coordination in place.

Wind energy development, however, enjoys the procedural privileges and supportive measures for construction of renewable energy plants. This includes time-limits for construction and operation permitting and a recent proposal to temporarily grant procedural priority to green transition projects between 2023-2027 in administrative courts and the Regional State Administrative Agency. Authorities have also compiled a manual for renewable energy project developers, and guidance is offered nation-wide by a centralised administrative contact point.



Future trends

Wind to hydrogen

Cost-competitive wind power is key in unlocking Finland's potential for green hydrogen production. The Finnish Government just recently adopted a resolution confirming Finland's goal to become a European leader throughout the hydrogen value chain. Finland intends to produce at least 10% of the EU's emissions-free hydrogen by 2030. In addition to supplying the domestic industry, transport and energy sector, the aim is for Finland to become a major exporter of hydrogen, electric fuels and green steel.

To exploit this potential, Finland is making significant efforts to create a hydrogen infrastructure. This includes the construction of a national hydrogen network and a joint pipeline with Sweden (the "Nordic Hydrogen Route"), through which green hydrogen will be transported on a large scale from areas with high wind power production to industrial customers. The pipeline is planned to be operational by 2030. Over the longer term, an expansion via the Baltic countries and Poland all the way to Germany is planned.

A wide-ranging cooperation between commercial enterprises and other stakeholders aims at developing the economic and regulatory framework conditions as holistically and effectively as possible. This includes a joint project of the TSOs in the gas and electricity sector, the aim of which is to facilitate sector integration between hydrogen, gas and electricity transmission.

Wind power and reserve markets

As the share of wind power in the energy mix is growing, the increase of variable production creates challenges in terms of grid stability. However, wind power can also be part of the solution with wind farms providing flexibility on the reserve power markets.

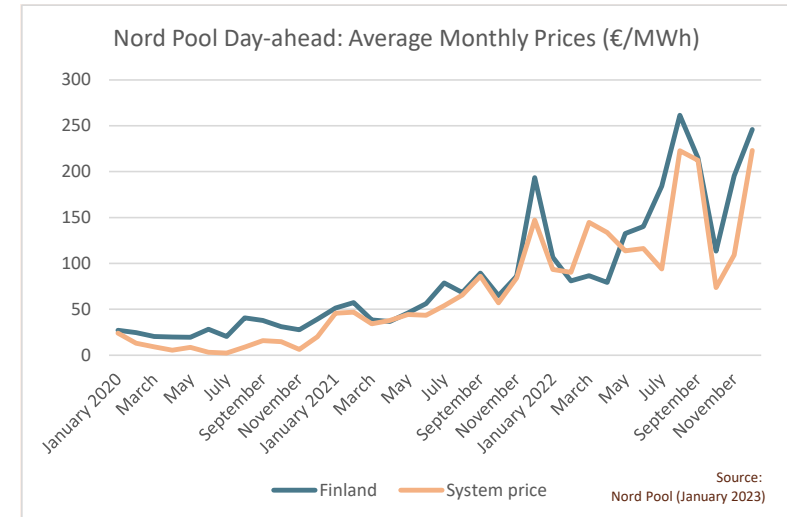
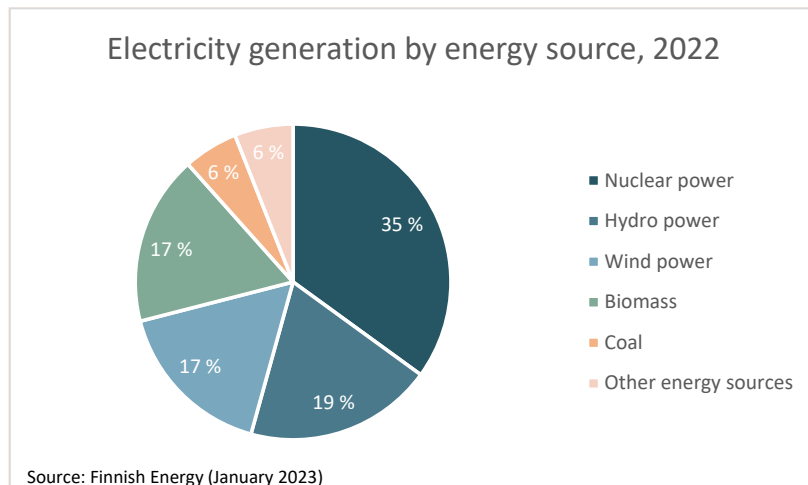
The Finnish TSO, *Fingrid Oyj*, procures different kinds of reserves from reserve markets to balance the grid. Reserves are power plants, consumption units and energy storages that can adjust their power in accordance with the needs of the grid. The reserve markets are based on auctions and the bulk of compensation is paid for maintaining the reserve capacity, regardless of whether the reserve is activated or not. In some reserve products, changes in the energy production caused in case of the activation of the reserve are also compensated.

Wind power is especially suited for reducing power production for down-regulating purposes. Additional income generated in the reserve market can be an attractive option for example in times of low electricity prices. The Finnish TSO has identified wind farms as interesting resources for offering reserve power and is striving to adapt its various products to make them more suitable and lucrative for the sector. Possibilities to create stable revenues via long-term agreements are also being explored.

The Finnish energy sector in brief

Finland is one of the leading nations in renewable energy. The share of renewables in both energy consumption and electricity supply is more than 40% and one of the highest in the EU. Hydro and bioenergy account for a major part of renewables, but the share of wind power in total electricity generation has grown from almost zero to 16.7% over the last decade.

Finland is part of the Europe’s leading electricity market Nord Pool. The Nordic and Baltic TSOs own a third of Nord Pool and are closely involved in its operations. The electricity market is divided in multiple bidding areas with individual prices. Unlike other Nordic countries, Finland has only one price zone. The monthly average prices were between 80 and 261 EUR/MWh in 2022, but there are considerable variations in weekly, daily and monthly averages.



The transmission grid covers nearly 15,000 kilometres of high-voltage lines and is operated by the TSO *Fingrid Oyj*. The national grid is linked with high-voltage connections to Estonia, Sweden and Norway. Regional high-voltage networks and local distribution networks are operated by 9 regional and 77 distribution network companies.

To accommodate increasing electrification and geographically segregated production and consumption hot-spots, significant new investments of around EUR 2.1 billion are planned over the next ten years to expand and upgrade the network. In its grid development plan for 2022–2031, Fingrid envisages the construction of 3,700 kilometres of new transmission lines and more than 100 new or upgraded substations. The development focuses on enhancing cross-border connections, in particular with Sweden, and improving the domestic transmission capacity from areas with high production in the north and at the west coast to areas with high consumption in the south.

Events

EnergyWeek **WIND** FINLAND

Vaasa Energy Week 2023
20–24 March 2023

Annual energy event arranged in Vaasa, Finland.

www.energyweek.fi



Energia 2024
22–24 October 2024

International energy event arranged in Tampere, Finland.

www.energiamesut.expomark.fi

Wind Finland Offshore 2023
4 May 2023

International seminar focused on offshore wind organized by the Finnish Wind Power Association in Helsinki.

www.windfinland.fi

Wind Finland 2023
4 October 2023

Annual wind power event organized by the Finnish Wind Power Association in Helsinki.

www.windfinland.fi

Finland Facts

Finland has been a European Union member state since 1995 and is the only Nordic state to have joined the euro. Key industries are electronics, metal, forestry and chemical industries. The main import partners are Germany, Sweden, the US, the Netherlands and China.

Population: 5.5 million

Total area: 338,472 km²

Largest cities by population:

Helsinki (658,457), Espoo (297,132), Tampere (244,223), Vantaa (239,206), Oulu (209,551) and Turku (195,137) (2021)

Currency: Euro (€, EUR)

GDP: EUR 252 bn (2021 estimate)

GDP per capita: EUR 45,000 (2021 estimate)

Official languages: Finnish and Swedish

Corporate tax rate: 20 %

Trade organizations: EU (1995), WTO (1995), OECD (1969)

Source: Statistics Finland and Population Register Center

Useful contacts

Networks and advisors

Bergmann Attorneys at Law

Helsinki-based law firm with a strong specialization in industrial projects in construction and engineering, energy, and infrastructure.

Pohjoisesplanadi 35 E
00100 Helsinki
office@bergmann.fi
www.bergmann.fi

The Finnish Wind Power Association

(Suomen Tuulivoimayhdistys ry.)

Association founded in 1988 for promotion of wind energy in Finland with over 160 private individual members and 140 member companies and associations.

Yliopistonkatu 34 B 17
40100 Jyväskylä
tuuli@tuulivoimayhdistys.fi
www.tuulivoimayhdistys.fi

Business Finland

Business Finland is the Finnish innovation funding, trade, investment, and travel promotion organization, fully owned by the Finnish Government..

Porkkalankatu 1
00180 Helsinki
www.businessfinland.com

Finnish Energy Industries (Energiateollisuus ry)

Sector organisation for the industrial and labour market policy of the energy sector, with about 270 member companies.

Eteläranta 10
00130 Helsinki
info@energia.fi
www.energia.fi

Deutsch-Finnische Handelskammer

(German-Finnish Chamber of Commerce)

Being part of the network of German chambers of commerce, the Helsinki-based chamber offers various services in order to promote business relations between Germany and Finland.

Unioninkatu 32 B
00101 Helsinki
info@dfhk.fi
www.ahkfinnland.de

State administration and state-owned companies

Finnish Energy Authority (Energiavirasto)

The Energy Authority is responsible for supervision of the energy market.

Lintulahdenkuja 2 A
00530 Helsinki
Tel: +358 29 5050 000
kirjaamo@energiavirasto.fi
www.energiavirasto.fi

Fingrid Oyj

Enterprise in majority state ownership responsible for the Finnish transmission grid. At present, the grid comprises lines at a total length of 14,400 km and 120 substations.

P. O. Box 530 (Läkkisepäntie 21)
00101 Helsinki
Tel. +358 30 395 5000
kirjaamo@fingrid.fi
www.fingrid.fi

Defence Command of the Finnish Defence Forces

The Defence Command leading the Finnish Defence Forces issues statements on requirement of radar impact assessment of a planned wind park and approves wind park projects in terms of their impact on military readiness.

P.O. BOX 919 (Kasarmikatu 17)
00131 Helsinki
Tel. +358 2 99 800
kirjaamo.pe@mil.fi
www.puolustusvoimat.fi

Finavia Oyj

Wholly state-owned company maintaining and operating the 20 traffic airports as well as Finland's air navigation system.

P. O. Box 50 (Lentäjantie 3)
01531 Vantaa
Tel. +358 20 708 000
tietopalvelu@finavia.fi
www.finavia.fi

Fintraffic Air Navigation Services (Fintraffic Lennonvarmistus Oy)

Fintraffic ANS is responsible for managing the use of Finnish airspace as well as providing flight route and air navigation services. Grants flight obstacle statements required for wind turbines.

P. O. Box 157
01531 Vantaa
Tel. +358 20 4284 000
info@fintraffic.fi
www.fintraffic.fi/ans

Finnish Transport and Communications Agency (Liikenne- ja viestintävirasto Traficom)

Traficom is an authority in licence, registration, and approval matters. Grants flight obstacle permits

required for wind turbines in some cases.

P. O. Box 320
00059 Traficom
Tel. +358 29 534 5000
kirjaamo@traficom.fi
www.traficom.fi

The Centres for Economic Development, Transport and the Environment (ELY Centres)

Elinkeino-, liikenne- ja ympäristökeskus (ELY-keskus)

There are 15 ELY Centres responsible for the regional implementation and development tasks of the central government. The ELY Centres are involved in the assessment of environmental impacts of the wind parks.

www.ely-keskus.fi
Tel. +358 295 020 000

Metsähallitus

A state-owned enterprise responsible for administration of the state-owned land and water areas. Metsähallitus also develops state-owned land also for the purposes of wind energy production production and leases out state-owned sea areas for offshore wind projects.

P.O. Box 94 (Ratatie 11)
01301 Vantaa
Tel. +358 206 39 4000
kirjaamo@metsa.fi
www.metsa.fi

Energy and environment policies

Ministry of Employment and the Economy

(Työ- ja elinkeinoministeriö, TEM)

The ministry responsible for, inter alia, energy policy and integration of the national preparation and implementation of climate policy.

P.O. Box 32
00023 Government
Tel. +358 2951 6001
kirjaamo.tem@gov.fi
www.tem.fi

Ministry of the Environment

(Ympäristöministeriö, YM)

The ministry responsible for the built environment, housing, biodiversity, sustainable use of natural resources and environmental protection.

P. O. Box 35 (Aleksanterinkatu 7)
00023 Government
Tel. +358 2951 6001
kirjaamo.ym@gov.fi
www.ym.fi

Services for the wind power sector

Project acquisition and divestment

- Due diligence scrutiny
- Financing and structuring
- Contract drafting and negotiation
- Process and document management

Project development and management

- Regulatory framework
- Project agreements
- Financing arrangements
- Taxation

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March 2023