



your investment link to Bulgaria

www.elana.net

The trendsetter on the Bulgarian financial market



- ❑ ELANA is a Bulgarian financial non-banking institution with over 16 years history in setting the novelties on the local financial market in transition relying on being stable traditional partner for its investors as well as the innovative trendsetter in the local environment by introducing first new financial products.
- ❑ ELANA is the largest non-banking financial group in Bulgaria and preferred partner to local and international investors in all of our areas of expertise: asset management, trading on the financial markets, investment banking, business consultancy, real estate investment, etc.
- ❑ Being one the first fully licensed investment intermediaries, we hold the responsibility for a series of start ups on the Bulgarian market such as founding the first asset manager and mutual fund, implementing the first bond issue, establishing the first fund for investing in agricultural land and many other examples from our past and current history that uphold our position as innovator on the Bulgarian market.



Corporate Vision



Our mission

Is to provide a wide range of professional services to institutional investors, corporate clients and private investors and help them achieve their objectives by constantly maintaining the highest standards of professionalism and performance.

We believe

our human capital is the key factor to success, as well as the reason for upholding a leading position on the Bulgarian financial market.

Our corporate vision

We maintain the position of a premier Bulgarian investment company, which is always the preferred partner due to offering the highest quality investment solutions based on professionalism, diversity, integrity and transparency. Building stable relationships with our business partners is our foremost objective.



ELANA: Key Figures



Founded	<u>1991</u>
Equity Capital	<u>EUR 3 mln</u>
Trading Turnover 2006	<u>Over EUR 880 mln</u>
Accumulated customers	<u>Approx. 40 000</u>
Assets under management	<u>Approx. EUR 150 mln</u>
Customer Outreach	<u>A network of ELANA</u>
Investment centres	<u>in 9 Bulgarian cities</u>
Employees	<u>120</u>





Market outline

□ Wind potential

The energy potential of wind energy could be divided in three main areas in Bulgaria:

• **Zone A** (Danube plain, Thracian lowland, Sofia region, Struma and Mesta valleys)

- Average wind speed: 2m/sec;

- Wind speed: maximum – in February, minimum – June and July.

- Energy potential: 100W/m² (less than 1000kWh/m²)

• **Zone B** (these parts of the country, situated in East of the line Rousse – V. Tirnovo and Danube coast, incl. the open low-mountain parts up to a height of 1000 m)

- Average wind speed: from 2m/sec to 4 m/sec

- Wind speed: maximum – in February, minimum – June and July.

- Energy potential: 100-200W/m² (1000-2000 kWh/m²)

• **Zone C** (the open and deforested mountain land in a height more than 1000m)

- Average wind speed: more than 4 m/sec

- Wind speed: maximum – in February, minimum – August

- Energy potential: 200W/m² (2000kWh/m²)

In general, the wind potential of Bulgaria is not so large. The estimations show that an area of 1400 km² approximately has annual wind speed over 6,5 m/s, which is the breakeven of a wind energy project. So, the most appropriate zones for initiating a wind project are some mountain regions and the North coast.



ELANA: WIND ENERGY



Useful wind potential as a percentage of the total potential at different wind speed

Station	Speed, m/s					
	3,5-4,0	4,5-4,0	5,5-4,0	3,5-7,5	4,5-11,5	5,5-11,5
Zone A						
Pleven	93	87	81	49	56	60
Gabrovo	95	91	86	36	44	51
Sofia	97	92	87	44	55	62
Zone B						
Nessebar	98	95	93	32	43	53
Sozopol	98	95	92	34	45	54
Sliven	98	98	97	15	23	31
Zone C						
Kaliakra	99.7	99	98	17	27	38
Botev	99.9	99	99	13	22	32
Musala	99.8	99	98	15	24	34

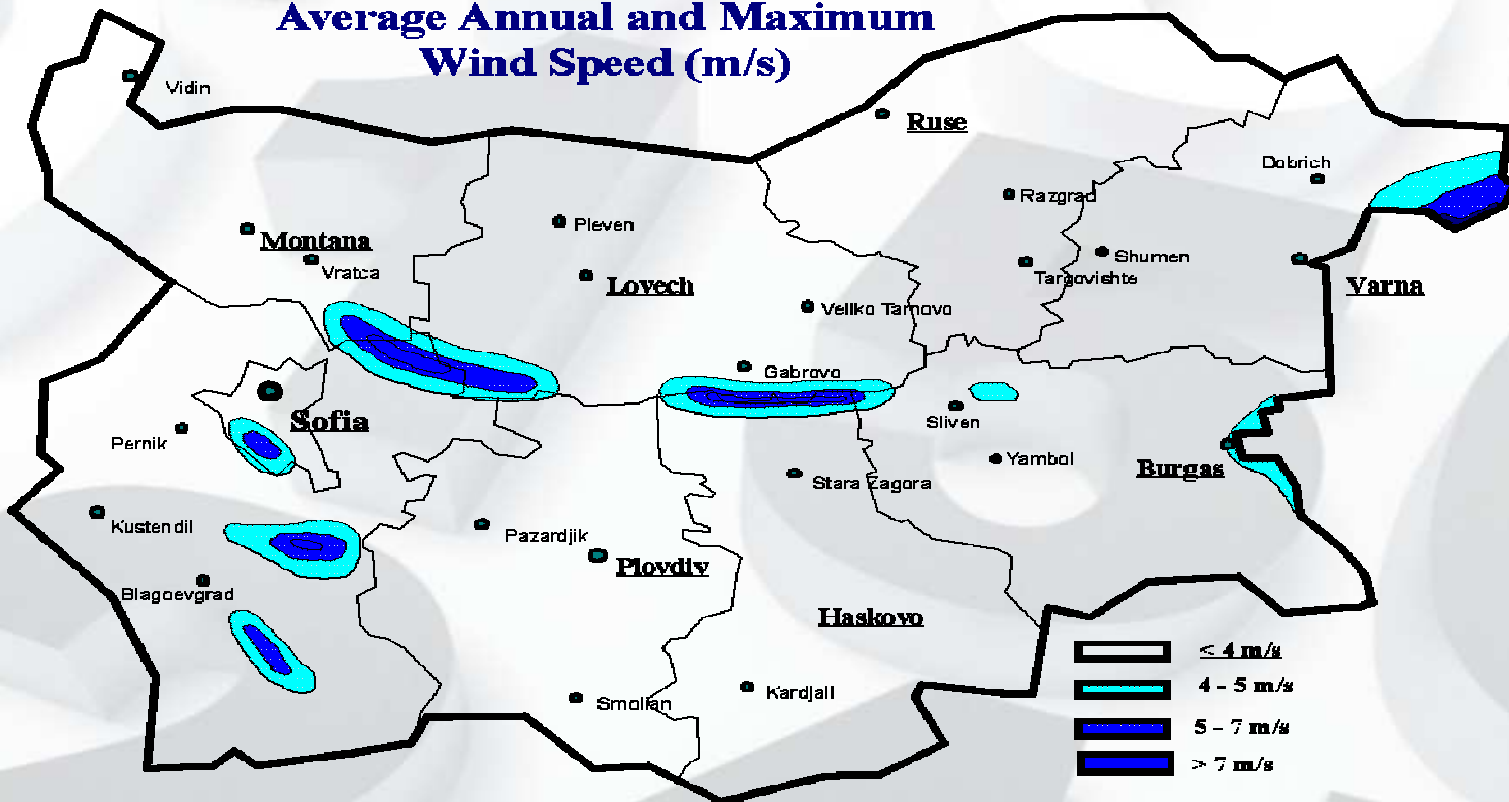


ELANA: WIND ENERGY



Wind map

WIND ENERGY - Theoretical Potential Average Annual and Maximum Wind Speed (m/s)





Investment process

• Investment project elaboration

• Permits and licenses

- License from the State Commission for Energy Regulations
- Written request for studying the conditions and the way of integration to the transmission and distribution electricity network
- Construction license
- Contract for integration to the transmission and distribution electricity network

• Construction and assembly

• Construction completion. Operations permit



ELANA: WIND ENERGY



□ Energy prices

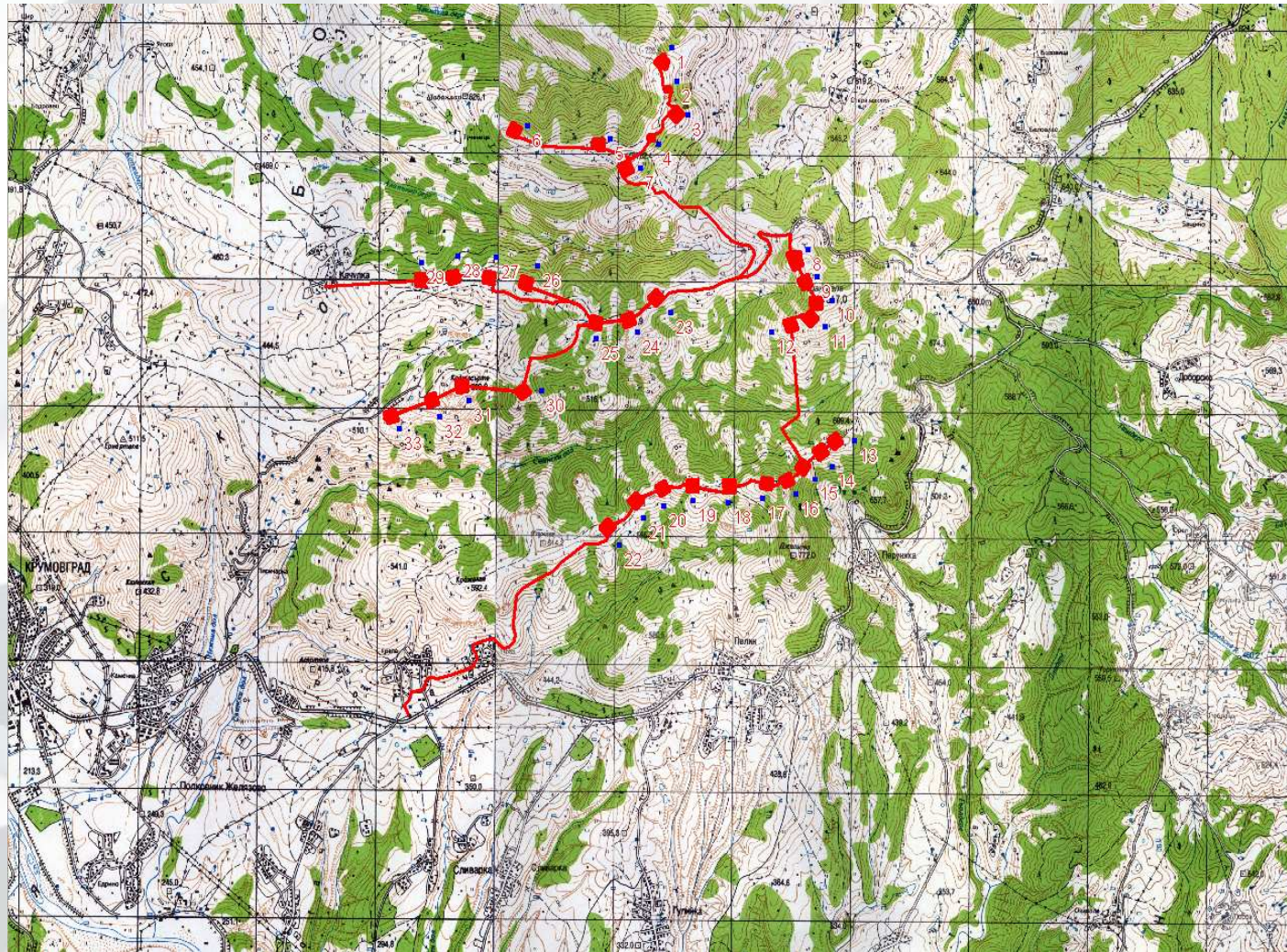
- Electricity energy price, produced by wind turbine with power up to 10 MW - **EUR 61.3 / MWh** \without VAT\
- Electricity energy price, produced by wind turbine (with new equipment, produced after 01.01.2006) \without VAT\
 - for wind generators with full efficient annual work hours up to 2250 – **EUR 89.5 / MWh**
 - for wind generators with full efficient annual work hours over 2250 – **EUR 74.5 / MWh**



ELANA: WIND PARK KRUMOVGRAD



PROJECT LOCATION



ELANA: WIND PARK KRUMOVGRAD



INVESTMENT PARAMETERS

□ Project size

- **The project includes:**

- the installation of 50 generators with approx. power capacity of **1.5 MW** each one.
- control centre
- cable assembly and connection with 20kV trace and substation

- **The total project cost is:**

EUR 85 million

- **The sources of financing are:**

- 95% loans – **EUR 80.6 million**
- 5% own funds – **EUR 4.3 million**



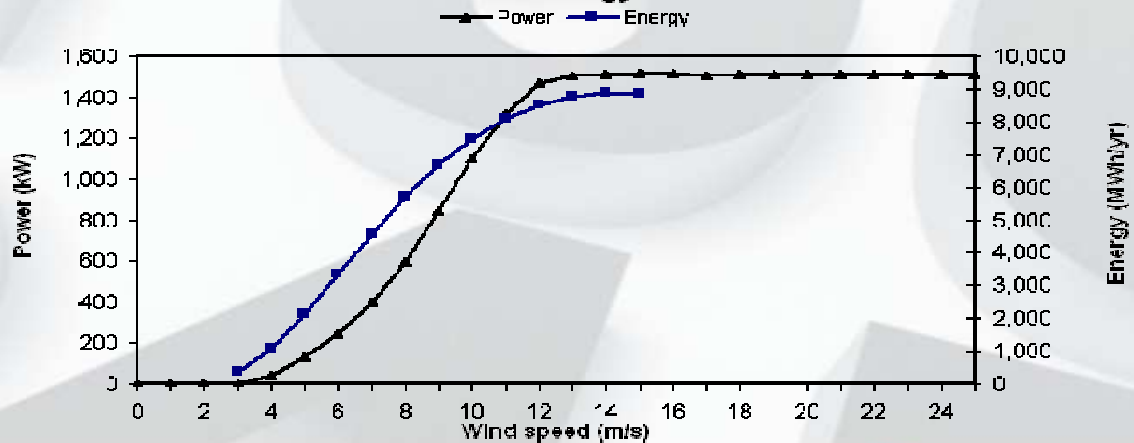
ELANA: WIND PARK KRUMOVGRAD



TECHNICAL SPECIFICATIONS

Turbines' characteristics	Estimations
Generator's capacity (kW)	1500
Height (m)	61.5
Runner's diameter (m)	77
Curve surface of screw movement (m2)	4,657
Producer	Nordex
Model	NORDEX S77
Energy curve	Standard

Power and Energy Curves



ELANA: WIND PARK KRUMOVGRAD



TECHNICAL SPECIFICATIONS

□ Energy model

• Location characteristics:

- Wind characteristics based on actual measurements –
 - Density – 362 W/sq.m.
 - Average speed – 7.0 m/s at 30m.
 - Average speed – 5.8 m/s at 10m.
- System parameters
 - 50 turbines (1.5MW each)
 - Average wind speed at 50m - 6.7m/s
 - Tower height – 61.5m
 - Wind speed at tower top – 7.8m/s
 - Wind density at tower top – 580 W/sq.m.
- Annual energy generation
 - Gross energy production – 300 216 MWh
 - Losses coefficient – 0.88
 - Wind plant capacity factor – 40%
 - Delivered energy – 262 897 MWh



ELANA: WIND PARK KRUMOVGRAD



PROJECT RETURN

Investment (own funds)	EUR 4.3 million
Total amount of discounted cash flows (7 years' period)	EUR 21.9 million
IRR	61%
NPV	EUR 17.6 million
<i>Estimations</i>	
Discount rate	12%



ELANA: WIND PARK KRUMOVGRAD



STAGE OF READINESS

- The land has been acquired
- A study of the geophysical and ecological characteristics of the wind park is completed
- Positive statement of the Regional Inspection for the Environment and Water is received
- Preliminary contracts for integration to the electricity network are concluded with EVN Bulgaria
- A number of measurement devices with calibrated wind measurement tools of NRG Systems are installed
- Preliminary negotiations with different project companies are conducted
- Contacts with turbines' producers are established
- Detailed designs of the wind park are under negotiation with an international consultant.

THE PROJECT IS ABOUT 6 MONTHS AWAY FROM ACQUIRING ALL THE PERMITS NECESSARY TO COMENCE DEVELOPMENT





SOLAR ENERGY

☐ PV potential

The energy potential of solar energy could be divided in three main areas in Bulgaria:

• **Central – East region** (covers up to 40% of the country territory)

-Average annual duration of the solar radiation: for the period 31.03 -31.10 – up to 1640 hours; for the period of 31.10 -31.03 – up to 400 hours;

-Solar energy resource – 4kWh/m² daily or 1450 kWh/m² annually

• **North-East region** (covers up to 50% of the country territory)

-Average annual duration of the solar radiation: for the period 31.03 -31.10 – up to 1750 hours; for the period of 31.10 -31.03 – up to 500 hours;

-Solar energy resource – 4.25kWh/m² daily or 1450-1500 kWh/m² annually

• **South- East and South-West region** (covers up to 10% of the country territory)

-Average annual duration of the solar radiation: for the period 31.03 -31.10 – over 1750 hours; for the period of 31.10 -31.03 – over 500 hours;

-Solar energy resource – more than 4.25 kWh/m² daily or 1550 kWh/m² annually



ELANA: Alternative energy



☐ Solar map



ELANA: Alternative energy

Investment process

• Investment project elaboration

• Permits and licenses

- License from the State Commission for Energy Regulations (only for installations with power over 5MW)
- Written request for studying the conditions and the way of integration to the transmission and distribution electricity network
- Construction license
- Contract for integration to the transmission and distribution electricity network

• Construction and assembly

• Construction completion. Operations permit



☐ Energy prices

- Electricity energy price, produced by photovoltaic installations \without VAT\:

-With installed capacity up to 5 KW – **EUR 400/MWh**

-With installed capacity over 5 KW – **EUR 367/MWh**



ELANA: PV PROJECT IVAILOVGRAD



INVESTMENT PARAMETERS

Project size – EUR 3.5mln. (1MW facility)

The project is very scalable, as it is a matter of replication the land is readily available.

Technical specifications

Photovoltaic

Type		mono-Si	
Power capacity	kW	1 012.86	
Manufacturer		SolarTec AG	
Model		Mono crystalline ST170	5720 unit(s)
Efficiency	%	14.0%	
Nominal operating cell temperature	°C	45	
Temperature coefficient	% / °C	0.40%	
Solar collector area	m ²	7 235	

Miscellaneous losses % 5.0%

Inverter

Efficiency	%	96.0%
Capacity	kW	1200.0
Miscellaneous losses	%	5.0%

Summary

Capacity factor	%	14.5%
Electricity exported to grid	MWh	1 289.27



ELANA: PV PROJECT IVAILOVGRAD



INVESTMENT PARAMETERS

☐ Cost Analysis

Initial costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
Feasibility study					
Feasibility study	cost	1	€ 5 000	€ 5 000	
Sub-total:				€ 5 000	0.1%
Development					
Development	cost	1	€ 100 000	€ 100 000	
Sub-total:				€ 100 000	2.8%
Engineering					
Engineering	cost		€ -	€ -	
Sub-total:				€ -	0.0%
Power system					
Photovoltaic	kW	1 012.86	€ 2 900	€ 2 937 294	
Road construction	km	0		€ -	
Transmission line	km	17	€ 600	€ 10 200	
Substation	project	1	€ 10 000	€ 10 000	
Energy efficiency measures	project	0		€ -	
Монтаж електро	cost	10	€ 750	€ 7 500	
Престой на специалисти	cost	10	€ 750	€ 7 500	
Sub-total:				€ 2 972 494	84.6%
Balance of system & miscellaneous					
Spare parts	%			€ -	
Transportation	project	1	€ 30 000	€ 30 000	
Training & commissioning	p-d			€ -	
Engineering	cost	1	€ 200 000	€ 200 000	
Contingencies	%	5.0%	€ 3 307 494	€ 165 375	
Interest during construction	7.00%	4 month(s)	€ 3 472 869	€ 40 517	
Sub-total:				€ 435 892	12.4%
Total initial costs				€ 3 513 386	100.0%

Annual costs (credits)	Unit	Quantity	Unit cost	Amount
O&M				
Parts & labour	project	1	€ 20 000	€ 20 000
Management fees	cost	1	€ 23 665	€ 23 665
Contingencies	%	20.0%	€ 43 665	€ 8 733
Sub-total:				€ 52 398

Periodic costs (credits)	Unit	Year	Unit cost	Amount
Inverter refurbishment	cost	10	€ 30 000	€ 30 000
				€ -
End of project life	cost			€ -



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INVESTMENT PARAMETERS

Financial Analysis

Finance			
Incentives and grants	€		0
Debt ratio	%		70.0%
Debt	€		2 459 370
Equity	€		1 054 016
Debt interest rate	%		8.00%
Debt term	yr		15
Debt payments	€/yr		287 327

Income tax analysis			
Effective income tax rate	%	<input checked="" type="checkbox"/>	10.0%
Loss carryforward?			Yes
Depreciation method			Straight-line
Depreciation tax basis	%		100.0%
Depreciation period	yr		10
Tax holiday available?	yes/no		No

Annual income			
Electricity export income			
Electricity exported to grid	MWh		1 289
Electricity export rate	€/MWh		367.11
Electricity export income	€		473 300
Electricity export escalation rate	%		0.0%

Financial viability			
Pre-tax IRR - equity	%		14.7%
Pre-tax IRR - assets	%		3.7%
After-tax IRR - equity	%		14.2%
After-tax IRR - assets	%		3.1%
Simple payback	yr		8.3
Equity payback	yr		7.9
Net Present Value (NPV)	€		4 588 755
Annual life cycle savings	€/yr		183 550
Benefit-Cost (B-C) ratio			5.35
Debt service coverage			1.46
Energy production cost	€/MWh		198.82



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INVESTMENT PARAMETERS

Sensitivity Analysis

Sensitivity analysis

Perform analysis on
Sensitivity range
Threshold

After-tax IRR - equity	
30%	
15	%

Initial costs		Debt term				yr
€		11	13	15	17	20
		-30%	-15%	0%	15%	30%
2 459 370	-30%	25.2%	27.4%	29.1%	30.8%	32.1%
2 986 378	-15%	18.0%	19.3%	20.2%	21.5%	22.7%
3 513 386	0%	13.3%	14.0%	14.2%	15.1%	15.8%
4 040 393	15%	10.0%	10.3%	10.1%	10.5%	11.0%
4 567 401	30%	7.6%	7.7%	7.1%	7.2%	7.3%

O&M		Debt interest rate				%
€		5.60%	6.80%	8.00%	9.20%	10.40%
		-30%	-15%	0%	15%	30%
36 679	-30%	18.6%	17.0%	15.5%	14.0%	12.5%
44 538	-15%	17.9%	16.4%	14.8%	13.4%	11.9%
52 398	0%	17.2%	15.7%	14.2%	12.8%	11.4%
60 258	15%	16.6%	15.1%	13.6%	12.2%	10.8%
68 117	30%	15.9%	14.5%	13.0%	11.6%	10.3%

O&M		Debt term				yr
€		11	13	15	17	20
		-30%	-15%	0%	15%	30%
36 679	-30%	14.2%	15.1%	15.5%	16.4%	17.3%
44 538	-15%	14.2%	14.5%	14.8%	15.7%	16.6%
52 398	0%	13.3%	14.0%	14.2%	15.1%	15.8%
60 258	15%	12.8%	13.4%	14.2%	14.4%	15.1%
68 117	30%	12.3%	12.9%	13.0%	13.7%	14.4%





THANK YOU

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