



# Determine the Scope of Influence and Impact Due to Noise from Wind Turbines During the Operation of Wind Power Plant Project No. 3 – Soc Trang Province

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Facing climate change, global warming and the depletion of fossil resources such as coal, oil, etc., the development of clean energy sources has become a global trend. Clean energy sources are being exploited and strongly developed globally today, including: solar energy, wind energy, geothermal energy, ocean wave energy, geothermal energy, biomass energy. Vietnam is located in the tropical monsoon climate, with a coastline stretching over 3,000 km, so the potential for wind energy development in Vietnam is extremely large, attracting a lot of investment in wind power projects in Vietnam. current and future, including wind power plant project No. 3 – Soc Trang province. So far, we have only mentioned the benefits and clean, renewable aspects of wind power, but few have mentioned the environmental and human health impacts of wind power plants, especially noise during operation. The paper uses WindPro software 3.1.597 to determine the extent of influence caused by noise emitted by wind turbines during the operation of wind power plants, thereby assessing its impacts on people's health. local people living around the project area and propose remedial measures.

**Keywords:** wind power, noise, environmental impact, wind power plant project No. 3 - Soc Trang province

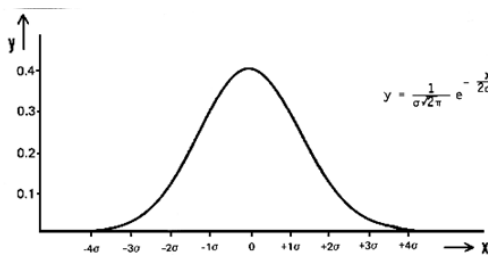
## 1. Introduction

Wind power plant No. 3 has installed capacity of 29.4MW, newly built in Soc Trang province and connected to the national power system by a new 110kV transmission line. The construction area of the project is 10.22ha. The main items of the project include: substation 110kV, 7 turbines with 4.2MW capacity, connecting cables 5.8 km long.

## 2. Materials and Methods

### 2.1. Calculation method of noise circulation

Single noise: the noise is distributed according to the Gauss model.



Multi-noise: noise from multiple sources is calculated by the formula:

$$L_{\Sigma} = 10 \lg \sum_{i=1}^n 10^{0,1 L_i}$$

Noise by distance

The noise level in the range  $r_2 > r_1$  will reduce the noise level in the range  $r_1$  by a value of  $\Delta L$  (dB) according to the following formula:

$$\Delta L = 20 \lg \left( \frac{r_2}{r_1} \right)^{1+a} \quad (\text{dB})$$

### 2.2. Software of the report

WinPro software has 2 main modules, as follows:

- The Decibel module is used to calculate noise from wind turbines;
- Shadow module is used to calculate flicker from wind turbine.

### 2.3. Model Input Document:

Altitude about +3.0 ~ + 0.0m.

In low-lying areas, there are shrimp ponds with an elevation of 0 ~ + 1.0m.

The study area has the dominant wind direction from West – Southwest, the average maximum wind speed from 1977 to 2011 is about 5.86 m/s.

Meteorological documents: from 1997 to 2018 of Vinh Phuoc Meteorological Station: Class II Meteorological Station, monitoring the elements of Surface Meteorology and Agricultural Meteorology according to the task targets assigned by the Southern Meteorological Station. annually (address: Vinh Phuoc, Vinh Chau town, Soc Trang province);

Meteorological data: from January 1, 2014 and ending on December 31, 2014 of the wind measuring column near the project site installed in Ward 2, Vinh Chau town - Soc Trang province. Geographic coordinates of the measuring column: 09019.243' N, 106001.997' E (WGS-84).

Topographic data is obtained online from Winpro software, with a resolution of 30m.

The data of sunshine hours are taken from the sun measuring station of Kota Bharu/Pengk Alan Chepa station of Malaysia, about 504km to the southwest of the study location, the average daily sunshine hours from 1975 to 1993.



Fig. 1. Location of wind measuring tower  
Rys. 1. Lokalizacja analizowanego wiatraka

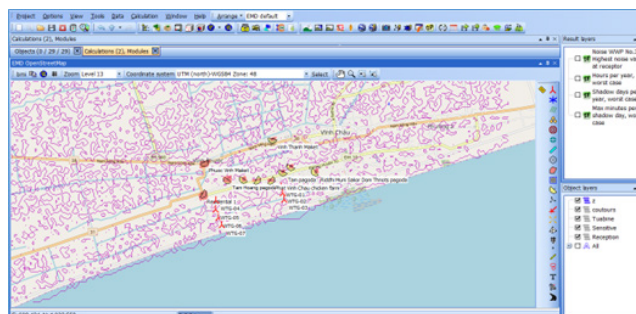


Fig. 2. Topographic map of the project area  
Rys. 2. Mapa topograficzna lokalizacji analizowanej elektrowni

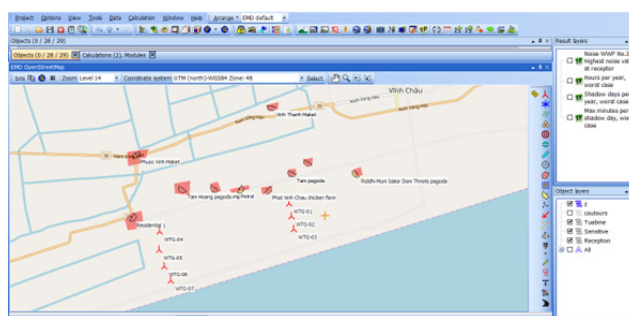


Fig. 3. Map of sensitive locations  
Rys. 3. Mapa wrażliwych lokalizacji

Fig. 3. Map of sensitive locations  
Rys. 3. Mapa wrażliwych lokalizacji

No.	Area	UTMCoordinates X,Y (m)	Altitude Z (m)	Influence height (m)	Noise level (dBA)
1	Phuoc Vinh market	X: 1029561 Y: 602447	0	4	32
2	Giong Me residential area	X: 1028054 Y: 602611	0	4	46,4
3	Tam Hoang pagoda	X: 1028758 Y: 603241	0	4	37,6
4	My Hung petrol station	X: 1028779 Y: 603985	0	4	35,3
5	Phat Vinh Chau Chicken Farm	X: 1028791 Y: 605192	0	4	44,3
6	Thien Thanh vegetarian fish sauce production facility	X: 1029327 Y: 605860	0	4	37,7
7	Tam pagoda	X: 1029101 Y: 605530	0	4	41,7
8	Riddhi Muni Sakor Dom Thnots pagoda	X: 1029114 Y: 606878	0	4	32,7
9	Vinh Thanh market	X: 1030449 Y: 605112	0	4	29,0
10	Residential area along roadHL31	X: 1028851 Y: 604730	0	4	38,2

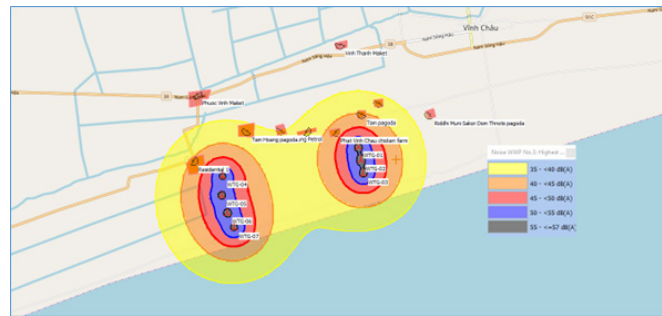


Fig. 4. Diagram of noise circulation as of Wind power plant No. 3 in operation  
 Rys. 4. Schemat rozprzestrzeniania się hałasu od momentu eksploatacji Elektrowni Wiatrowej nr 3

### 3. Results and Discussions

According to the noise calculation results, only Wind power plant No. 3 operates, the noise at the location of the turbines is from 55–57 dBA, and is about 35–40dBA at location about 2,000m from the wind turbines.

Compared to QCVN 26:2010/BTNMT – noise regulation, the noise from wind turbines all meet the standard. Compared with the noise assessed in the EIA report approved by the Soc Trang Provincial People's Committee in Decision No.

2125/QĐ-UBND dated August 1, 2019, the noise and flicker impact on the surroundings remain unchanged.

### 4. Conclusions

Compared to QCVN 26:2010/BTNMT – noise regulation, the noise from wind turbines all meet the standard. The noise impact on the project areas is small so that it's not affect to people healthy and ecosystem within project area.

#### Literatura – References

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#### *Określenie zakresu oddziaływania turbin i oddziaływania hałasu z turbin wiatrowych podczas eksploatacji elektrowni wiatrowej projekt nr 3 – prowincja Soc Trang*

*W obliczu zmian klimatu, globalnego ocieplenia i wyczerpywania się zasobów kopalnych, takich jak węgiel, ropa naftowa itp., rozwój czystych źródeł energii stał się światowym trendem. Czyste źródła energii są obecnie eksploatowane i silnie rozwijane na całym świecie, w tym: energia słoneczna, energia wiatru, energia geotermalna, energia fal oceanicznych, energia geotermalna, energia biomasy. Wietnam położony jest w tropikalnym klimacie monsunowym, z linią brzegową rozciągającą się na ponad 3000 km, więc potencjał rozwoju energetyki wiatrowej w Wietnamie jest niezwykle duży, co przyciąga wiele inwestycji w projekty wiatrowe w kraju. Przykładem omawianym w artykule jest elektrownia wiatrowa nr 3 – prowincja Soc Trang. Jak dotąd wspomnieliśmy tylko o korzyściach i czystych, odnawialnych aspektach energii wiatrowej, ale niewielu wspomniało o wpływie elektrowni wiatrowych na środowisko i zdrowie ludzi, a zwłaszcza emisji hałasu podczas pracy. W artykule wykorzystano oprogramowanie WindPro 3.1.597 do określenia stopnia oddziaływania hałasu emitowanego przez turbiny wiatrowe podczas pracy elektrowni wiatrowych, oceniając tym samym jego wpływ na zdrowie ludzi, lokalnych mieszkańców mieszkających w pobliżu obszaru objętego projektem i zaproponować środki zaradcze.*

**Słowa kluczowe:** energetyka wiatrowa, hałas, oddziaływanie na środowisko, wind power plant project No. 3 - Soc Trang province Vietnam- (miasto Ho Chi Minh, Wietnam)