GREEN EAGLE SOLUTIONS

AEE
Spanish Wind Energy Associaton

Operación de plantas desde el Centro de Control

Cómo mejorar la eficiencia gracias a la automatización

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Company overview

Unlimited Power for Wind Farms and Solar Plants

9+ Years

experience in the sector

10+ countries

Where we provide services

20+ OEM Scada's

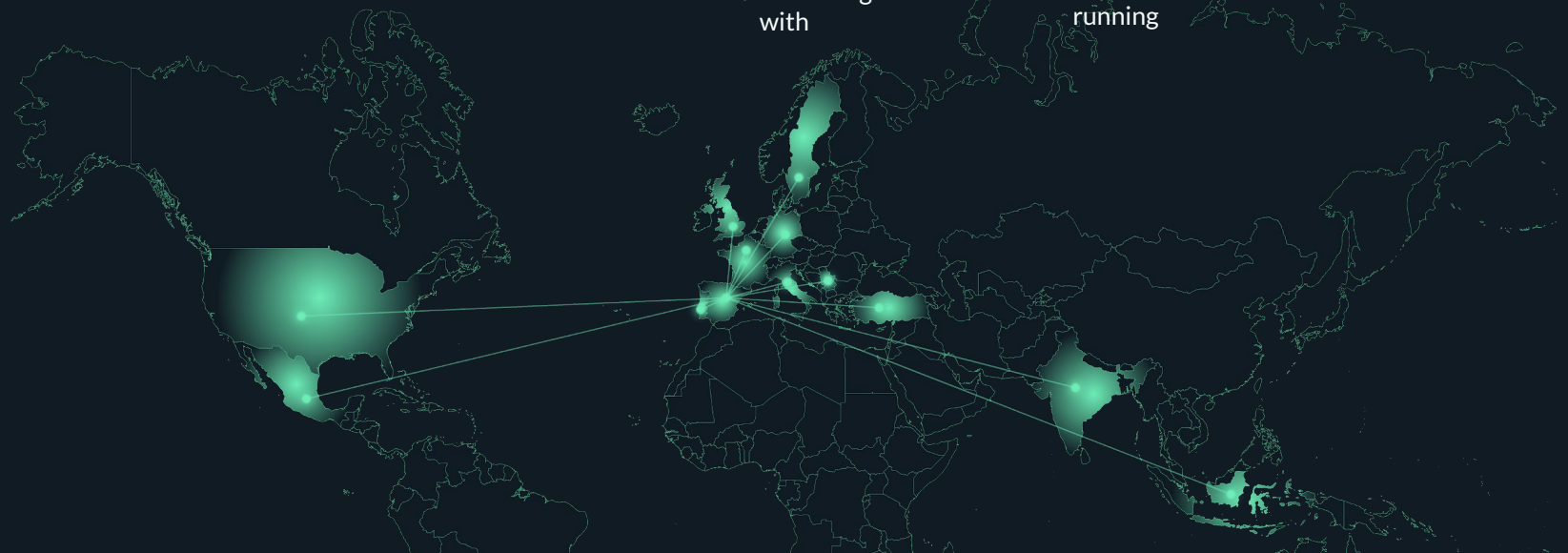
We are working with

250+ plants

Where CompactSCADA is running

6+ GW

Total monitored installed power



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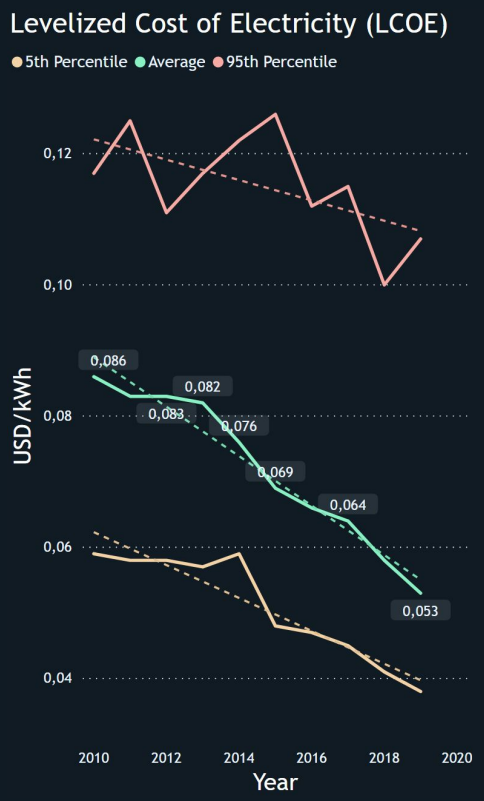
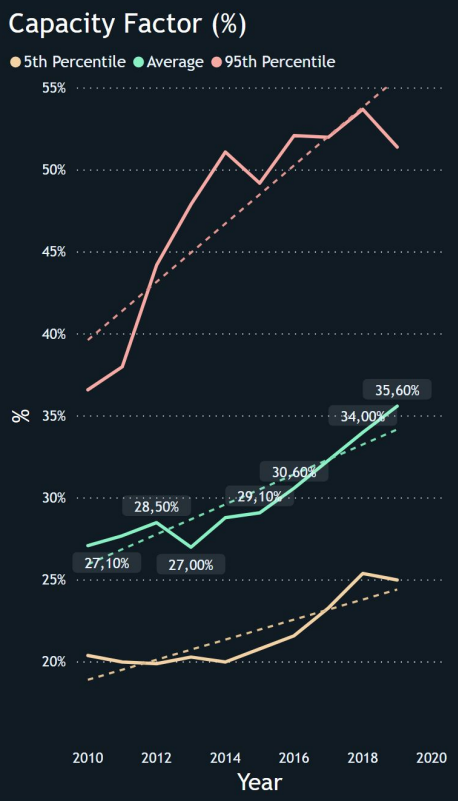
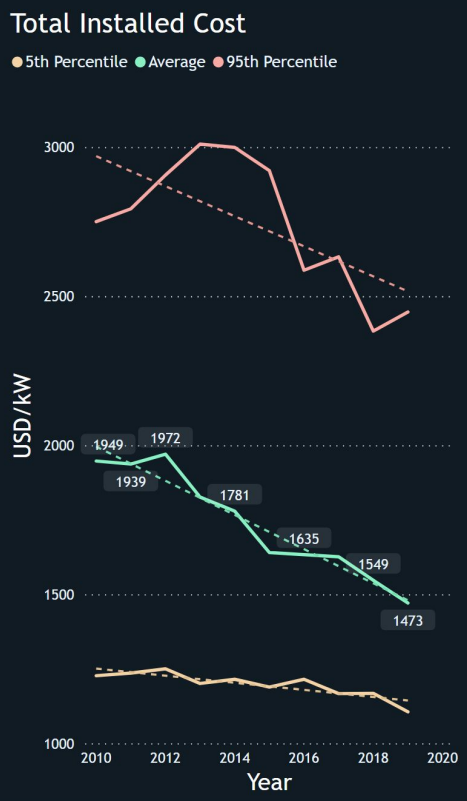
The context

Wind energy sector trends







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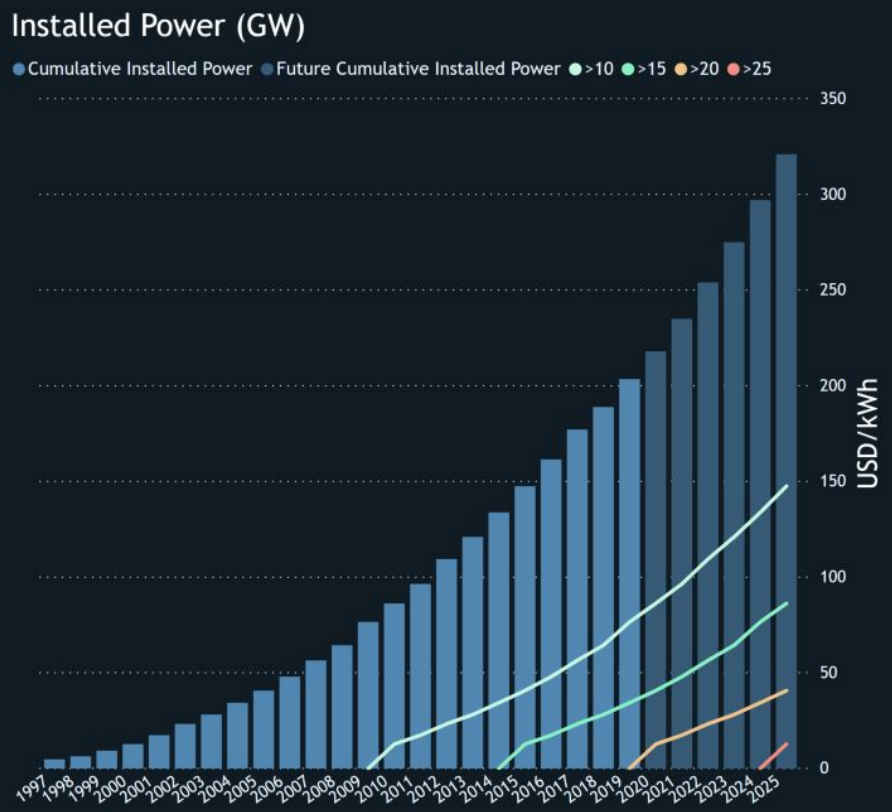
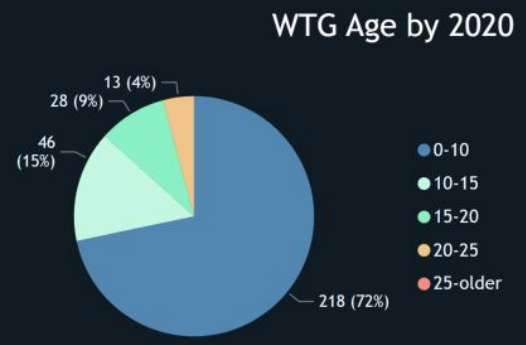
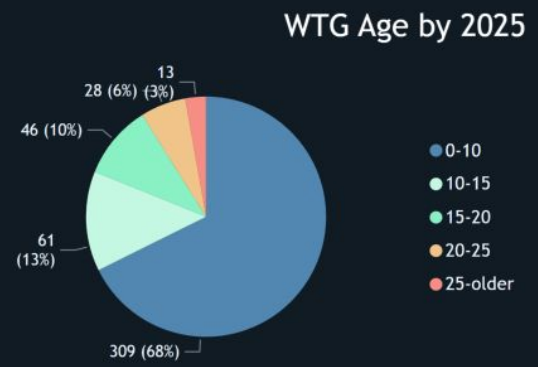
The context

Heterogeneous wind technology portfolios







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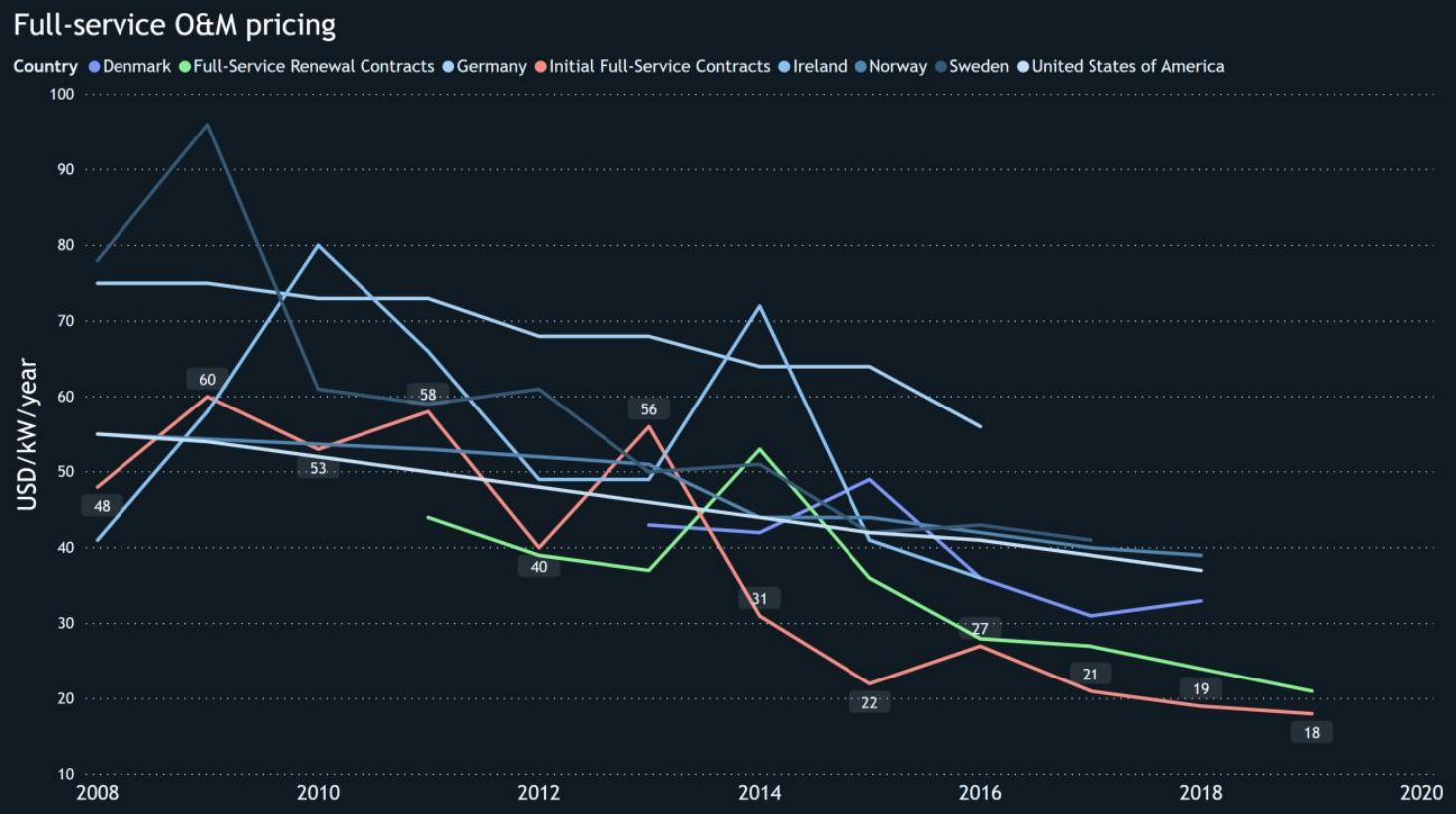
The context

O&M business adjustment



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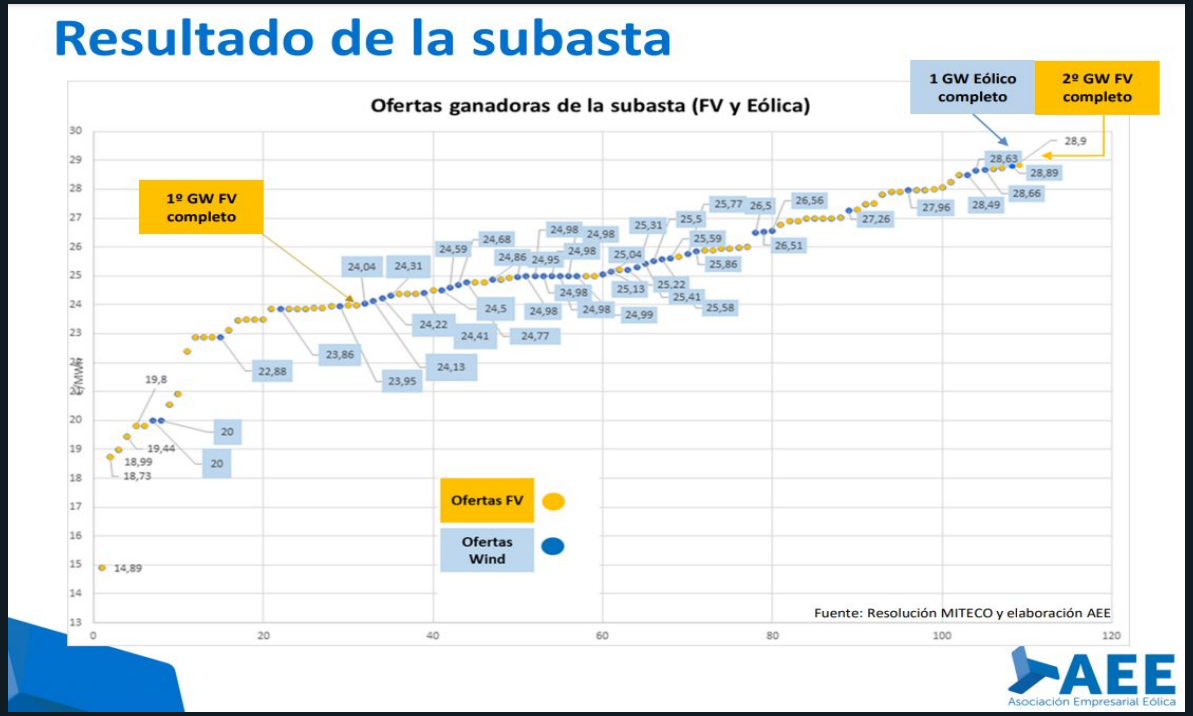

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Automation vs. Standard Operations

Average response time:	Fast (5 seconds)	Standard (20 minutes)
Strategies:	10 (Remote RESET, Wind Sector Management, Flickering, Noise Reduction, Market Price, Bats, Birds, Safe Stops, Cost, Weather alerts, Life Time extension)	1 (Remote RESET)
# of Protocols:	10 per individual turbine	1-2 per site
Safety of assets:	High	Standard (due to human errors and unattended assets)
# of turbine operated:	~ 5 000 per operator (x5 times capacity)	~ 1 000 per operator

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Operational challenges of large portfolios

There are many opportunities to increase efficiency and safety by adapting operations processes, moving from human-based to automation-based control

1

Scalability: Optimize manpower

Avoid repetitive tasks and get people to focus on customer added value activities such performance analysis or operations support center

2

Quicker and more intelligent response time

Improve operational processes using all available data and historical operations knowledge

3

Increase assets' safety by performing automated preventive actions

Based on WTG/ Components and environmental conditions

4

Implement Strategies beyond human capabilities

Adapted to environmental restrictions or energy market prices or commercial strategies

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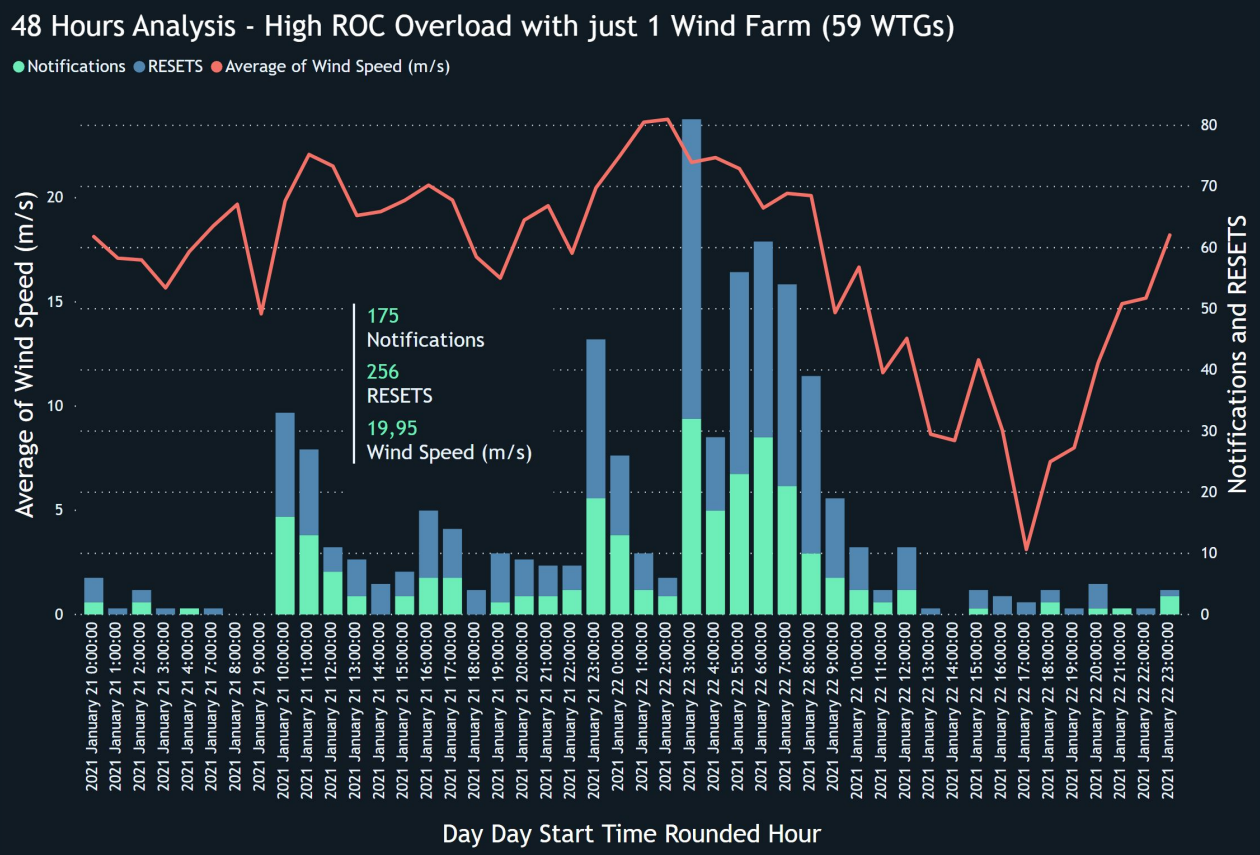
Operational challenges of large portfolios

Manpower optimization



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Operational challenges of large portfolios

There are many opportunities to increase efficiency and safety by adapting operations processes, moving from human-based to automation-based control

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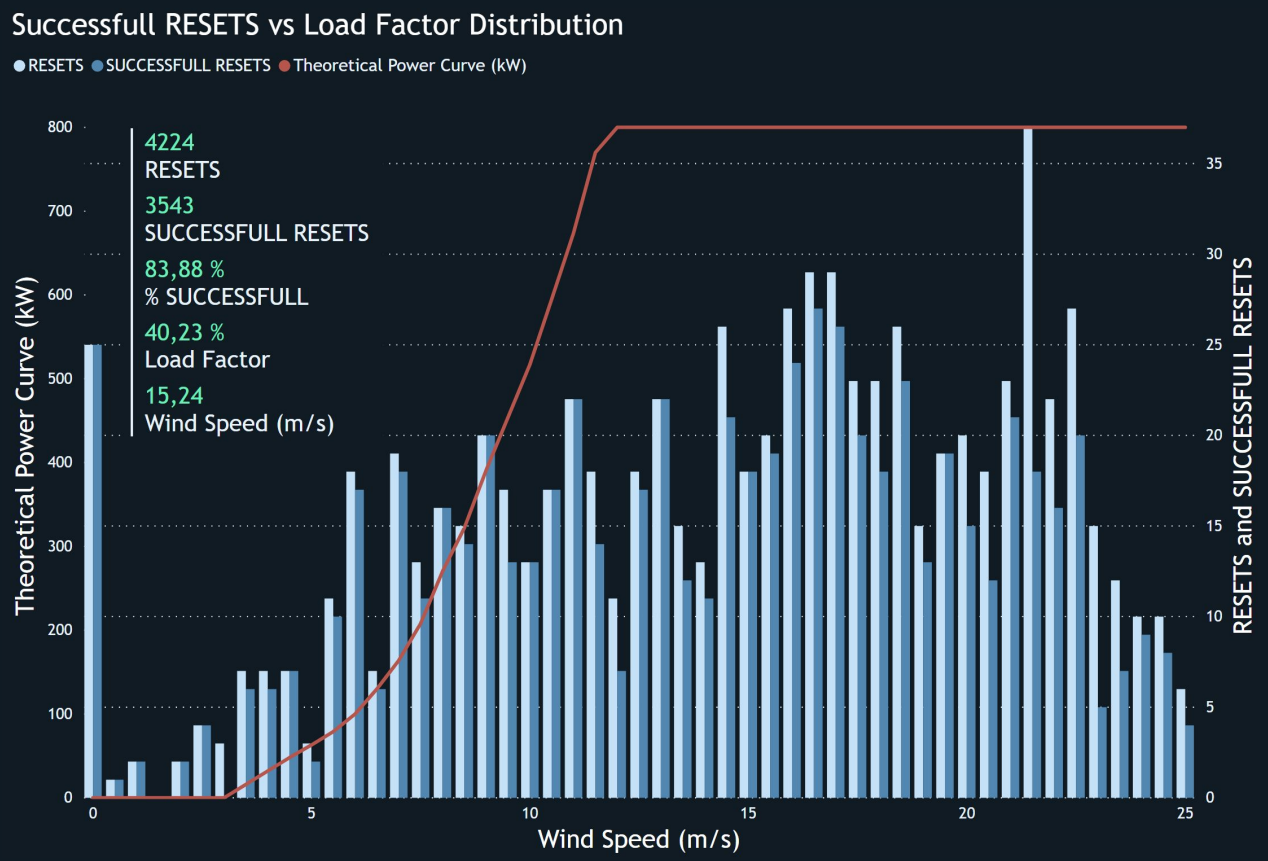
Quicker and more intelligent response time

Improve operational processes using all available data and historical operations knowledge

Operational challenges of large portfolios

Quicker and more intelligent response time



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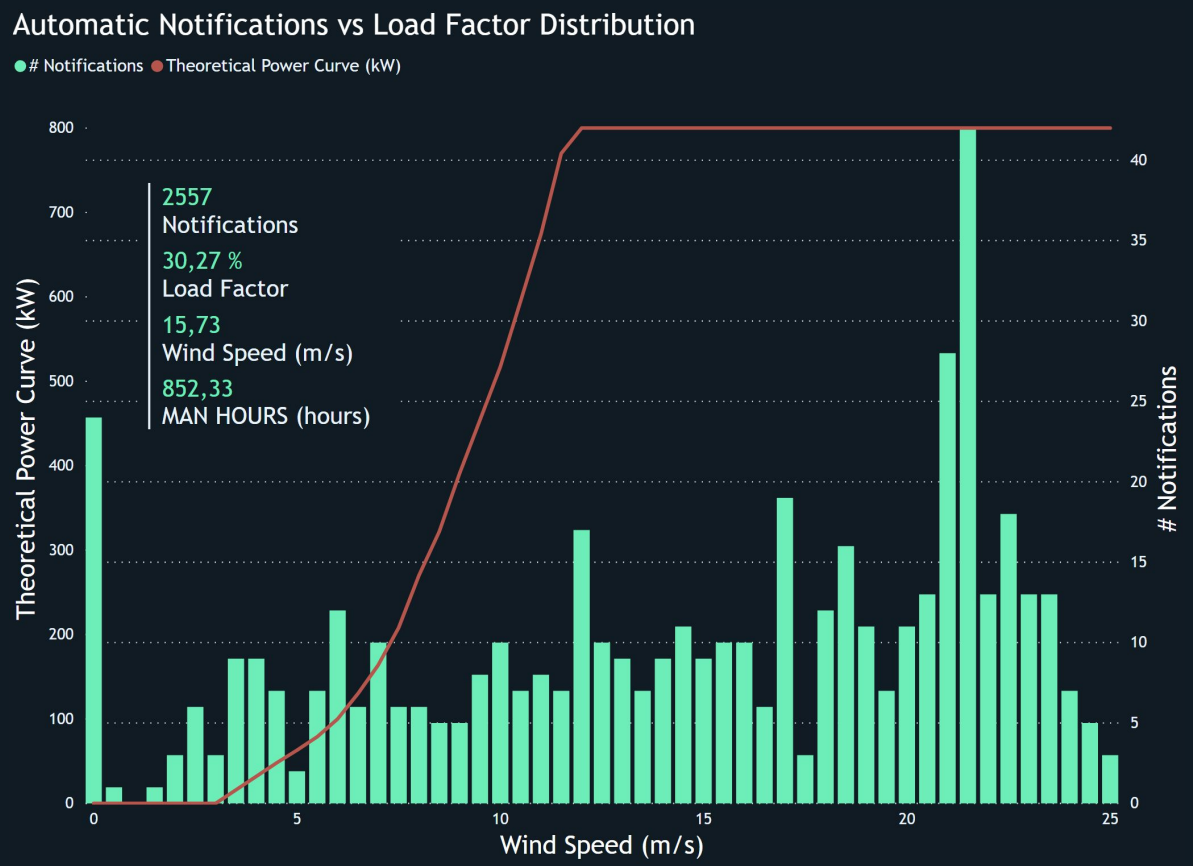
Operational challenges of large portfolios

Quicker and more intelligent response time



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Operational challenges of large portfolios

There are many opportunities to increase efficiency and safety by adapting operations processes, moving from human-based to automation-based control

3

Increase assets' safety by performing automated preventive actions

Based on WTG/ Components and environmental conditions

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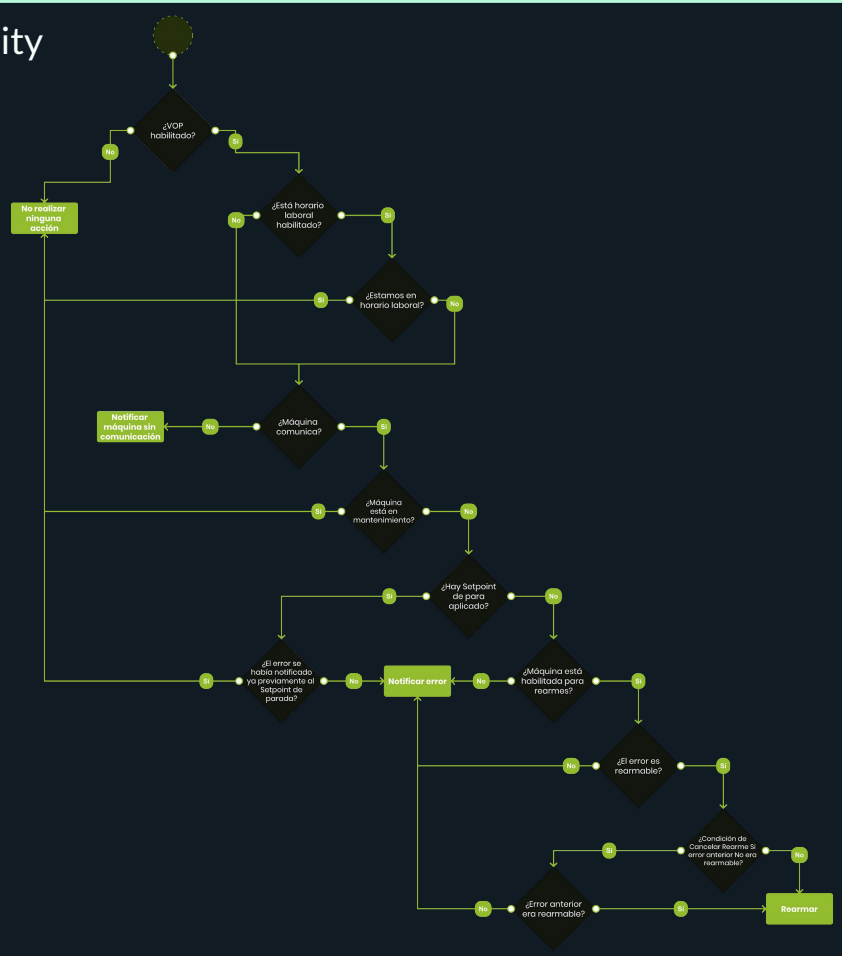
Operational challenges of large portfolios

Automation provides security and flexibility

Checks on:

Wind Turbine Status

- Communications.
- Working Schedule.
- On-field technicians availability.
- Major components quarantine periods.



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Operational challenges of large portfolios

There are many opportunities to increase efficiency and safety by adapting operations processes, moving from human-based to automation-based control

4

Implement Strategies beyond human capabilities

Adapted to environmental restrictions or energy market prices or commercial strategies

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The operational challenges of large portfolios

Implement Strategies beyond human capabilities:

WTG Status & Health:

- Wind Speed
- Wind Direction
- Active Power
- Active primary and secondary alarms
- Main component status

External inputs

- Weather forecast
- Energy forecast
- Energy market price
- Environmental restrictions

Business case

Automated Renewable Smart Operations Software

Initial Situation	Need	ARSOS Pilot	Expansion
470 WTGs	x2 Portfolio size	56 WTGs	750 WTGs
500 MW	1 GW	auto-pilot	1 GW
5 People	? People	Automatic	All fleet
Full Capacity		Operations	Spain & Italy

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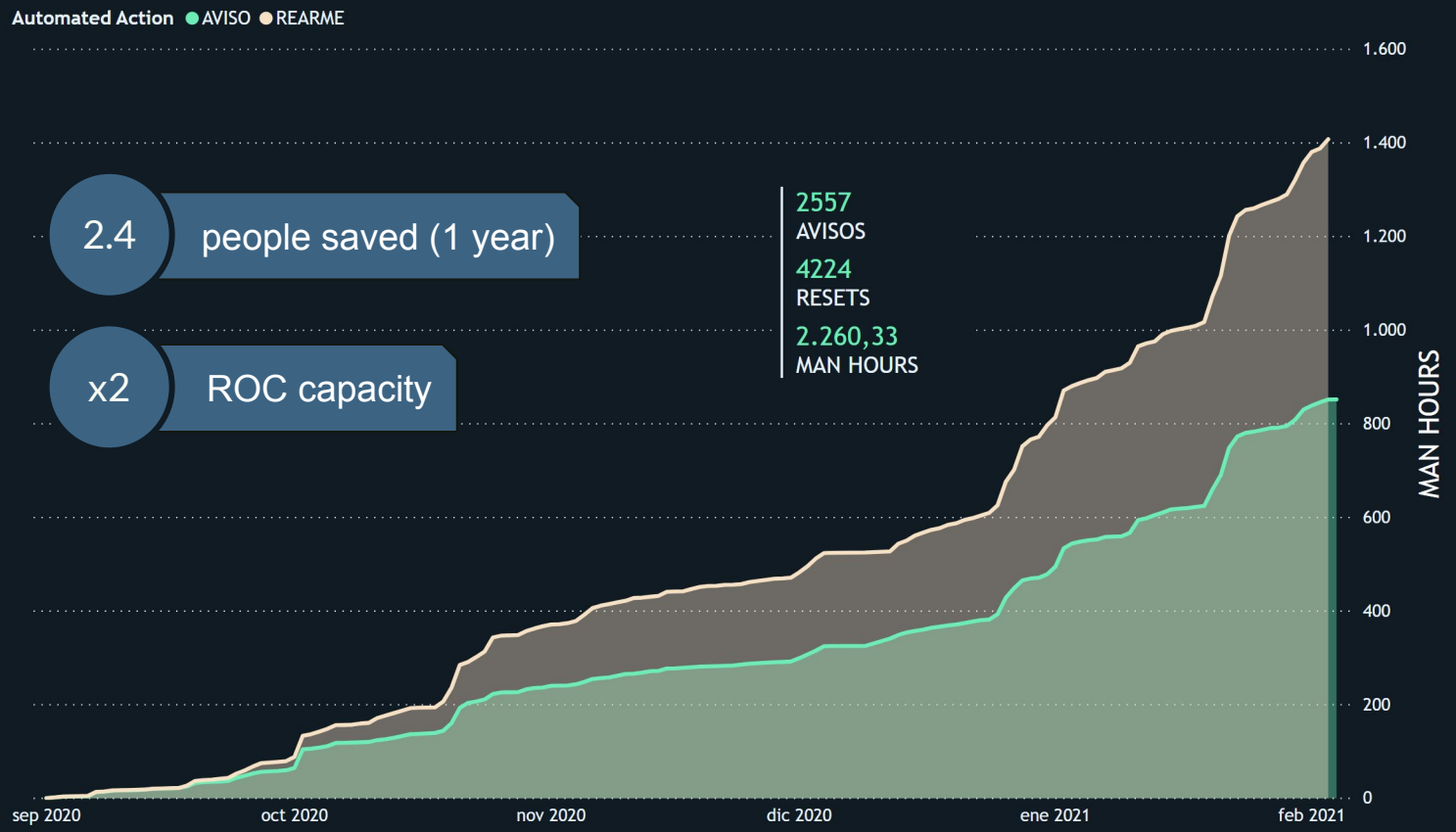
Scalability Increase

Man hours saved thanks to automated actions



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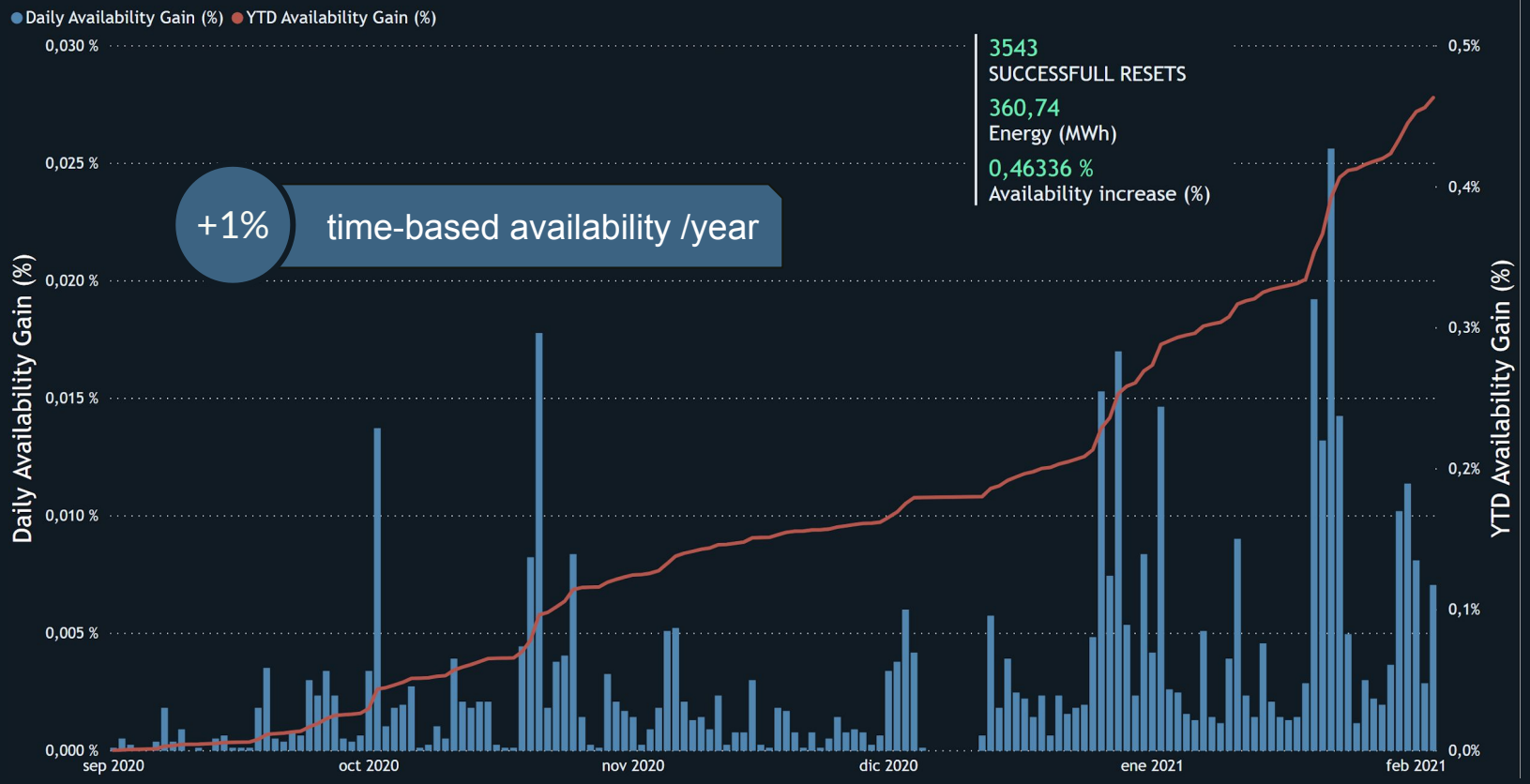
Availability Increase

ARSOS reduces time response from 20 minutes to near 0



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Business SUCCESS case

RWE Control Center in Barcelona

Initial Situation	Need	ARSOS Pilot	Expansion
470 WTGs	x2 Portfolio size	56 WTGs	750 WTGs
500 MW	1 GW	auto-pilot	1 GW
5 People	? People	Automatic	All fleet
Full Capacity		Operations	Spain & Italy

582k€/y

- 240k€ Savings due to Manpower Optimization
- 192k€ Increase of Availability and Production
- 150k€ Reduction of Maintenance Costs

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The solution: ARSOS

Automated Renewable Smart Operations Software

DIGITALIZATION → OPERATIONAL AUTOMATION

INTELLIGENT CONTROL

Turn data into action. Automate your ROC operations

INTEGRATED ANALYTICS

Dispose of real quality data and gain full analytical autonomy

INTEGRAL MONITORING

Universal and reliable data gathering platform

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Smart Control Overview

Operations > Automated Operations > Smart Control Overview

John Doe
Admin

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Last actions done

ARSOS activity log

WTG	Site	Action done	Time
JP03	Jupiter	RESET: Executed 1/3 attempt	3 min. ago
JP13	Jupiter	Changed to human mode	30 min. ago
JU16	Juno	RESET: Executed 1/2 attempt	45 min. ago
JP11	Jupiter	RESET: Executed 2/3 attempt	1 hr. ago
BA12	Bosque Alto	Maintenance mode detected	2 hr. ago
BA21	Bosque Alto	Maintenance mode detected	2.5 hr. ago
JP11	Jupiter	RESET: Executed 1/2 attempt	3 hr. ago
JU12	Juno	RESET: Executed 1/2 attempt	4.5 hr. ago
JU13	Juno	Maintenance mode detected	5 hr. ago
JU15	Site	Maintenance mode detected	6 hr. ago

ARSOS Upcoming Actions

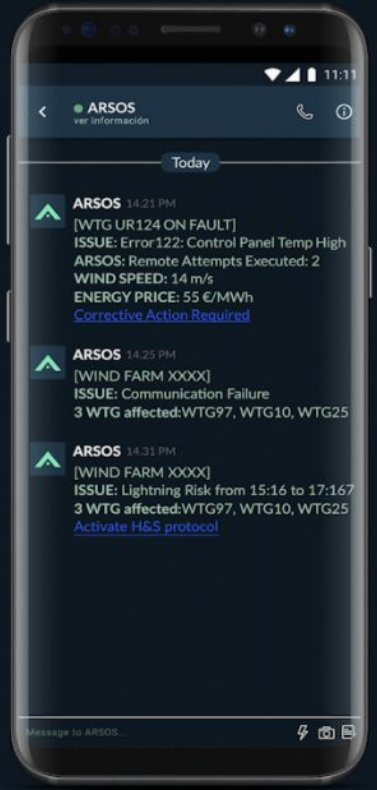
The following table shows the scheduled automated actions

WTG	Site	Automated control	Remaining time	Manual Control
JP11	Jupiter	NOTIFY: No more Remote RST allowed, Sending notification to on-site technicians	00:00:30	
JP03	Jupiter	RESET: Executing 2/3 attempt	00:07:00	
JU13	Juno	STOP: due to Vibrations, low production forecast and low energy price	00:22:00	
JP12	Jupiter	RESET: Executing 1/2 attempts	00:50:00	

ARSOS WTG Overview

Search

WTG	Status	Power Kw	Wind speed m/s	OEM Status	Pith Angle °	Smart Control Scenario	Next Actions	GU Operations Protocol	Manual Control
Jupiter									
JP01	Curtailed	-29.3	19.8	PRO	-0.1	--	--	MADE_AE56_AL_S	
JP02	Curtailed	1310.8	22.2	PRO	0	--	--	MADE_AE56_AL_S	
JP03	Fault	-3.9	23.0	PAR	87	--	--	MADE_AE56_AL_S	
JP11	Fault	-4.3	24.2	PAR	87	--	--	MADE_AE56_AL_S	
JP12	Fault	-3.9	22.9	PAR	87	--	--	MADE_AE56_AL_S	
JP13	Fault	-56.999	22.4	PAR	87.1	error'107-Termico Inter.Gen' (12225 sec.)	WTG on quarantine mode, O&M was last notificed on: 2021-02-08 14:18:55	MADE_AE56_AL_S	
Bosque Armijo									
BA12	Stopped - Service	-0.0	8.9	B	--	--	Turbine in maintenance, ARSOS will not operate it during this state	MADE_LLPP_GR_S	
BA21	Stopped - Service	-297.6	4.9	B	--	--	Turbine in maintenance, ARSOS will not operate it during this state	MADE_LLPP_GR_S	



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