

# TEOLLISUUDEN VOIMA OYJ CREDIT INVESTOR PRESENTATION

December 2022  
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# TVO IN BRIEF

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**TVO – AN  
EXPERIENCED  
PIONEER**

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- Non-listed public limited liability company producing electricity to its shareholders at cost
- Annual production 16.3 TWh (OL1/OL2 14.4 TWh + OL3 1.9 TWh), approximately 20% of the total electricity consumption (82 TWh\*) in Finland (2022)
- Annual turnover EUR 358 million
- Approximately 1 000 employees
- Rated BB+ (positive outlook) and BBB- (stable outlook) by S&P and Fitch
- ESG Risk Rating of 23.0 by Sustainalytics, the low-end of the Medium risk category

\*) Finnish Energy, Energy Year 2022 (Jan 2023)  
Source: TVO, TVO annual report 2022



# OVERVIEW OF UNITS

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## **Olkiluoto 1 (OL1) and Olkiluoto 2 (OL2)**

- OL1 890 MW, OL2 890 MW (BWR), Westinghouse Atom
- Commercial operation since 1979 and 1982
- Modernisation and upgrade in several stages from 660 MW to 890 MW

## **Olkiluoto 3 EPR\* (OL3)**

- 1,600 MW (PWR), AREVA-Siemens Consortium
- Under test production phase

## **Posiva Oy (Subsidiary, 60%)**

- Responsible for the final disposal of spent fuel produced by its shareholders

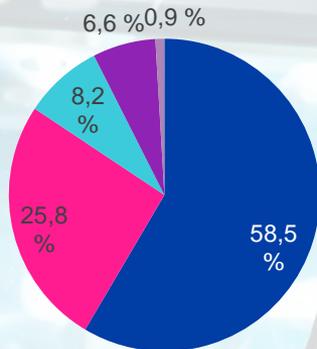
\*) European Pressurized Reactor  
BWR: Boiling water reactor  
PWR: Pressurized water reactor



# TVO OWNERSHIP STRUCTURE



Dec 31, 2022



- Pohjolan Voima Oyj (PVO), 58.5%
- Fortum Power and Heat Oy, 25.8%
- Oy Mankala Ab, 8.2%
- EPV Energia Oy, 6.6%
- Kemira Oy, 0.9%

| Underlying shareholders by sector |     |
|-----------------------------------|-----|
| Industrial companies              | 47% |
| Municipalities                    | 27% |
| Fortum                            | 26% |

\*) UPM Energy Oy is the subsidiary of UPM-Kymmene Oy, rated Baa1 by Moody's and BBB by S&P

Main shareholders of PVO (Dec 31, 2021):

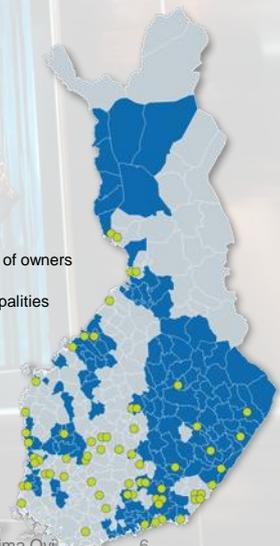
- UPM Energy Oy\*: 47.73%
- Stora Enso Oyj (Baa3, BBB-): 15.61%

Shareholder of Fortum Power and Heat Oy:

- Fortum Oyj (BBB, BBB): 100%

TVO's shareholders are Finnish industrial and energy companies - the latter are owned by **131 municipalities**

- Industrial locations of owners
- TVO-owner municipalities



# TVO KEY INDICATORS 2018–2022

|  | 2022         | 2021       | 2020       | 2019       | 2018       |
|--|--------------|------------|------------|------------|------------|
| <b>Electricity delivered (GWh)</b>                         |              |            |            |            |            |
| OL1/OL2  | 14 440       | 14 414     | 14 563     | 14 729     | 14 063     |
| OL3  | 1 876        |            |            |            |            |
| Total  | 16 316       |            |            |            |            |
| <b>Load factor (%)</b>                                     |              |            |            |            |            |
| OL1  | 89.1         | 95.1       | 93.7       | 96.9       | 87.8       |
| OL2  | 96.8         | 90.4       | 93.3       | 92.7       | 94.3       |
| Investments (M€)   | 339          | 220        | 56 (***)   | 369        | 181        |
| OL1/OL2 combined production cost (€/MWh) (*)               | 24           | 19         | 17         | 15         | 20         |
| Average market price (€/MWh) (**)                          | 153.5        | 72.2       | 28.0       | 44.0       | 46.8       |
| <b>OL1/OL2 value creation for shareholders (M€) (****)</b> | <b>1 870</b> | <b>767</b> | <b>160</b> | <b>427</b> | <b>377</b> |



\*) Including electricity transmission costs, rounded to nearest Integer. Source: TVO annual reports

\*\*\*) Annual Nord Pool weighted average of Finnish base load daily prices

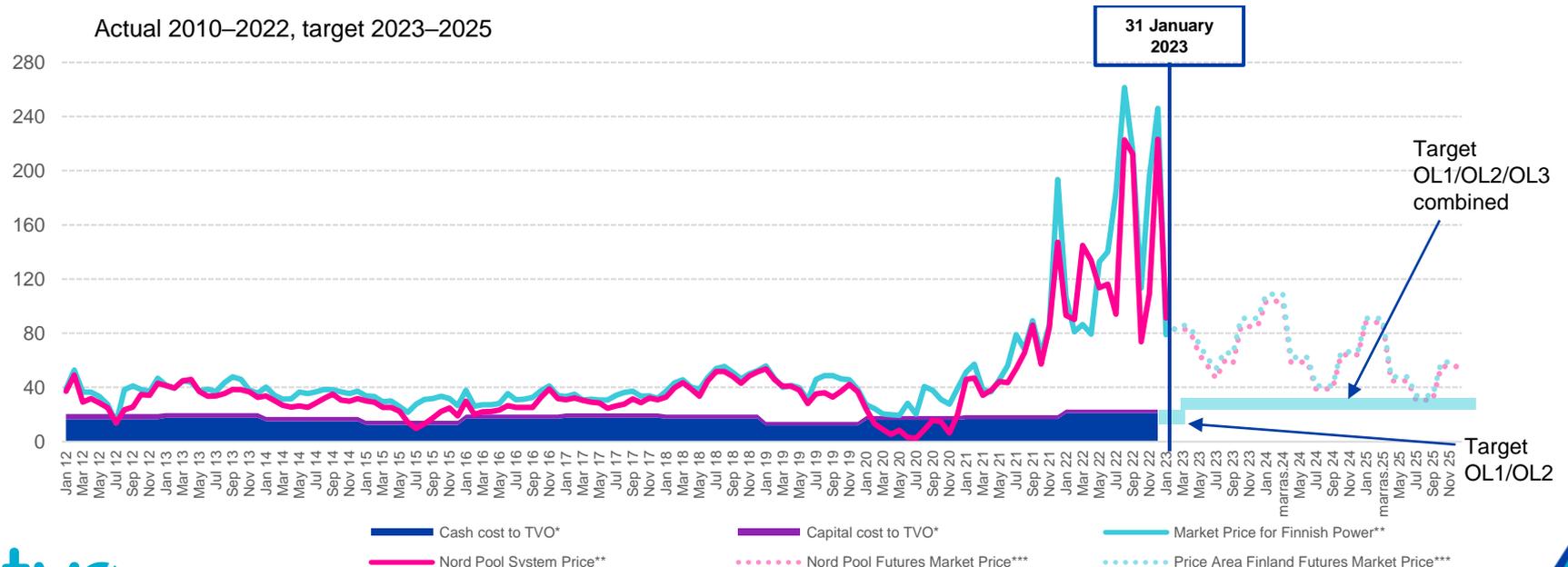
\*\*\*\*) Net of OL3 capex and GSA penalties

\*\*\*\*) Calculated simply as (average market price - OL1/OL2 combined production cost) \* OL1/OL2 electricity delivered. Actual shareholder position may vary from this.

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# TVO CREATES VALUE TO OWNERS BY PRODUCING STABLE AND LOW-COST POWER

TVO's historical cost of nuclear power has been stable and below the market price



\*) Source: TVO annual reports

\*\*) Source: [www.nordpoolspot.com](http://www.nordpoolspot.com)

\*\*\*) Source: [www.nasdaqomx.com](http://www.nasdaqomx.com), 6 February 2023



# SUSTAINABILITY

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# SUSTAINABILITY ROADMAP 2030

- The TVO Group develops sustainability in its operations with the Sustainability Roadmap 2030, which sets targets and KPIs for the Group's material sustainability topics. The targets also support the UN SDGs.



## ENVIRONMENT & CLIMATE

- Climate-friendly electricity production
- Responsible nuclear waste management
- Emissions
- Biodiversity
- Circular economy
- Energy efficiency



## HIGH-CLASS SAFETY CULTURE

- Safety culture
- Occupational health & safety
- Radiation protection
- Plant safety



## ADDED ECONOMIC VALUE

- Customer-oriented & competitive activities
- Nuclear power as a desired production method
- Funds ready for final disposal



## WELL-BEING OF EMPLOYEES & STRONG NETWORKS

- Occupational health
- High-class expertise
- Professional development
- Employer role
- Responsible supply chain
- Stakeholder cooperation



## TRAILBLAZER IN THE NUCLEAR INDUSTRY & FINAL DISPOSAL

- Research & development
- Reliable use of the plant units
- Increasing final disposal expertise



# FOCUS ON CLIMATE & ENVIRONMENT

- The TVO Group's most significant sustainability impacts relate to climate-friendly electricity production, responsible final disposal of spent nuclear fuel, and biodiversity.



- ✓ **Climate-friendly electricity production:** The emissions generated by nuclear power are low: throughout the lifecycle, the emissions remain at the same level as for renewable sources of energy.
- ✓ **Final disposal of spent nuclear fuel:** TVO's subsidiary, Posiva, is the first in the world to start the final disposal of spent nuclear fuel in the mid-2020s.
- ✓ **Impact on biodiversity:** The concentration of energy production to a small geographic area minimises the environmental impact and allows the preservation of other areas in their natural state.

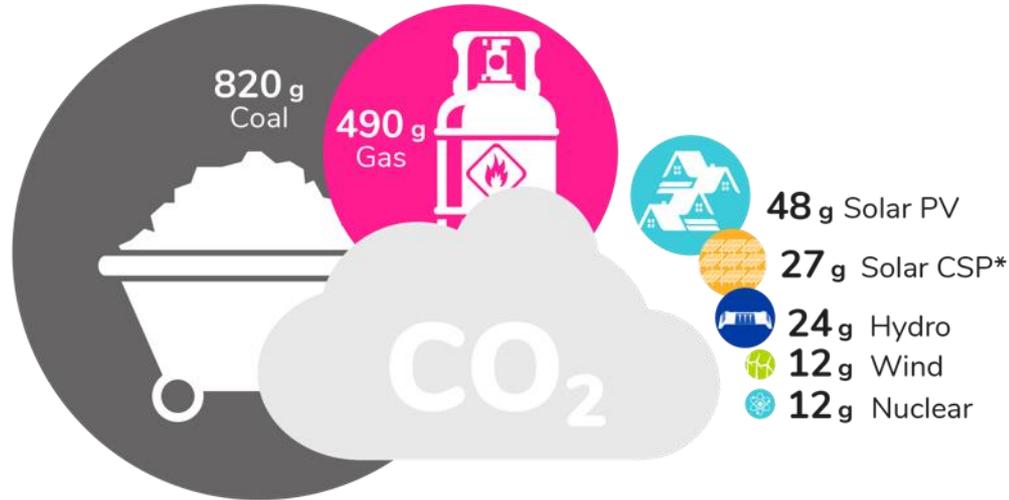
# EU TAXONOMY



- **In February 2022, the European Commission proposed the inclusion of nuclear energy in the EU Taxonomy, with certain criteria**
- **In its plenary session on 6 July 2022, the European Parliament accepted nuclear power and natural gas to be included in the EU Taxonomy on sustainable finance in accordance with the European Commission's proposal**
- The inclusion of nuclear power in the EU Taxonomy means that it will be classified as an environmentally sustainable investment
- The proposal entered into effect as of 1 January 2023

# CO<sub>2</sub> EMISSIONS OF DIFFERENT PRODUCTION MODES DURING THEIR LIFECYCLE

Amount of carbon dioxide produced per 1 kWh of energy underlines the sustainability advantages of nuclear:



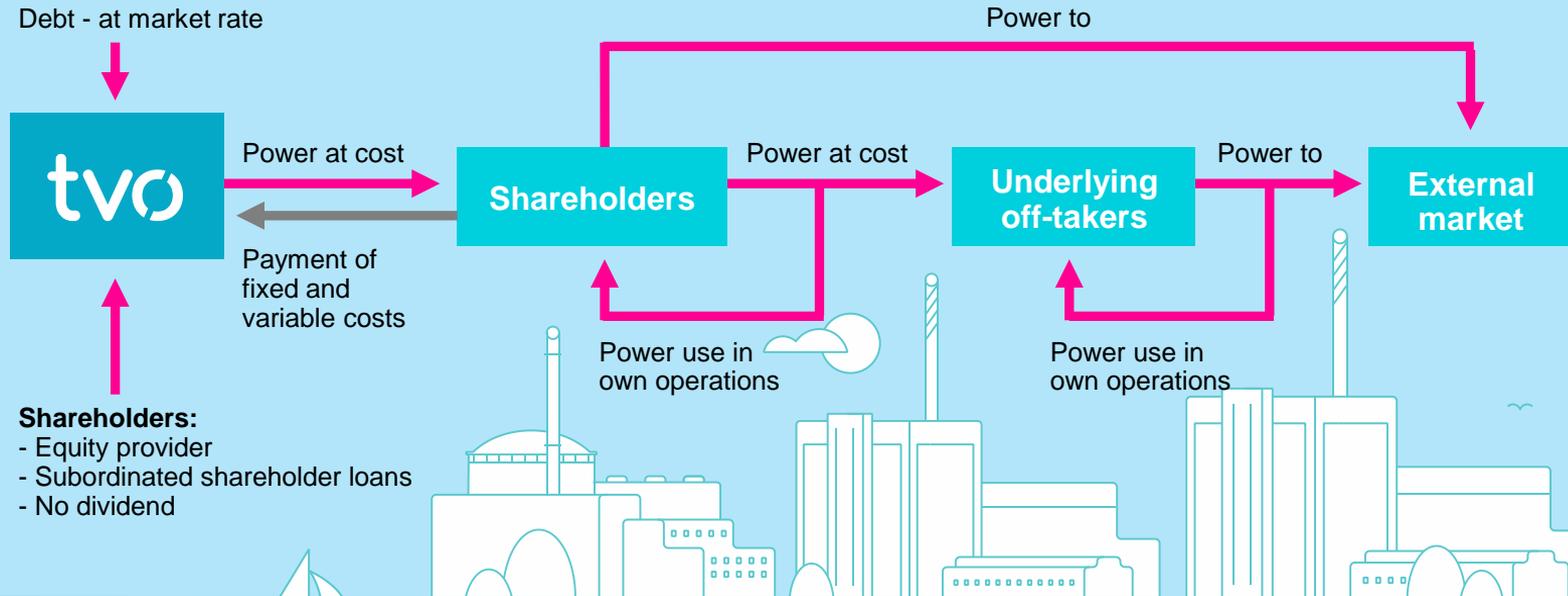


# OPERATING MODEL OF TVO

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# TVO'S OPERATING MODEL

Mankala model benefits both TVO as well as its shareholders and off-takers



# TVO'S OPERATING MODEL



- TVO is run according to the **Mankala Principle**, which is a unique model widely applied in the Finnish energy industry
  - Different share classes give access to the output of TVO's different assets proportionally to a shareholder's stake
  - TVO invoices fixed costs one month in advance, minimising its liquidity and working capital needs, variable costs are invoiced monthly based on electricity consumed by each shareholder
- Shareholders are **severally responsible** for the annual costs of the respective asset as **defined in the articles of association** of TVO
  - TVO is a limited liability company, and its shareholders have no personal liability for the indebtedness of TVO
  - The shareholders are not liable for any other costs than those defined in the articles of association, unless otherwise agreed in writing
  - Only the company has the sole right to call upon the responsibility of the shareholders
- In the event that a shareholder does not make its payments, TVO has the right to sell the non-paying shareholder's electricity to other shareholders or to third parties at market price
- Existing shareholders have a right of first refusal to buy shares that may be offered for sale



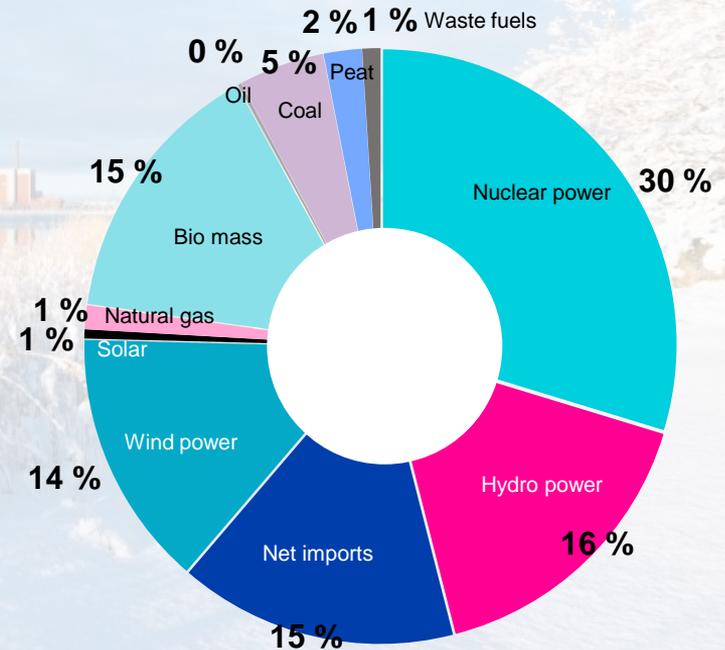
# ELECTRICITY MARKET IN FINLAND

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# ELECTRICITY SUPPLY

by energy sources 2022 (82 TWh)

Balanced sources of production, but high share of imports implies further domestic production capacity required

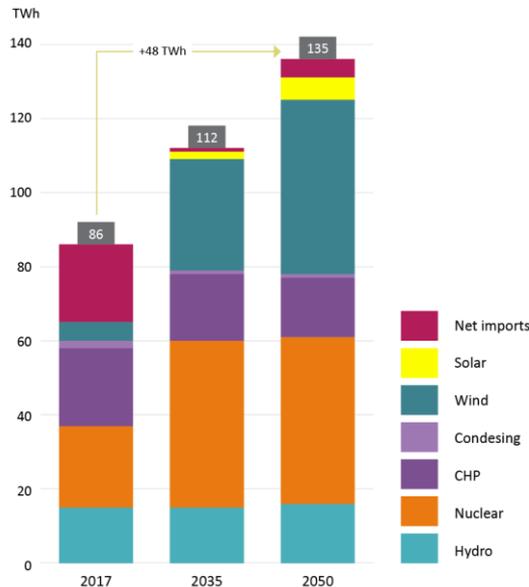


Source: Finnish Energy, Energy Year 2022 (Jan 2023), illustration TVO

# EMISSION-FREE ELECTRICITY IN FOCUS

## Scenario of strong electrification in Finland, Finnish Energy

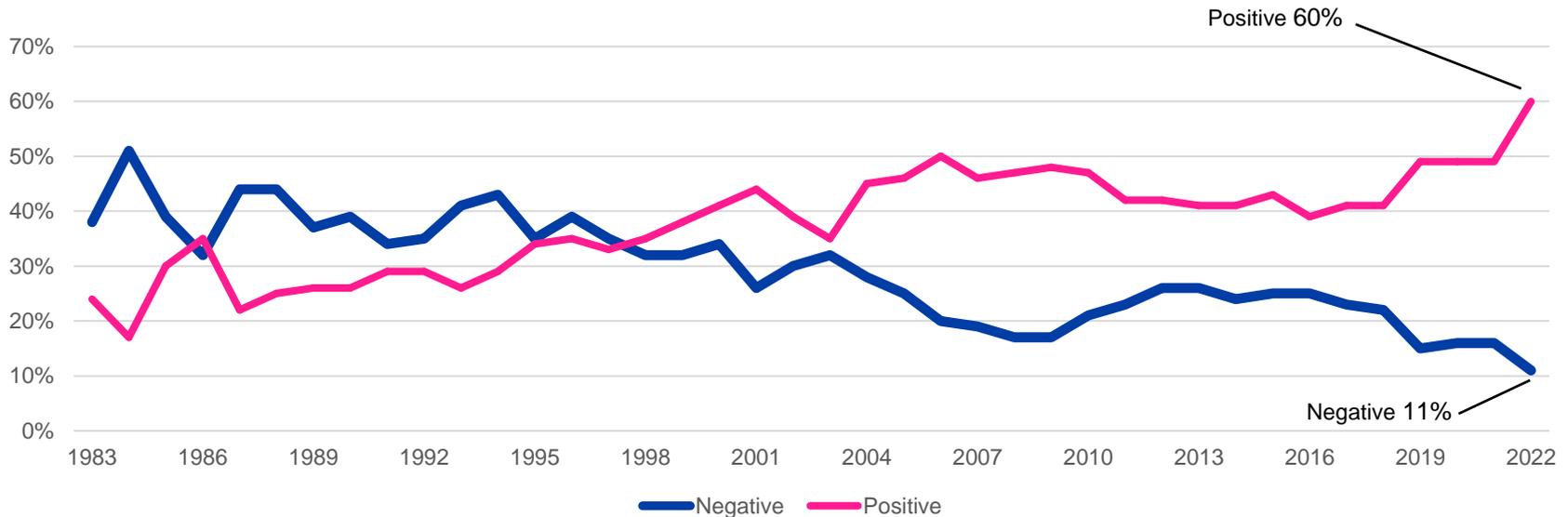
The energy sector is meeting the growing demand for electricity on market terms. Steering of emissions trading safeguards investments in cleaner electricity generation.



- The expansion and strengthening of emissions trading is the most important instrument for 2030 and beyond
- No need for instruments that overlap with emissions trading, for example, those based on national taxation
- Functioning of the electricity market must be promoted with pan-European legislation
- Public funding should be aimed at energy demonstration and pilot projects

# DEVELOPMENT OF NUCLEAR POWER ACCEPTANCE, FINLAND, 1983–2022

## Public support exists for nuclear power





# OL1 AND OL2

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# OL1 AND OL2 PRINCIPLES FOR DEVELOPMENT

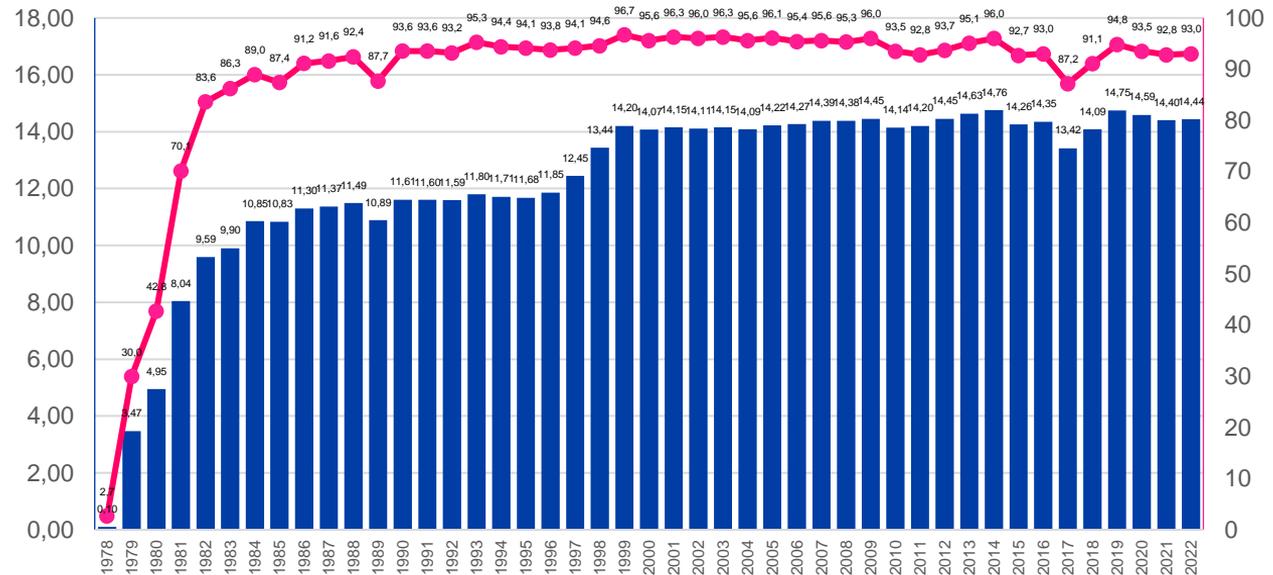
- Long-term capacity factors rank among the global top
- Annual combined production over 14 TWh
- Plant units continually maintained and developed to improve the reliability and safety of the units, for example:
  - Completion of replacement of the main circulation pumps in 2018
  - Replacement of emergency diesel generators (EDG) for OL1 and OL2 ongoing
    - First EDG unit installed in July 2020
- In **September 2018**, the Finnish Government approved the extension of the operating licence until 2038



# STRONG TRACK RECORD OF OL1 AND OL2

- OL1 and OL2 plants have regularly achieved load factors among the highest within their global peer group
- High load factors indicate stability and safety of operations
- Consistently (>20 years) high stability also spreads fixed costs over a maximum volume of output

Production TWh





# OL3 EPR PROJECT

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# OL3 EPR SCHEDULE

- Operating licence granted March 2019
- Fuel Loading in March 2021, completed
- Start-up of the reactor in December 2021
- Start of electricity production in March 2022
- Scheduled start of regular electricity production and subsequent Provisional Take Over (PTO) expected in March 2023



# AMENDMENT TO OL3 EPR SETTLEMENT AGREEMENT

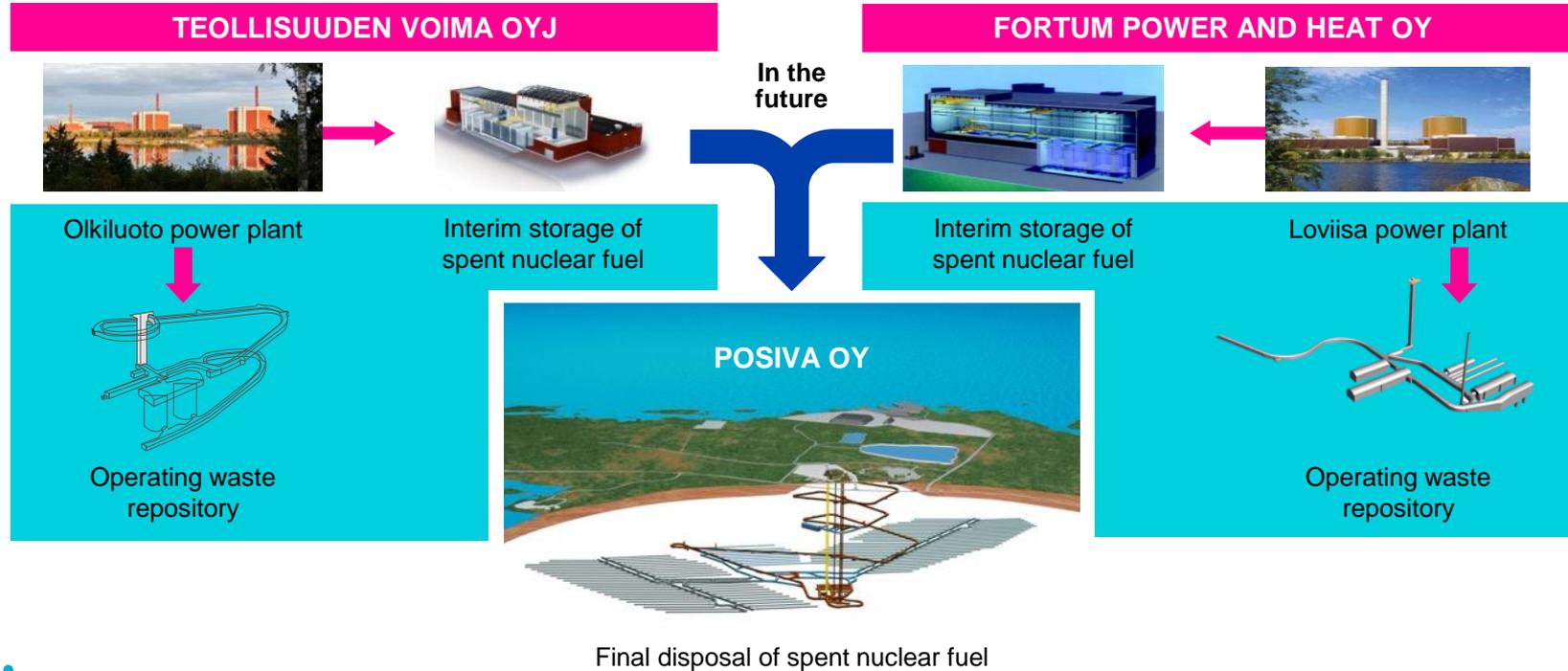
- **Amendment** to the Global Settlement Agreement (GSA) in 2018 **signed in June 2021**
- The Areva companies' **trust mechanism**, established in the GSA, **remains and has been further replenished** by Areva with approximately **EUR 600 million** as of the beginning of January 2021
- The **parties are to cover their own costs** for the period **between July 2021 and 28 February 2022**
- In the event that the OL3 EPR project is not completed by the end of February 2022, the **Supplier shall pay to TVO an additional delay compensation** until 30 September 2022. The amount of the additional compensation depends on the actual completion date of the project and in any case is **limited to a maximum of EUR 56.7 million**
- The penalty amount of **EUR 400 million** agreed in the GSA 2018 is **paid in two instalments**: 1) ~EUR 200 million that has been executed in connection with the GSA amendment becoming effective, 2) The remaining ~EUR 200 million will be paid **when OL3 EPR regular electricity production starts or 31 March 2023 at the latest**
- The **turnkey principle** of the OL3 EPR plant contract and the joint and several liability of the supplier consortium companies **remains in full force**



# NUCLEAR WASTE MANAGEMENT

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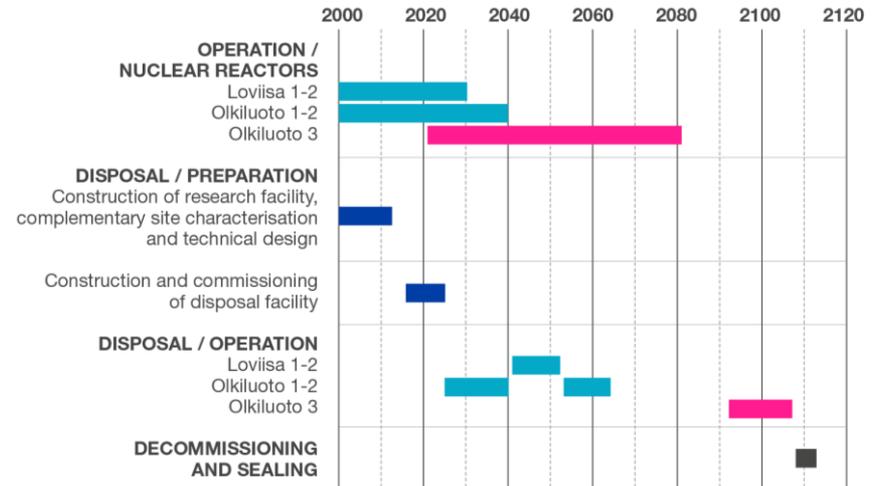
# IMPLEMENTATION OF SPENT FUEL DISPOSAL



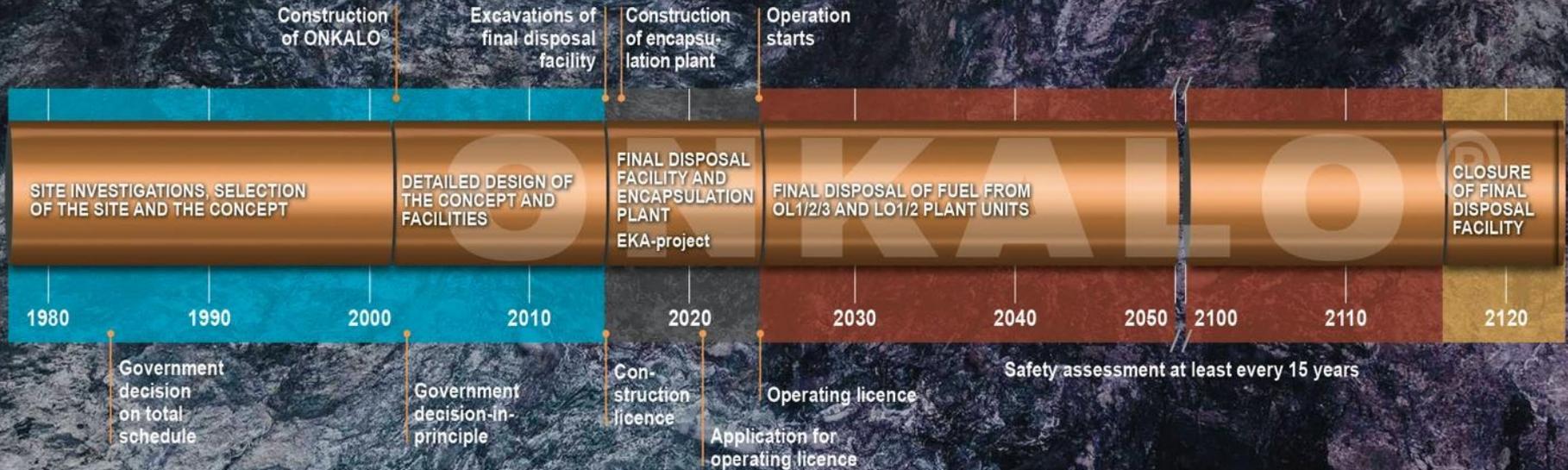
# SPENT FUEL DISPOSAL AND ITS TIMETABLE

- Unlike most other nuclear power producing countries, Finland has made a political decision about the final disposal of spent fuel and nuclear waste - Olkiluoto was selected as the site for this purpose
- Funds have been collected for future costs out of the price for nuclear electricity to the State Nuclear Waste Management Fund
- Posiva was granted construction licence for the final disposal facility of spent nuclear fuel in **November 2015**
- The Radiation and Nuclear Safety Authority in Finland (STUK) has concluded in the decision it issued in **November 2016**, that Posiva is in the position to start the construction of the final disposal facility
- Excavation work for the first tunnels for the final disposal facility started in **December 2016**. In **May 2021**, Posiva announced it started the excavation of the actual final disposal tunnels, where the spent nuclear fuel will be stored
- Posiva submitted the application for the operating licence for the encapsulation and final disposal facility to the Ministry of Economic Affairs and Employment of Finland in **December 2021**
- Final disposal project has advanced to the building phase of the encapsulation plant and the underground final disposal repository designed for the final disposal of spent nuclear fuel

Schedule of spent fuel disposal



# SCHEDULE FOR FINAL DISPOSAL OF SF



# ALL NECESSARY NUCLEAR WASTE MANAGEMENT IN OLKILUOTO

## Spent fuel interim storage facility

Cooling of fuel assemblies removed from the reactor building in water pools excavated in rock

## Decommissioning waste repository

Space reservation for decommissioning waste

## Operating waste repository – VLJ

Final disposal of intermediate and low-level waste

## Spent nuclear fuel repository

The underground research facility ONKALO®

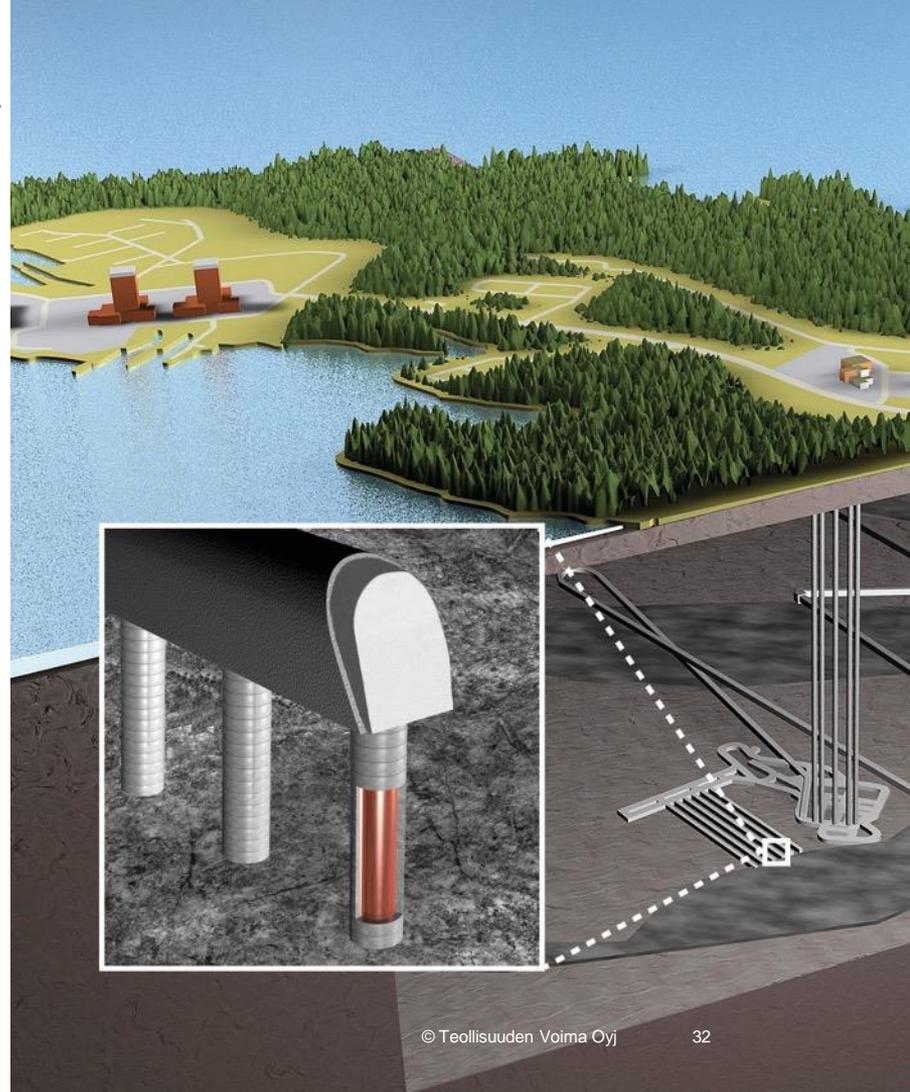
# FINANCING OF NUCLEAR WASTE MANAGEMENT

## The Finnish State Nuclear Waste Management Fund

- A guarantee fund towards all future nuclear waste management costs
- The Finnish Government annually assesses TVO's liability for future nuclear waste management costs as well as the funding target
- TVO's contribution is assessed by the Fund

## Financing of the Fund

- TVO's annual operational costs as well as its share of Posiva's costs are charged in the annual electricity cost
- The annual incremental increase of the Fund's resources is covered by earned interest of the Fund and TVO's waste management contribution to the Fund
- According to new legislation, applicable from 2022, company borrowing is limited to 60% of the fund balance and broader investments are allowed
- The Fund has started investing based on the new legislation during summer of 2022.





# FINANCIAL UPDATE

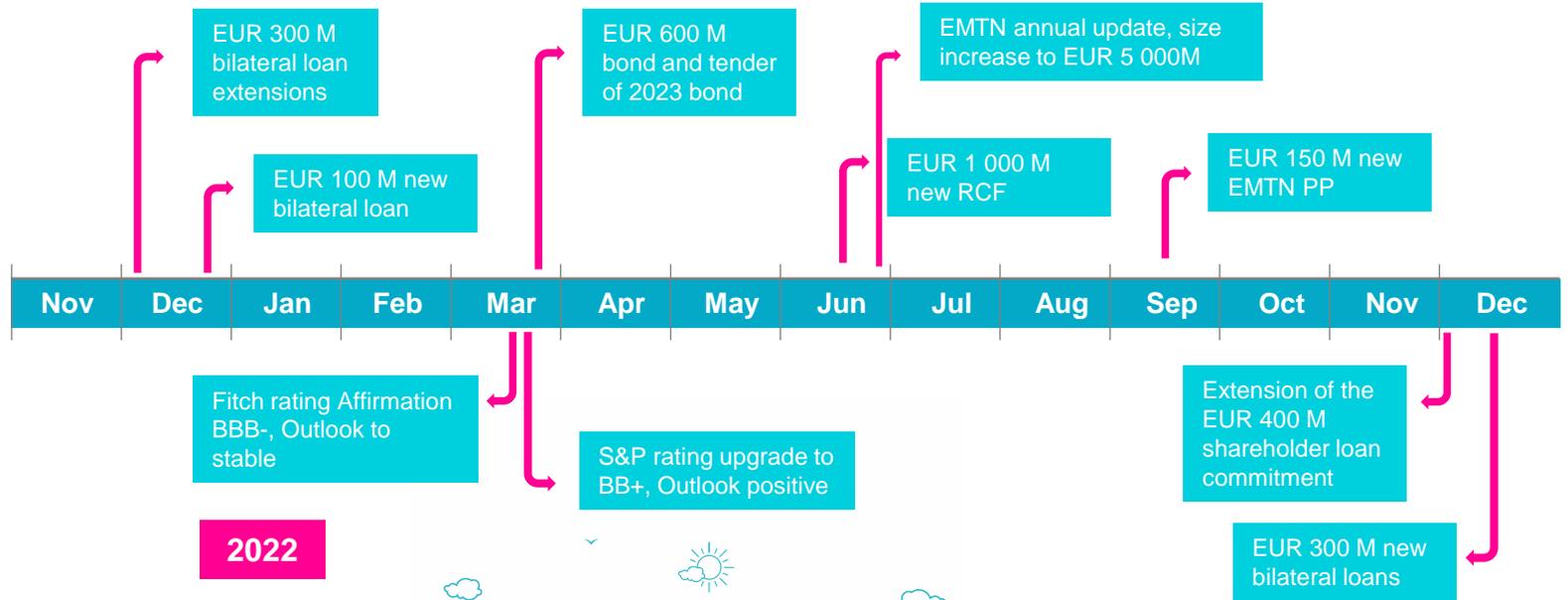
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# FINANCIAL SITUATION DEVELOPING AS PLANNED, LIQUIDITY REMAINS STRONG

- The long-term goal of the Company is to maintain an equity ratio of at least 25 percent (30.7% at the end of 2022 with a covenant level at 25%)
- TVO operates in both the domestic money market and the international capital markets
  - EUR 5.0 billion Euro Medium Term Note programme (EMTN) listed on the Luxembourg Stock Exchange
  - EUR 1.0 billion domestic commercial paper programme
- Credit facilities
  - EUR 1.0 billion syndicated revolving credit facility, maturing June 2025
  - EUR 400 million subordinated shareholder loan commitment

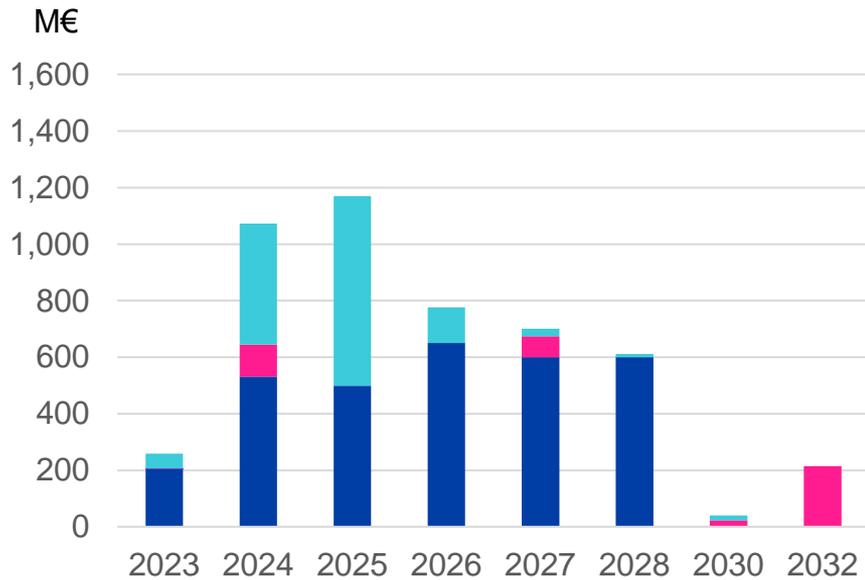
| Credit ratings                    |           |          |
|-----------------------------------|-----------|----------|
|                                   | Long-term | Outlook  |
| <b>S&amp;P Global Ratings</b>     | BB+       | Positive |
| <b>Fitch Ratings</b>              | BBB-      | Stable   |
| <b>Japan Credit Rating Agency</b> | A+        | Negative |

# TVO'S RECENT FINANCIAL ACTIVITIES



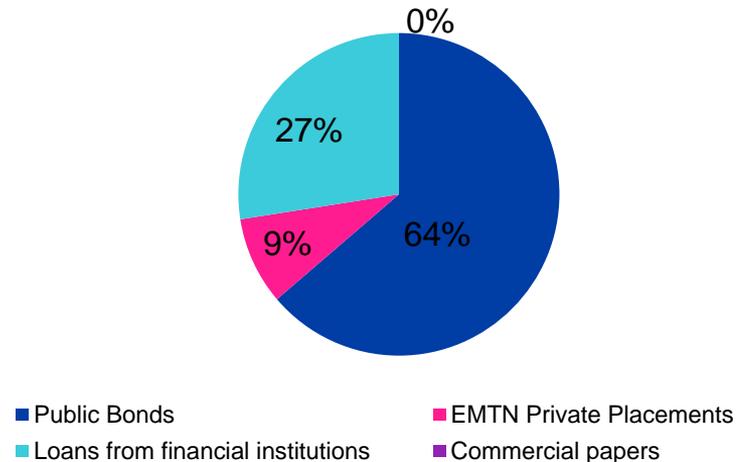
# DEBT MATURITY PROFILE, GROUP

## Well spread maturity profile and diversified funding sources



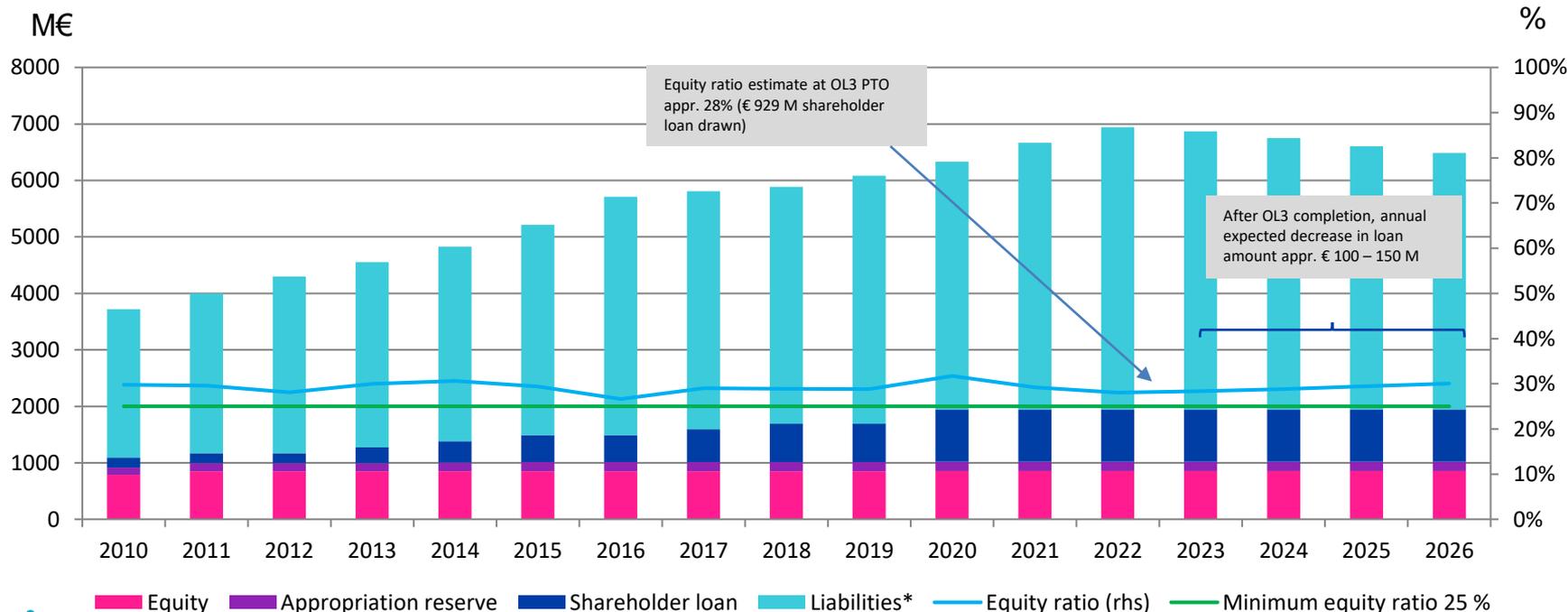
Debt structure 31.12.2022  
Loan amount € 4,845 M

In addition, the Group has subordinated shareholder loans (hybrid equity) totalling € 929 M.



# TVO BALANCE SHEET AND EQUITY RATIO (FAS), ILLUSTRATIVE

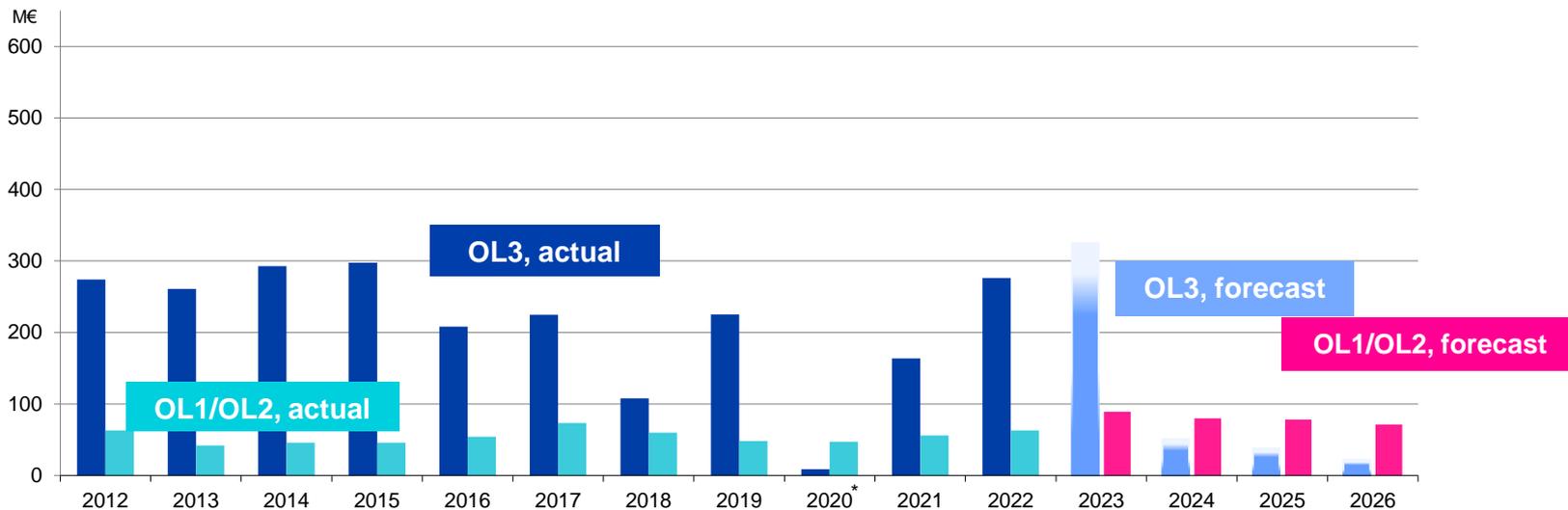
(OL3 EPR commercial operation, scheduled to start in March 2023)



\*) Excluding loan from the Finnish State Nuclear Waste Management Fund  
Note: 2014 – 2022 based on audited information, 2023 onwards as company target levels

# CAPEX CASH FLOW PROGRAM OL1/OL2/OL3

Capex expected to be more moderate in the years to come upon the completion of OL3



Note: As of 31.12.2022 OL3 capitalized investment approximately EUR 5.4 billion. According to the Plant Supplier's latest project schedule, TVO's current cost estimate, and the effects of the Global Settlement Agreement as amended, TVO estimates that its total investment in the OL3 EPR project will be approximately EUR 5.8 billion, which includes also nuclear fuel to be used during electricity production, totaling approximately EUR 250 million, which will be part of current assets when OL3 starts commercial operation.

\*) Year 2020 OL3 actual capex including GSA penalties.

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