

# PROMOTING THE RENEWABLE REVOLUTION BY INSTALLING WIND TURBINES HAVING AN OBSERVATION PLATFORM

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**SUMMARY:** In Japan, the Great East Japan Earthquake and Tsunami was occurred on March 11, 2011. Over 18,000 people were killed and the followed meltdown accidents of the Fukushima Dai-ichi nuclear power stations of Tokyo Electric Power Company effected to national life and economic activities in Fukushima and Japan. Through the experience of the accidents, the most of Japanese people have awaked into the dangerous of the nuclear power generation plants but Japanese government and industrial world have not yet awoken. The author found the word “Renewable Revolution” at the time when visited to Grouse Mountain, Vancouver, Canada, for sighting the Eye of the Wind. In this presentation the author would like to introduce the meaning of the “Renewable Revolution” and the concept of the Eye of the Wind, because the author considers that extending the use of wind turbines, having an observation platform like the Eye of the Wind, is to contribute to promoting the “Renewable Revolution”.

**Keywords:** renewable energy, renewable revolution, wind power, observation platform, wind turbine

## INTRODUCTION

The symposium of RE2014 is an activity to extend the renewable energy usage to our daily life and industries in the world, and to especially in Japan. In Japan, the great terrible earthquake and tsunami was broken out on March 11, 2011. Over 18,000 people were died. And, the followed meltdown accidents of the Fukushima Dai-ichi nuclear power stations of Tokyo Electric Power Company damaged to national life and economic activities in Fukushima and whole of Japan. Through the experience of the accidents, the most of Japanese people have awaked into the dangerous of the nuclear power generation plants but Japanese government and industrial world have not yet awoken. The author found the word “Renewable Revolution” at the time when visited to Grouse Mountain, Vancouver, Canada, for sighting the Eye of the Wind.

In this presentation the author would like to introduce the word and meaning of the “Renewable Revolution” and the concept of the Eye of the Wind, through site-investigation[1]. Because, the author considers that extending the use of wind turbines having an observation platform like the Eye of the Wind is to contribute to promoting the aim of the “Renewable Revolution”, and in Japan that it is effective to revitalization from the great accidents and to make a renewable green community.

## THE EYE OF THE WIND

### Grouse Mountain

Grouse Mountain is one of the North Shore Mountains of the Pacific Ranges in North Vancouver, British Columbia, Canada. Exceeding 1,200 m in altitude at its peak, is the site of an alpine ski area in the winter season overlooking Greater Vancouver. In the summer, the mountain features lumberjack shows and a 2.9km hiking trail known as the Grouse Grind. Public access to the mountain top is by an aerial tramway [1, 2].

### The Eye of the Wind

Grouse Mountain has been developed as a mountain resort by Grouse Mountain Resorts Inc. The company has built a 1.5MW wind turbine, named as The Eye of the Wind, of Leitwind LTW77-1500 type with 65m hub height and 76.8m rotor diameter at the peak of the resort. The Eye of the Wind is an iconic structure located at the peak of Grouse Mountain in North Vancouver BC.



Figure 1 Photos of the Eye of the Wind, Wind Turbines, having an Observation Platform.

This unique renewable energy source can provide up to 25% of Grouse Mountain Resort's electricity needs. It also offers the visiting public the opportunity to experience an operational 1.5MW wind turbine from a viewing platform situated at the top of the tower.

### Characteristics of the Eye of the Wind

The design was recognized in the 2011 Consulting Engineers of British Columbia "Awards for Engineering Excellence". This award recognizes the structural engineering services of The Eye of the

Wind. This role required us to go beyond the typical design procedures used for conventional buildings and address the special loads, forces, and effects from the wind turbine. Innovative design solutions were developed and new approaches were taken in producing a safe and constructible design[3].

Construction of the turbine began in September 2008 as collaboration between Grouse Mountain and Italy's Leitwind Technology. The turbine weighs more than 250 ton and rises from its base to the top of the tower. Three 37.4 m, fiberglass reinforced polyester blades sweep an area of 4,657m<sup>2</sup>. The support tower includes an observation deck that is accessible by elevator[1, 2].

From a height equivalent to a 20-storey skyscraper, tower visitors can feel the platform moving in step with the nacelle as it turns to face into the prevailing wind. The revolving blades have a swept area the size of three NHL hockey rinks, pass within an arm's length of the platform, and have tip speeds that can reach 260km/hr. To ensure an acceptable level of safety, The Eye of the Wind meets the requirements of the British Columbia building code.

This is the first wind turbine in the world with an elevator[4]. The glassed-in viewing area will hold 37 people at a total elevation of 1,280m and will offer breathtaking views of the Lower Mainland. The A 360-degree viewing platform, with panoramic coastal views, will form part of a planned €100 million wind farm[5]. The foundation for this is 65m high structure. The actual foundation is anchored by 32 seismic anchor rods, which are 63mm in diameter and drilled 50ft into the bedrock. About 150m<sup>3</sup> of cement went into the foundation and 15,000kg of steel.

The Eye of the Wind was produced to showing a symbol for renewable innovation by over twenty companies of nine countries[4].

## **THE RENEWABLE REVOLUTION**

### **Scope of the Renewable Revolution**

A meaning of the "Renewable Revolution" is to achieve an aim to increase a percentage of renewable energy use by the year of 2030[6]. It is also to achieve the needed reductions in energy related carbon-dioxide (CO<sub>2</sub>) emission to the date. That is a way to achieve the final target to the "Sustainable Revolution" to build the sustainable society. The words of the "Renewable Revolution" and the "Sustainable Revolution" are not identified for everyone at the present day.

### **A Countermeasure to achieve the Renewable Revolution**

It is a long way to the renewable society because there are a different thinking in nations and people. The author thinks that a solution for the countermeasure against this state is effective by adapting characteristics of wind turbine, which have

an iconic scene as "media", produced due to rotating turbine blades.

At the great earthquake disaster stricken area of Japan, revival based on new vision is expected. By the energy, I can reproduce by the use of the natural energy as de-nuclear power generation, the non-fossilization and want to promote the revolution.

At this chance the wind turbine having an observation platform, like the Eye of the Wind, becomes an effective example as an innovative project in wind power generation in Japan. Particularly, by installing the FM radio station in the observation platform, it gives the revival areas broadcast of the local community and broadcast suffering information in the emergency more. In addition to it offers the place to view sightseeing. This creates receptiveness of the wind power generation and can help with the revolution.

Therefore, the author would like to perform a project to build the wind turbine, having an FM broadcasting station in an observation platform, in combination with the government revival plan, at three places in the suffering cities of three prefectures, Iwate, Miyagi, and Fukushima, of the Pacific side in Tohoku.

## **SUMMARY**

I proposed in the report to build wind turbines with the observation platform in the revival areas and to promote the "Renewable Revolution". The following six is important:

1. Installing wind turbines as the renewable energy into the revival areas.
2. Security and the reinforcement of the local community are necessary in the revival areas, and the wind turbine set up an FM broadcasting station.
3. Promoting wind power, the wind turbine with an observation platform makes its receptiveness.
4. Its observation platform may become a new sightseeing spot.
5. Selling of the wind-generated electricity is a usual function of this project.
6. It may be that it is easy by applying the Eye of the Wind and can perform the advanced example of the wind turbine with the above-mentioned complex functions.

## **References**

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