

Hungarian storage support system

Eva Somossy

Department of Sustainable Development, MEKH

Energy Hackathon

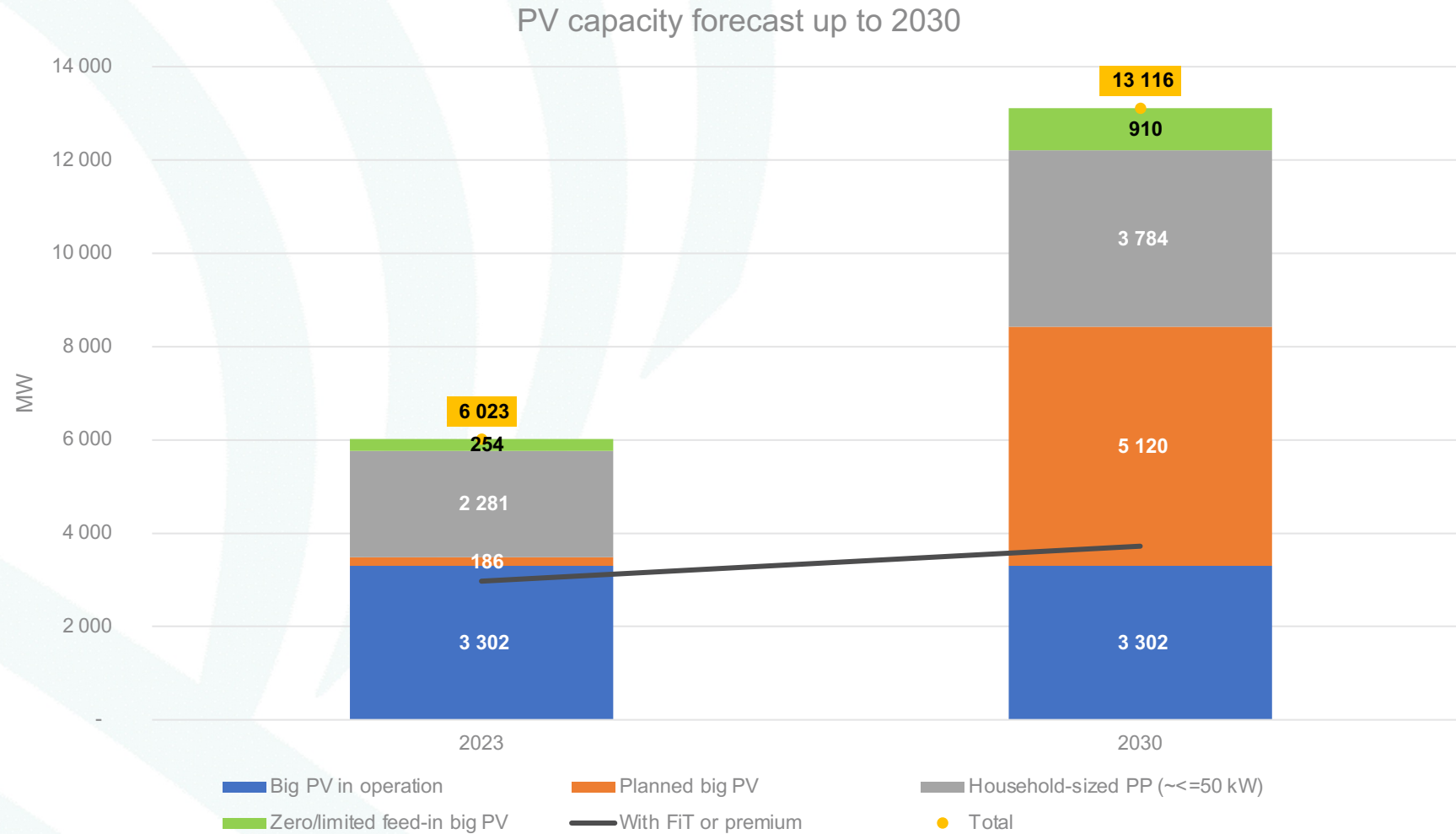
Tallinn, 23rd January 2024

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

- **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

- 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!

Storage support scheme

Investment support
~ 162 million EUR

EU
RRF fund

Revenue
compensation

TSO
Storage Support Account*

* 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

- 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

- 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

- Revenues from hourly or shorter period products of the aFRR balancing market 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
- **No net revenue from sale of balancing energy**, assuming that income = variable charging costs

- 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

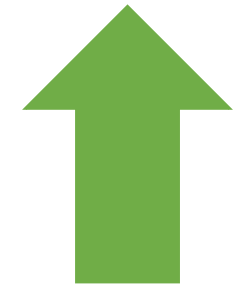
Eligibility
Selection of winners
Special rules
Application

- 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

- Available network connection right for grid injection + grid withdrawal \geq 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

- „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 EUR
3.	30+ years	13 million EUR



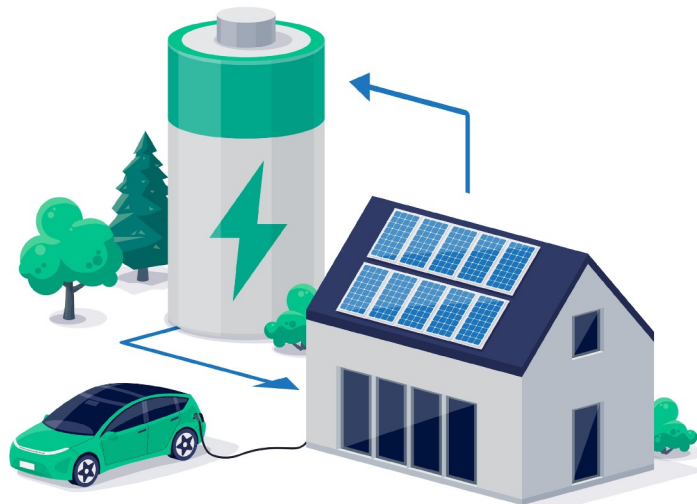
- Winners are selected based on required net revenue (EUR/kW/year) until the budget for investment support is depleted
 - The support of 459 MW storage capacity is expected with 135 million HUF/MW (~ 353 EUR/kW) investment support (~162 million EUR in total)
- At least 50% over-subscription is needed 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

- **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 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

- 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



- 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!

somossye@mekh.hu
tarolotamogatas@mekh.hu

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