



# Ynni Consulting Electrical Engineering services related to Wind Farm in France

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## *Electrical engineering services related to Wind Farm in France*

### *Feasibility study*

- *Basis of the design.*
- *Integration of new WF to the existing network.*

### *Wind Farm Design*

- *Conceptual design.*
- *Basic design.*
- *Detailed design.*

### *Grid Code Compliance*

- *RTE (225kV & 90kV)*
- *Enedis (20kV)*

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## **1. Feasibility study**

### **✓ Basis of the design.**

- *Gather the inputs necessary for the electrical design and integration studies.*
- *First design assumptions and choices (location, the point of connection, power, voltage level)*

### **✓ Integration of new WF to the existing network.**

- *Project characteristics,*
- *Grid characteristics,*
- *System modelling, including the new wind farm and the Grid.*
- *Analysis of grid capacity to absorb the new WF power without any issue.*

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## **2.Wind Farm Design**

### **✓ Conceptual design.**

- *Study several scenarios,*
- *Preliminary SLD*
- *Number of WTG*
- *Determine a technically and economically optimized design.*

### **✓ Basic design.**

- *Validation of the SLD*
- *Maximum cable section and number of WTG per array.*
- *Layout concept*
- *Equipment specifications*
- *Power system studies*
- *Technically & economically optimized design.*

### **✓ Detailed design.**

- *Validation of the SLD*
- *Validation of the design*
- *Equipment specifications & datasheet*
- *Power system studies*
- *Market consultation*
- *Validation of Suppliers*
- *Procurement processes*

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## **3.Grid Code Compliance**

### ✓ **RTE**

- *Voltage : 90/225kV (HTB)*
- *Power : > 40 MW*
- *Reactive power capability UQ-PQ Diagram*
- *Active power & frequency control*
- *Transient stability analysis*
- *Small signal stability analysis*
- *Harmonic & flicker analysis*
- *Transient insulation analysis*

### ✓ **Enedis**

- *Voltage : 15/20kV (HTA)*
- *Power : < 40 MW*
- *Reactive power capability PQ Diagram*
- *In accordance with NF C 13/15-100.*

*According to **Enedis-PRO-RES\_50E** : Principes d'étude et règles techniques pour le raccordement au Réseau Public de Distribution géré par Enedis d'une Installation de Consommation en HTA*

## *Electrical engineering services related to Wind Farm in France*

### **Main Tools:**

#### ✓ **DigSilent Power Factory**

- *Power flow*
- *Short circuit,*
- *Harmonic analysis,*
- *Transient stability*
- *...etc.*

#### ✓ **PSCAD, EMTP-RV**

- *Insulation coordination analysis*
- *Switching,*
- *Lightning*
- *...etc.*