INNOVATION FOR CHANGE | TOWARD A SMARTER GREEN ENERGY MANAGEMENT

How can we better forecast energy outputs from wind farms?

WHAT?_____

- Stringent regulations and an increased sensitivity regarding environmental issues pushes energy providers **toward an increased development in wind, solar and other forms of energies from renewable sources**

- **Weather forecasting matters for energy,** since inaccurate forecasting impacts production efficiency and profitability

- Today, a 15-20% of error in wind prediction results in **power plants operating with a reduced degree of efficiency** and at additional costs

- **Predicting wind accurately** well in advance would help reduce forecast error in power generation and reduce the need to adapt to such power production gap using traditional energy production plants

HOW?_____

- While many existing companies focus on offering forecasting services, **very few concentrate on measuring and obtaining the data.** Sensors are located in positions that are remote to wind farms – e.g. next to airports and in bigger cities

- We believe that we can **improve the accuracy of wind speed measurements** by **placing the right sensoring technology in the right locations** by making use of the existing infrastructure

- We offer a **customized sensors installation**, specifically located with the purpose to provide our clients with local wind prediction. The client is given the forecasting model output with a 5 days advance at an established accuracy level

Photo credits (right to left): Leosphere Windcube , Shaka sensor, Anenometer

WHY?_____

- One of the **global goals** is to ensure access to affordable, reliable, sustainable and modern energy for all

- In developed countries there is an excess of offer and a stagnant demand. **Optimization of the energy mix** that is poured into the electricity grid and efficient usage of current power plants is crucial

- By improving weather forecasting and reducing uncertainty, we can contribute in achieving **large reductions in the operational costs** required for balancing power generation

- The result would be a more effective use of renewable energy by ensuring a **smart installed capacity management** and an increased grid management

WHEN?_____

February 2016	Kick-off start @ CERN • Market Understanding • Wind Forecasting Research: Available technologies • First-line experience (interviews)
March 2016 April 2016	• Technology requirements • Data analysis • Output drafting (2 mock-ups) • Accuracy requirements
May 2016	• Third-party subcontractor research (data processing) • Sponsoring • Testing
June 2016	• Optimization

WHO ARE WE?_____

A multidisciplinary and international team composed by PhD and MBA students with backgrounds in Industrial, Electrical, Aerospace Engineering, Mathematics and Design working together to solve this challenge, which we believe could have a huge impact in the profitability of the wind energy industry

POLITECNICO DI TORINO

SAM Scuola di Alta Formazione al Management

CERN Ideas

enel

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Our schedule

7-20 Feb 16

1

Analysis
Direct interviews with different stakeholders: Enel, Datameteo, UniTo, DTU, Aeolis.
What we understood:

- Identifycation of useful time slots for wind forecasting: **3-5 days**.
- Importance of sensors **positioning**.
- Wind forcasting is important for the whole system: producers, grid operators and final users.

22 Feb – 26 Mar 2016

2

Alternatives:

Option 1- Better forecasting through better positioning (4 persons)
For the whole month:
1. Getting forecasting data from ilMeteo.it considering the time slot of 3-5 days.
2. Comparing those forecasted data with the actual ones day by day.
3. Contact ilMeteo.it to know the right position of thei sensors.
4. Analysing the accuracy related to the position (forecasting in loco vs. forcasting for interpolated positions).
5. Understanding the feasibility of our hypotesis.

Option 2- Raise public awareness about improved green energy production (3 persons)
Involving people to this theme leveraging on:
- Sustainability: minus CO_2
- Savings: lower levy related to electrical energy → lower bills.

1- 10 Apr 16

3

Results analysis (all together)
Have a better understanding of the best option between 1 and 2, based on resarch results.

10 Apr 19 Jun 16

4

Output implementation (all together)
Identify the best option to work on, maybe integrate them.
Considering possible third-party subcontractor, sponsorship
Testing.

20 Jun 16

5

Presentation
Impress the audience.