Hungarian storage support system

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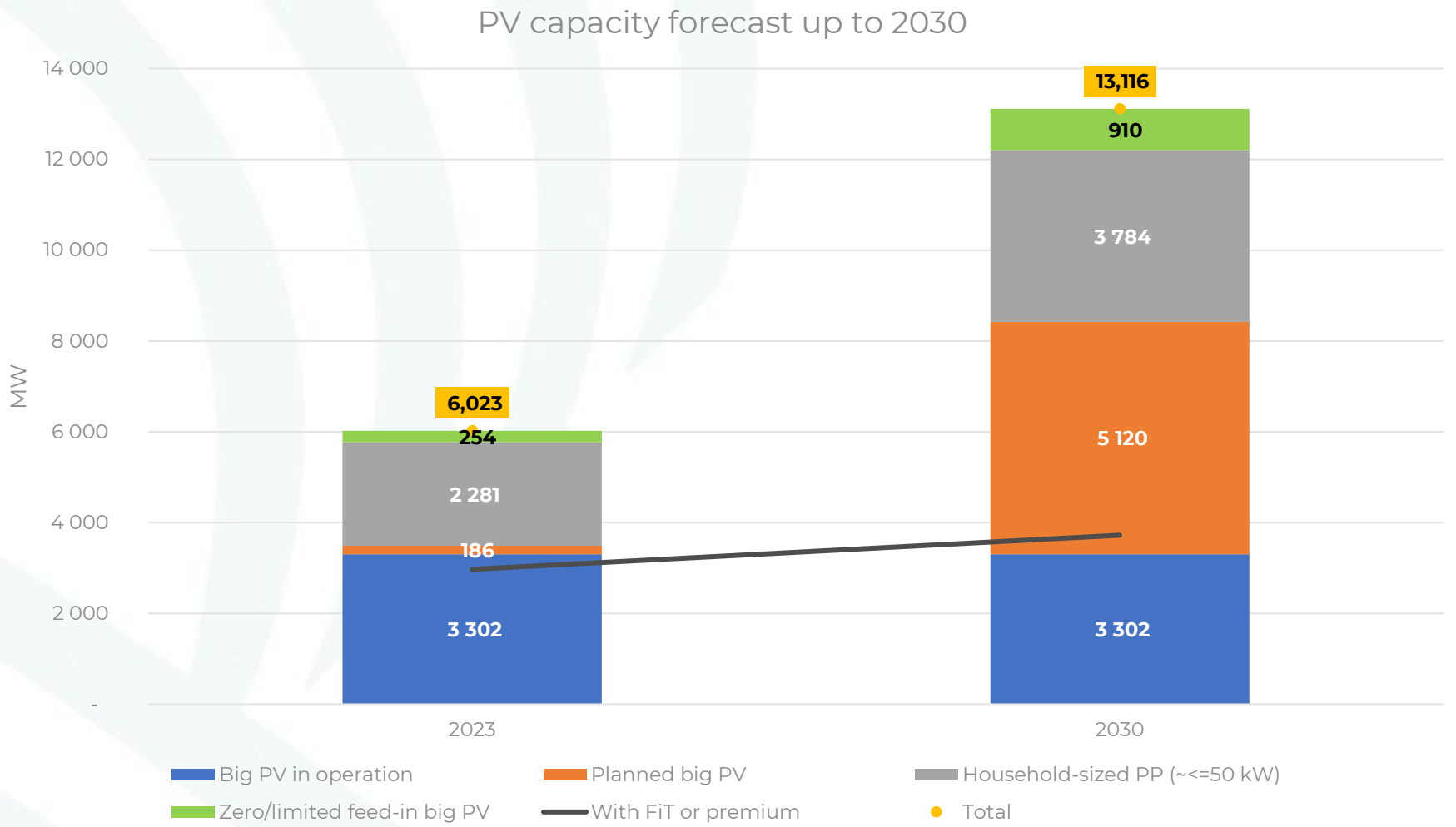
Joint Meeting of ERRA's RE & EMER COM

Bratislava, 7 March 2024

Hungarian Energy and Public Utility Regulatory Authority
Clean energy, sustainable environment

PV uptake and system integration challenges

PV uptake estimation up to 2030



[Actual PV capacity data available on the TSO's website]

Source: MAVIR (TSO), dynamic scenario

New focus: system integration of PV

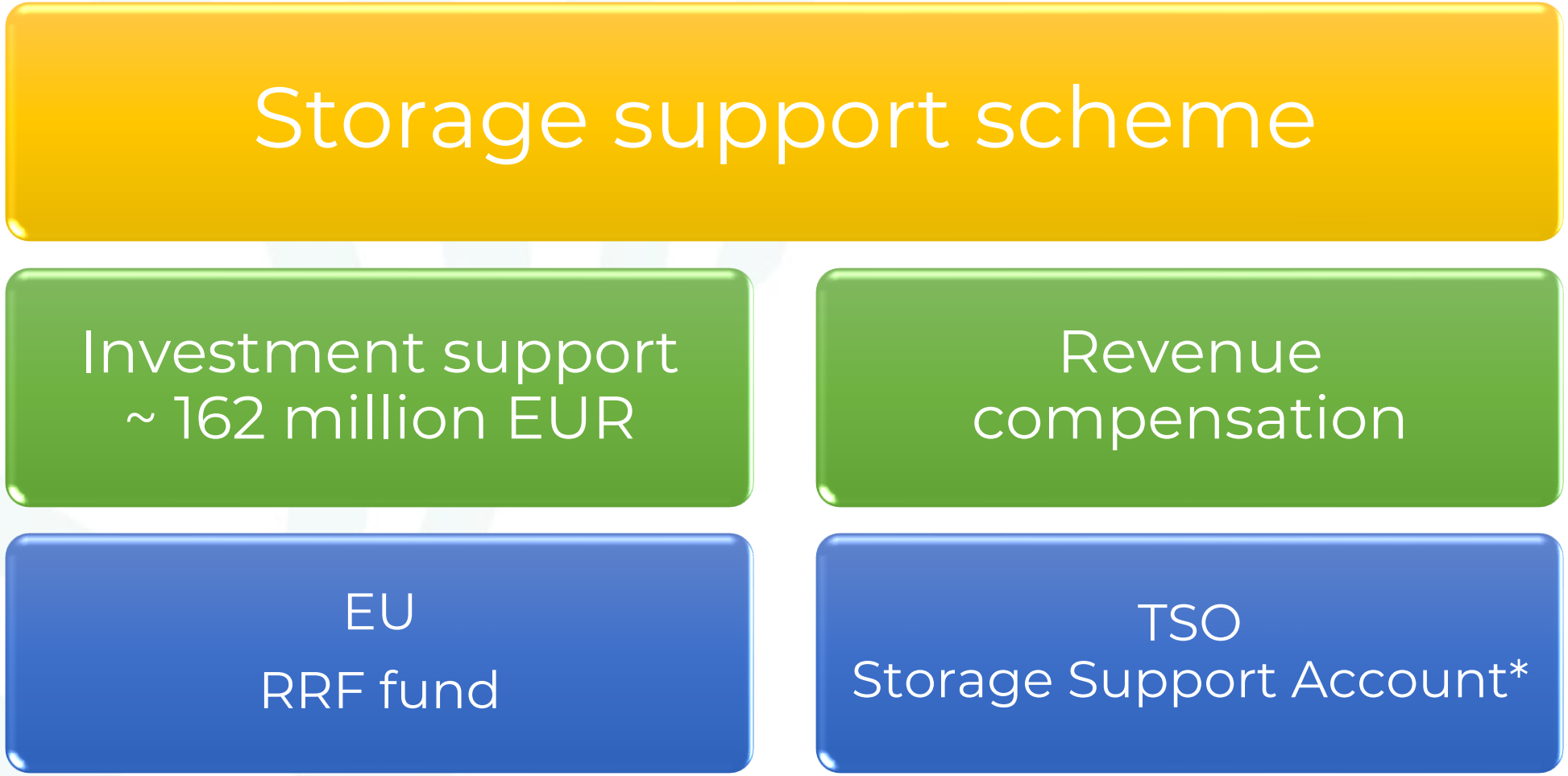
- **Stronger electricity networks needed**
  - Limited feed-in possibility for small PV (<50kW)
    - Restrictions have been lifted in most part of Hungary from January 2024
  - For utility scale PV later deadlines and higher costs for network connection
- **More volatile and negative prices on the wholesale market**
- **Scarcity of flexible capacity**
  - high costs for the TSO to procure balancing capacity and energy
  - rising network charges and prices for non-household electricity consumers
- **Energy storage can be part of the solution for all of these problems**
  - Support scheme is introduced to accelerate this process
  - We expect higher gains than the cost of support

New storage support system

Overview of the support scheme (SA. 102428)

- **Investment support**
  - **Fixed at 135 million HUF/MW (~ 353 EUR/kW)**, but max. 45% of the eligible investment cost (that is, min. 55% own financing)
- **Revenue compensation (as 2-way CfD)**
  - *Competition for the support based on the bids for required net revenue*
    - Net revenue: revenue of storage – costs of charging
    - **Bid for required net revenue: min. 19 EUR/kW/year, max. 190 EUR/kW/year**
      - Set in EUR, paid in HUF, based on actual exchange rate
      - Pay-as-bid
  - Revenue compensation = required net revenue – benchmark net revenue
    - Benchmark net revenue: net revenue available for market activity, calculated by MEKH
    - **Paid by the investor if benchmark net revenue > required net revenue**
    - Required and benchmark net revenue corrected with SoH (State of Health)
- **Investment support and revenue compensation part cannot be separated from each other!**

Funding of storage support scheme



* Paid by electricity consumers who are not entitled to universal service, mainly industrial consumers

Who will be responsible for what?

Government	• Organise and manage storage tenders • Monitoring of storage facilities
MEKH (Regulator)	• Determine the methodology of the benchmark revenue (in MEKH Decree) • Update of methodology • Monitoring of storage facilities
MAVIR (TSO)	• Administration of Storage Support Account • Determine the monthly levy for consumers • aFRR accreditation of storage facility

Tasks of MEKH in storage support system

Benchmark revenue calculation

- MEKH organised **market consultations** and studied the European experience in order to establish a reliable benchmark
- **Benchmark net revenue calculation**
  - Methodology in *MEKH Decree Nr. 17/2023.*
    - *See the benchmark net revenue model on MEKH's website*
  - **Net revenues from wholesale and balancing market activity** are taken into account
  - **Fixed costs of charging are deducted from revenues**
    - Fix and capacity based distribution fees for medium voltage connection
- **The benchmark means no constraint on how the storage capacity can be used**

Wholesale market benchmark revenue

- **Assumptions**:
  - 1 storage cycle (that is energy arbitrage) / day
    => 2 hours for charging and 2 hours for discharging
  - no wholesale market activity if income doesn't cover variable costs
- **Calculation:**
  - **Daily wholesale market revenue** =
    daily wholesale selling price * discharged energy – daily wholesale buying price * charged energy
  - **Discharged energy** = energy output/cycle =
    nominal storage capacity * SoH * DoD (80%) * availability factor (95%) * discharging efficiency (90%) , where
    - **State of Health (SoH):** the ratio of the real and the available storage capacity, according to yearly metering of TSO; if <70%, no revenue compensation is paid until SoH is restored (deadline: 1 year)
    - **Depth of Discharge (DoD):** the capacity that is discharged from a fully charged battery, divided by battery nominal capacity
  - **Charged energy** = discharged energy / roundtrip efficiency (81%)
  - **Selling price:** average of the 4 highest hourly prices at the day ahead market
  - **Buying price:** average of the 4 lowest hourly prices at the day ahead market + variable fees of medium voltage network connection + other variable fees

Balancing market revenue

- **Revenues from hourly or shorter period products of the <u>aFRR balancing market</u>** are taken into account
- **Assumptions**:
  - storage bids for 10-20 hours/day, depending on the liquidity of the intraday market
  - 50-50% upward/downward balancing capacity bids
  - *„Success factor"* of bids on aFRR capacity tenders: ratio of the quantities allocated and actually offered (under a given price threshold)
- **Balancing capacity market income:**
  + Income from upward regulation capacity allocation at daily average upward capacity fees
  + Income from downward regulation capacity allocation at daily average downward capacity fees
- **<u>No</u> net revenue from sale of balancing energy**, assuming that income = variable charging costs

Compensation scenarios

Update of benchmark and monitoring

- Benchmark revenue composition fixed for 1 year at least
- **MEKH will monitor the behaviour of storage operators**
  - Bidding patterns on the balancing capacity market
  - Frequency of their activation as balancing energy provider
- **MEKH will update the revenue benchmark at least every 2 years** (1st review in 2027, applicable from 2028)
- **Extraordinary review in following cases:**
  - Yearly reference net income **deviates on average more than 20%** from the yearly average of realised net income in given year
  - **On request of project owners** (>50% of investors or representing >50% of supported storage capacity) => 90% reimbursement of damage in case of unrealistic benchmark for the first two years (2026-2027)
- **Regular monitoring** is essential for reviews
  - Monthly reports to MEKH on real revenues, costs and activities

Eligibility
Selection of winners
Special rules
Application

Eligibility – General rules

- **All electricity storage technologies** will be eligible
  - Newly installed or repowered storage capacities as well
- The project **must be located in Hungary**
- **At least 2 MWh/MW supported storage capacity**
  - For example a 10 MW / 10 MWh project can apply as a 5 MW/ 10 MWh project
  - An e.g. 4 MWh / MW project can apply, but gets no extra remuneration
- **At least 0,5 MW storage capacity**
- The storage capacity **must be available for at least 10 years** with at least 70% of the initial capacity
- **aFRR accreditation from the TSO** (prerequisite for physical completion!)
- The project has to be **physically completed by 30th April 2026**

Eligibility – Network connection

- **Available network connection right for grid injection + grid withdrawal ≥ supported storage capacity**
  - Someone with right only for withdrawal from the grid can also apply
    - Normally this means a storage next to a big consumer
    - aFRR accreditation is possible in this case as well
    - Right for injection to the grid can be added later if the investor chooses to do so
  - No dedicated grid injection capacity is needed for the storage
    - The injection capacity can be used together with an existing (or planned) power plant
    - E.g. a 10 MW PV plant can apply for the support of a 10 MW storage without extra grid connection capacity
      - Extra grid injection or withdrawal capacity can be added later if the investor chooses to do so
- **The documents for grid connection should contain the storage**
  - The investor can ask the TSO/DSO to amend the documents any time if the grid connection capacity remains the same
    - It should take no more than 30 days

Selection of winners

- **„Application windows”:** technology groups with different technical lifetimes

Nr. of application window	Maximum lifetime	Budget for investment support
1.	<11 years	105 million EUR
2.	11-29 years	44 million EUF
3.	30+ years	13 million EUR

- **Winners are selected based on required net revenue (EUR/kW/year) until the budget for investment support is depleted**
  - The support of **459 MW** storage capacity is expected with **135 million HUF/MW** (~ 353 EUR/kW) **investment support** (~162 million EUR in total)
- **At least 50% over-subscription is needed in each window**
- Evaluation starts with window Nr3. => non-winners are considered when evaluating window Nr 2. => the same with window Nr2. and Nr 1.
- **Unused budget of any window is reallocated to the next window**
- Maximum price would be the same for all groups
- Lower budget for groups with longer technical lifetime as less applications are expected there

Winners – Special rules

- **Anti-concentration rules**
  - There must be at least 5 winners, but 100 as a maximum
  - Maximum investment aid limit of 12.32 billion HUF (~ 32 million EUR) for each single legal entity or ownership group participating in the tender
- **Waiting list**
  - If a project fulfils all the requirements but not selected as a winner
- **Winners have to provide** 13 500 HUF/kW (~ 35 EUR/kW) **financial guarantee**
  - If not provided, the next applicant from the waiting list takes his place
  - Released within 30 days after the physical completion of the project
  - It is lost if the project is not finished on time
- The **revenue compensation period** starts from the physical completion (aFRR accreditation) of the project and **lasts for 10 years**
- **But revenue compensation can be paid only from 1 January 2026, the earliest!** (even if the storage facility is built earlier)

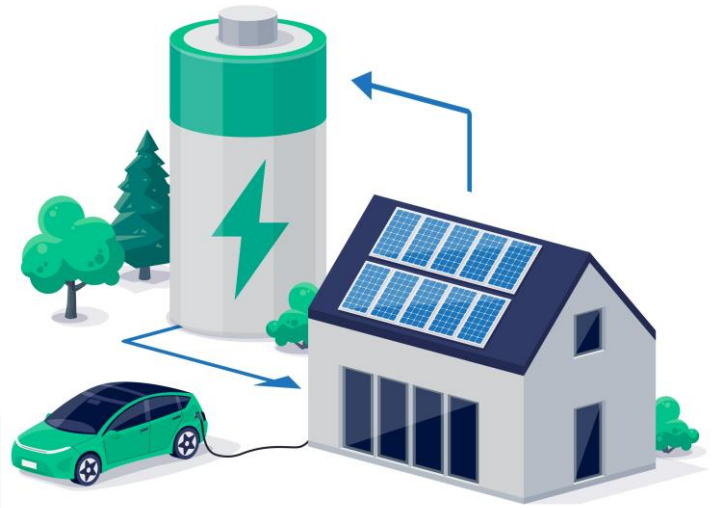
Application and more information

- **Application between 15 January and 5 February 2024**
- Call for application available on palyazat.gov.hu (RRF-6.5.1-23)
- RRF-6.5.1-23 cannot be combined with any other aid!
- **Detailed rules of the benchmark revenue calculation:**
  - MEKH Decree Nr. 17/2023.
  - Excel model on MEKH's website
- You can ask questions on the revenue compensation at tarolotamogatas@mekh.hu

Other support options for storage

Solar Energy Plus Programme 2024

- **Application for investment support** started on 15 January 2024
- 75,8 billion HUF (~ 198 million EUR) budget
- **Max. 66% aid intensity, max. 5 million HUF (~ 13,000 EUR) per project**
- **New household sized PV + storage**
- **Inverter of 4-5 kW capacity + storage of 7,5-10 kWh capacity**
- For households not eligible for net metering



Corporate tax relief for storage investments

- **From 1st January 2024** (see Law on Corporate and Dividend Tax)
- In case of **investment in power storage facilities**
- Starting in the tax year of commercial operation or in the next tax year, lasting for 5 consecutive tax years thereafter
- Special requests:
  - **At least 75% of the power stored in the facility should come from a RES power plant** which is connected to the public grid at the same connection point as the storage facility
  - The taxpayer should acquire a **valid network connection and usage contract** until the first tax year
  - The storage facility should be **used at least for 5 years** after the start of commercial operation
- **Corporate tax can be reduced with max. 30%* of the present value of investment costs** (state support included), but with **max. 30 million euros** (per taxpayer and per investment)
- Electronic request for tax relief should be made before the planned start of the investment

*In case of small enterprises, this can be increased with 20 percentage points, and in case of medium-sized enterprises, with 10 percentage points.

Thank you for the attention!

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Hungarian Energy and Public Utility Regulatory Authority

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