

COMUNI DI SAN SEVERO E RIGNANO

GARGANICO

PROVINCIA DI FOGGIA



PROGETTO PER LA REALIZZAZIONE DI UN PARCO EOLICO

RICHIESTA DI AUTORIZZAZIONE UNICA

D.Lgs. 387/2003

**PROCEDIMENTO UNICO
AMBIENTALE (PUA)**

**VALUTAZIONE DI IMPATTO
AMBIENTALE (V.I.A.)**

D.Lgs. 152/2006 ss.mm.ii. (Art.27)
"Norme in materia ambientale"



PROGETTO

FLORIO

DITTA

NVA S.r.l.

REL 11 - 2

Titolo dell'allegato:

RELAZIONE ANEMOLOGICA E PRODUCIBILITA'

REV	DESCRIZIONE	DATA
2	REVISIONE	13/05/2024
1	EMISSIONE	30/05/2023

CARATTERISTICHE GENERALI D'IMPIANTO

GENERATORE - Altezza mozzo: fino a 175 m
Diametro rotore: fino a 172 m
Potenza unitaria: fino a 7,2 MW

IMPIANTO - Numero generatori: 32
Potenza complessiva: fino a 230,4 MW

Il proponente:

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<h1>FLORIO</h1>		
IMPIANTO EOLICO COMPOSTO DA 32 AEROGENERATORI PER UNA POTENZA COMPLESSIVA DI 230,4 MW UBICATO NEI COMUNI DI SAN SEVERO E RIGNANO GARGANICO	Data:	13/05/2024
	Revisione:	2
	CodiceElaborato:	REL 11 - 2
Società:	NVA S.r.l.	

Elaborato da	Data	Approvato da	Data Approvazione	Rev	Commenti
ATS Engineering S.r.l	13/05/2024	ATS Engineering S.r.l	13/05/2024	2	

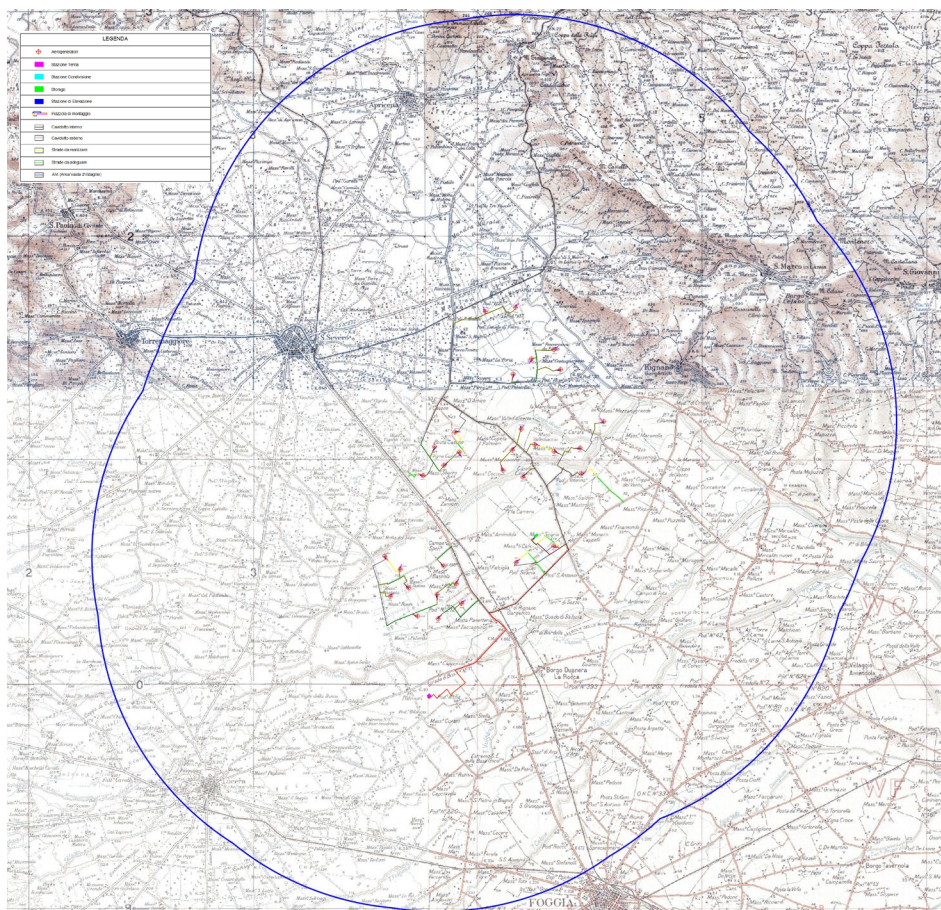
1. Premessa

La presente relazione sullo studio della producibilità energetica riporta i risultati della valutazione della risorsa eolica e i calcoli di rendimento energetico per il progetto FLORIO, un impianto industriale per la produzione di energia elettrica alimentato da fonte rinnovabile eolica, proposto dalla società NVA s.r.l., con sede in Lainate(MI), in Via Lepetit,8, che ha previsto la realizzazione di un impianto eolico ubicato nei territori comunali di San Severo e Rignano Garganico in provincia di Foggia.

2. Descrizione generale del progetto

La superficie territoriale totale dell'area di progetto - che prevede l'installazione di n. 32 aerogeneratori di potenza nominale attiva pari a 7,2 MW per una potenza complessiva di 230,4 MW - è di 16 ettari (160.000 m²), ossia 5000 m² per aerogeneratore, considerando in tale previsione anche le piazzole, le fondazioni, la cabina, le strade e la superficie dei cavidotti.

Il progetto, oltre all'ubicazione nell'area di n. 32 aerogeneratori, prevede anche la realizzazione di una linea interrata di collegamento alla stazione di elevazione interna all'impianto da realizzare in prossimità della torre WTG12.



Inquadramento su IGM, scala 1:50.000

Per una identificazione univoca di ogni singolo aerogeneratore nella tabella seguente si riportano le coordinate relative all'ubicazione georeferenziata di ognuno di essi nel sistema di riferimento UTM 84-33N.

	COORDINATE UTM 33N WGS84	COORDINATE UTM 33N WGS84
wtg	est	nord
1	535794.0963	4605545.0320
2	536485.7283	4604951.6200
3	536863.4638	4604127.2815
4	536038.5356	4603751.0683
5	538426.9995	4605099.5548
6	538126.9723	4603834.7242
7	538981.0000	4604308.0001
8	537261.7296	4602865.5075
9	539220.0000	4603434.0001
10	538172.0000	4602751.0001
11	541651.0000	4605254.0001
12	543328.0000	4606000.0000
13	537502.9047	4609131.8154
14	538422.7671	4609593.8051
15	539113.0295	4610179.6884
16	538016.7923	4610420.5089
17	538924.6698	4611066.5214
18	541068.0000	4609364.0000
19	541480.0000	4610270.0001
20	541875.0000	4611202.0000
21	542470.0000	4610523.0000
22	541952.0000	4609066.0000
23	543337.0000	4610213.0000
24	544500.0000	4610366.0000
25	544555.5749	4609211.2393
26	545553.0616	4611543.3824
27	541514.1826	4613659.3505
28	542323.9719	4614333.4034
29	543628.3258	4613867.3850
30	543337.0000	4614747.0000
31	540281.0117	4616440.1598
32	541613.4292	4616627.2147

Coordinate aerogeneratori nel sistema di riferimento UTM 84-33N

3. Potenziale eolico dell'area di progetto

Il parco eolico FLORIO, essendo costituito da n. 32 aerogeneratori - di potenza nominale attiva pari a 7,2 MW - per una potenza complessiva 230,4 MW, rientra nella tipologia degli impianti di grandi dimensioni.

Le aree idonee agli impianti di grandi e medie dimensioni, secondo il Piano Paesaggistico Territoriale Regionale (P.P.T.R.) sono:

- le aree produttive pianificate;
- le aree agricole di mitigazione delle zone industriali; le aree prossime ai baci estrattivi.

La sovrapposizione di tali aree ai bacini con un buon indice di ventosità e potenzialità eolica - individuate dall'Atlante eolico del Cesi e dall'Atlante Eolico Regionale - definisce gli ambiti ottimali per l'installazione degli impianti eolici.

Di seguito si riporta uno studio aggiornato, rispetto alla precedente REL 11_Rel anemologica-producibilità presentata al MASE che non ha considerato i potenziali impatti con gli altri impianti presenti nella stessa area, con uno studio più approfondito condotto dalla DNV.



NVA srl

Florio Wind Farm

EYA update

Doc. No. P0033643 – Rev.00 – May 2023

Rev.	Description	Prepared by	Controlled by	Approved by	Date
.00	EYA update	B.Moorthy	M. Minervini	S.Sadowski	12/05/2023

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LIST OF FIGURES

Figure 1: View of project area

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ABBREVIATIONS AND ACRONYMS

EYA	Energy Yield Assessment
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1 INTRODUCTION

Rina Consulting S.p.A. (the "Technical Consultant", hereinafter CT) has been appointed to update EYA for Florio plant following the update of the layout, carried out in the interest of NVA (the "Client") regarding a possible investment on that site.

All documentation used and / or produced in the course of the activity is of a confidential nature and cannot be disclosed or made available to third parties outside NVA and iCON without the prior written consent of RINA Consulting.

As part of the assignment, the updating of the results obtained and the analyses carried out in relation to events or information made available after the issue of the due diligence document is not envisaged, unless otherwise indicated to be agreed with the Customer.

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RINA Consulting ('RINA') has been appointed by the Client to update EYA for Florio wind plant following the update of the layout from 33 WTGs to 32 WTGs for a total power of 230.4 MWp installed capacity.

The scope provided in this report includes:

- EYA of the new layout;
- Comparison between EYA of the old and new layout.

~~Each of these services is presented in the subsequent sections of this report.~~

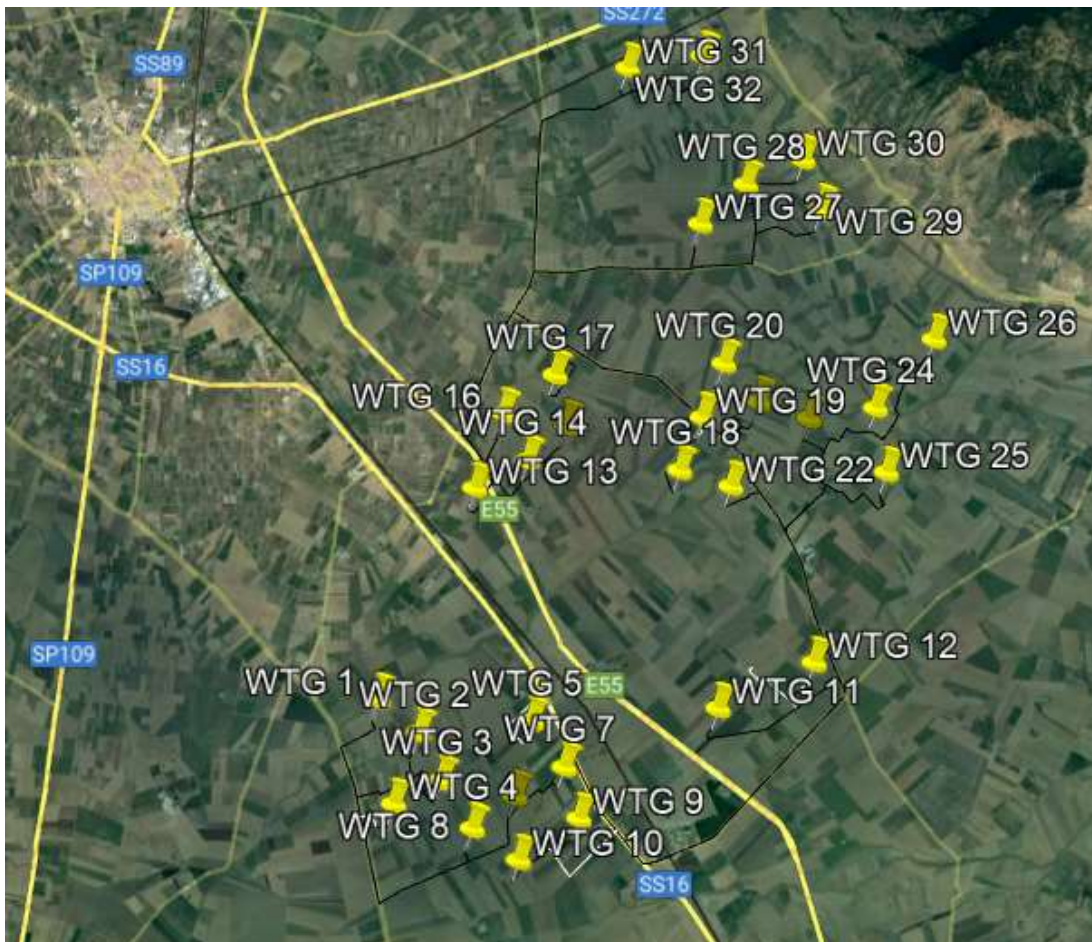
2 PROJECT OVERVIEW

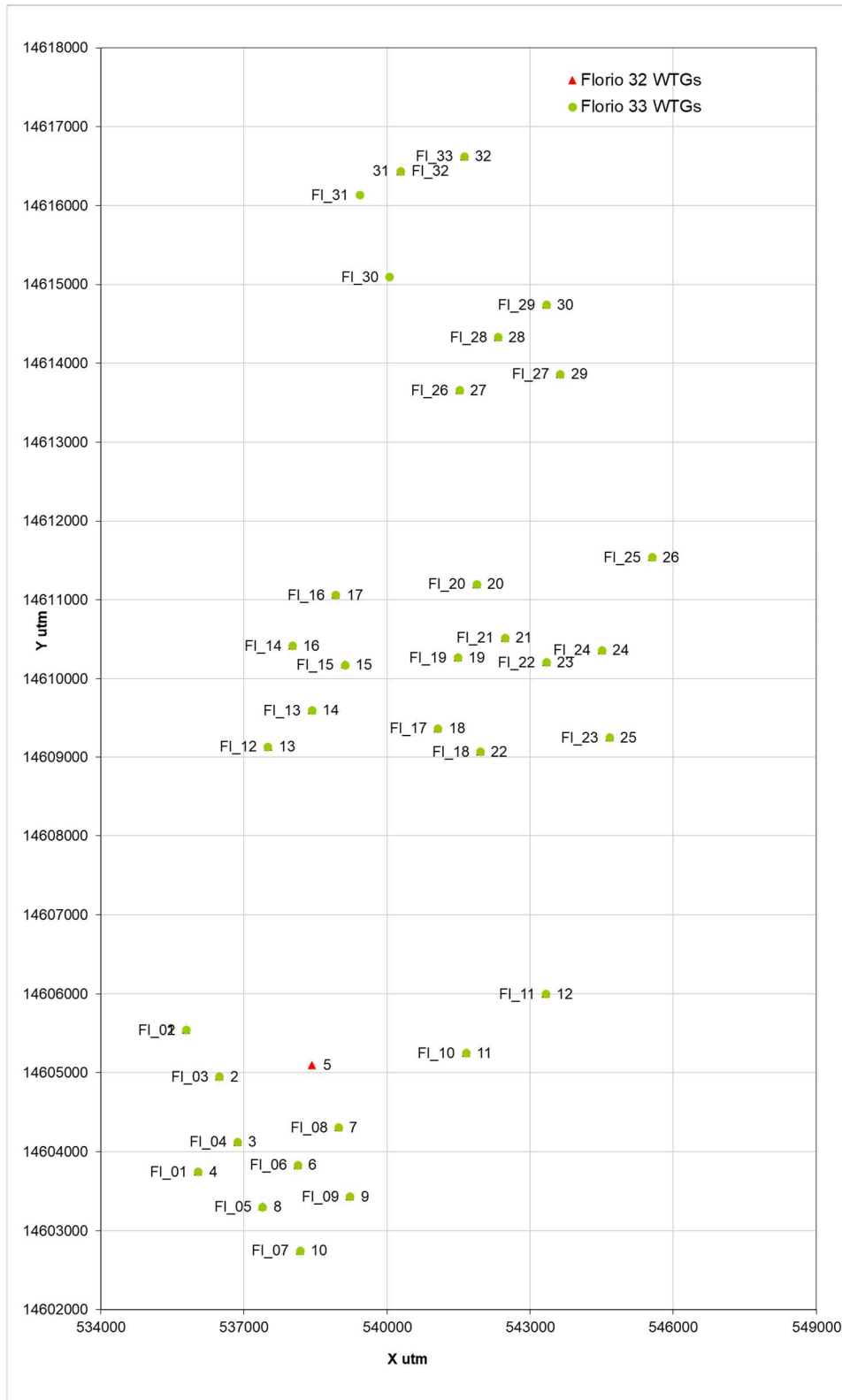
Project area is in Municipality of San Severo.

From the old layout, object of the previous Technical Due Diligence, and the actual one some minor changes are carried out:

- Reduction of WTGs from 33 to 32, for a total power of 230,4 MW
- Movement of one WTG

Figure 1: View of project area





3 ENERGY YIELD ASSESSMENT RESULTS

3.1 RESULTS OF NEW LAYOUT

As described in the risk matrix, high level EYA has been performed for the project to estimate the wind conditions at the windfarm location. Based on the average wind speed at hub heights (175 m and 195 m a.g.l.) derived from GlobalWind Atlas, mesoscale data from the nearest ERA5 grid node were adjusted to match the target wind speed. Further assessments concerning the orography and roughness of the project locations were performed as the wind characteristics at hub height are influenced by these parameters. Moreover, the existing wind turbines from nearby windfarms were also considered, as their influence on planned project might have an impact, especially concerning the wake losses. The analysis was performed in WindPro software (based on WASP software and methodology of assessment).

For the project (Florio) the EYA simulations were made using the Vestas V172-7.2 WTG type, with 175 m hub height. Power curve and thrust curve values were derived from the documentation provided by the Client.

No uncertainties were considered at this stage of analysis.

	Florio Vestas V172 – 7.2 MW 32 WTGs
Hub height[m]	175
Average Velocity of WTG [m/s]	6.8
Total Capacity [MW]	230.4
Gross Production [GWh/a]	684.3
1. Wake Effects	93.8%
2. Availability	97%
3. Electrical Efficiency	98%
4. Turbine Performance	99%
5. Environmental	99%
6. Curtailment	100.0%
7. Others	100.0%
Total Loss Factor	87.4%
Net Energy Production, P50 (10-anno) [GWh/a]	598.3
Capacity Factor, P50 (10-anno)	29.6%

At the Client's request, additional EYA simulations were performed for Florio project considering different technical characteristics, that are not yet implemented in any existing WTG type. The assumption was made therefore for the same power and ct curves as those present at Vestas V172 7.2 MW, but for a different hub height (195 m) and also a different rotor diameter (185 m).

	Florio (WTG 7.2MW, 195 hh, 185 RD) 32 WTGs
Hub height[m]	195
Average Velocity of WTG [m/s]	7.0
Total Capacity [MW]	230.4

Gross Production [GWh/a]	715.63
1. Wake Effects	93.6%
2. Availability	97%
3. Electrical Efficiency	98%
4. Turbine Performance	99%
5. Environmental	99%
6. Curtailment	100.0%
7. Others	100.0%
Total Loss Factor	87.2%
Net Energy Production, P50 (10-anno) [GWh/a]	624.34
Capacity Factor, P50 (10-anno)	30.9%

3.2 COMPARISON BETWEEN THE TWO LAYOUTS

In this chapter are compared the results of the simulations of the old Florio layout, with 33 WTGs, and the newest one, with 32 WTGs.

	Florio Vestas V172 – 7.2 MW 33 WTGs	Florio Vestas V172 – 7.2 MW 32 WTGs
Hub height[m]	175	175
Average Velocity of WTG [m/s]	6.80	6.8
Total Capacity [MW]	237.6	230.4
Gross Production [GWh/a]	746.3	684.3
1. Wake Effects	94.6%	93.8%
2. Availability	97%	97%
3. Electrical Efficiency	98%	98%
4. Turbine Performance	99%	99%
5. Environmental	99%	99%
6. Curtailment	100.0%	100.0%
7. Others	100.0%	100.0%
Total Loss Factor	87.6%	87.4%
Net Energy Production, P50 (10-anno) [GWh/a]	653.7	598.3
Capacity Factor, P50 (10-anno)	31.6%	29.6%

	Florio (WTG 7.2MW, 195 hh, 185 RD) 33 WTGs	Florio (WTG 7.2MW, 195 hh, 185 RD) 32 WTGs
Hub height[m]	195	195
Average Velocity of WTG [m/s]	7.0	7.0
Total Capacity [MW]	237.6	230.4
Gross Production [GWh/a]	778.8	715.63
1. Wake Effects	94.5%	93.6%
2. Availability	97%	97%
3. Electrical Efficiency	98%	98%
4. Turbine Performance	99%	99%
5. Environmental	99%	99%
6. Curtailment	100.0%	100.0%
7. Others	100.0%	100.0%
Total Loss Factor	87.5%	87.2%
Net Energy Production, P50 (10-anno) [GWh/a]	681.4	624.34
Capacity Factor, P50 (10-anno)	32.9%	30.9%

4 CONCLUSION

Though one position has been removed and one position relocated, the wake loss is slightly higher in 32 positions than 33 positions. This is because the movement of position 5 is not free flowing (Predominant wind directions are: NNW and SSW) and is situated with the cluster of other proposed positions. But in general, the overall energy capacity for 32 positions is good and recommended to do detailed yield study with onsite measurement data for accurate results.