

# Sistema d'intel·ligència de negoci per parcs eòlics amb boies meteorològiques

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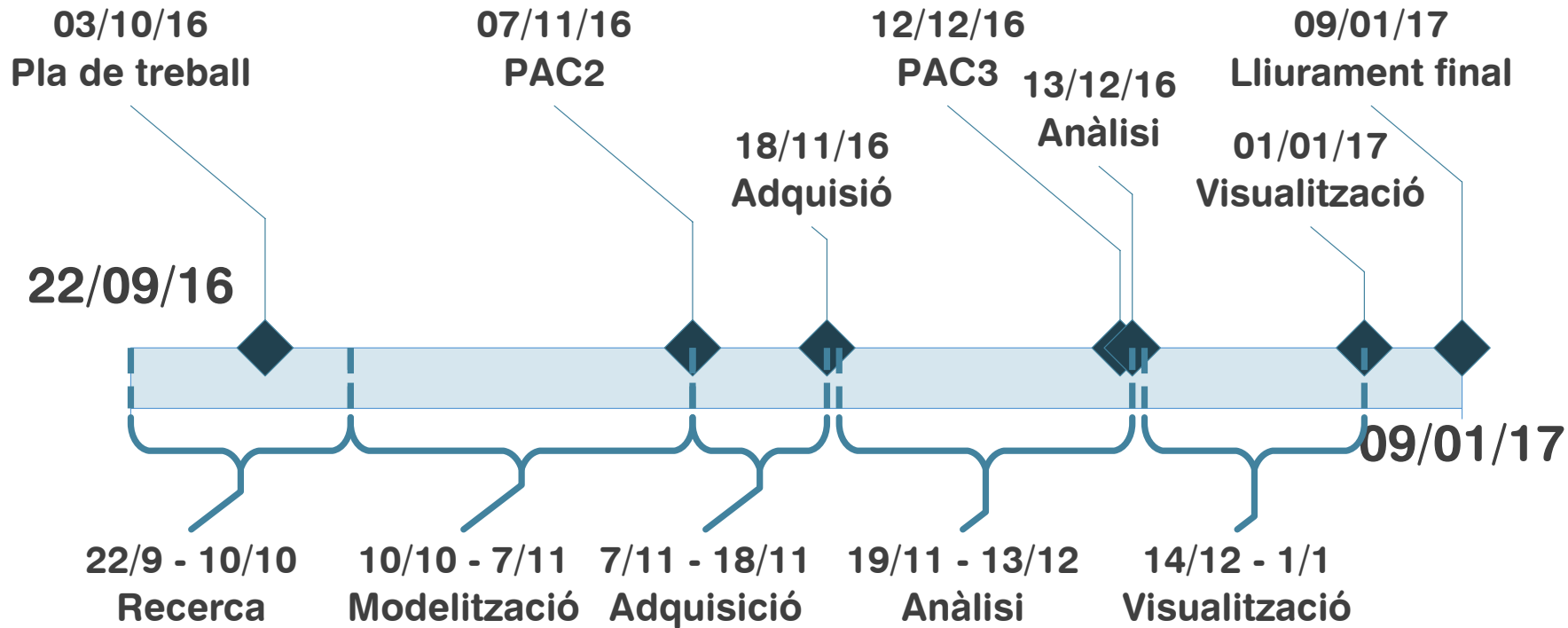
Gener de 2017, Barcelona



Productivitat ? Eficiència empreses de manteniment ? ?  
? Relació meteorologia amb alarmes ? ?  
% disponibilitat ? ? On ampliar ?

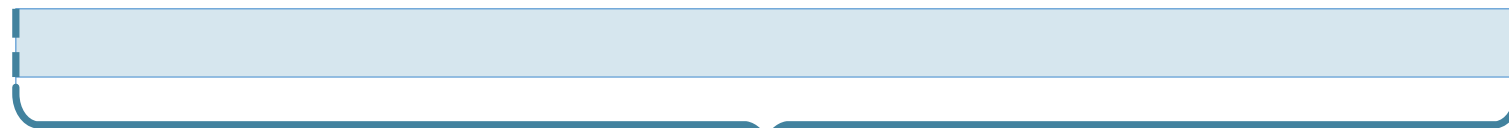
- Observar
- Comprendre
- Predir
- Decidir

Intel·ligència de Negoci



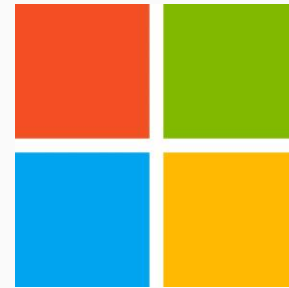
**22/09/16**

**09/01/17**



**22/9 - 9/1**

**Memòria del Treball**



DATAOFFSHORE [Compatibility Mode] - Excel

File Home Insert Page Layout Formulas Data Review View Developer LOAD TEST ACROBAT Team Tell me what you want to do Share

M2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	<b>NAME</b>	<b>COUNTRY</b>	<b>AEROGEN</b>	<b>POWER</b>	<b>NUMBER</b>	<b>OPERATOR</b>	<b>MAINTAINER</b>	<b>X</b>	<b>Y</b>					
2	NAMPER	DENMARK	VESTAS	2.0 MW	15	EUROWIND	GDEP	56,768529	7,516189					
3	RIAS BAIXAS	SPAIN	ALSTON	2.5 MW	25	ACTIONAK	GDEP	43,619283	-9,452281					
4	GUARACHICO	SPAIN	GAMESA	2.0 MW	30	EOLIAGER	CUPRA	28,908792	-15,766131					
5	KIRSKEN	GERMANY	ENERCON	2.5 MW	25	EOLIAGER	MANWIN	55,223968	18,17081					
6	POLVARS	POLSKA	ENERCON	2.5 MW	40	EUROWIND	MANWIN	55,223968	16,986964					
7	COUNSCOT	UK	VESTAS	2.0 MW	29	EOLIAGER	GDEP	58,971376	-4,124971					
8	GREENBLUE	IRLAND	ALSTON	3.0 MW	10	ACTIONAK	CUPRA	55,336347	-8,860358					
9	NORTHENCAP	NORWAY	ALSTON	2.5 MW	33	EUROWIND	CUPRA	63,449339	6,54047					
10														
11														

OFFSHORE WIND FARM NAMPER RIAS BAIXAS GUARACHICO KIRSKEN ...

Ready 100%

DATAOFFSHORE [Compatibility Mode] - Excel

File Home Insert Page Layout Formulas Data Review View Developer LOAD TEST ACROBAT Team Tell me what you want to do Share

A1

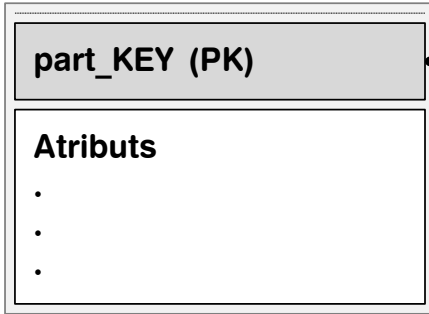
DATE

	A	B	C	D	E	F	G	H	I	J	K
1	<b>DATE</b>	<b>POWER (MW/H)</b>	<b>WIND SPEED</b>	<b>TEMP</b>	<b>AVAILABILITY</b>	<b>WAVE HIGHT</b>	<b>REPARATION TIME (H)</b>	<b>ALARMS GEARBOX</b>	<b>ALARM GENERATOR</b>	<b>ALARM ROTOR</b>	<b>ALARM OTHER</b>
2	1/3/2016 00:00:00	557	7,6	8	99,6	7	1	0	0	0	0
3	1/3/2016 00:10:00	1218	9,5	4	99,2	9	1	1	0	0	0
4	1/3/2016 00:20:00	589	7,6	12	100,0	2	0	0	0	0	0
5	1/3/2016 00:30:00	628	7,6	4	100,0	2	0	0	0	0	0
6	1/3/2016 00:40:00	497	7,6	4	100,0	2	0	0	0	0	0
7	1/3/2016 00:50:00	481	7,6	9	99,9	9	0	0	0	0	0
8	1/3/2016 01:00:00	929	5,7	9	99,8	6	0	0	0	1	0
9	1/3/2016 01:10:00	1000	7,6	5	100,0	5	0	0	0	0	0
10	1/3/2016 01:20:00	920	5,7	4	100,0	4	0	0	0	0	0
11	1/3/2016 01:30:00	1564	9,5	3	99,4	9	0	1	0	0	0

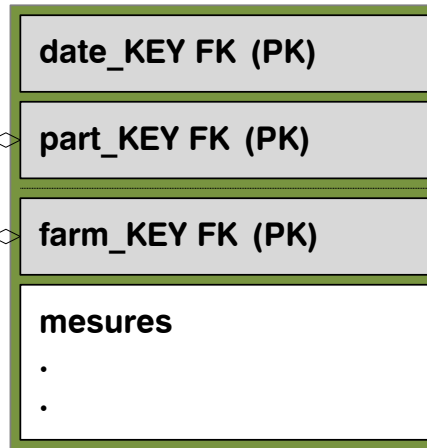
OFFSHORE WIND FARM NAMPER RIAS BAIXAS GUARACHICO KIRSKEN ...

Ready 100%

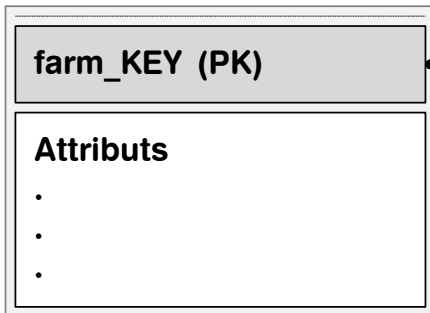
### dim\_turbine\_parts



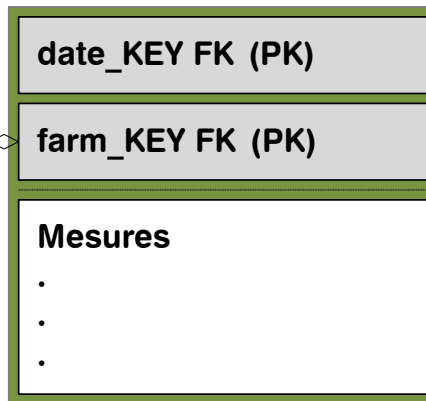
### fact\_alarms



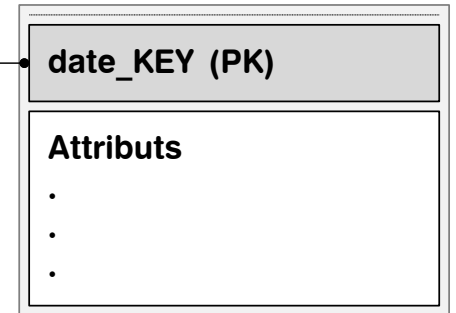
### dim\_farms



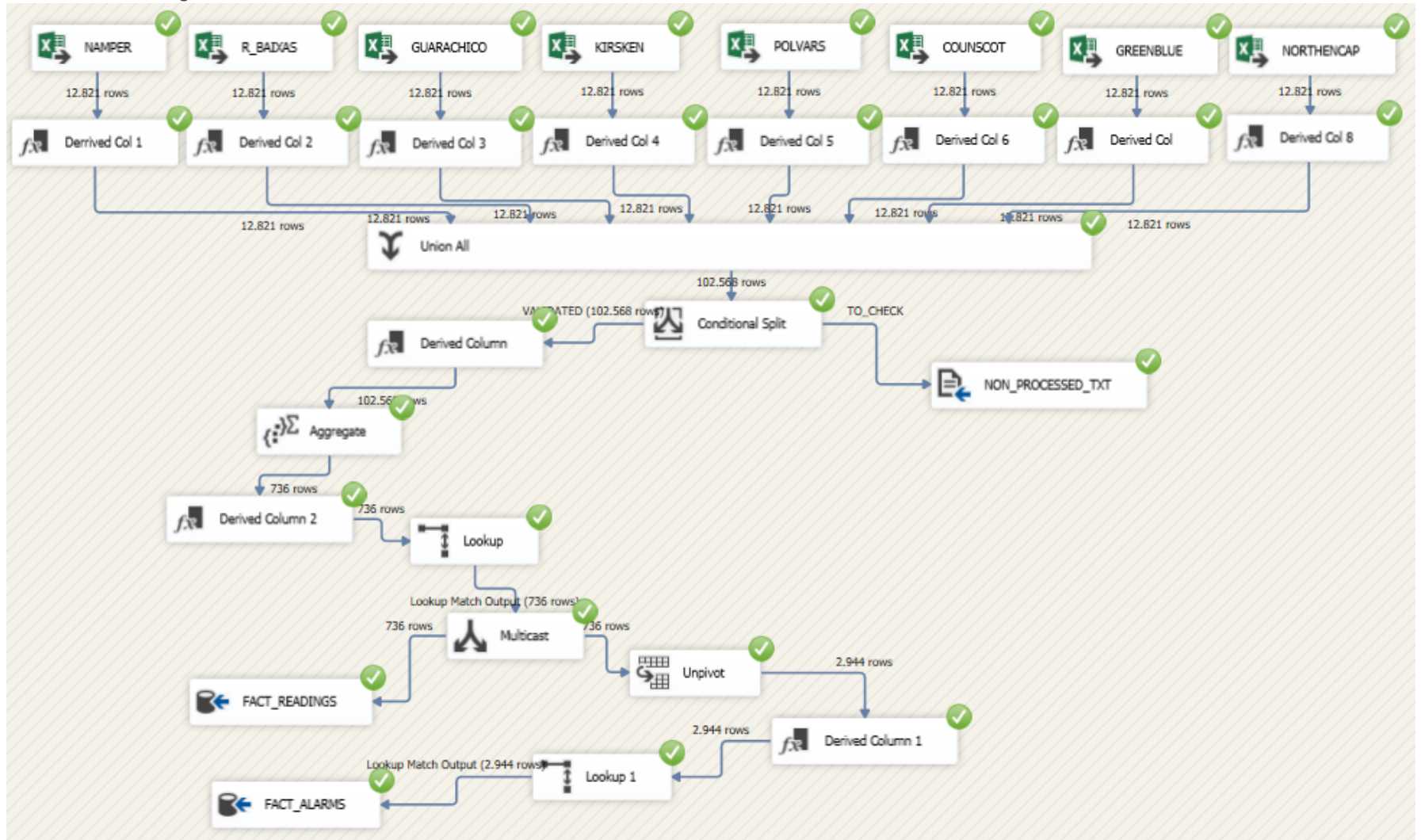
### fact\_readings



### dim\_date



# 1er. pas - SSIS



# 2on. pas - SSAS

BIBO\_Cube.cube [Design] + X

Cube Str... Dimensio... Calculations KPIs Actions Partitions Aggregat... Perspecti... Translations Browser

Measures

- BIBO\_Cube
  - Alarms
  - Readings
    - Power
    - Availability Avg
    - Availability Min
    - Availability Max
    - Temperature Avg
    - Temperature Min
    - Temperature Max
    - Wind Speed Avg
    - Wind Speed Min
    - Wind Speed Max
    - Wave Height Avg
    - Wave Height Min
    - Wave Height Max
    - Reparation Time
    - Readings Count

Dimensions

- BIBO\_Cube
  - Farms
  - Turbine Parts
    - Edit Turbine Parts
  - Attributes
  - Dates
    - Edit Dates
    - Year - Month - Date
    - Year - Week - Date
    - Year - Month Name - Date
    - Attributes

Data Source View

```

    graph TD
        Alarms[Alarms] --> Farms[Farms]
        Alarms --> Dates[Dates]
        Farms --> Readings[Readings]
        Dates --> Readings
        Turbine_parts[Turbine_parts] --> Alarms
    
```

Alarms table fields: date\_KEY, part\_KEY, farm\_KEY, alarms\_avg

Farms table fields: farm\_KEY, name, country, country\_iso, aerogen, power, model, number, operator, maintainer, x, Y, location\_area, maxpower

Dates table fields: date\_KEY, str\_date\_YMD, str\_date\_DMY, sql\_date, day\_of\_week\_num..., day\_of\_week\_name, day\_of\_month, week\_number, month\_number, month\_name\_short, month\_name\_long, year

Turbine\_parts table fields: part\_KEY, name

Readings table fields: date\_KEY, farm\_KEY, wind\_speed\_avg, wind\_speed\_min, wind\_speed\_max, temperature\_avg, temperature\_min, temperature\_max, wave\_height\_avg, wave\_height\_min, wave\_height\_max, availability\_avg, availability\_min, availability\_max, reparation\_time, power

Current level: (All)

- All
- AREA1
  - KIRSKEN
  - NAMPER
  - POLVARS
- AREA2
  - COUNSCOT
  - GREENBLUE
  - NORTHENCAP
- AREA3
  - RIAS BAIAS
- AREA4
  - GUARACHICO

Current level: (All)

- All
- 2016
  - 10
  - 11
  - 12
  - 13
  - 14
    - 2016-03-28
    - 2016-03-29
    - 2016-03-30
    - 2016-03-31
    - 2016-04-01
    - 2016-04-02



# 2on. pas - SSAS

**BIBO\_Cube**

Dimension	Hierarchy	Operator	Filter Expression	Param...
Dates	Year - Month - Date	Equal	{ Apr, 2016-03-30, 2016-03-31 }	
Farms	Wind Turbines	Equal		

Date KEY	Model	Availability	Temperature	Wind Speed
2016-03-30	ALS2.5	99,46784...	10,0075757...	4,4318181...
2016-03-31	ALS2.5	99,35176...	9,77536231...	4,5217391...
2016-04-01	ALS2.5	99,34163...	9,86805555...	4,5
2016-04-02	ALS2.5	99,37366...	9,63888888...	4,3645833...
2016-04-03	ALS2.5	99,33880...	10,3055555...	4,5520833...
2016-04-04	ALS2.5	99,43305...	9,84027777...	4,78125
2016-04-05	ALS2.5	99,34652...	10,0138888...	4,4166666...
2016-04-06	ALS2.5	99,41577...	10,4861111...	4,5416666...
2016-04-07	ALS2.5	99,36041...	10,0763888...	4,3229166...
2016-04-08	ALS2.5	99,30052...	9,93055555...	4,4895833...
2016-04-09	ALS2.5	99,38644...	10,125	4,5104166...
2016-04-10	ALS2.5	99,31033...	9,88194444...	4,4166666...
2016-04-11	ALS2.5	99,36529...	10,1354166...	4,5625
2016-04-12	ALS2.5	99,33691...	10,2291666...	4,5833333...
2016-04-13	ALS2.5	99,38779...	10,3291139...	4,5189873...
2016-04-14	ALS2.5	99,50330...	9,825	4,48125
2016-04-15	ALS2.5	99,34133...	9,91666666...	4,4895833...
2016-04-16	ALS2.5	99,32233...	9,84027777...	4,4166666...
2016-04-17	ALS2.5	99,36883...	10,1041666...	4,53125
2016-04-18	ALS2.5	99,36013...	9,72222222...	4,59375
2016-04-19	ALS2.5	99,38222...	9,88194444...	4,40625

**Properties**

**BIBO\_Cube** Cube

- Aggregation
- Collation
- DefaultMea
- Description
- ErrorConfig (default)
- EstimatedR: 0
- ID
- Language
- Name **BIBO\_Cube**
- ProactiveCa (none)

**Name**  
Specifies the name of the object.

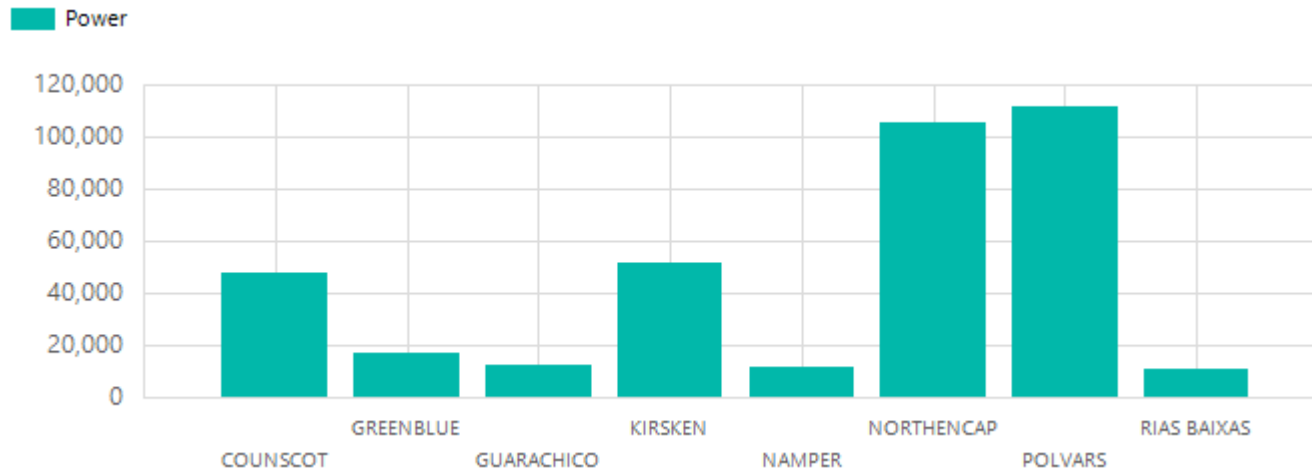
# 3er. pas - SSRS

The screenshot displays the Microsoft Visual Studio interface for creating a SQL Server Reporting Services (SSRS) report. The main window shows the design surface for 'ProductionSummary.rdl' in Design mode. A large rectangular area in the center contains the instruction: "To add an item to the report: drag an item from the Toolbox to the design surface, and then drag dataset fields to the item." Below this area, the 'Row Groups' and 'Column Groups' sections are visible but empty. The 'Output' pane at the bottom shows 'Show output from: Build'.

On the left side, the 'Toolbox' contains various report items such as Pointer, Text Box, Line, Table, Matrix, Rectangle, List, Image, Subreport, Chart, Gauge, Map, Data Bar, and Sparkline. Below the toolbox is the 'Report Data' pane, which shows a hierarchy of data sources and datasets. Under 'DataSources', 'DataSource1' is listed. Under 'Datasets', 'DataSet1' is expanded, showing fields: Year, Week\_Number, Date\_KEY, Farm\_KEY, Maxpower, and Power.

On the right side, the 'Solution Explorer' shows the project structure for 'BIBO\_RS', including 'Shared Data Sources', 'Shared Datasets', and 'Reports'. The 'Properties' pane is open for the 'Body' of the report, showing properties like BackgroundColor (set to 'No Color'), BorderColor (Black), BorderStyle (None), BorderWidth (1pt), and Size (6.5in; 2in). A tooltip for 'BackgroundColor' is visible at the bottom right, stating: "Specifies the background color of the item."

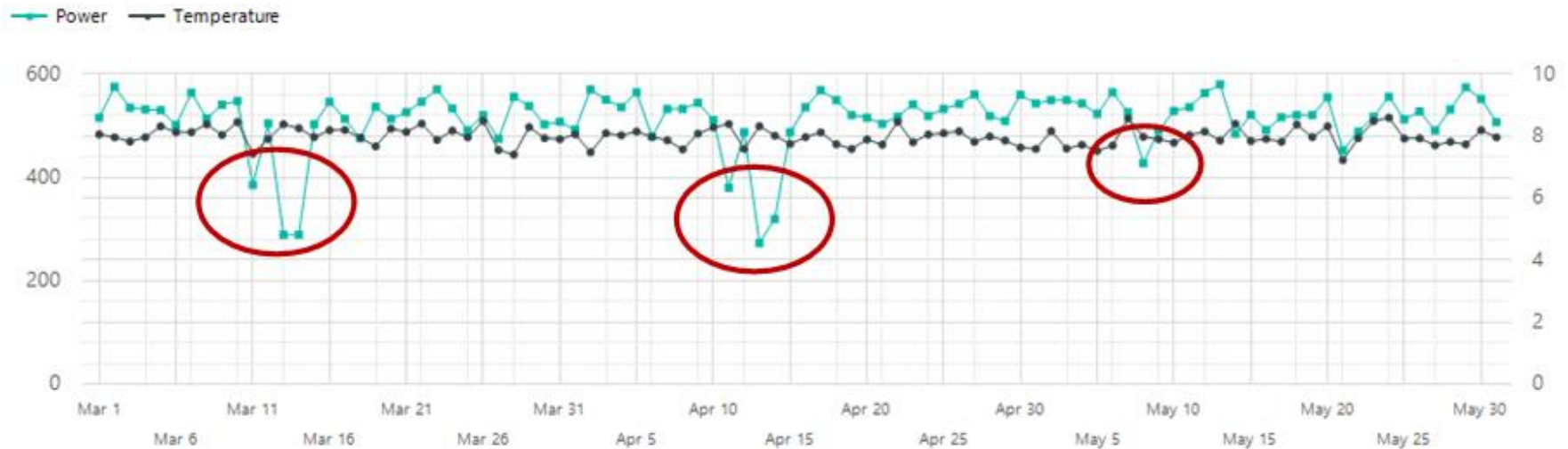
# Informe “OFFSHORE WIND”



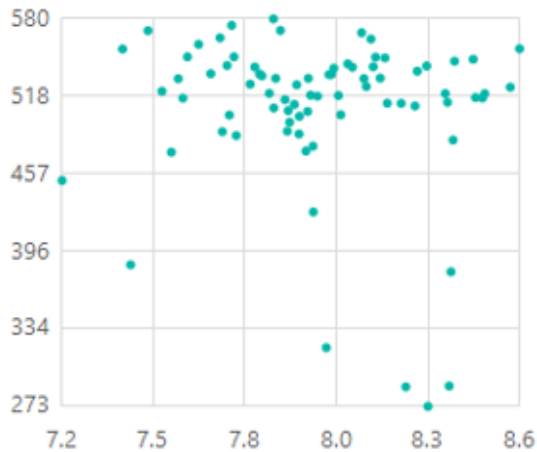
Mostrar detalls setmanal

Parc	Aerogenerador	Potència Màx. MW	Producció MW · H	Rendiment %	Tendència	Mtjana Producció
COUNSCOT	VES2.0	58	47,163.6	36.8 %		3,588.5
GREENBLUE	ALS3.0	30	16,270.8	24.6 %		1,238.0
GUARACHICO	GAM2.0	60	12,092.5	9.1 %		920.1
KIRSKEN	ENE2.5	62	51,464.4	37.6 %		3,915.8
NAMPER	VES2.0	30	10,926.2	16.5 %		831.3
NORTHENCAP	ALS2.5	82	104,646.0	57.8 %		7,962.2
POLVARS	ENE2.5	100	111,204.4	50.4 %		8,461.2
RIAS BAIXAS	ALS2.5	62	10,509.3	7.7 %		799.6

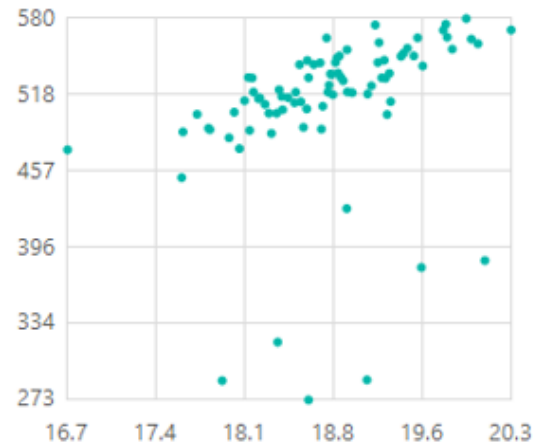
# Informe “OFFSHORE WIND”



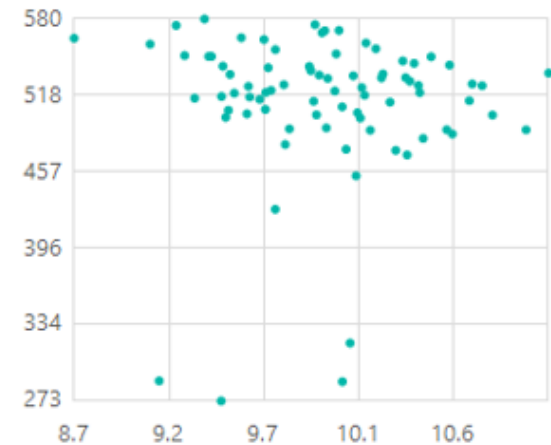
Productivitat vs Temperatura



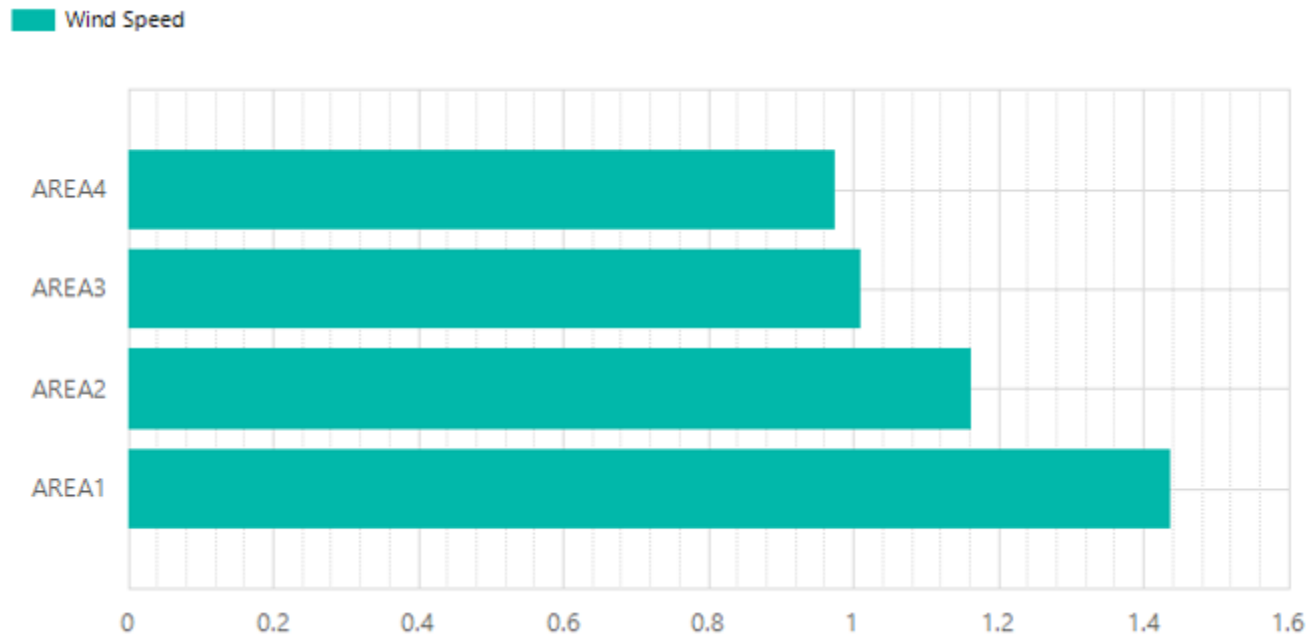
Productivitat vs Vent



Productivitat vs Onades



# Informe “OFFSHORE WIND”



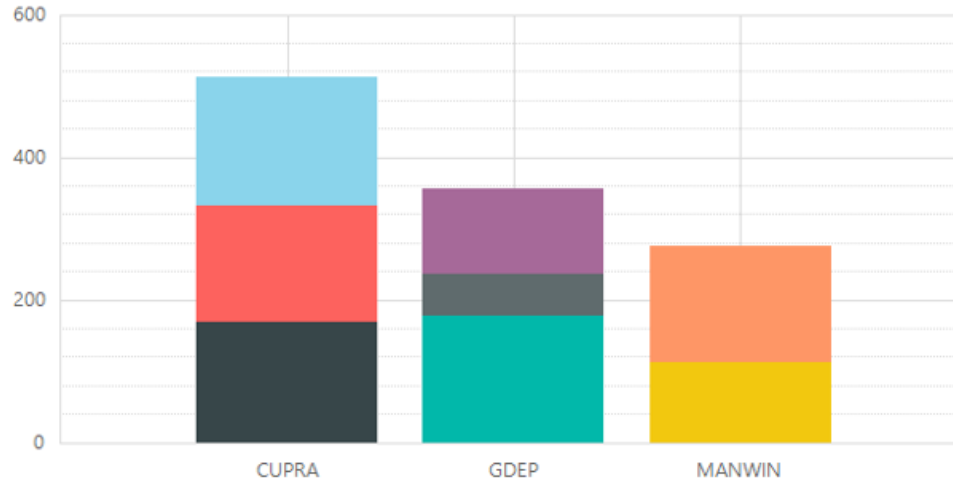
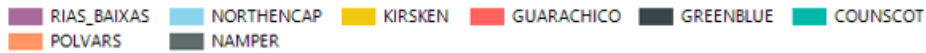
# Informe “OFFSHORE WIND”

	GEARBOX				GENERATOR				OTHER				ROTOR			
	Alarmes (Mitjana)	Temp. (Rang)	Onades (Rang)	Vent (Rang)	Alarmes (Mitjana)	Temp. (Rang)	Onades (Rang)	Vent (Rang)	Alarmes (Mitjana)	Temp. (Rang)	Onades (Rang)	Vent (Rang)	Alarmes (Mitjana)	Temp. (Rang)	Onades (Rang)	Vent (Rang)
COUNSCOT	139.0	10	16	22.5	38.4	10	16	22.5	0.0	10	16	22.5	0.5	10	16	22.5
GREENBLUE	140.2	10	16	22.5	27.4	10	16	22.5	0.1	10	16	22.5	0.1	10	16	22.5
GUARACHICO	143.7	10	4	6	20.3	10	4	6	0.0	10	4	6	0.5	10	4	6
KIRSKEN	81.9	15	10	25.5	29.7	15	10	25.5	0.0	15	10	25.5	0.0	15	10	25.5
NAMPER	57.4	9	8	3.8	1.0	9	8	3.8	0.0	9	8	3.8	0.0	9	8	3.8
NORTHENCAP	143.4	5	16	21	35.7	5	16	21	0.0	5	16	21	0.3	5	16	21
POLVARS	104.6	15	10	25.5	48.8	15	10	25.5	0.0	15	10	25.5	9.2	15	10	25.5
RIAS_BAIXAS	109.3	10	6	3	9.9	10	6	3	0.0	10	6	3	0.0	10	6	3

	GEARBOX				GENERATOR				OTHER				ROTOR			
	Alarmes (mitjana)	Temp. (mitjana)	Onades (mitjana)	Vent (mitjana)	Alarmes (mitjana)	Temp. (mitjana)	Onades (mitjana)	Vent (mitjana)	Alarmes (mitjana)	Temp. (mitjana)	Onades (mitjana)	Vent (mitjana)	Alarmes (mitjana)	Temp. (mitjana)	Onades (mitjana)	Vent (mitjana)
COUNSCOT	139.0	8.0	10.0	18.8	38.4	8.0	10.0	18.8	0.0	8.0	10.0	18.8	0.5	8.0	10.0	18.8
GREENBLUE	140.2	8.0	10.0	18.8	27.4	8.0	10.0	18.8	0.1	8.0	10.0	18.8	0.1	8.0	10.0	18.8
GUARACHICO	143.7	15.0	4.0	4.5	20.3	15.0	4.0	4.5	0.0	15.0	4.0	4.5	0.5	15.0	4.0	4.5
KIRSKEN	81.9	10.4	7.0	17.2	29.7	10.4	7.0	17.2	0.0	10.4	7.0	17.2	0.0	10.4	7.0	17.2
NAMPER	57.4	7.5	6.0	7.6	1.0	7.5	6.0	7.6	0.0	7.5	6.0	7.6	0.0	7.5	6.0	7.6
NORTHENCAP	143.4	5.5	10.0	22.4	35.7	5.5	10.0	22.4	0.0	5.5	10.0	22.4	0.3	5.5	10.0	22.4
POLVARS	104.6	10.5	7.0	17.3	48.8	10.5	7.0	17.3	0.0	10.5	7.0	17.3	9.2	10.5	7.0	17.3
RIAS_BAIXAS	109.3	10.0	5.0	4.5	9.9	10.0	5.0	4.5	0.0	10.0	5.0	4.5	0.0	10.0	5.0	4.5

# Informe “OFFSHORE WIND”

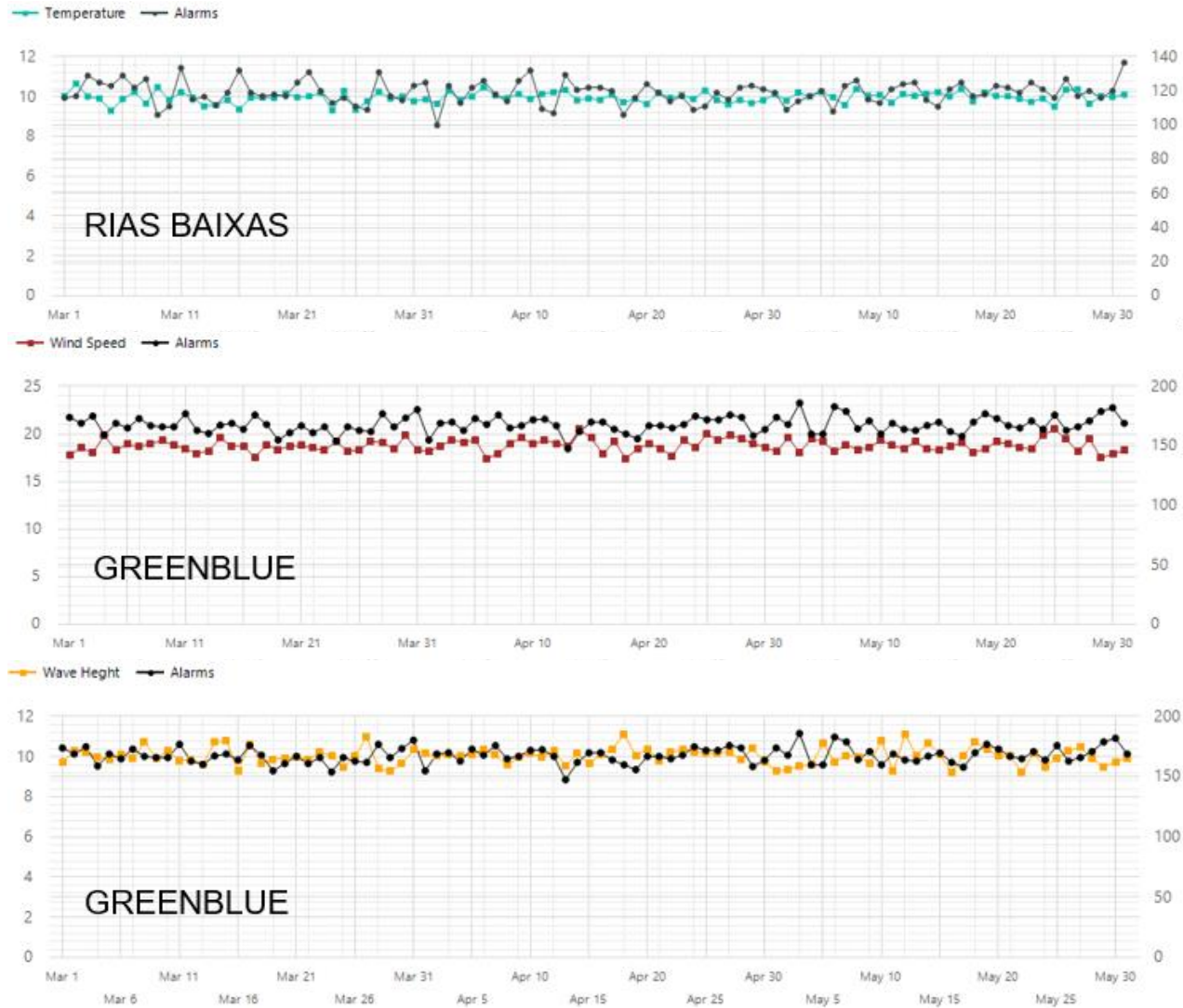
Mitjana alarmes diàries



Mostrar detall d'alarmes

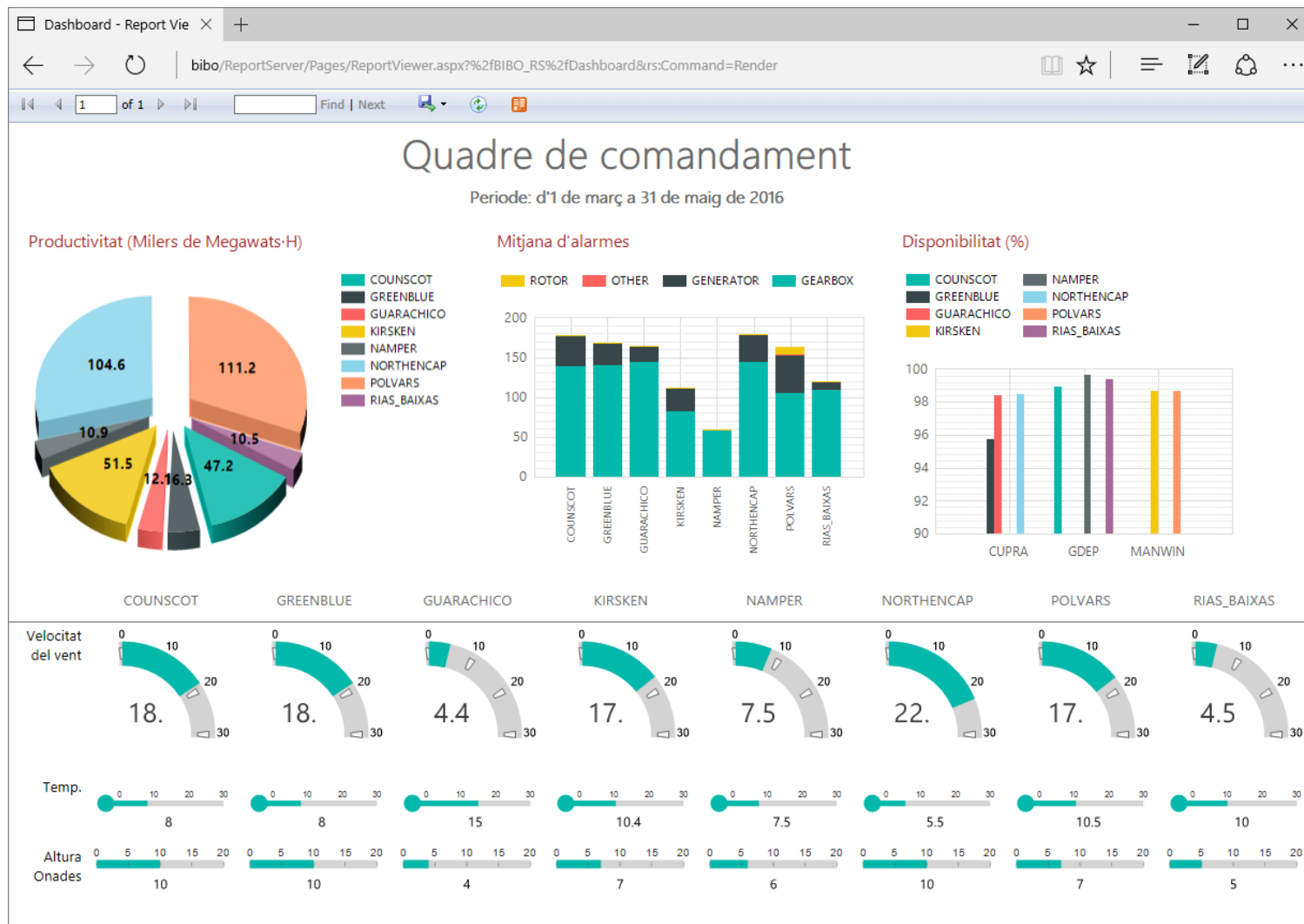
Mantenedor	Parc	Alarmes	Disponibilitat %	Temps de Reparació	GEARBOX	GENERATOR	OTHER	ROTOR
☒ CUPRA		511.8	97.5	137,078.9	427.3	83.4	0.2	0.9
☒ GDEP		355.8	99.3	104,682.2	305.7	49.3	0.1	0.6
	COUNSCOT	178.0	98.9	53,123.1	139.0	38.4	0.0	0.5
	NAMPER	58.6	99.6	18,292.5	57.4	1.0	0.0	0.0
	RIAS_BAIXAS	119.2	99.4	33,266.6	109.3	9.9	0.0	0.0
☒ MANWIN		274.4	98.7	90,094.3	186.5	78.5	0.1	9.3

# Informe “OFFSHORE WIND”





# Informe "OFFSHORE WIND"



- ✓ **Objectius assolits**
- ✓ **BI estratègic pel negoci**
- ✓ **Plataforma encertada**
- ✓ **Granularitat elevada**
- ✓ **Interpretació comença amb verificació**
- ✓ **Més informació amb IA i Minería de dades**



# Gràcies

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