Available online at www.sciencedirect.com

ScienceDirect

Energy Procedia 118 (2017) 72–78

Energy Procedia

www.elsevier.com/locate/procedia

2nd International Conference on Advances on Clean Energy Research, ICACER 2017, 7-9 April 2017 Berlin, Germany

A Clean Energy Generation System Also a Free Air Cooler

Yee-Chang Feng*

Independent Energy Researcher/Inventor *15F-3, 35 Lane 126, Gongxue Rd., Taichung 402, Taiwan*

Abstract

This paper presents the concepts of a clean energy generation system also referred to as a free air cooler. The system has many subsidiary generation units in-tandem disposed in a common wind tunnel, using the wind tunnel's air flow as common working fluid. Each unit has its own air compressor, air turbine, heat pump, and generator, and works independently. The air compressor extracts air from its preceding unit's turbine and thus renders the turbine's outlet pressure P4 and outlet temperature T4 to descend. Lower T4 triggers the turbine to produce more output work which is proportional to turbine inlet/outlet air temperature difference T34(=T3-T4) as T3 remains unchanged, therefore a net useful work is obtained as soon as ΔT34 becomes larger. Heat pumps carry in heat energy from the external high-temperature source to the low-temperature air (as the sink) in wind tunnel, thus offsetting the energy extracted by the turbines. When air heat pumps are deployed, all evaporators cool down the ambient air passing through them, so the system is a free air cooler, too. The wind tunnel is fully thermally insulated for nearly zero-heat-loss. Most significantly, this is a zero-carbon-emission and fuel needless system, working as a cold thermal engine and using breakthrough and patented [1] technology continuously generating non-intermittent renewable energy to achieve an efficacious climate solution.

Peer-review under responsibility of the scientific committee of the 2nd International Conference on Advances on Clean Energy Research.

Keywords: clean energy; climate solution; compressor; energy efficiency; generator; heat pump; turbine; wind tunnel

* Corresponding author. Tel.: +886-975-751527
E-mail address: unipower@ms12.hinet.net

1876-6102
Peer-review under responsibility of the scientific committee of the 2nd International Conference on Advances on Clean Energy Research.
10.1016/j.egypro.2017.07.016

1. Introduction

This patented [1] system, or the WTT (=Wind-Tunnel-Turbine) system, has 'n' (n=2, 3, 4,⋯∞) units of identical or similar subsidiaries using common airflow, working in a common wind tunnel. See the two figures below:

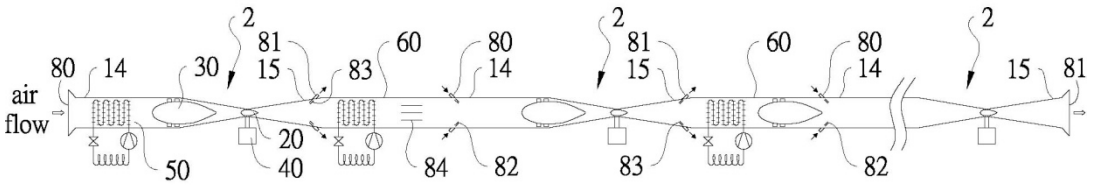

Fig. 1. A Clean Energy Generation System with Infinite Identical Subsidiary Units Each with Air Heat Pump

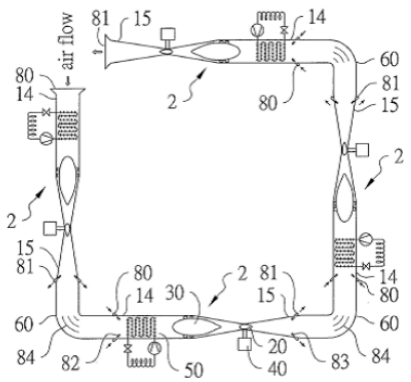

Fig. 2. A Clean Energy Generation System with Four Identical Subsidiary Units Each with Air Heat Pump

1.1. Five primary parts of each subsidiary power generation unit of WTT system:

1.1.1 Part of the Common Wind Tunnel (#2 as shown in Fig.1/Fig.2):

The wind tunnel is subsonic, atmospheric, continuous and open-loop-type. It is fully thermally insulated to prevent heat loss, and may work with airflow guide vanes (#84 as shown in Fig.1/Fig.2), and programmed air inlet/outlet vent valves (#80, #81, #82, and #83 as shown in Fig.1/Fig.2) to maintain smooth airstream moving in the wind tunnel.

1.1.2 Air Compressor (#30 as shown in Fig.1/Fig.2):

Its consumption work W_{CPS} is proportional to inlet/outlet air temperature difference ΔT_{12}, shown as below:

as $T_2=T_1\left(\frac{P_2}{P_1}\right)^{\left(1-\frac{1}{k}\right)}$

and thus,