

BI application for managing wind and solar plants

Romanian Solar Summit 2013
Razvan Neamtu



REPOM Services

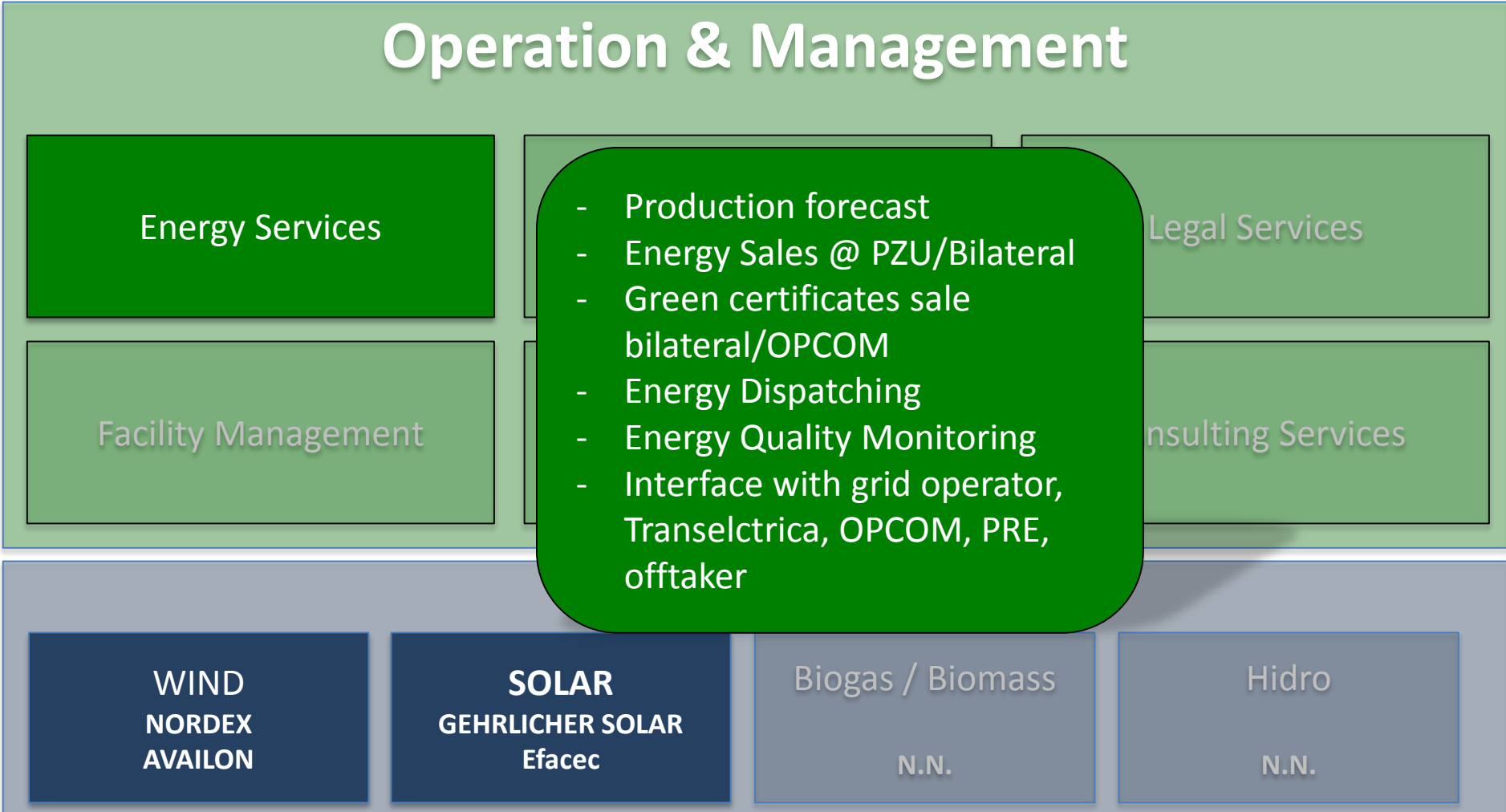
Operation & Management

Energy Services	Financial Services	Legal Services
Facility Management	Technology Services	Consulting Services

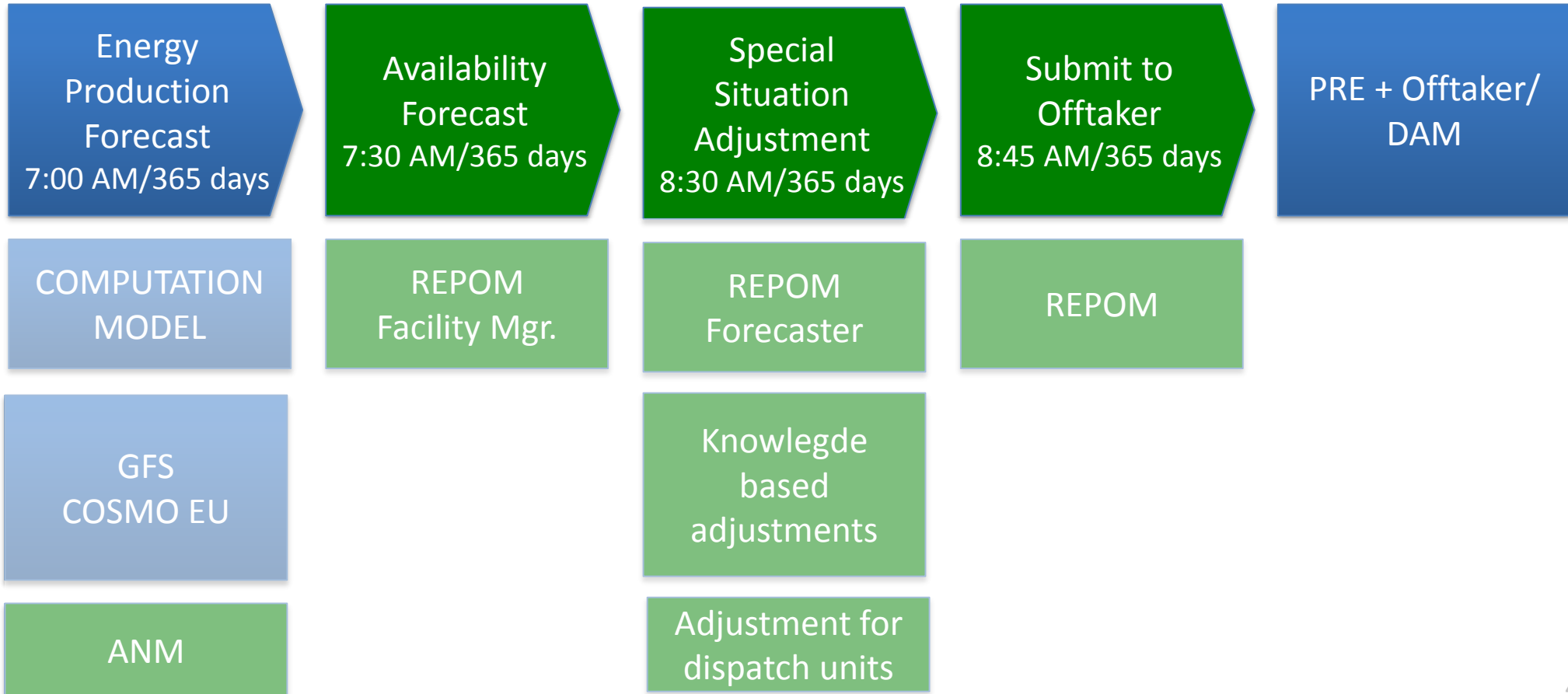
Maintenance

WIND NORDEX AVAILON	SOLAR GEHRLICHER SOLAR Efacec	Biogas / Biomass N.N.	Hidro N.N.
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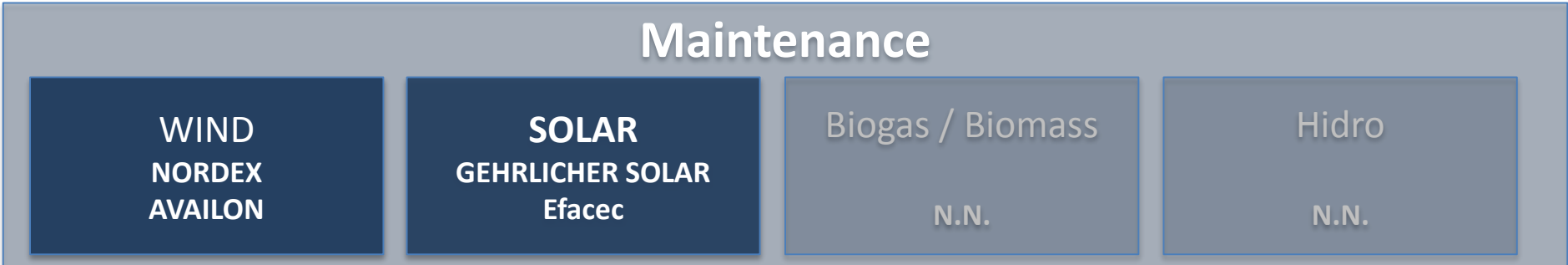
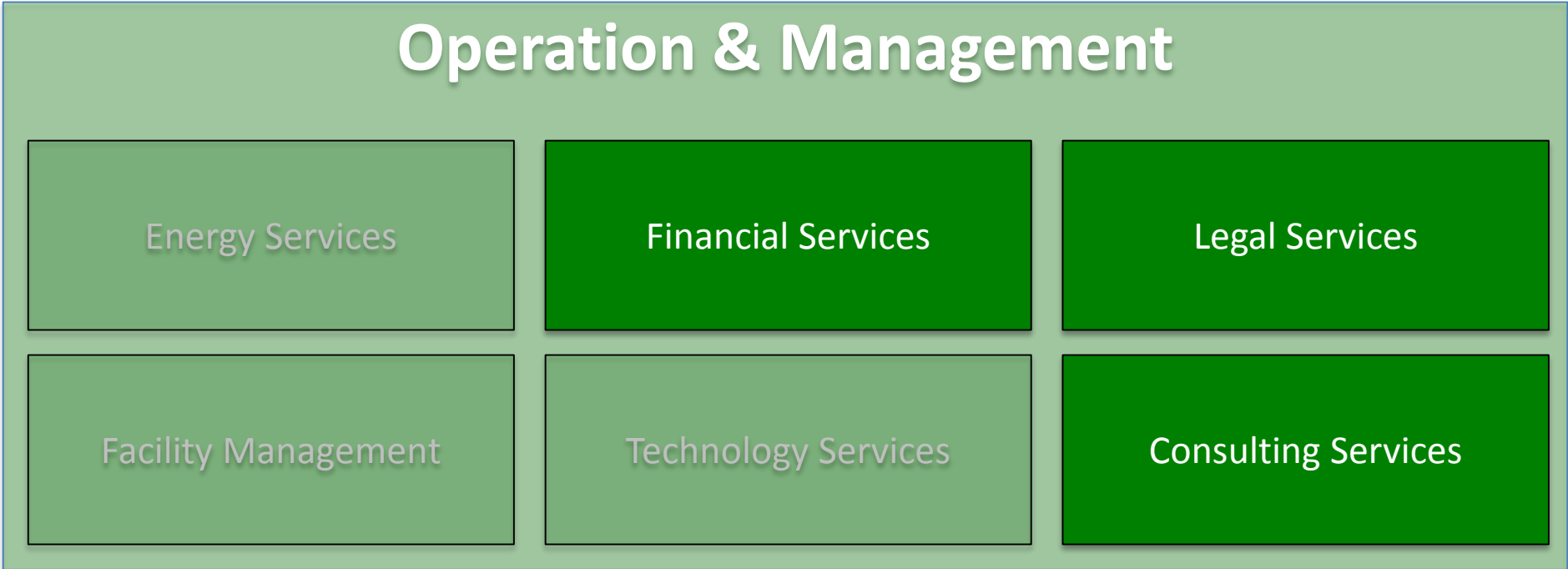
REPOM Services



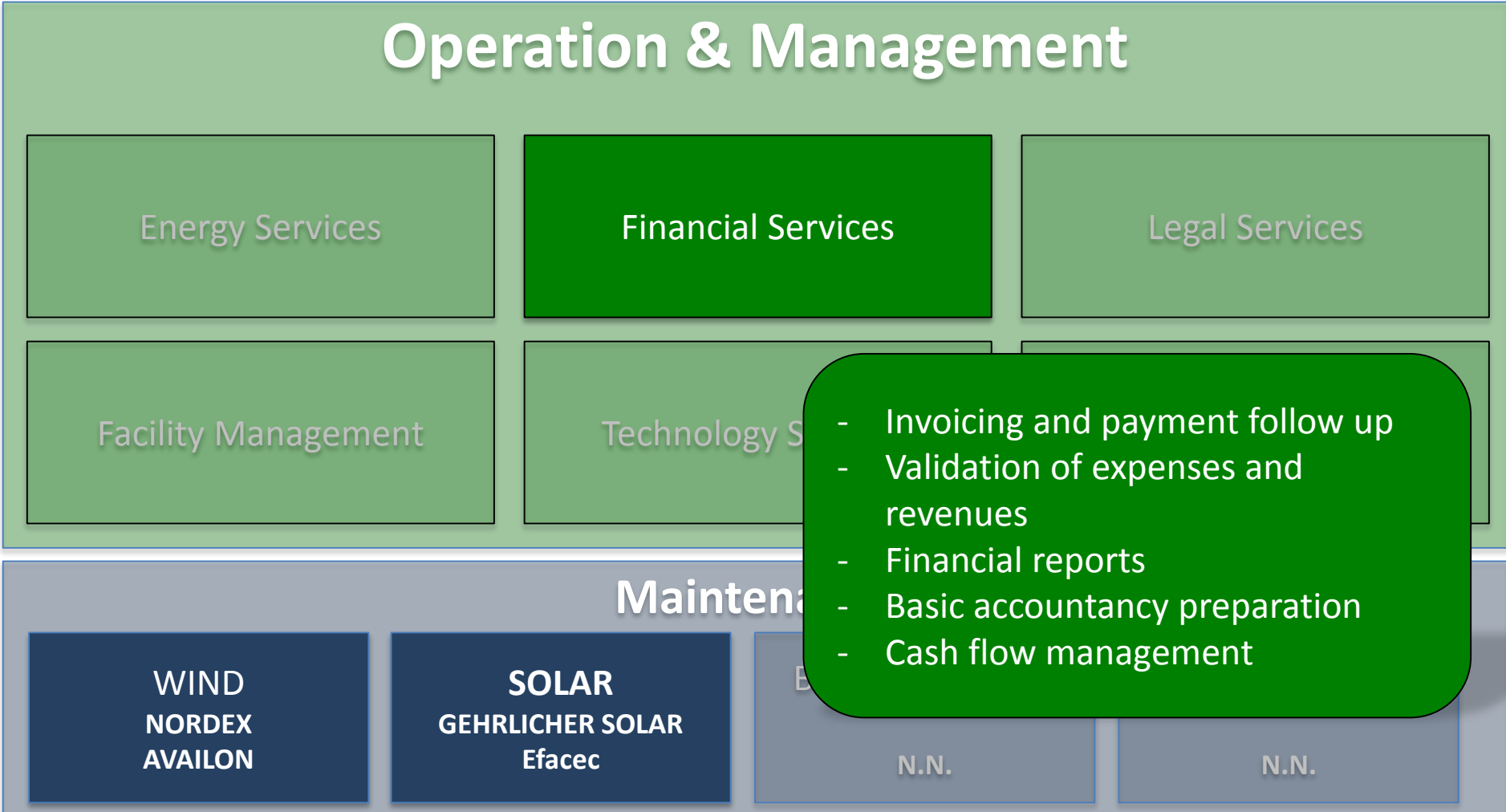
REPOM Services – Production forecasting process



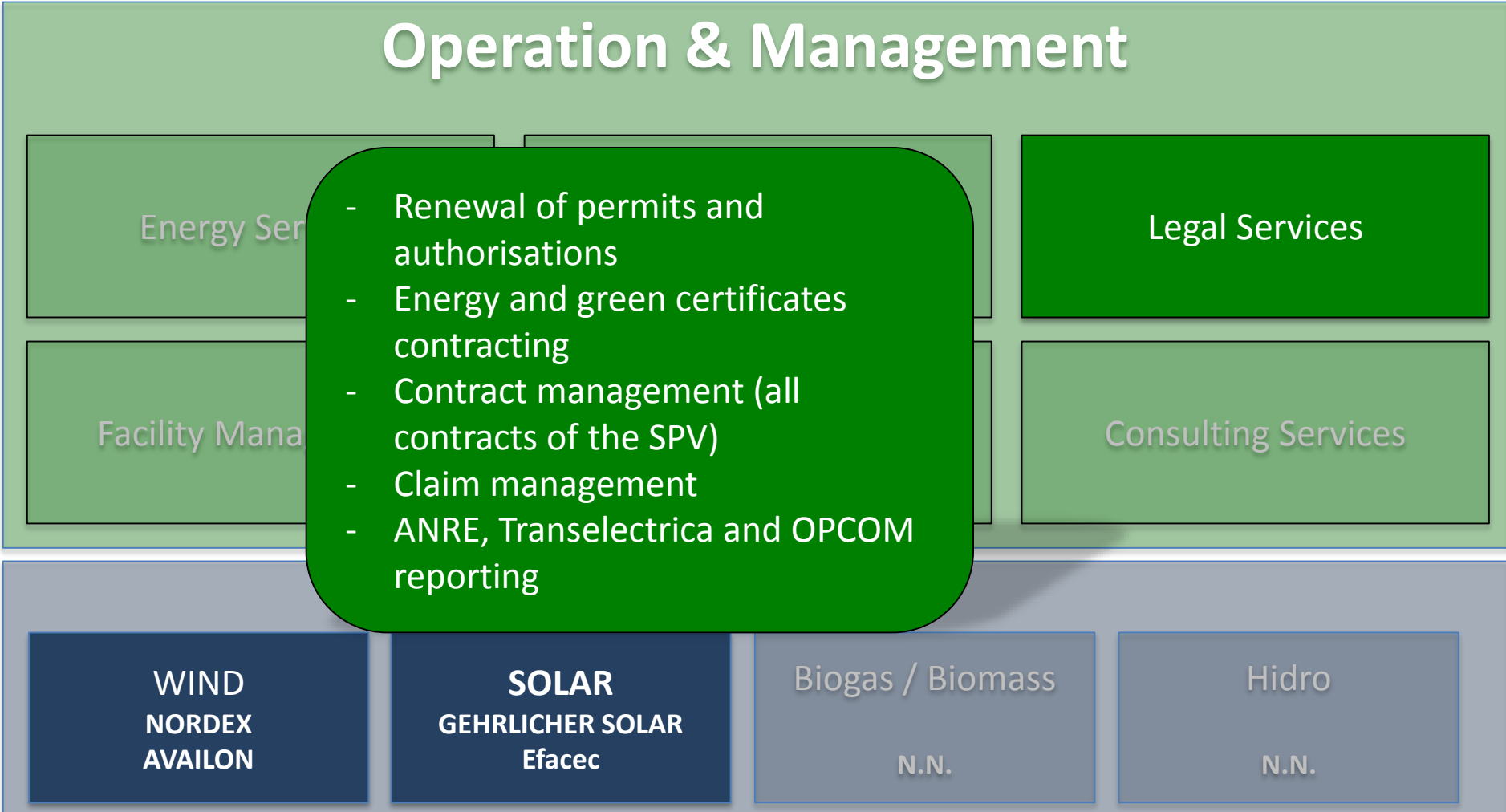
REPOM Services



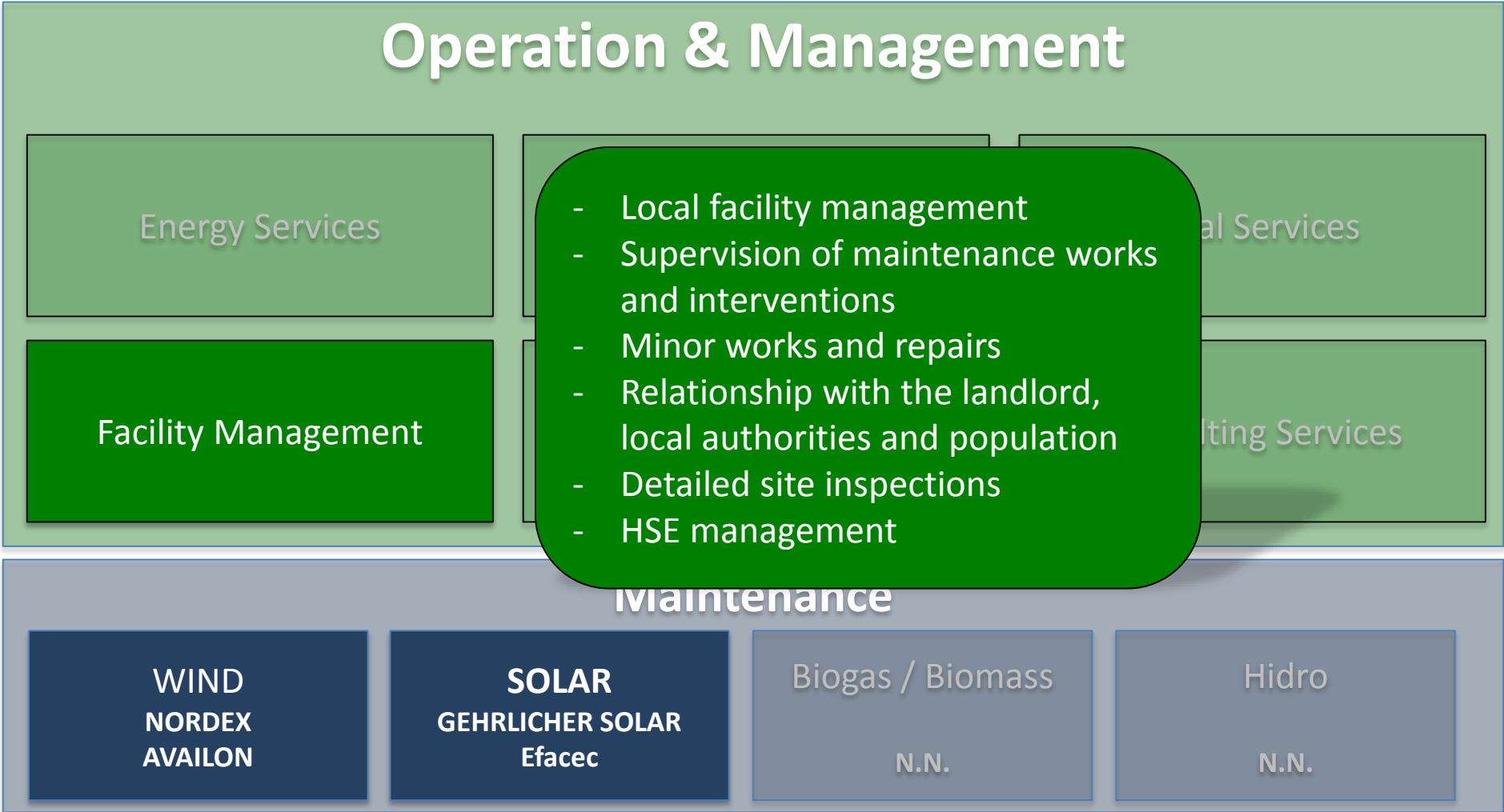
REPOM Services



REPOM Services

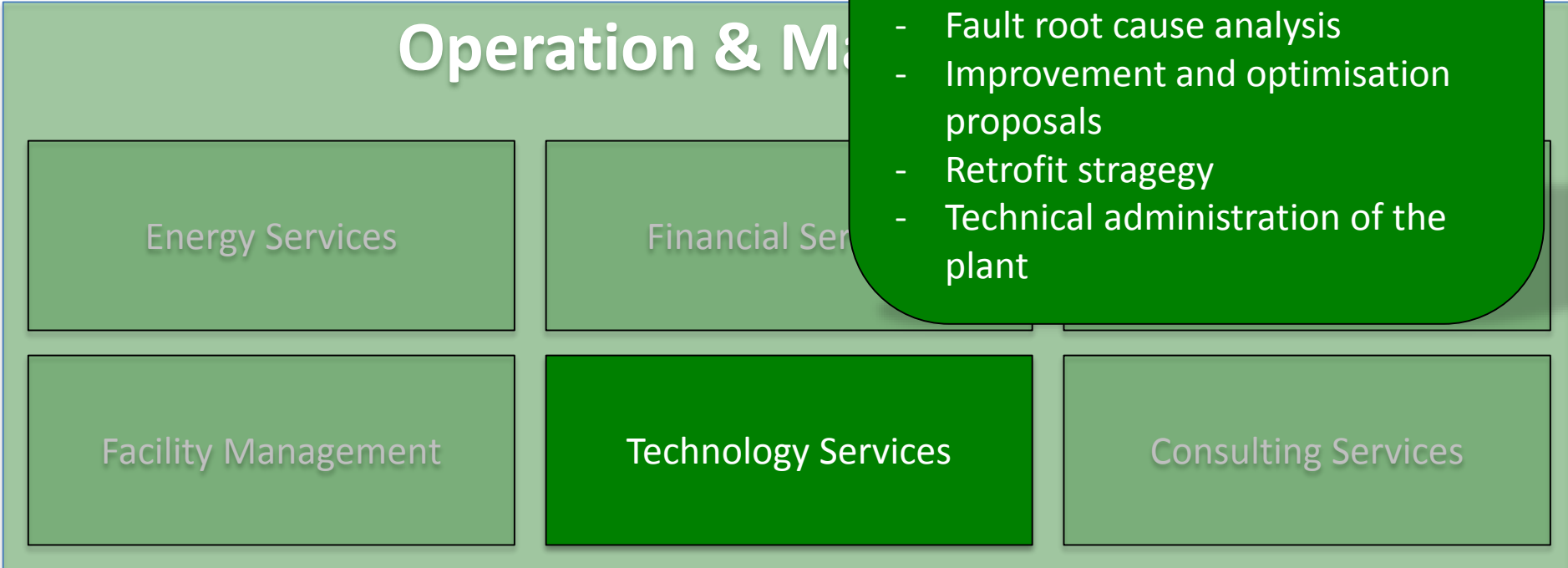


REPOM Services

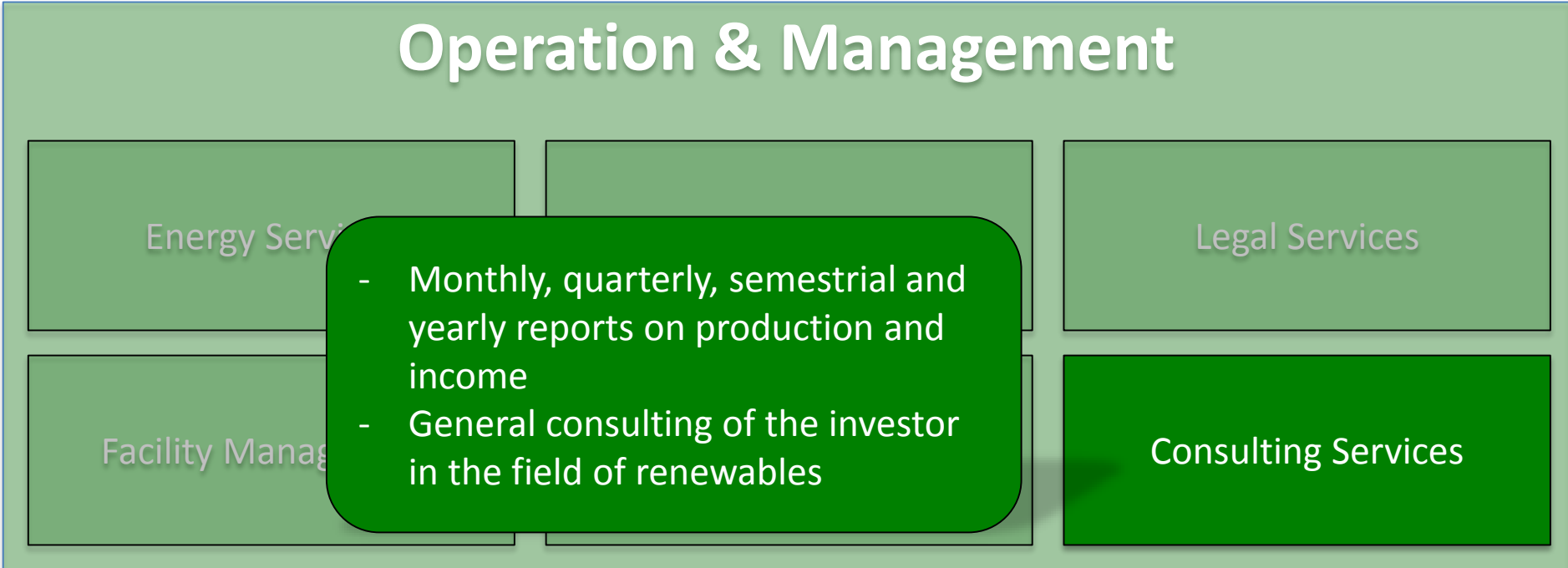


REPOM Services

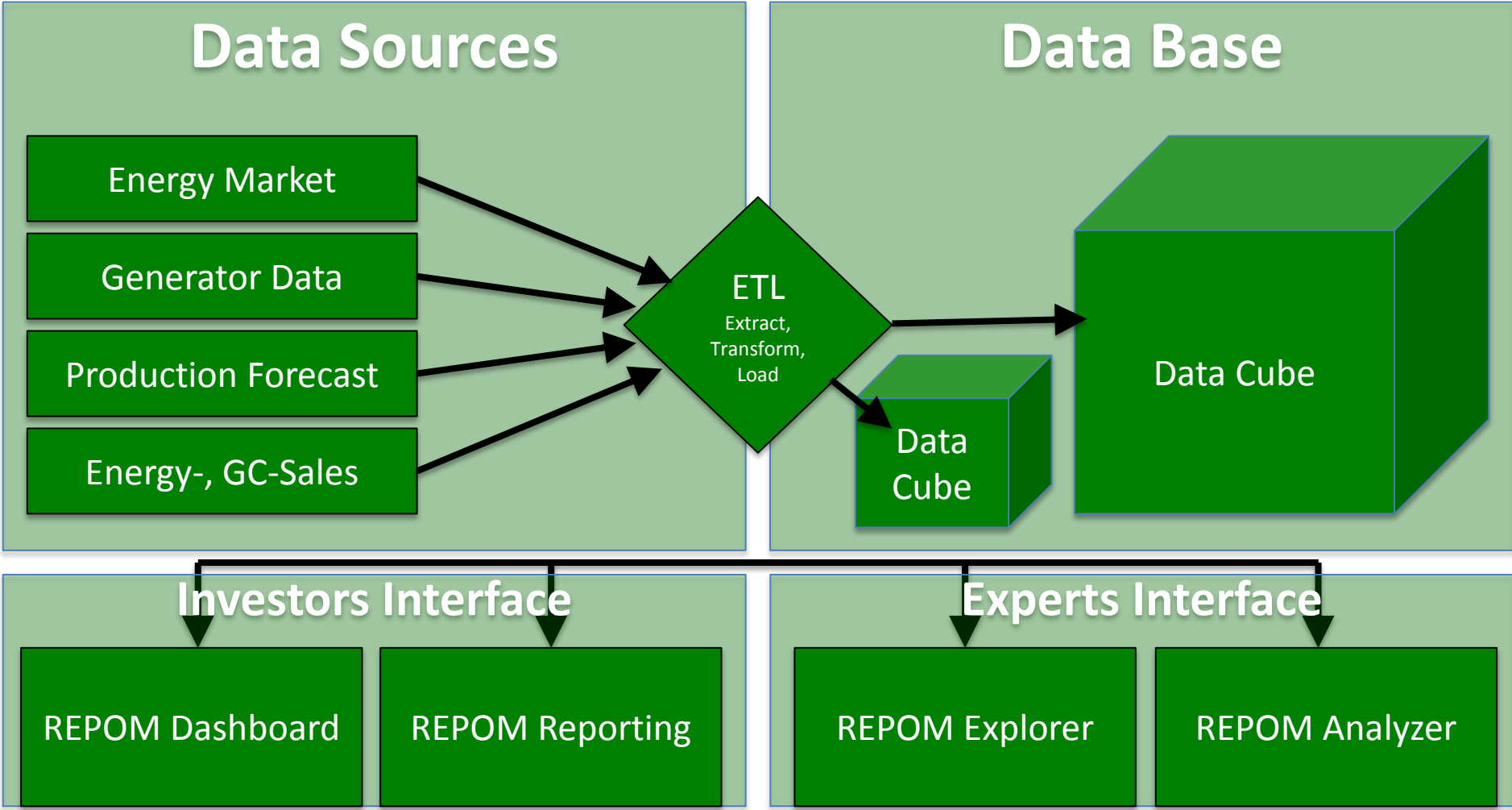
- 24/7 Dispatch Center, plant monitoring and intervention
- Availability forecast
- Technical analysis and reporting
- Data collection and analysis
- Fault root cause analysis
- Improvement and optimisation proposals
- Retrofit strategy
- Technical administration of the plant



REPOM Services



REPOM Business Intelligence



Data Model – sources

Transelectrica
Green certificates issued

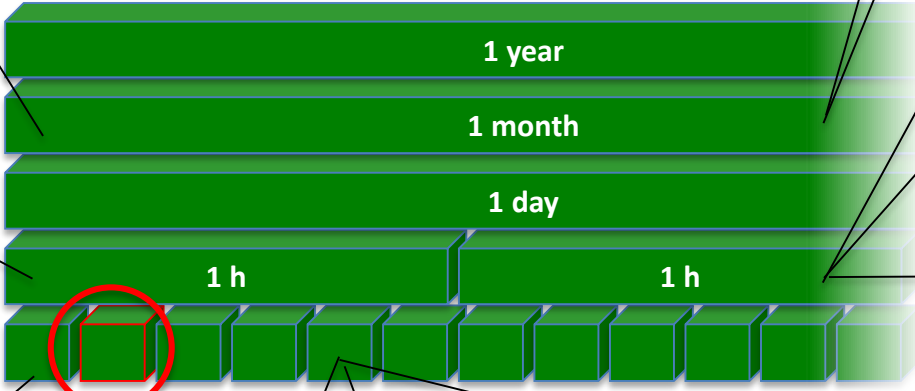
OPCOM
Price green certificates

Weather station
Irradiation
Outside temprature
Module temprature
Wind

String level
I – current

Inverter Level
P – active power
Q – reactive power
U – voltage
I – current
F – frequency
E – total production

10 minute interval



Investor Budget
Production
Revenue
Expenditure

REPOM Actuals
Revenues black energy
Revenues green certificates
Expenditure

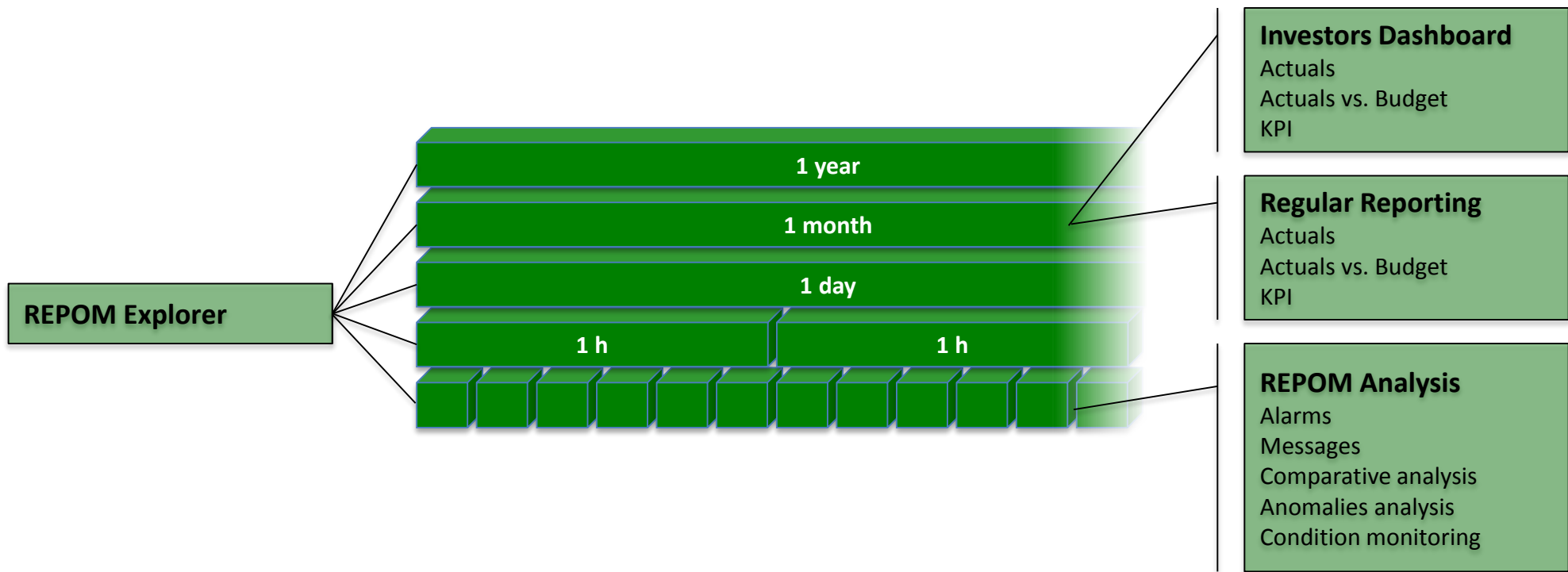
Offtaker / PRE
Proces verbal energy
delivered to grid

OPCOM
Price per MWh
Price excedent
Price deficit

REPOM
Availability forecast
Adjusted Production
forecast

Park Level
Energy delivered to grid

Data Model – reporting

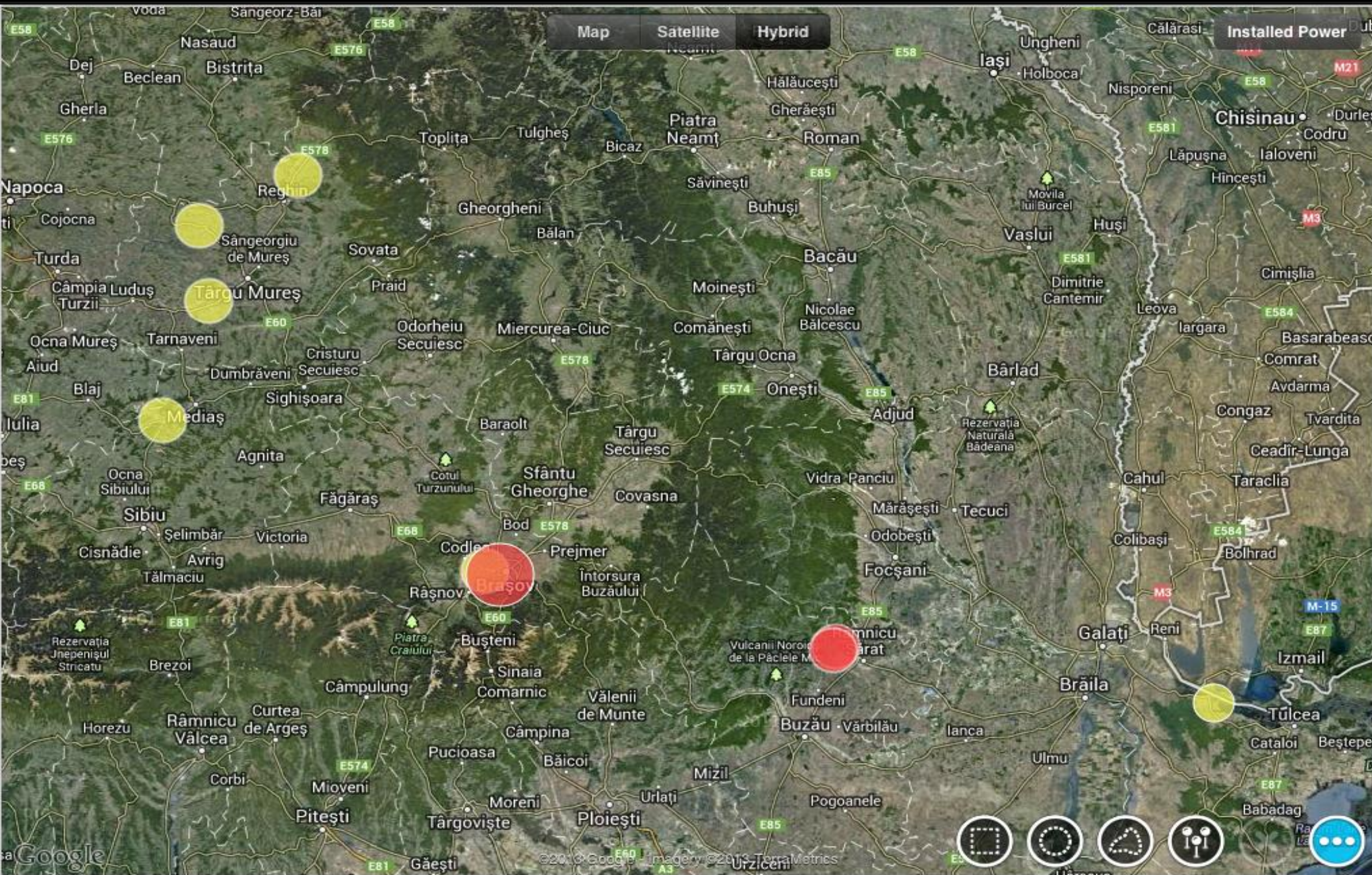


BI Application – Investor's interface

DEMO

Close

Park Map v3

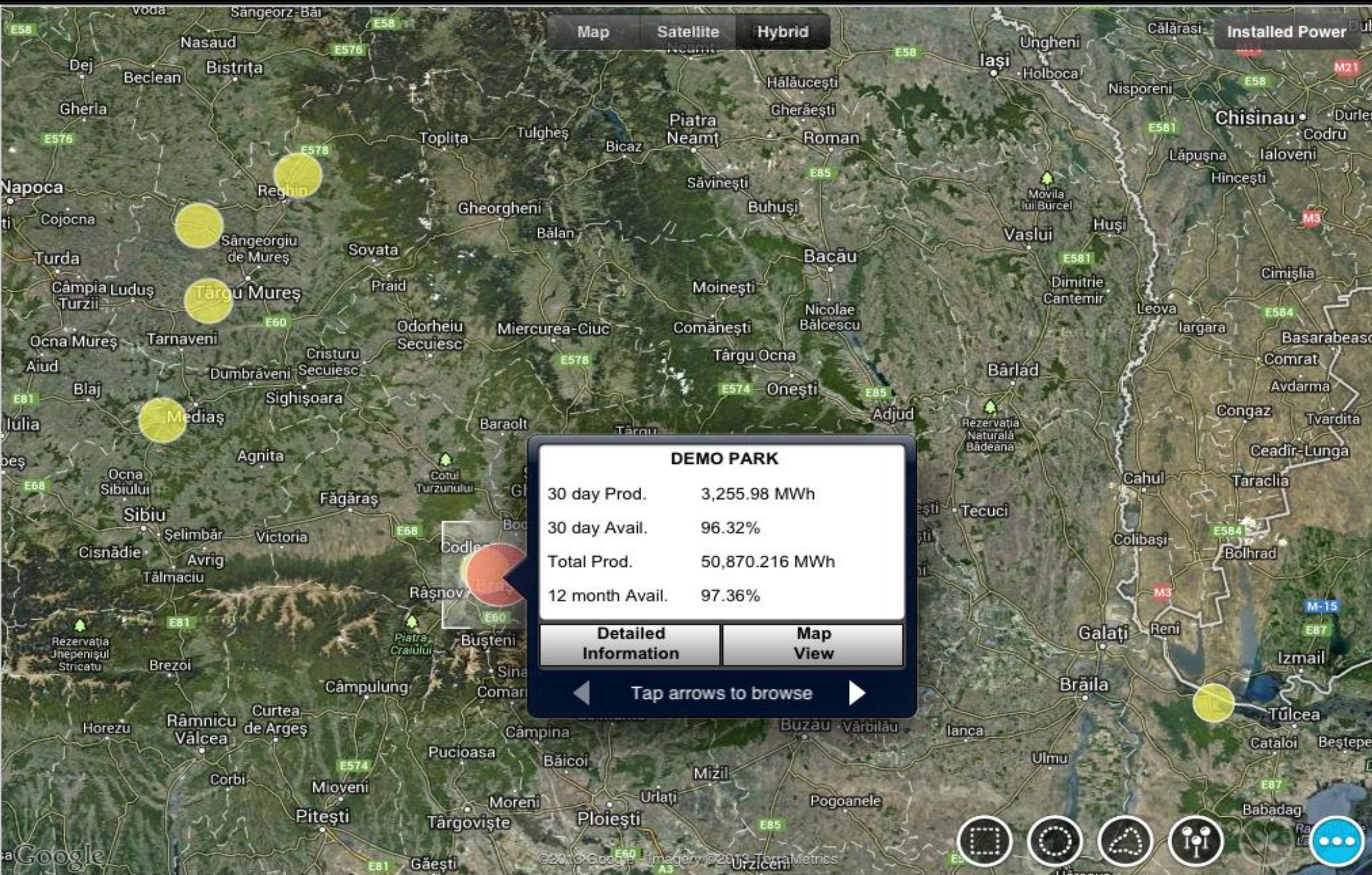


Map Satellite Hybrid

Installed Power

Close

Park Map v3



Map Satellite Hybrid

Installed Power

DEMO PARK

30 day Prod.	3,255.98 MWh
30 day Avail.	96.32%
Total Prod.	50,870.216 MWh
12 month Avail.	97.36%

Detailed Information Map View

Tap arrows to browse



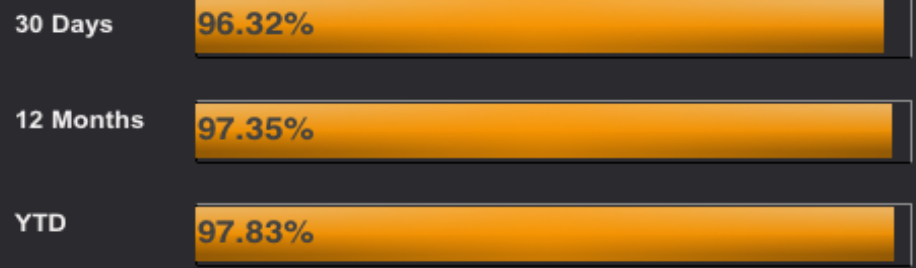
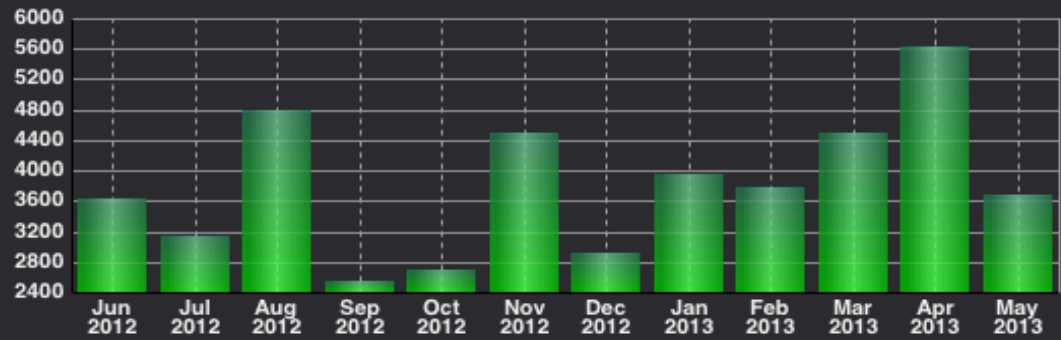
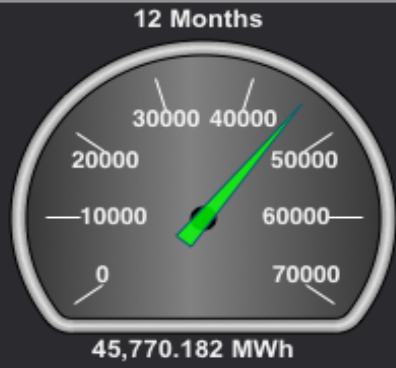
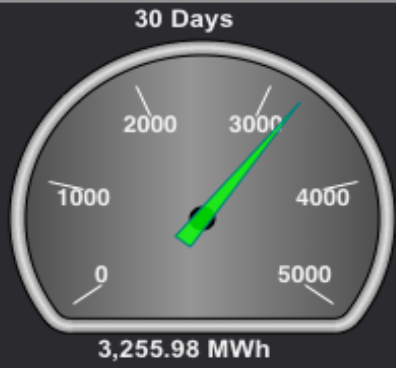
Close

Park Detailed Information

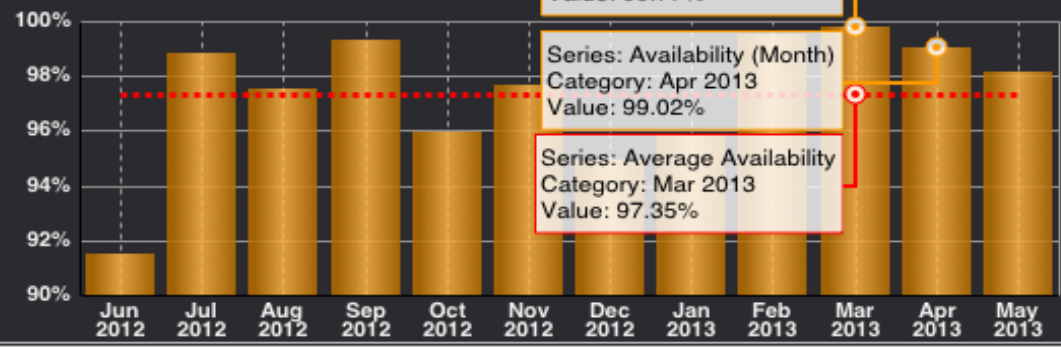
Filter

DEMO PARK

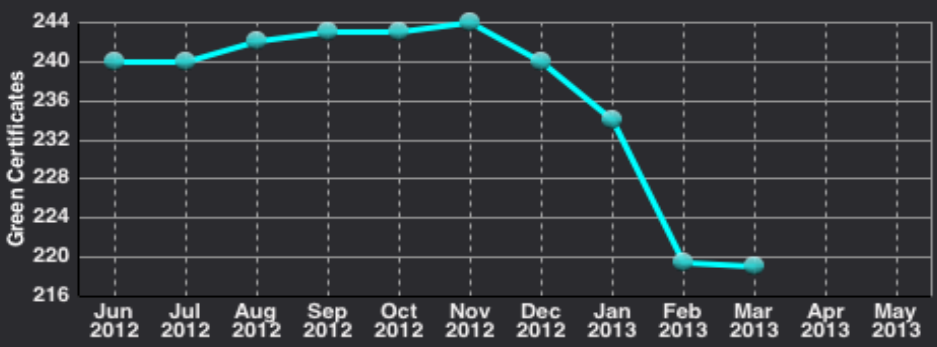
Production [MWh]



Availability [%]



Prices [RON]



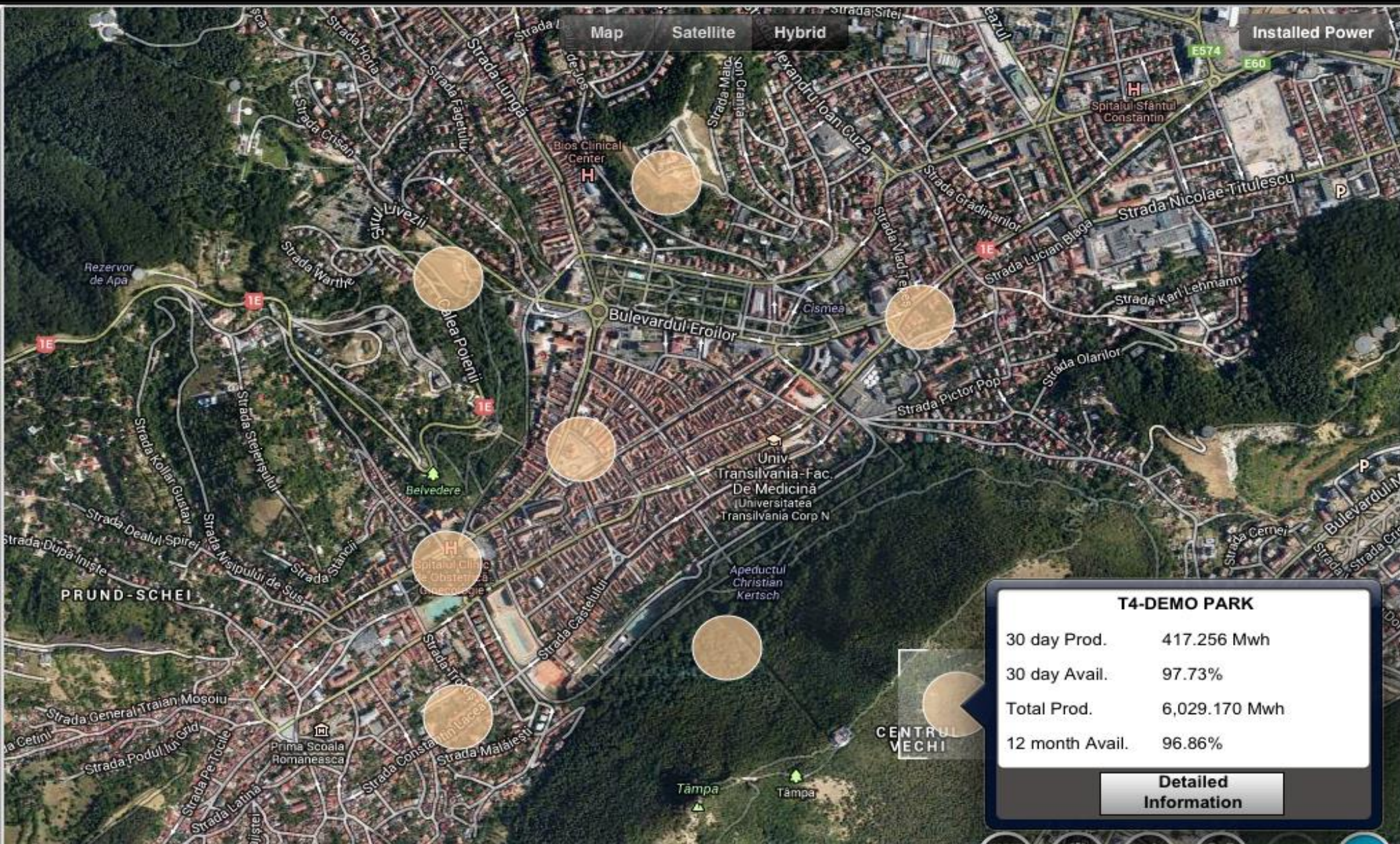
Close

Park Detailed Map v2

Filter

Map Satellite Hybrid

Installed Power



T4-DEMO PARK

30 day Prod.	417.256 Mwh
30 day Avail.	97.73%
Total Prod.	6,029.170 Mwh
12 month Avail.	96.86%

[Detailed Information](#)



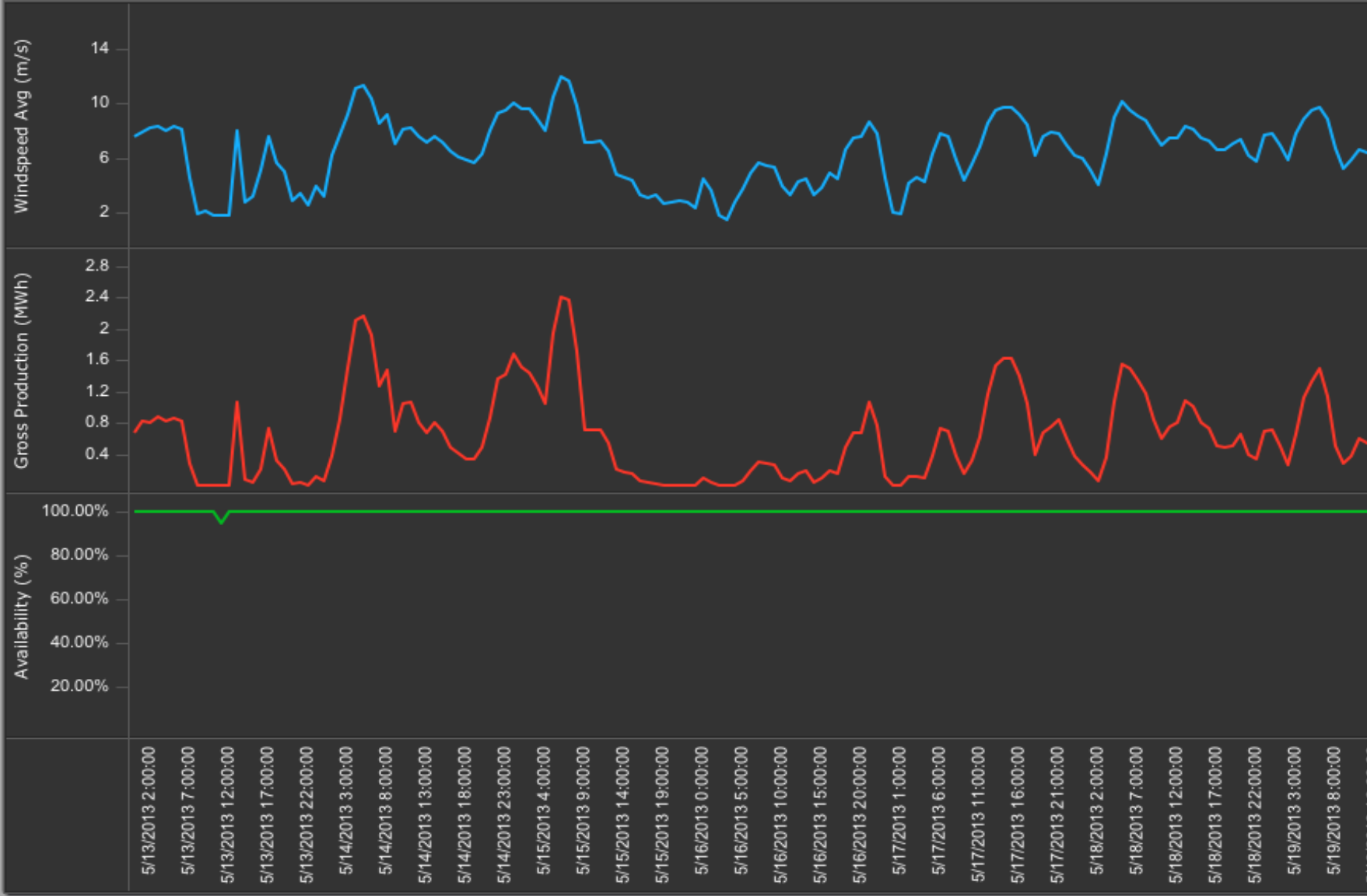
Close

Turbine Detailed Info - Last30Days

Filter [Share Icon] [Refresh Icon]

DEMO PARK : TURBINE 4 (T4)

WindSpeed/Production/Availability



▶

Metrics

- WindSpeed Avg (m/s)
- Gross Production (MWh)
- Availability (%)

Cancel

Add Comment



▶

Metrics

- Windspeed Avg (m/s)
- Gross Production (MWh)
- Availability (%)



Cancel Send

Please check

To: Mircea Ungur

Cc/Bcc:

Subject: Please check



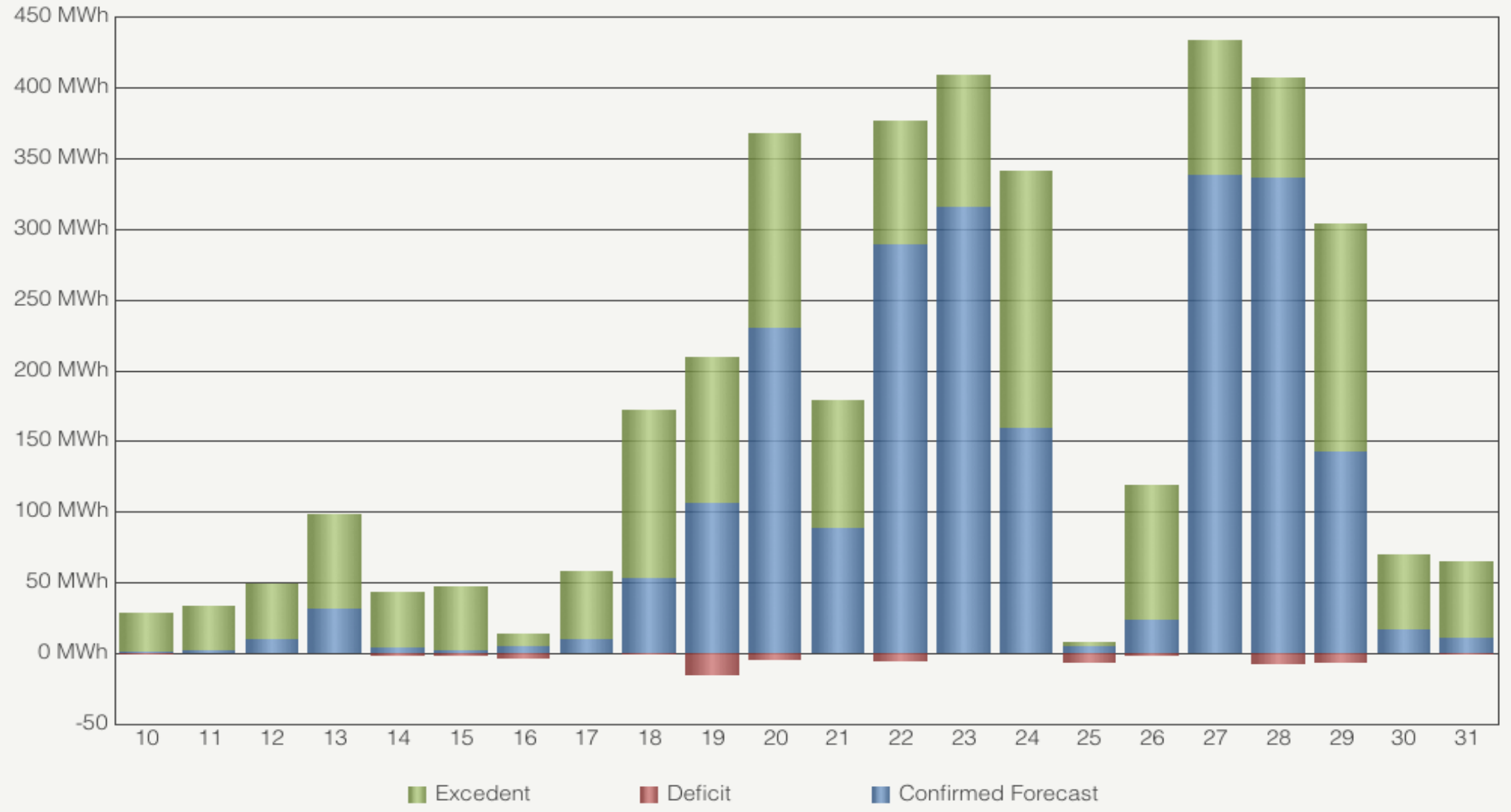
Close

Daily Production, Deficit, Excedent by Park



2012 May 2012 DEMO PARK

Daily Production, Deficit, Excedent by Park



Close

Daily Income, Deficit, Excedent by Park



2012

May 2012

DEMO PARK

Day Of Month	Metrics	Forecast Income	Deficit Expense	Excedent Income
10		307.80 RON	-119.57 RON	1,724.90 RON
11		440.64 RON	-47.67 RON	2,285.04 RON
12		1,743.48 RON	-5.16 RON	2,216.86 RON
13		5,612.04 RON	-13.40 RON	6,888.61 RON
14		955.80 RON	-346.64 RON	3,082.04 RON
15		790.92 RON	-467.49 RON	1,670.50 RON
16		1,627.20 RON	-768.15 RON	810.11 RON
17		1,839.06 RON	-31.84 RON	3,941.61 RON
18		9,622.26 RON	-128.19 RON	9,772.59 RON
19		22,084.74 RON	-4,170.58 RON	8,429.11 RON
20		42,345.90 RON	-765.65 RON	14,938.77 RON
21		15,889.14 RON	-1.80 RON	9,904.44 RON
22		53,028.00 RON	-888.73 RON	10,223.82 RON
23		56,823.30 RON	0.00 RON	9,066.70 RON
24		28,628.28 RON	0.00 RON	13,204.86 RON
25		2,046.42 RON	-1,584.51 RON	476.12 RON
26		4,537.08 RON	-452.93 RON	7,373.13 RON
27		60,772.68 RON	0.00 RON	13,413.00 RON
28		61,816.68 RON	-1,001.13 RON	8,357.19 RON
29		26,963.64 RON	-975.60 RON	9,384.84 RON
30		2,986.92 RON	-69.90 RON	5,694.25 RON
31		2,074.68 RON	-75.34 RON	3,696.24 RON
Total		402,936.66 RON	-11,914.27 RON	146,554.74 RON

Close

Financial Results by Park



2013

January

DEMO PARK

Financial Results January 2013

Park	DEMO PARK
Net Production	3,943.801 MWh
Total Energy	3,943.801 MWh
Forecast Income	276,486.65 RON
Excedent Income	272,051.89 RON
Total Energy Income	548,538.54 RON
GC Received Amount	1,233,465.00 RON
GC Open Amount	0.00 RON
Total GC Income	1,233,465.00 RON
Total Income	1,782,003.54 RON
Deficit Expense	-76,534.82 RON
PRE Expenses	1,406.98 RON
Total Expenses	-75,127.83 RON
Result	1,706,875.70 RON
Average Value/MWh (RON)	432.80
Average Value/MWh (EUR)	92.09

BI Application – Data explorer and analysis



Home > Tools > Data > Grid Format >

Columns >

REPORT DETAILS ? x

Report Filter:
Year = 2012

PAGE-BY: Park: GREBANU

Data rows: 47 | Data columns: 3

Year	Month	Turbine	Metrics	Windspeed Avg	Availability (SCADA)	Gen Speed Avg
		TURBINE 4	04WEA81807	6.57 m/s	98.06%	794.07
	May 2012	TURBINE 1	01WEA81945	8.38 m/s	99.95%	832.62
		TURBINE 2	02WEA81946	8.14 m/s	99.63%	819.86
		TURBINE 3	03WEA81947	7.56 m/s	98.81%	808.15
		TURBINE 4	04WEA81807	7.90 m/s	99.65%	812.38
	Jun 2012	TURBINE 1	01WEA81945	6.34 m/s	98.40%	720.62
		TURBINE 2	02WEA81946	6.08 m/s	93.17%	679.36
		TURBINE 3	03WEA81947	5.60 m/s	97.09%	674.00
		TURBINE 4	04WEA81807	6.61 m/s	45.30%	343.34
	Jul 2012	TURBINE 1	01WEA81945	7.59 m/s	96.64%	786.84
		TURBINE 2	02WEA81946	7.33 m/s	98.20%	790.03
		TURBINE 3	03WEA81947	6.70 m/s	98.34%	764.99
		TURBINE 4	04WEA81807	7.12 m/s	98.39%	778.32
	Aug 2012	TURBINE 1	01WEA81945	7.07 m/s	98.49%	782.71
		TURBINE 2	02WEA81946	6.56 m/s	87.59%	689.70
		TURBINE 3	03WEA81947	6.36 m/s	98.38%	759.94
		TURBINE 4	04WEA81807	6.48 m/s	95.84%	751.79
	Sep 2012	TURBINE 1	01WEA81945	5.44 m/s	99.95%	640.66
		TURBINE 2	02WEA81946	5.77 m/s	98.76%	690.81
		TURBINE 3	03WEA81947	5.12 m/s	99.99%	666.91
		TURBINE 4	04WEA81807	5.14 m/s	99.74%	646.78



Grid +

Filters

- Month (6)
 - (All)
 - Jan 2012
 - Feb 2012
 - Mar 2012
 - Apr 2012
 - May 2012
 - Jun 2012
- Park (2)
 - Turbine (4 of 8)
 - TURBINE 2:02WEA...
 - TURBINE 3:03WEA...
 - TURBINE 4:04WEA...
 - TURBINE 1:01WEA...
 - TURBINE 2:02WEA...
 - TURBINE 3:03WEA...
 - TURBINE 4:04WEA...
- Year (1)
 - 2012

Drop Zones

Grouping +

- Turbine
- Date

Size By +

- Availability (SCADA)

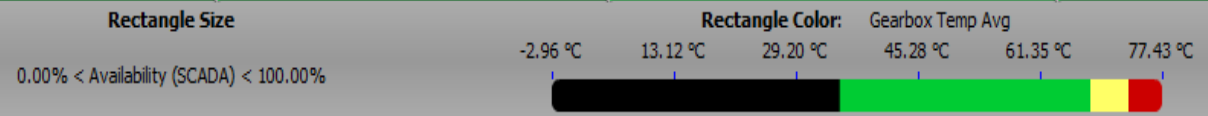
Color By +

- Gearbox Temp ...

Additional Metrics +



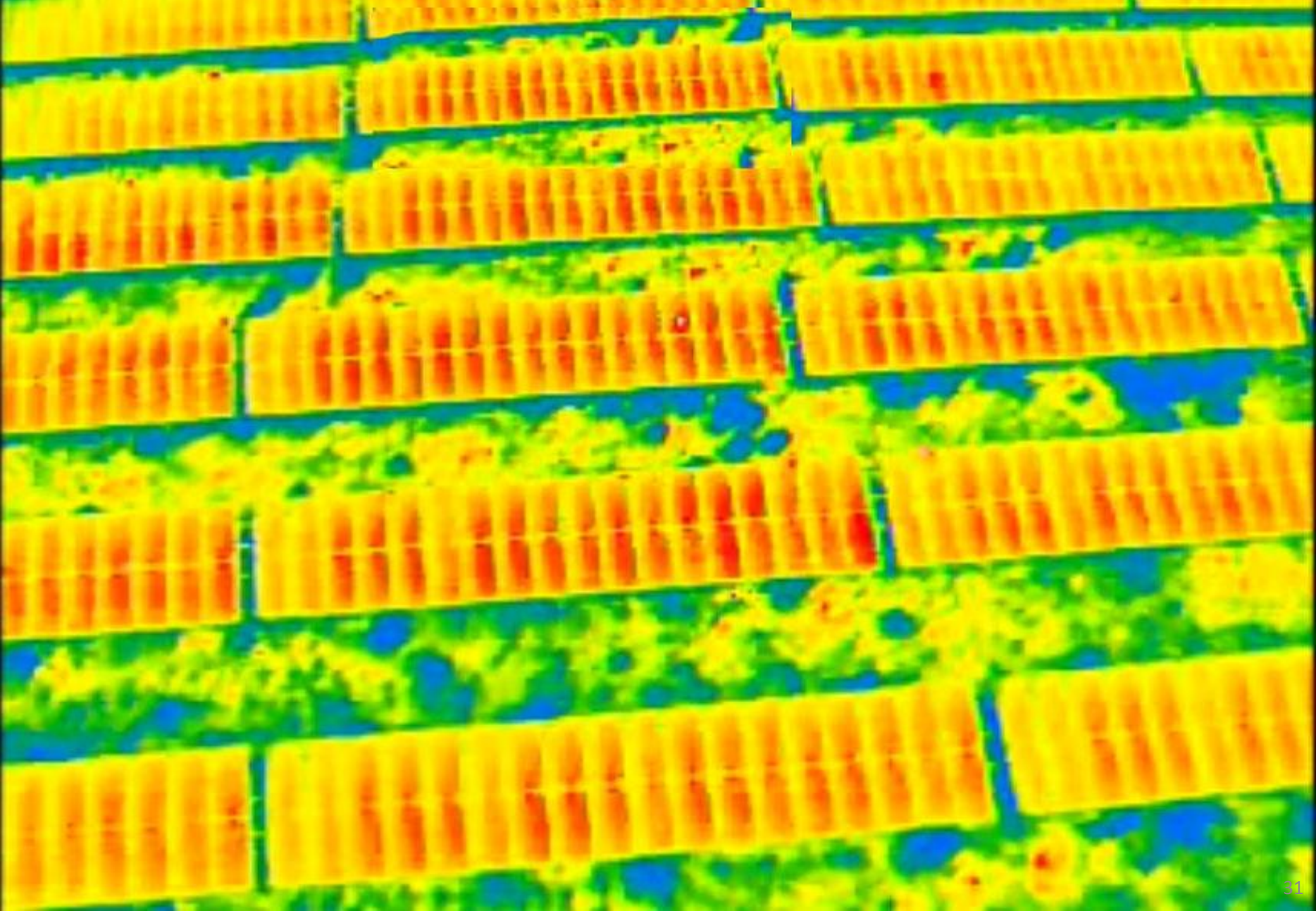
Date: 5/13/2012
 Availability (SCADA): 79.93%
 Gearbox Temp Avg: 73.70 °C



Operation of a PV Plant

operational aspects, BI tool integration



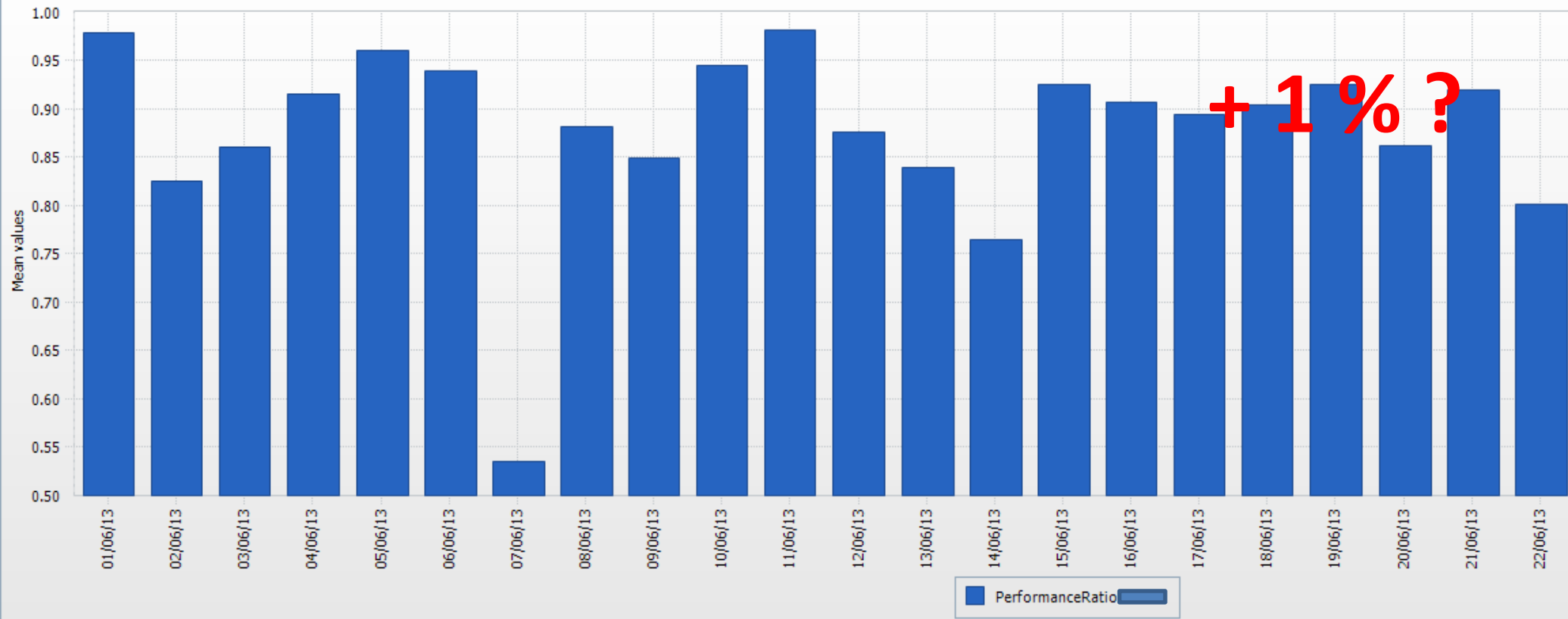








from 01/06/2013 to 30/06/2013





16-09-2013 15:58:08



CAM 2



Thank you for your attention!

sc REPOM srl
Renewable Energy Production Operation + Management

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