Power & Gas
Forum

28-29 March 2024

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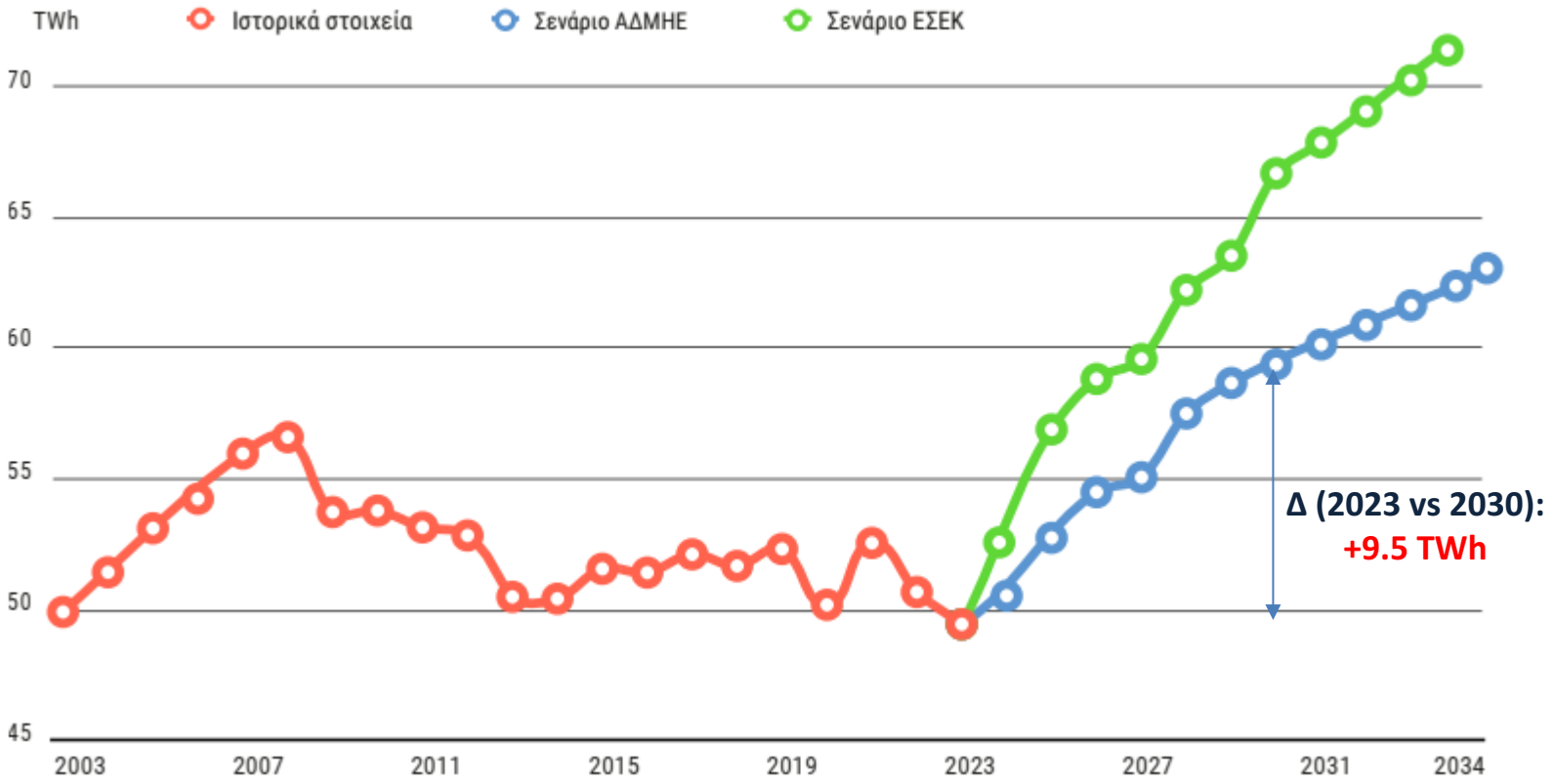
Is the expansion of photovoltaic (PV) systems in Greece exceeding the required level?

GW	Mainland				Country	
	Actual (Jan 2024)	With final connection terms from ADMIE	With final connection terms from DEDDIE	Total Installed Capacity if all parks are built	ESEK 2019 2030	Draft ESEK 2023 2030
Wind	5	2,7		7,7	7,1	9,5
PV	6,4	10,1	1,9	18,3	7,7	13,4
Other	0,6	0,3	0,2	1	0,7	0,6
Coupled with storage		0,5		0,5		
TOTAL	11,9	13,6	2	27,5	15,1	23,5

Factors that should be considered for any additional MW of RES installation

- Energy Demand Forecast
- Market Dynamics and Prices
- Grid Capacity and Stability
- Environmental Impact
- Technological Viability
- Economic and Financial Implications
- Policy and Regulatory Framework
- Social Acceptance

Could the surge in PV potentially surpass energy demand, resulting in unexpected surpluses along with extra costs and issues?



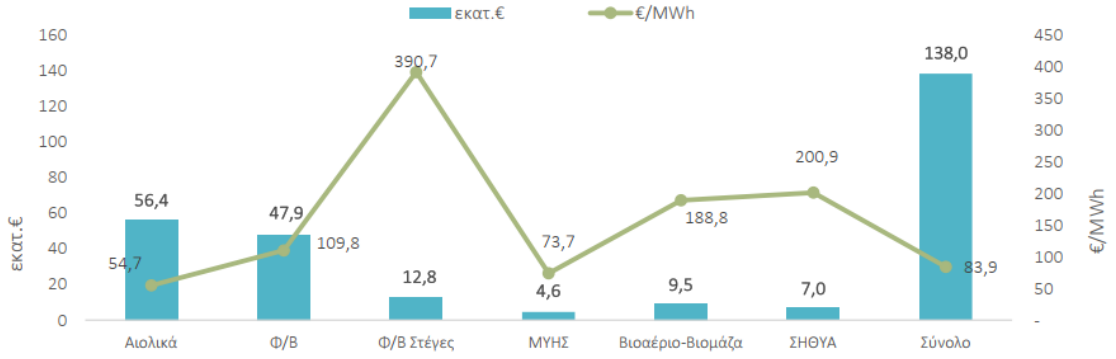
Δ (2023 vs 2030) PV production: +17.7 TWh
Δ (2023 vs 2030) Wind Production: + 6 TWh

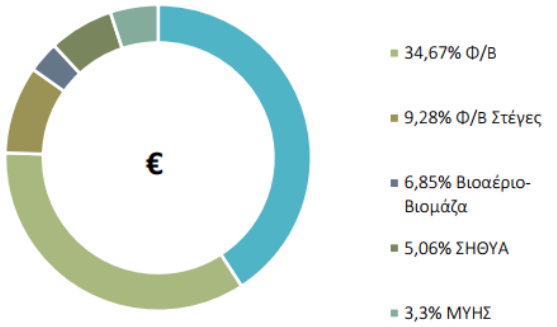
Total Δ (2023 vs 2030): +23.7 TWh

Source: Demand forecast 2025-2034/ΑΔΜΗΕ – RES forecast production based on the final connection terms of ADMIE/DEDDIE

RES Production Carries Costs for Consumers

Αξία και Μεσοσταθμική Τιμή Ενέργειας Μονάδων ΑΠΕ ΔΣ





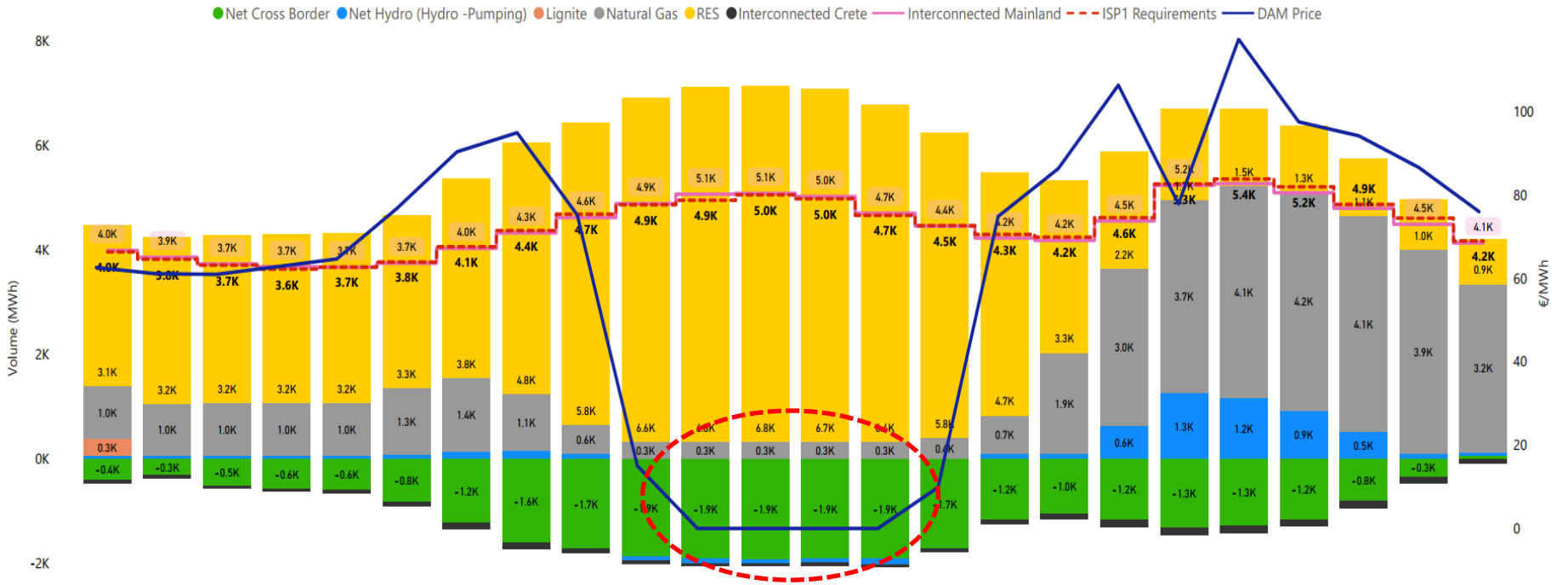
Μήνας	Αιολικά		Φ/Β		Φ/Β Στέγες **		ΜΥΗΣ		Βιοαέριο-Βιομάζα		ΣΗΘΥΑ (1) & Κατανεμόμενες		ΣΗΘΥΑ (2)	Σύνολο	
	εκατ.€	€/MWh	εκατ.€	€/MWh	εκατ.€	€/MWh	εκατ.€	€/MWh	εκατ.€	€/MWh	εκατ.€	€/MWh (1)	€/MWh (2)	εκατ.€	€/MWh
Ιαν	56,6	60,9	49,3	128,7	11,6	394,0	5,3	75,1	6,8	145,5	9,2	321,0	-	138,9	93,3
Φεβ *	54,4	56,7	62,2	119,8	8,7	391,5	4,2	69,3	6,1	141,2	6,0	222,1	-	141,6	86,8
Μαρ	58,6	59,6	80,3	125,5	9,5	389,5	5,8	71,4	6,7	142,3	5,6	201,7	-	166,6	92,3
Απρ	41,2	57,5	85,3	122,7	10,6	391,3	5,0	70,0	8,8	183,4	4,7	184,3	-	155,7	98,2
Μάι	51,4	60,5	80,7	124,8	16,0	391,6	5,8	71,7	9,1	184,1	4,3	179,7	-	167,3	98,9
Ιουν *	30,6	59,1	99,1	121,1	15,0	391,5	5,3	74,1	8,7	186,2	3,7	160,3	-	162,4	107,1
Ιουλ	39,3	56,8	106,9	109,9	15,4	391,2	3,4	72,6	8,5	185,1	3,2	168,7	-	176,8	97,3
Αυγ	63,8	57,8	102,0	111,7	20,8	390,2	2,5	72,3	8,5	189,8	4,8	184,9	-	202,5	93,1
Σεπ	62,6	58,2	77,9	113,8	21,4	391,6	2,2	73,2	7,9	186,0	4,7	188,8	-	176,7	92,4
Οκτ *	43,8	56,3	75,7	113,0	17,8	390,6	2,3	73,9	9,4	185,9	5,6	193,9	-	154,7	96,4
Νοε	67,1	58,1	51,8	110,2	16,9	390,6	3,6	75,0	9,5	190,3	6,5	206,4	-	155,4	86,4
Δεκ	56,4	54,7	47,9	109,8	12,8	390,7	4,6	73,7	9,5	188,8	7,0	200,9	-	138,0	83,9
Σύνολο Ετους	**625,8**	**58,0**	**919,1**	**117,1**	**176,5**	**391,2**	**50,0**	**72,5**	**99,5**	**176,1**	**65,4**	**203,5**		**1.936,4**	**93,7**

*Μήνες Εκκαθάρισης για τα Φ/Β Χαμηλής Τάσης
Σημειώσεις: Συμπεριλαμβάνονται και τα στοιχεία των Φ/Β Στεγών στα ΜΔΝ

ΔΑΠΕΕΠ/2023

Are exports of photovoltaic (PV) production profitable or Not?

DAM 25/03/2024

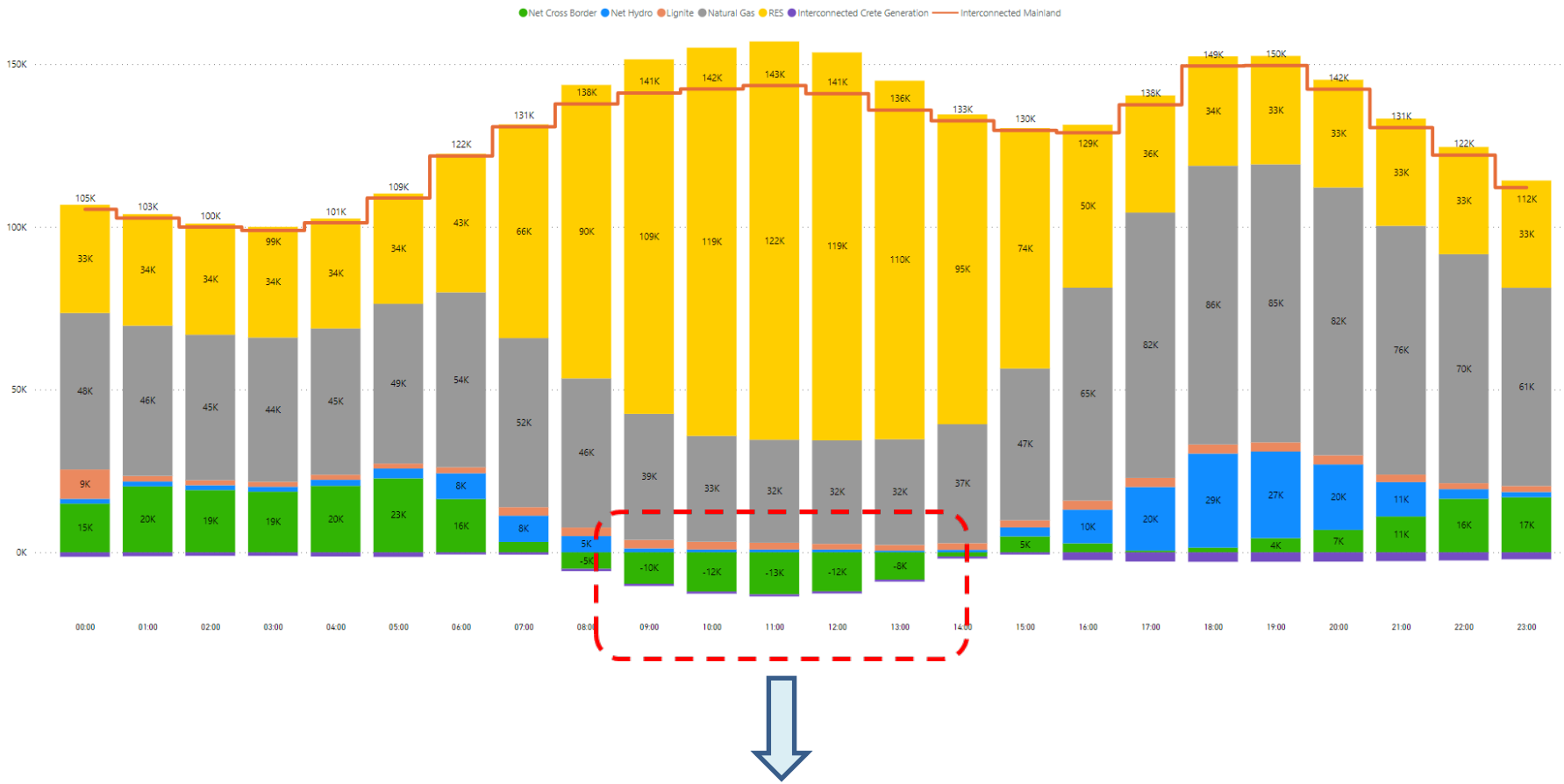


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DAM (€/MWh)	62,5	61,0	60,9	62,7	64,6	76,7	90,2	94,8	75,1	15,0	0,0	0,0	0,0	0,0	9,9	74,7	86,2	106,2	77,8	117,2	97,4	94,0	86,4	75,9

Financial impact analysis of Exporting PV production during the hours 11-14:

- **Exports (MWh):** 7.700
- **Revenue from Exports (€):** 0
- **Cost of PVs payment: 7.700MWh × 117 €/MWh =** 900.900 €
- **Net Financial Impact for Consumers:** -900.900 €

Energy Mix/1-25 of March



Exports during noon hours are primarily due to the surplus of photovoltaic (PV) production.

The cannibalization effect due to high photovoltaic (PV) penetration

		Capture price/DAM price (%)	
		Wind	PV
March	2021	96%	95%
	2022	96%	89%
	2023	94%	81%
	2024	97%	72%

DAM vs Wind & PV Capture Price (€/MWh) (1-25 March 2024)		
DAM	Wind	PV
70,9	69,12	50,8

Cannibalization Effect and Its Impacts:

Prices Drop Sharply: Excessive PV production simultaneously can cause electricity prices to plummet, sometimes even turning negative.

Losses for PV Producers: When prices drop dramatically, PV producers may see their profits vanish, putting the viability of their projects at risk.

PPAs Lead to Financial Difficulties: For individuals holding agreements to purchase PV production at fixed prices, a market downturn can transform these contracts into significant financial burdens, compelling them to pay substantially more than the prevailing rates for electricity.

Huge Challenge in Keeping the Lights On: With so much PVs coming in, keeping the electricity grid stable and efficient becomes a big challenge.

Risks of 10-Year PPAs

Fixed Prices vs. Market Fluctuations: Committing to a PPA means locking in electricity prices, which can become a liability if market prices decrease, potentially leading to paying more for energy than current rates.

Lack of Flexibility for Changing Needs: PPAs set specific terms for energy volume and price, which might not align with future operational changes or reductions in energy consumption, limiting adaptability.

Unforeseen Regulatory Changes: The energy sector's regulatory landscape can evolve, impacting the anticipated benefits or obligations of a PPA and possibly introducing new costs.

Risk of Counterparty Failure: The bankruptcy or financial distress of either the energy buyer or seller poses a significant risk, potentially leading to legal disputes or the loss of investment and energy supply.

Overshadowed by Technological Advancements: Rapid advances in energy generation and storage technologies could make the terms of a PPA less attractive over time as more cost-effective or efficient options emerge.

THANK YOU
FOR YOUR ATTENTION

ANDREAS PETROPOULEAS