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## Supplementary data

for

"Development of a new vacuum-based photovoltaic/thermal collector, thermal and exergy analyses"

## Exergy assessment at different wind speed.

An increase of wind speed had an impact on the thermal and electrical exergies at the same value of Re. When the wind speed increased from 1 to 6 ms<sup>-1</sup> at Re =50, the electrical exergy was increased with the increase of the wind speed. In contrast, the increase of the wind speed led to a reduction in the thermal exergy at the same value of Re = 50. As shown in Fig.1-a and Fig. 1-b, respectively. The same impact of wind speed on thermal and electrical exergies is observed for both new and conventional PV/Thermal. However, it is worth mentioning that when the wind speed increases from 1 to 6 m/sec, a 13.3% reduction occurred on the new VPV/T total exergy where it was about 16 % in the case of conventional PV/T system. This clarifies the benefits of the new design and exergy stability at higher wind speed compared to the conventional PV/T system. At a wind speed of 1 m/s and Re =50, the maximum total gained exergy was 64.8 W and 49.5 W for VPV/T and conventional PV/T system, respectively. Based on Fig. 1-c and Fig. 1-d, the VPV/T system also accomplished higher total exergy efficiency compared to the PV/T system at the same wind speed.



Fig. 1 Variation of (a) exergy for new VPV/T system (b) exergy of the conventional PV/T system (c) exergy efficiency for new VPV/T system (b) exergy efficiency of the conventional PV/T system at different wind speed.