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Innovative public transport stop with autonomous power supply

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Considered the possibility of creating a public transport stop with autonomous power supply using solar panels and wind generator.

Currently, in many countries around the world, experts are working on creating innovative public transport stops. In Termez (Uzbekistan), stops have been built using modern construction materials, air conditioning, public transport schedule displays, information panel for emergency communication with the ambulance service, environmental monitoring sensor, free WiFi network, video cameras and phone charging devices, and ATMs have been installed [1].

At this kind of stops information about the number of people is collected and analyzed, which is important for estimating the passenger flow and timetable of passenger transport. There is a possibility of obtaining operational information about cases of violations of public order. Solar panels installed at the innovative stop provide lighting and electricity to USB ports for charging phones. Some stops can be equipped with trade and service points (Fig. 1).

Fig. 1. Innovative stop in the city of Termez

he company «XXI Century-TV» has developed an innovative stop for public transport (Fig. 2).

Fig. 2. Innovative stop for public transport

Specialists of the company «XXI Century-TV» developed an innovative project of a public transport stop with the possibility of automatic heating for waiting passengers. The complex is designed with several options and LED backlighting [2]. The first such stop is installed near the government building of the Moscow region in Krasnogorsk. The bench for waiting passengers has an infrared heater with a load sensor that activates as soon as any of the citizens waiting for public transport sits down on a seat. In future the design of this public transport stop will provide waiting people with WiFi connection.

LLC «LSTK−Ural» is a manufacturer of innovative stop pavilions and interactive sensor systems (Fig. 3).

Fig. 3. Smart Stop - LSTC - Ural (Chelyabinsk)

The innovative pavilions are equipped with LED lighting, adjustable heated benches, a touch screen with a city navigation system and the ability to display

advertising content, an electronic library, a news feed, a video surveillance camera, a WiFi access point, and vandal-resistant paintwork. For the first time in Russia, a 700 watt solar power station has been installed on a smart bus stop, which allows the stop to be fully autonomous in the summer and save up to 70% of electricity in the winter.

These pavilions are of closed type with infrared heaters and warm benches. An interactive counter with a super-bright display allows to inform the passengers about the arriving transport at the touch of a button. A map of the city with moving passenger transport in real time, as well as weather and advertising content is also displayed on the display [3].

An innovative public transport stops with autonomous power supply using solar panels and a wind generator are proposed. Such a stop will function all year round and its operation will not depend on the weather. Especially the stop will be effective in the Central Asian region, where there are many more sunny days per year than in other regions.

Fig. 4. shows the project of a public transport stop with an autonomous power supply using solar panels and a wind generator.

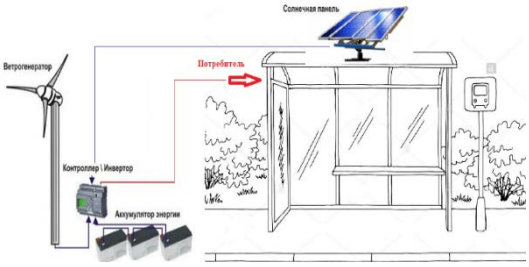

Fig. 4. Design of a public transport stop

Fig. 5. Vertical five−blade wind turbine generator with an airplane wing profile

Solar panels are installed on the roof of the bus stop. As an additional source of electrical energy a wind generator can be used. For the best use of wind energy a wind turbine of the vertical type is proposed (Fig. 5). The advantages of the vertical wind turbine are considered to be an increased service life and lower noise. At the same time, they have on average twice the service life and half the noise level.

The blades of a vertical wind turbine rotate parallel to the ground in any direction and strength of the wind. This type of wind turbine is

easier to install and maintain, because its gearbox and generator are placed on the ground. To achieve the maximum efficiency of this type of wind turbine should be installed on the curb between the roads with oncoming traffic. Fig. 6. shows the layout of wind turbines on the roads with two-way traffic.

Vertical wind generators are installed at a certain distance interval of about 4−5 m at special sites located on the curbs. Wind turbines are installed so that their blades do not interfere with the movement of passing cars. The cost of manufacturing and installation of such wind turbines on roads will be repaid in about 5−7 years.

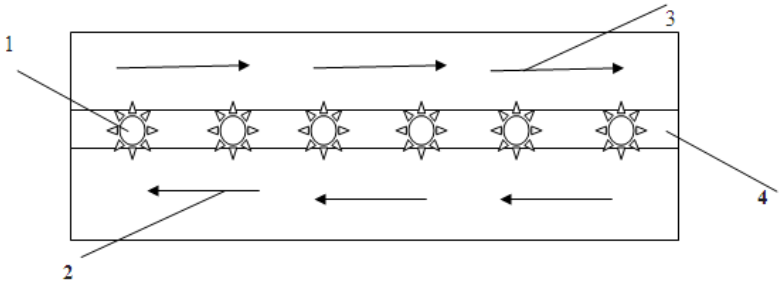

Fig. 6. Layout of wind turbine generators
on the roadway:
1 − wind generator; *2*, *3* − directions of movement of cars; *4* − curb

Practical implementation of the proposed project will make it possible to create public transport stops with autonomous power supply using solar panels and wind generator.

References

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