Hrvatska komora inženjera građevinarstva

Analysis of historical data of public tenders

Use of AI to identify trends and issues

Matej Mihić, asst.prof., PhD, MCEng

www.ecec.net

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A long-standing problem meets a new opportunity

Years of low prices

The Chamber has warned about fee dumping for engineering services for years – but the evidence lived in thousands of PDFs, impossible to analyze by hand.

A new EOJN

The new Croatian e-procurement portal (EOJN) is fully machine-readable: structured data plus the complete documentation of every procedure.

AI that reads

Large language models can now read tender documentation, minutes and bills of quantities – at scale, every day – and turn them into data.

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Two goals from the start

Live monitoring

Know which procedures are open,

and which of them contain conditions in the tender documentation that we consider bad for engineers – before the deadline passes.

Historical analysis

Hold the data on all past procedures,

so trends can be analyzed, compared across years and various public clients, and early warnings raised with evidence.

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From project brief to a working system

Project brief

The Chamber wrote the specification: what to collect, what to read, which checks to run.

Built by Uprise

A Croatian software company built the system to the Chamber's requirements.

New EOJN, daily

Every night the system pulls new and amended procedures from the new portal.

Old EOJN, once

Historical procedures were processed once – mostly from scanned PDFs, not machine-readable.

36,762
procedures in the database

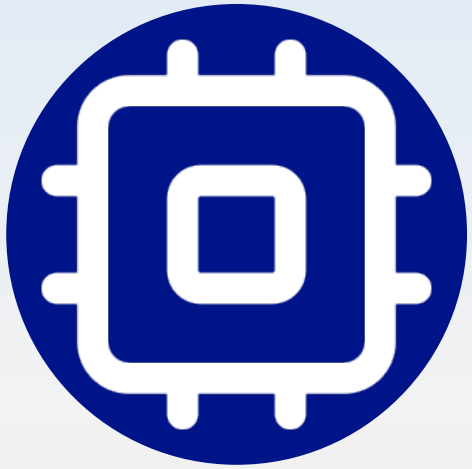
19,442
from the old EOJN

17,320
from the new EOJN

1,937
contracting authorities

€25.9 bn
contracted value

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PART 1

What the system does

Collect · read · compute · flag

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How the system works

1

Collects

Every day at midnight it downloads new and amended procedures from the EOJN, keeping those whose CPV code is relevant to the Chamber.

2

Reads

3

Fills the database

4

Flags and notifies

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How the system works

1

Collects

2

Reads

It downloads and reads the procurement documentation and the minutes of bid opening and of bid review and evaluation – including scanned documents.

3

Fills the database

4

Flags and notifies

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How the system works

1

Collects

2

Reads

3

Fills the database

Conditions, criteria, bids and bills of quantities become columns in the database. The PINS calculation gives an independent estimate of value and person-months.

4

Flags and notifies

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How the system works

1 **Collects**

2 **Reads**

3 **Fills the database**

4 **Flags and notifies**

A procedure that exceeds the limits is flagged for further action and an e-mail goes out to the recipients.

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What the system reads out of every procedure

From the tender documentation

- Link to the works procurement, to estimate the value of the service
- Weight of price in the evaluation, criteria types and scoring scales
- Financial, technical and professional ability
- Decision deadline, reliance on others' capacities, payment, bill of quantities

From the minutes

- List of bidders from the minutes of bid opening and of awards of tenders
- Points per criterion from the minutes of review and evaluation
- Trade customs, guarantees, EU funding, annexes, bidder country

In the database

- Search, filtering and sorting across all procedures
- Linking of procurements that belong to the same project
- Export for further analysis (CSV, Excel, Power BI)

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Twelve automatic checks (1/2)

Price weight above the limit

Price carries too many points – quality cannot really compete.

Issues with chosen quality criteria

Scoring how fast someone can produce design documents

Decision deadline too long

The authority left itself an unusually long period to decide.

Bid price vs. estimated value

The selected bid deviates too much from the estimated value.

Estimate vs. PINS value

The authority’s estimate does not match the PINS calculation – the key signal of EV under-pricing.

Second bidder’s share not set

When relying on others’ capacities, no minimum share of the partner is defined.

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Twelve automatic checks (2/2)

Payment not in equal instalments

Payment tied to the performace fo the contractor – risks to liquidity outside of the engineers control.

Costs not allocated by profession

Costs are not broken down by discipline, so individual specialist work is invisible in the tender price.

Wrong unit in the cost breakdown

The bill of quantities uses total price instead of breakdown by person months or similar.

Contract amount not time-dependent

A fixed amount regardless of duration – the risk of extension is not priced.

No price-adjustment formula

No mechanism to adjust prices in a contract that runs for years.

Deadline not realistic compared to scope

Too short deadline to complete the service based on project scope and complexity, calculated by HKIG's Standard of Services

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PART 2

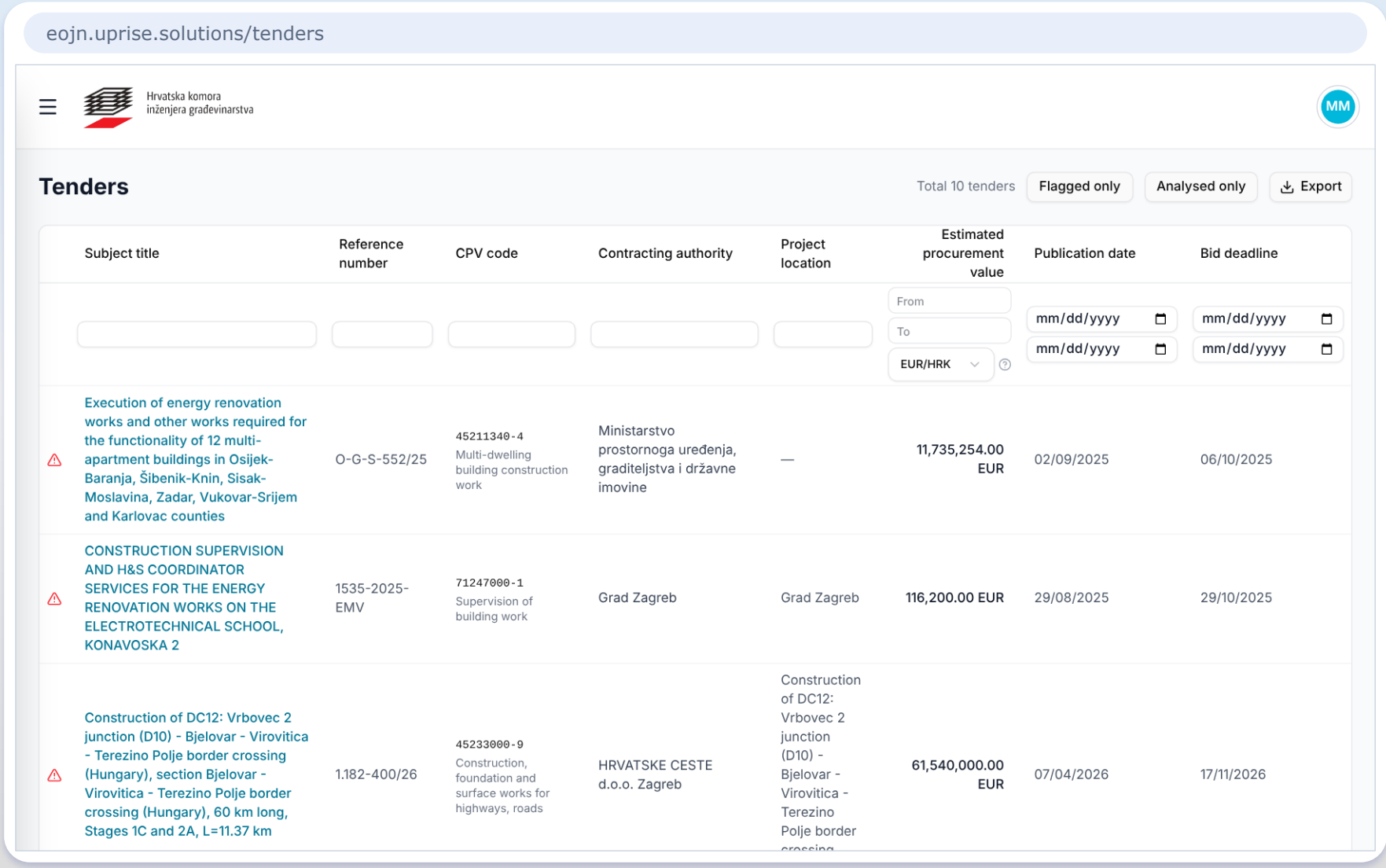
The system in action

A walk through real procedures – as in the web browser



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The list of procedures



Only relevant CPV codes

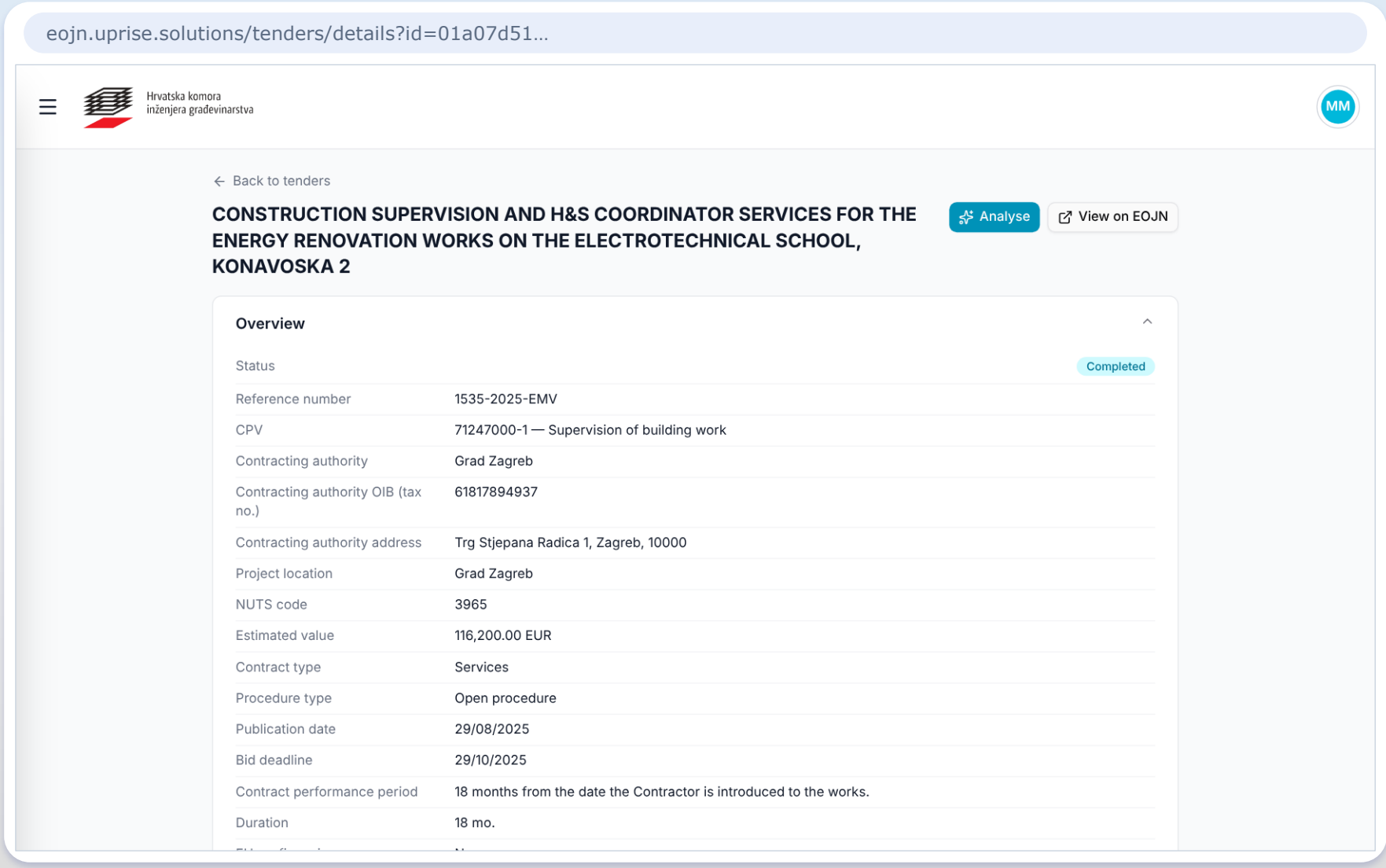
Every procedure the Chamber is interested in, updated daily. Filters by contracting authority, CPV, value, dates…

Warning icon

At least one of the twelve checks failed – click to see which.

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A procedure, read by the system

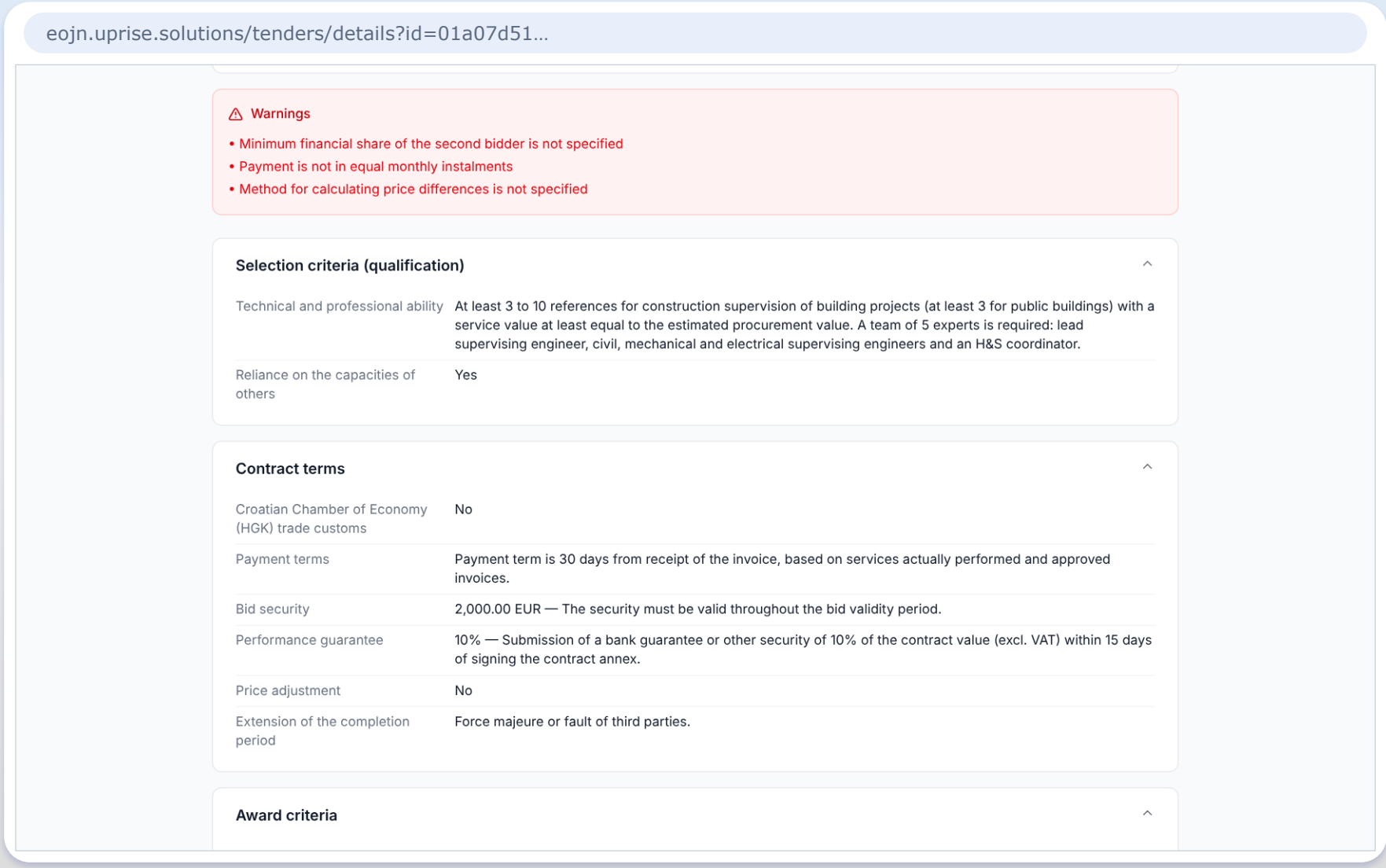


Overview

Supervision and H&S coordination for the energy renovation of a school in Zagreb. Estimated value €116,200, open procedure, 12 bids.

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A procedure, read by the system



Three warnings

No minimum share for the second bidder, payment not in equal instalments, no price-adjustment formula.

Conditions read from the documentation

Qualification criteria, payment terms, guarantees, extension clauses – as text, searchable.

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A procedure, read by the system

eojn.uprise.solutions/tenders/details?id=01a07d51…

Award criteria

Type	Criterion	Weight (%)
Price	Price	60%
Quality	Expert experience IS	40%

Bids

Bidder	Price excl. VAT	Price incl. VAT	Rank	Points	Price / EV ratio	Price / PINS estimate ratio
Bidder 1	30,960.00 EUR	38,700.00 EUR	1	98.14	0.27x	—
Bidder 2	30,000.00 EUR	37,500.00 EUR	2	92	0.26x	—
Bidder 3	38,300.00 EUR	47,875.00 EUR	3	87	0.33x	—
Bidder 4	38,700.00 EUR	48,375.00 EUR	4	76.51	0.33x	—
Bidder 5	53,348.00 EUR	66,685.00 EUR	5	73.74	0.46x	—
Bidder 6	53,998.00 EUR	67,497.50 EUR	6	73.33	0.46x	—
Bidder 7	56,700.00 EUR	70,875.00 EUR	7	71.75	0.49x	—
Bidder 8	57,800.00 EUR	72,050.00 EUR	8	71.14	0.50x	—
Bidder 9	66,600.00 EUR	83,250.00 EUR	9	67.03	0.57x	—
Bidder 10	68,400.00 EUR	85,500.00 EUR	10	66.32	0.59x	—
Bidder 11	39,200.00 EUR	49,000.00 EUR	—	—	0.34x	—
Bidder 12	76,800.00 EUR	96,000.00 EUR	—	—	0.66x	—

Points by criterion

Price 60 % – quality 40 %

The award criteria and their weights.

12 bids, winner at 0.27×

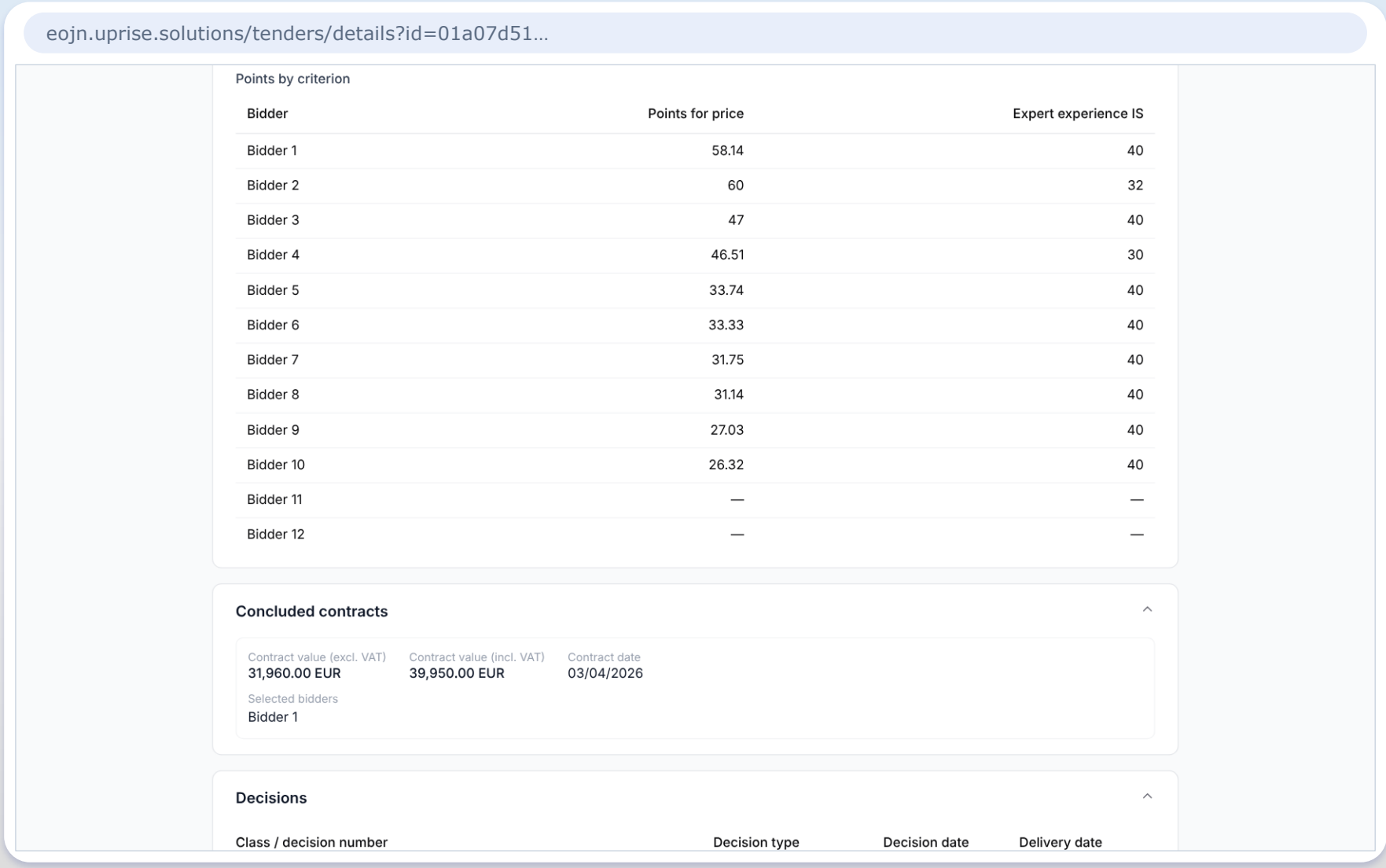
Each bid compared with the estimated value. The winning bid is 27 % of the estimate.

Lowest bidder at 26 % did not win due to less points in quality criteria

9 out of 12 bidders are 50 % or less then the estimated value

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A procedure, read by the system



Points per criterion

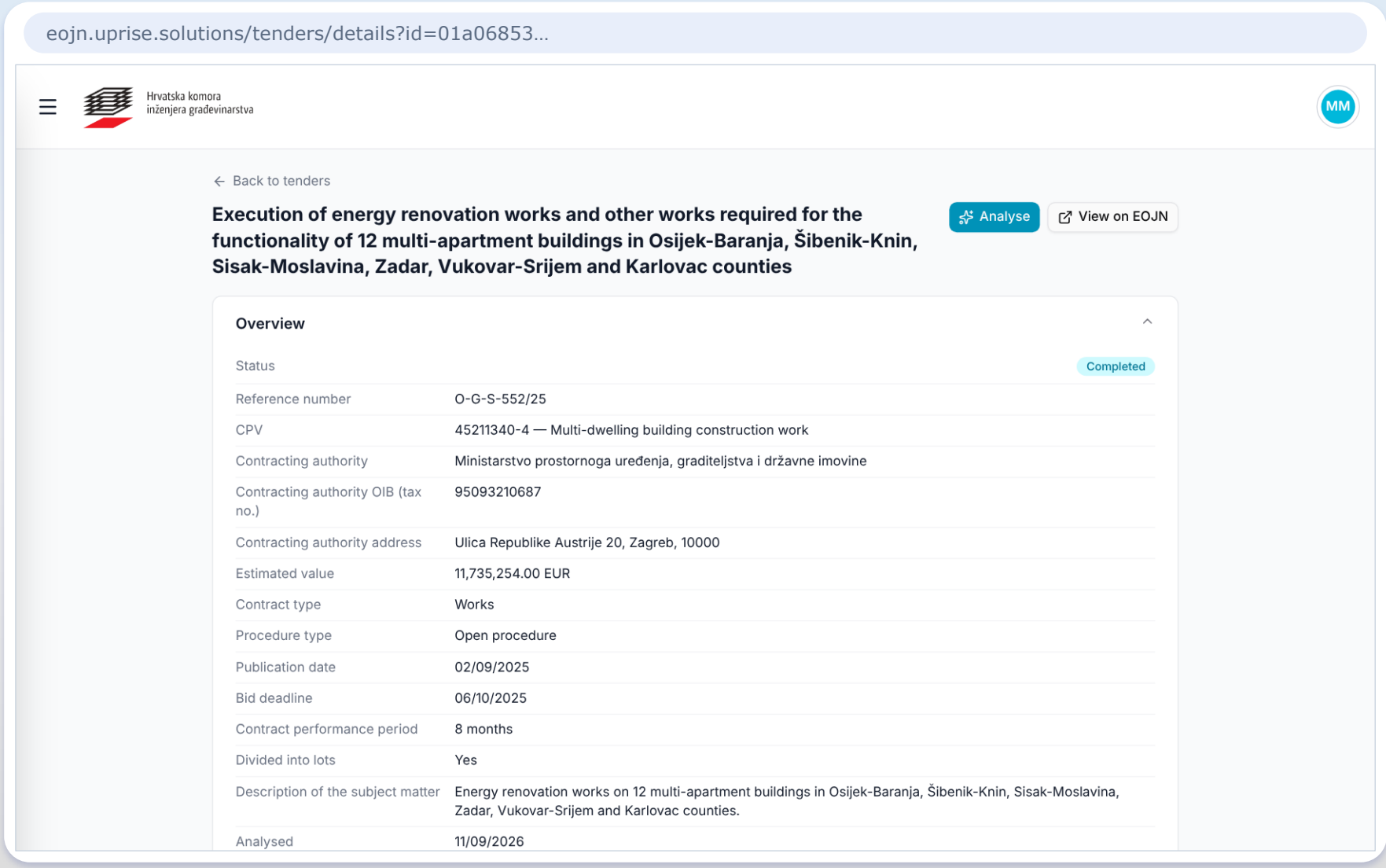
Read from the minutes of review and evaluation – for every bidder, not only the winner.

Contract: €31,960

Concluded contract and award decision, with dates.

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Procedures divided into lots



Nine lots

Energy renovation of 12 apartment buildings in six counties, €11.7 M, Ministry of Construction.

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Procedures divided into lots

eojn.uprise.solutions/tenders/details?id=01a06853…

Lot: 1 - LOT 1 - BELI MANASTIR

Lot details

Description of the subject matter	Energy renovation works and other works required for the functionality of two (2) multi-apartment buildings in Osijek-Baranja County
Estimated value	3,291,480.00 EUR
EU co-financing	Yes
Project location	Beli Manastir
NUTS code	3952
Duration	8 mo.

Award criteria

Type	Criterion	Weight (%)
Price	Price	90%
Quality	Warranty period for remedying defects	10%

Bids

Bidder	Price excl. VAT	Price incl. VAT	Rank	Points	Price / EV ratio	Price / PINS estimate ratio
Bidder 1-1	2,314,139.50 EUR	2,892,674.38 EUR	1	89.845595	0.70x	—
Bidder 1-2	2,053,042.72 EUR	2,566,303.40 EUR	—	—	0.62x	—

Points by criterion

Bidder	Points for price	Warranty period for remedying defects

Each lot on its own

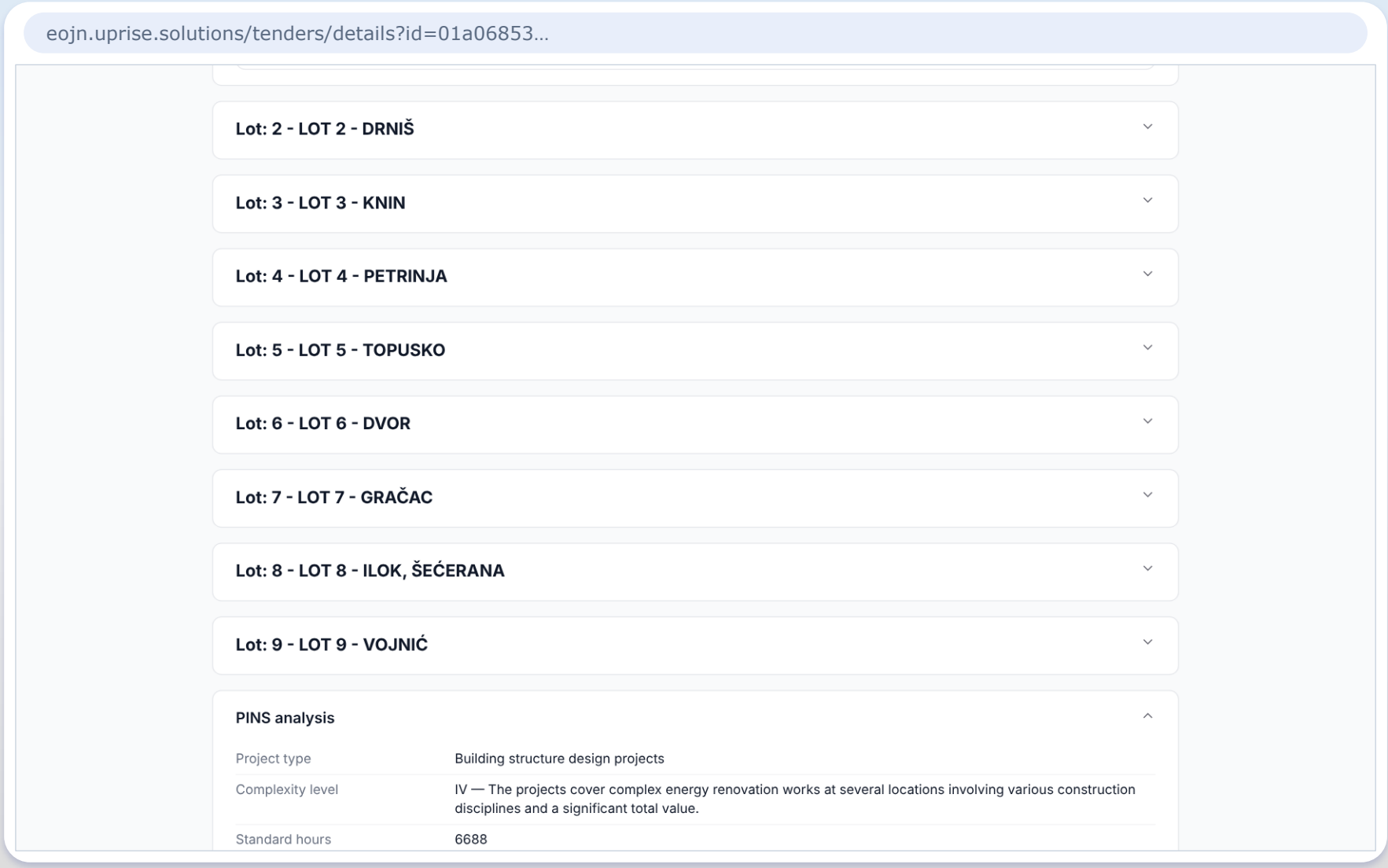
Estimate, award criteria, bids and contract per lot – here lot 1, Beli Manastir.

Warning

Bid price exceeds the set ratio to the estimated value.

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Procedures divided into lots

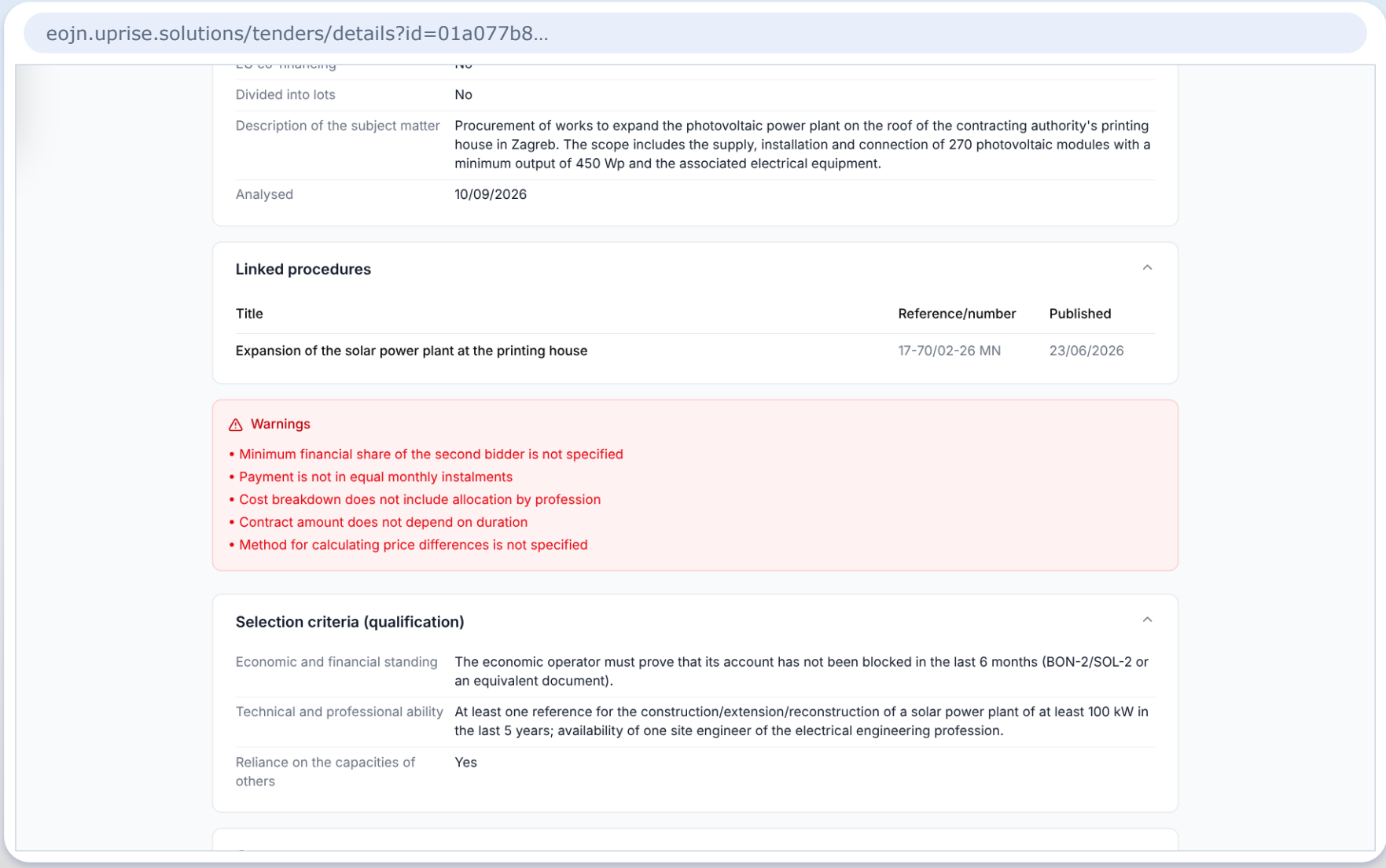


Transfered to the database

All information available for all of the lots and filterable in the database

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Linked procedures

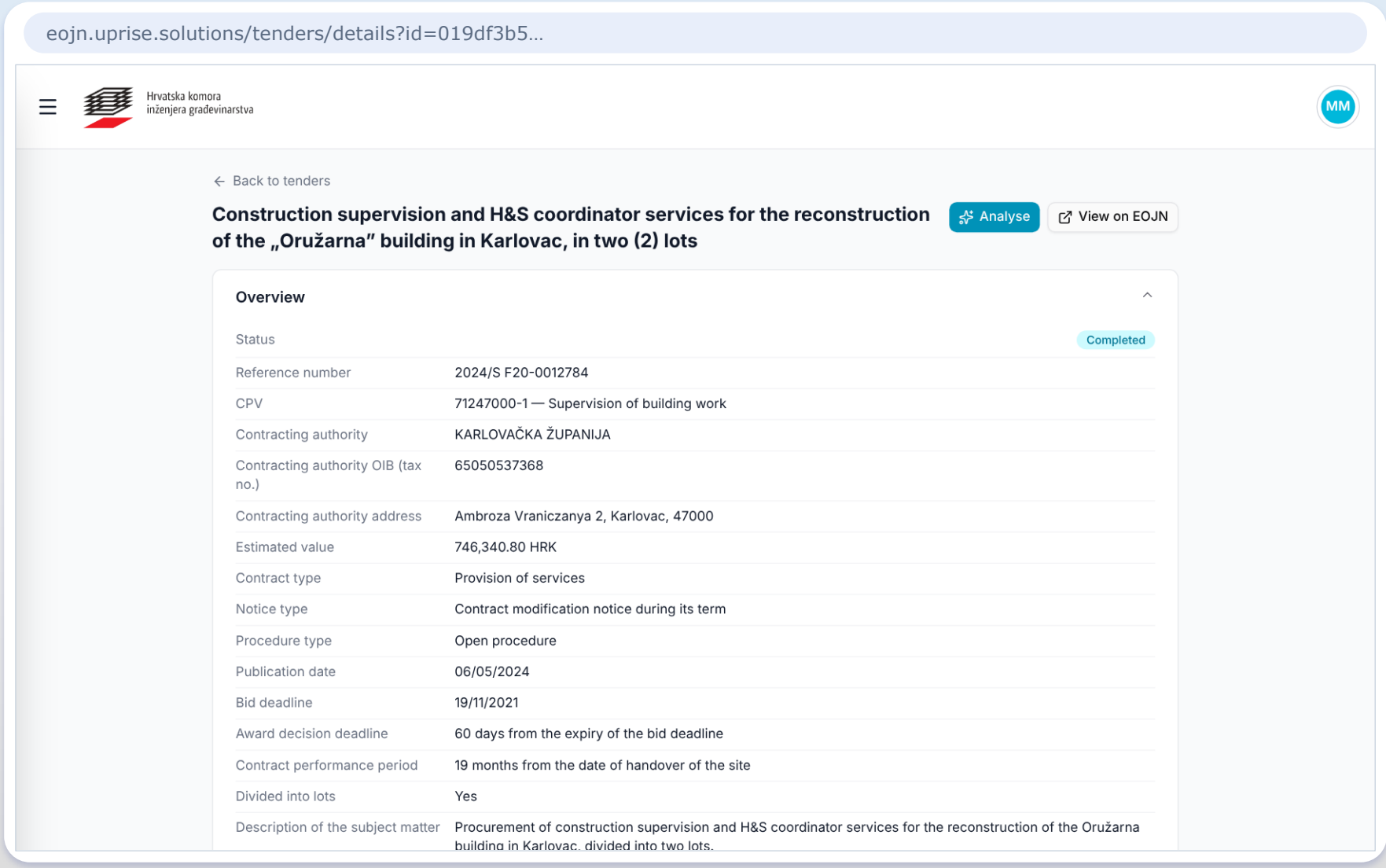


Same project, several procedures

The system links design, supervision, project management and works of the same project – so the price of the services can be compared with the price of the works.

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Historical data from the old EOJN

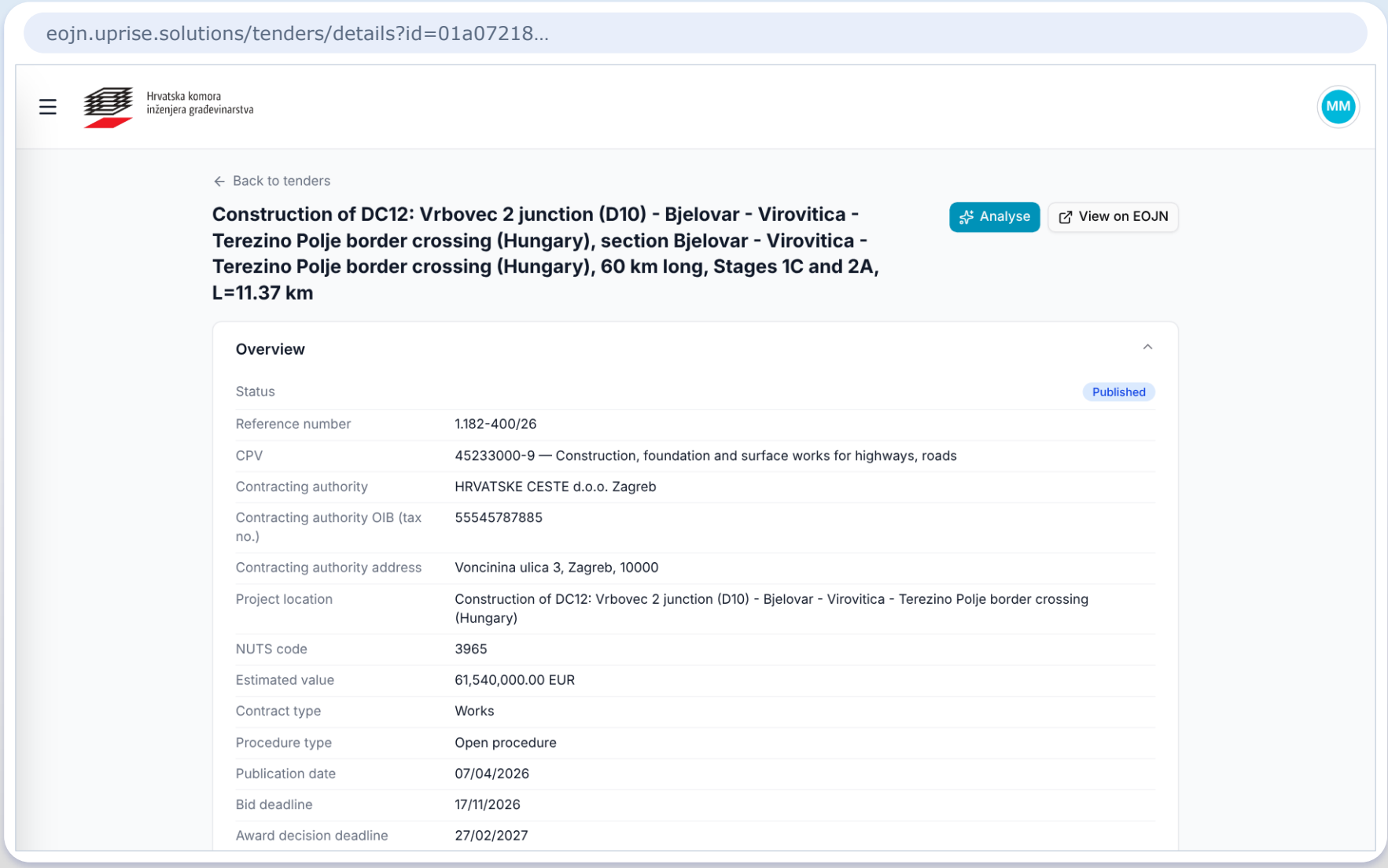


Old EOJN, 2021

Supervision and H&S coordination in two lots, Karlovac County. Values in kuna – recovered from scanned documents.

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Live: an open procedure



No bids yet

DC12 expressway, €61.5 M. Published, deadline 17/11/2026 – followed live until award.

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PART 3

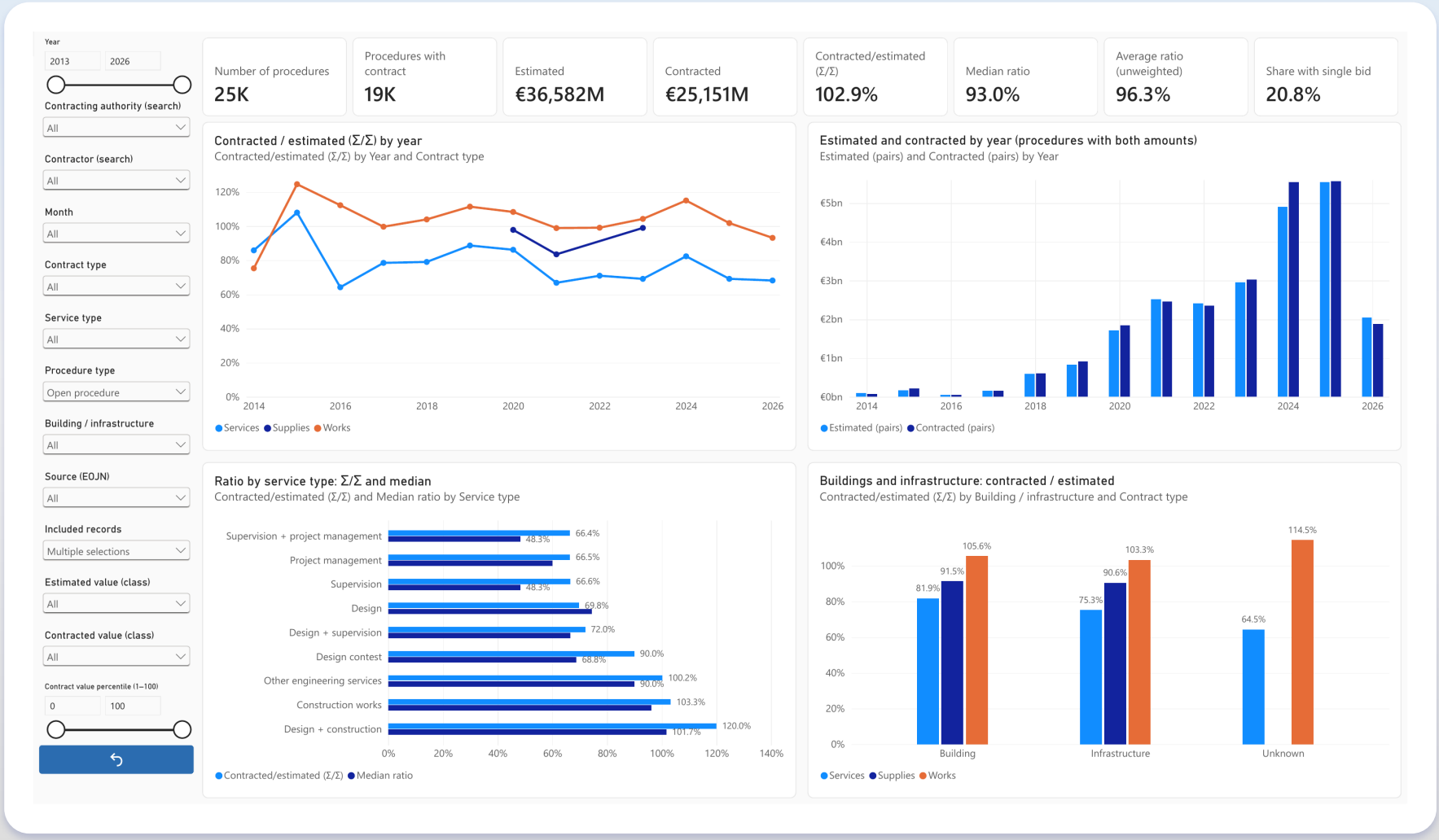
The database

Trends across 36,762 procedures

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Power BI (open procedures): Overview



Nine report pages

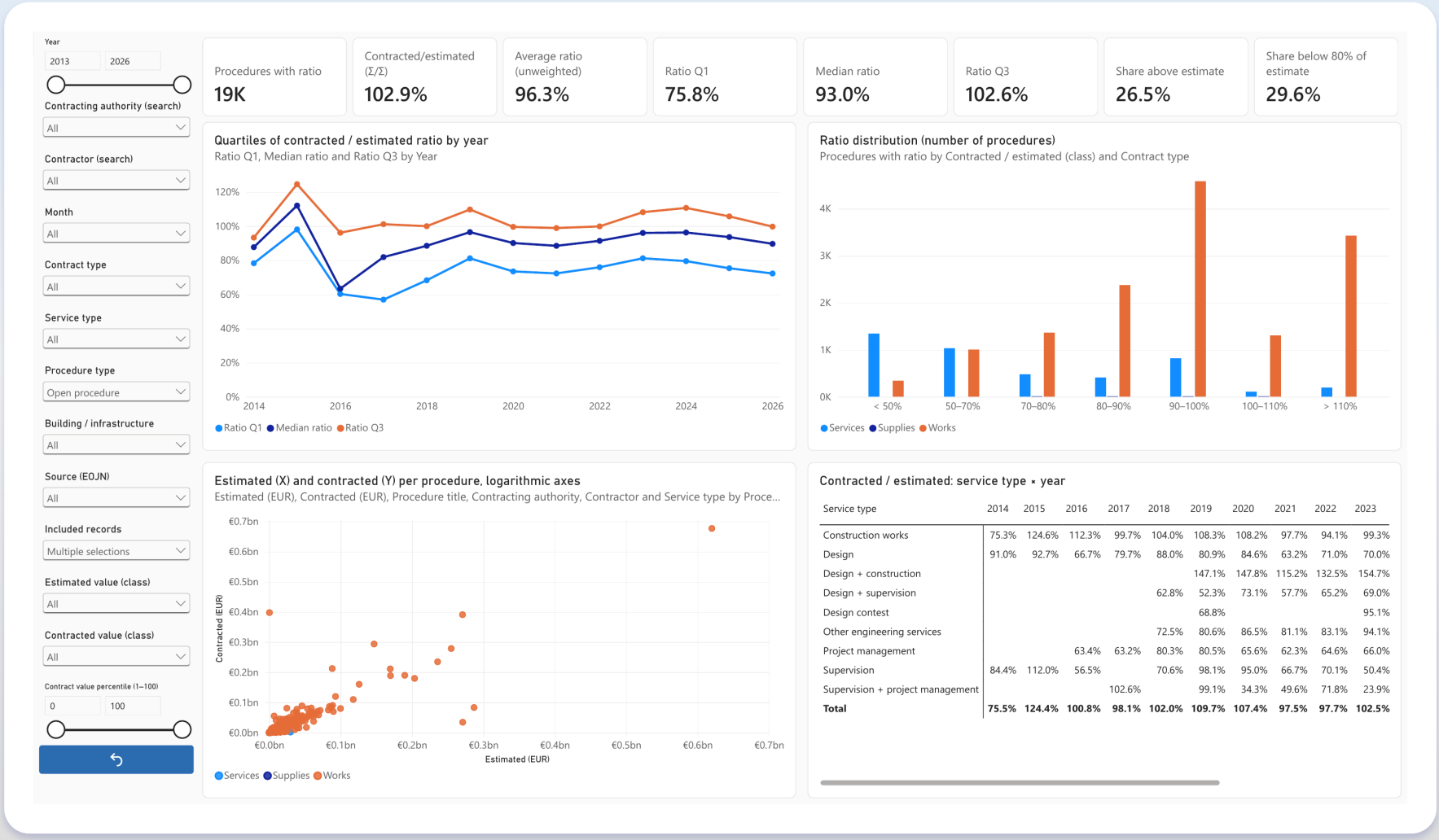
Every page filters by year, authority, contractor, service type, procedure type, value class – synchronised.

€25.2 bn contracted

25,215 open procedures in the default analysis set; median contract / estimate 93 %.

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Power BI (open procedures): Prices and values



Service type	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Construction works	75.3%	124.6%	112.3%	99.7%	104.0%	108.3%	108.2%	97.7%	94.1%	99.3%
Design	91.0%	92.7%	66.7%	79.7%	88.0%	80.9%	84.6%	63.2%	71.0%	70.0%
Design + construction						147.1%	147.8%	115.2%	132.5%	154.7%
Design + supervision					62.8%	52.3%	73.1%	57.7%	65.2%	69.0%
Design contest						68.8%				95.1%
Other engineering services					72.5%	80.6%	86.5%	81.1%	83.1%	94.1%
Project management			63.4%	63.2%	80.3%	80.5%	65.6%	62.3%	64.6%	66.0%
Supervision	84.4%	112.0%	56.5%		70.6%	98.1%	95.0%	66.7%	70.1%	50.4%
Supervision + project management				102.6%		99.1%	34.3%	49.6%	71.8%	23.9%
Total	**75.5%**	**124.4%**	**100.8%**	**98.1%**	**102.0%**	**109.7%**	**107.4%**	**97.5%**	**97.7%**	**102.5%**

The gap by service type

Supervision 48 %, project management 60 %, design 74 % – works 96 %.

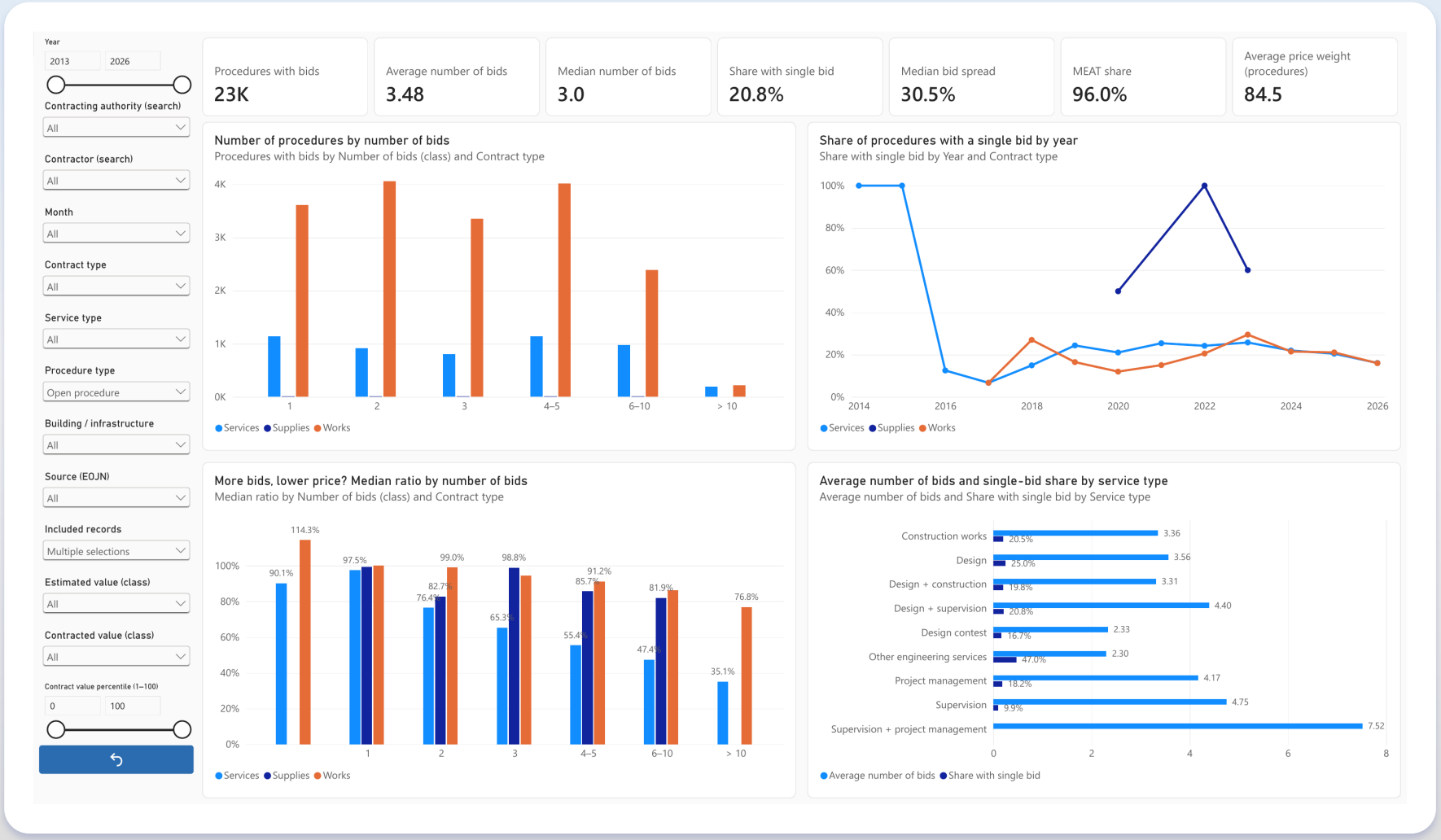
Ratio distribution

For supervision the mass sits below 50 % of the estimate.

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Power BI (open procedures): Competition



Bids per procedure

Supervision attracts the most bids – 4.8 on average – and the lowest prices.

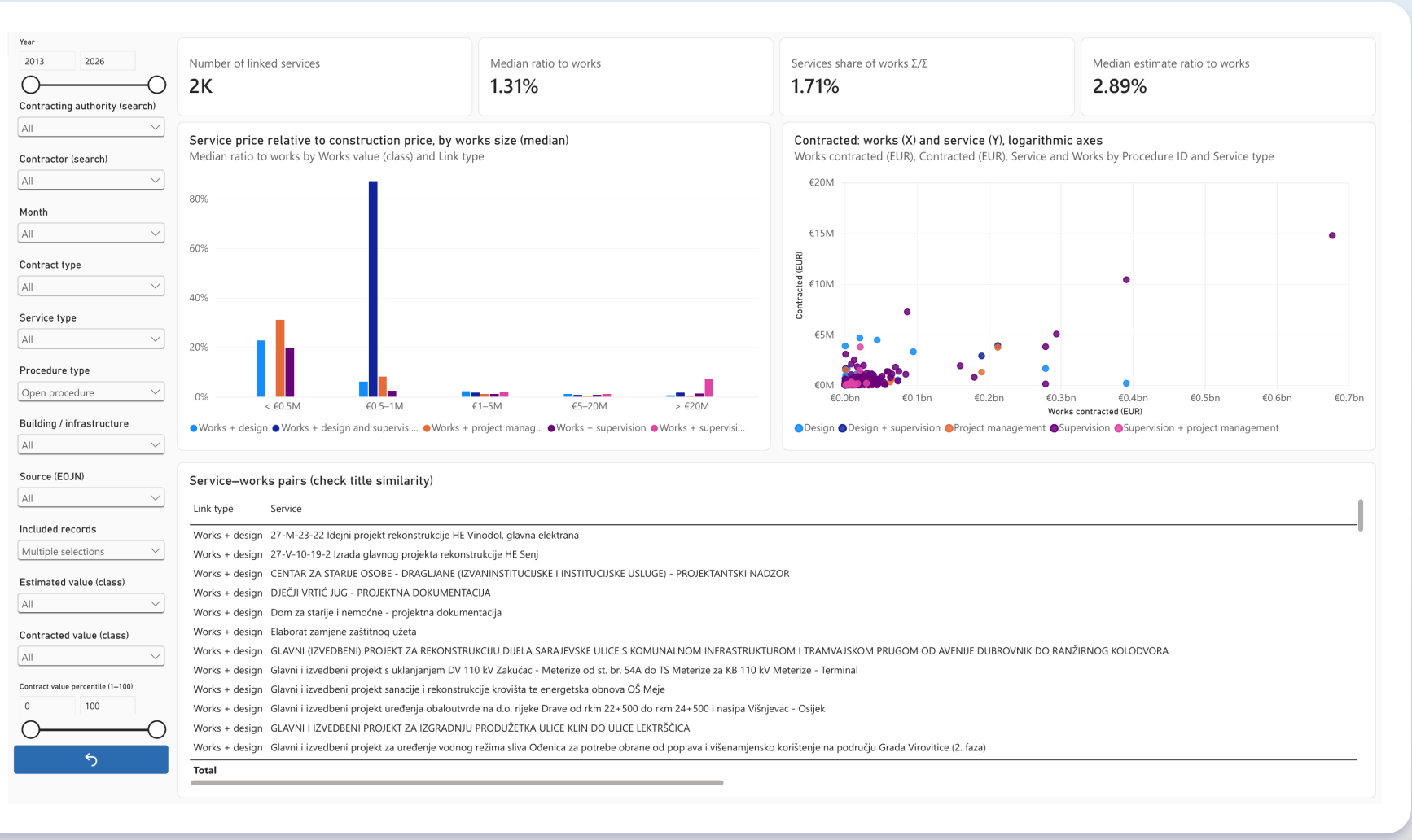
Single-bid share

21 % of open procedures receive one bid only.

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Power BI (open procedures): Linked procedures

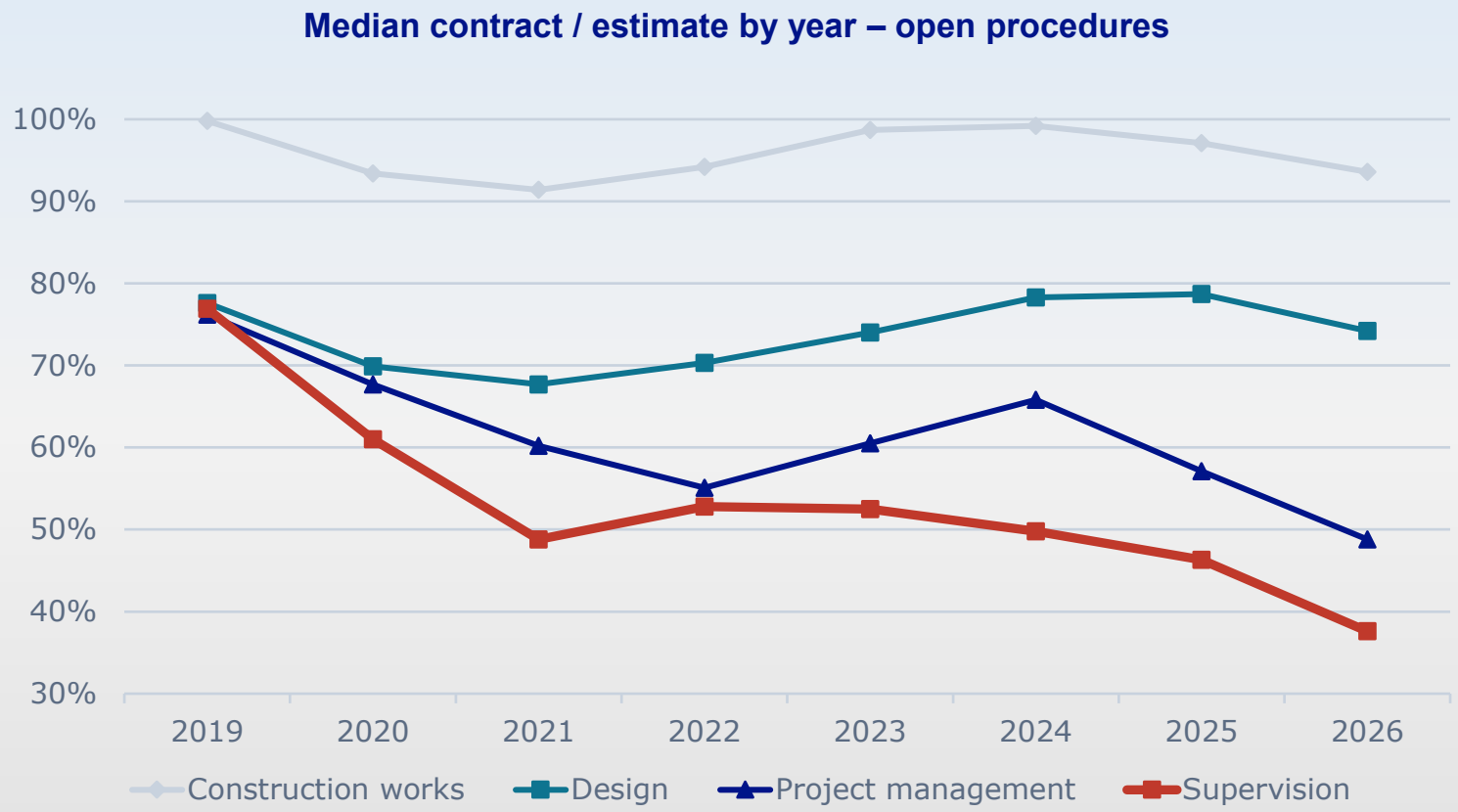


Service vs. works

Median: supervision 1.2 % of the works price, design 2.9 %, project management 0.7 %.

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The gap is not closing



Source: EOJN, HKIG database; open procedures in the default analysis set (n = 25,215); 2019–2026 by bid deadline.

Supervision keeps falling

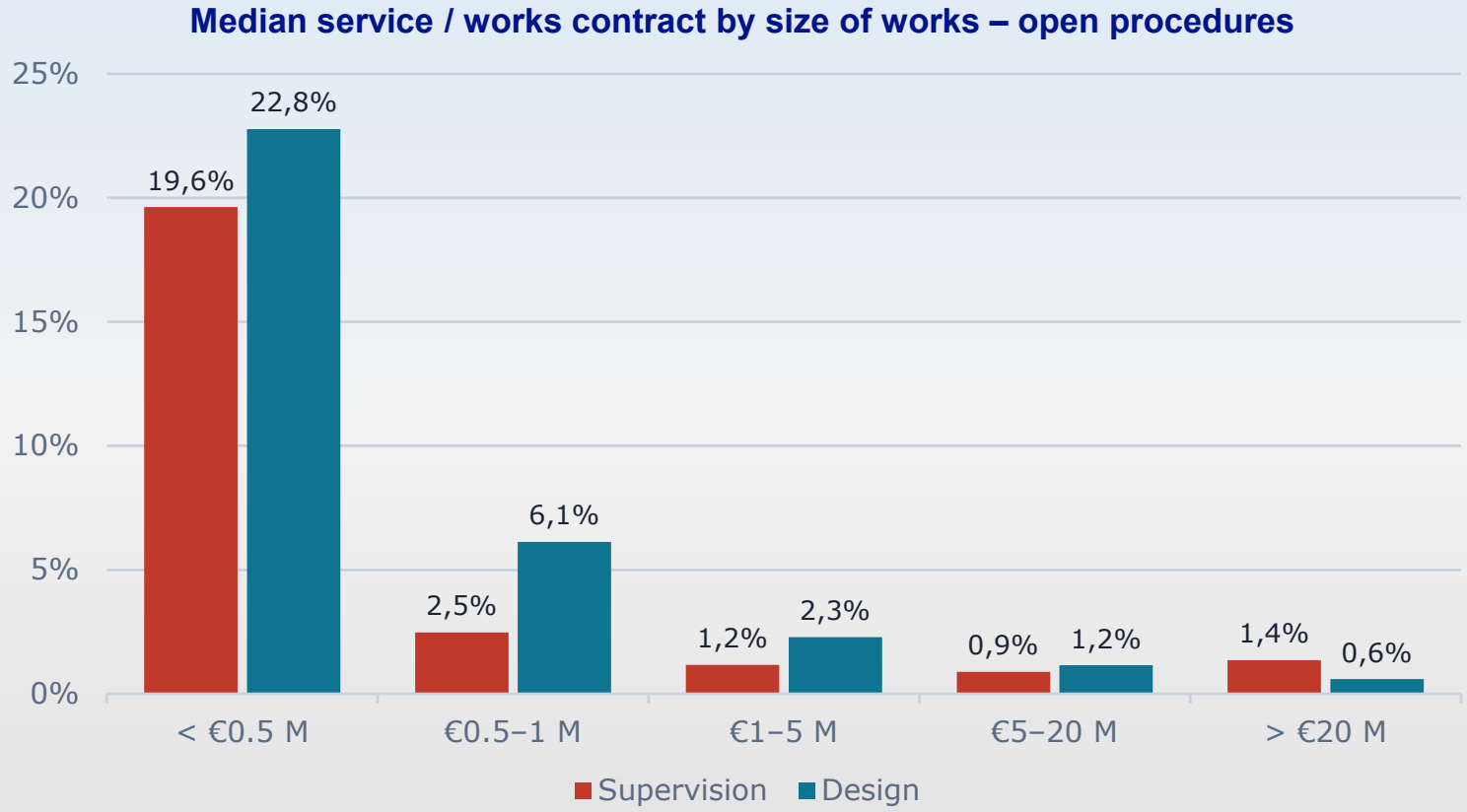
From 77 % of the estimate in 2019 to 38 % in 2026 – the median, not the extremes.

Design stays at three quarters

In open competition design has stayed at 70–79 % of the estimate since 2020 – and project management is sliding towards supervision.

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What a service costs next to the works



2,181 linked pairs

Services procured in open procedures, matched automatically to the works of the same project.

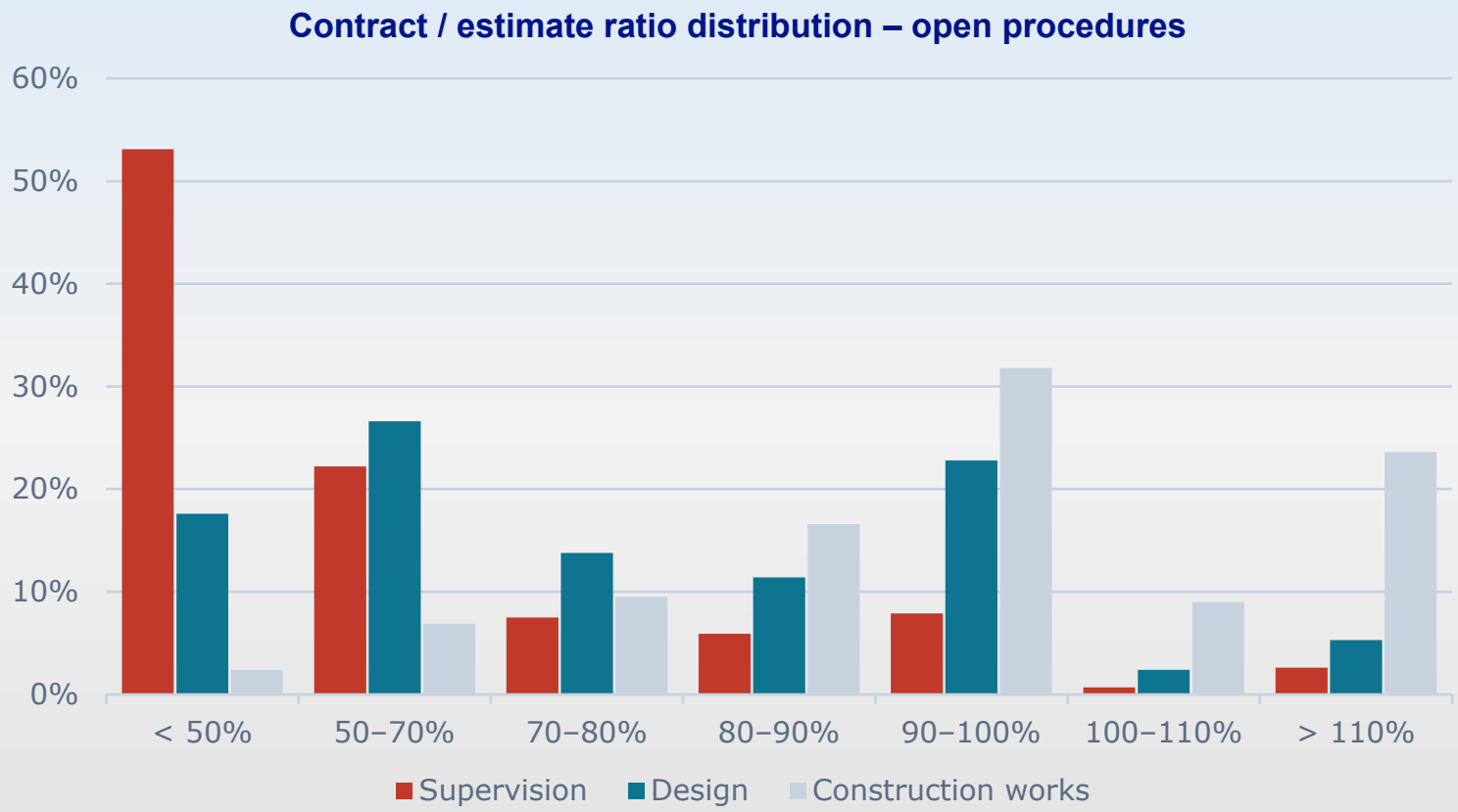
1–2 % of the works

Supervision of a €5–20 M project is contracted for 0.9 % of the works price, design for 1.2 %.

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Where the pressure comes from



53 % below half

More than half of supervision contracts are signed below 50 % of the estimate.

MEAT in name only

Open procedures use MEAT – but median weight of price criteria is 70 % for supervision, 90 % for works.

Plenty of competition

4.8 bids per supervision procedure; only 10 % single-bid.

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What we do with it

React while the procedure is open

Flagged procedures reach the Chamber by e-mail the same night – could be used to contact the contracting authority to change procurement provisions.

Benchmark with the standard of services

PINS norm hours give an independent estimate: a tool to argue abnormally low tenders (Art. 289 of the Procurement Act).

Present evidence of the issue

Trends by year, contracting authority and service type – for the Ministry, the authorities and our members.

Share the method

The approach – machine-readable portal + AI reading + a chamber's standard – can be repeated in other countries.

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Hrvatska komora
inženjera građevinarstva

Thank you

Development of the software tool was initated and funded by the Croatian Chamber of Civil Engineers

Matej Mihić, asst.prof., PhD, MCEng

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