Dust effect on solar panel efficiency in Oman

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Agenda

1) History of solar panel
2) Definition of solar panel
3) Problem statement
4) Objectives
5) Factors affect solar panel performance
6) Case study & Methodology
7) Results
8) Discussion
9) Conclusion

1) History of solar panel

- Edmond Becquerel 1839

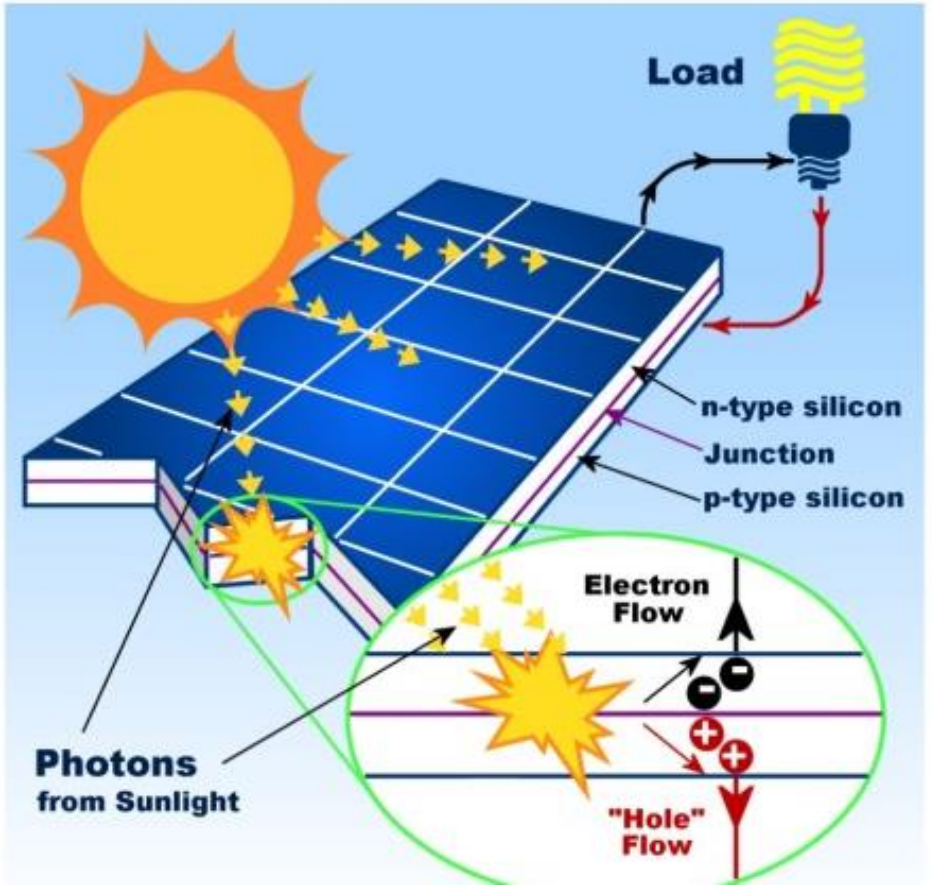
First scientist found that metals can generate electricity when sun rays fall on it.

- Ohl Russel 1954

First solar cell was made, and it is made from Silicon

2) Definition of solar panel

- An instrument made from Silicon converting sunlight to electricity
- Positive-layer
- Negative-layer
- P-N junction



3) Problem statement

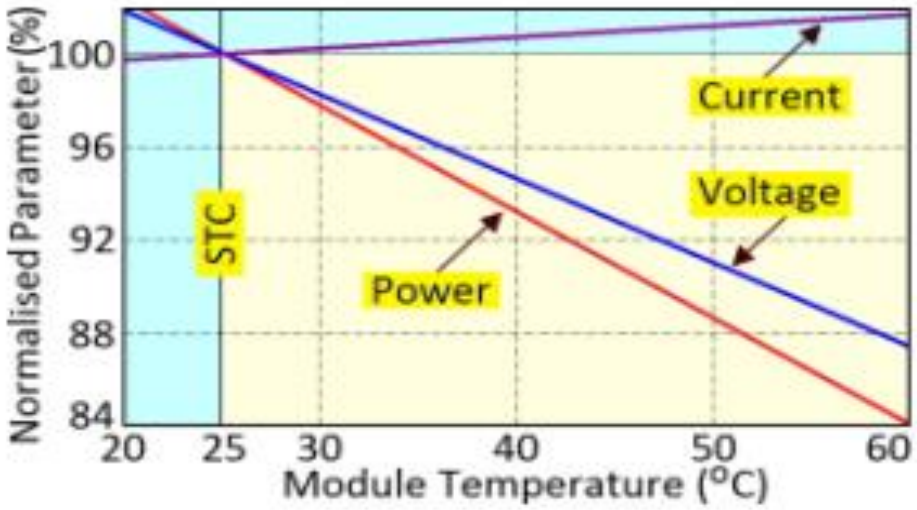
- Low production of electricity by solar cells in dusty area
- Dust impact on solar cells parameters

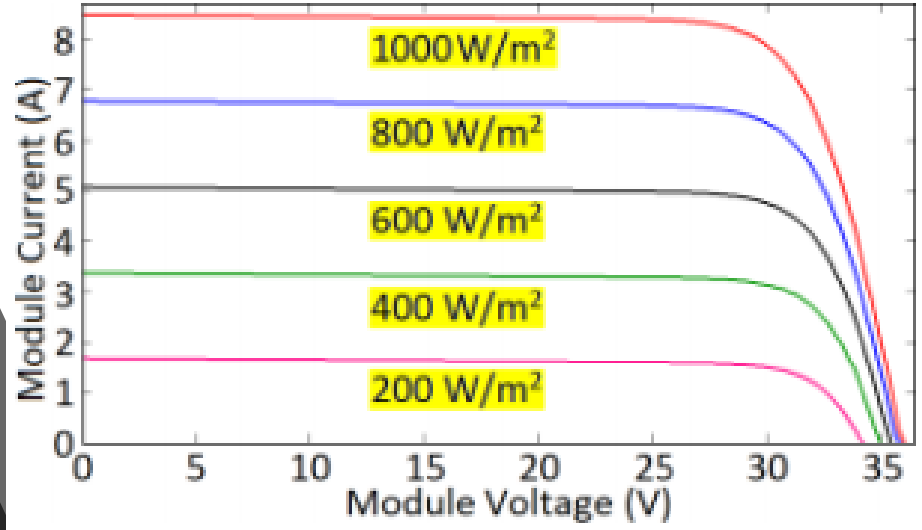
4) Objectives

- Investigate the effect of dust on solar cells voltage and current
- Investigate the effect of dust on solar cells efficiency
- Number of wash needed for dusty solar cells per month

5) Factors affect solar panel performance

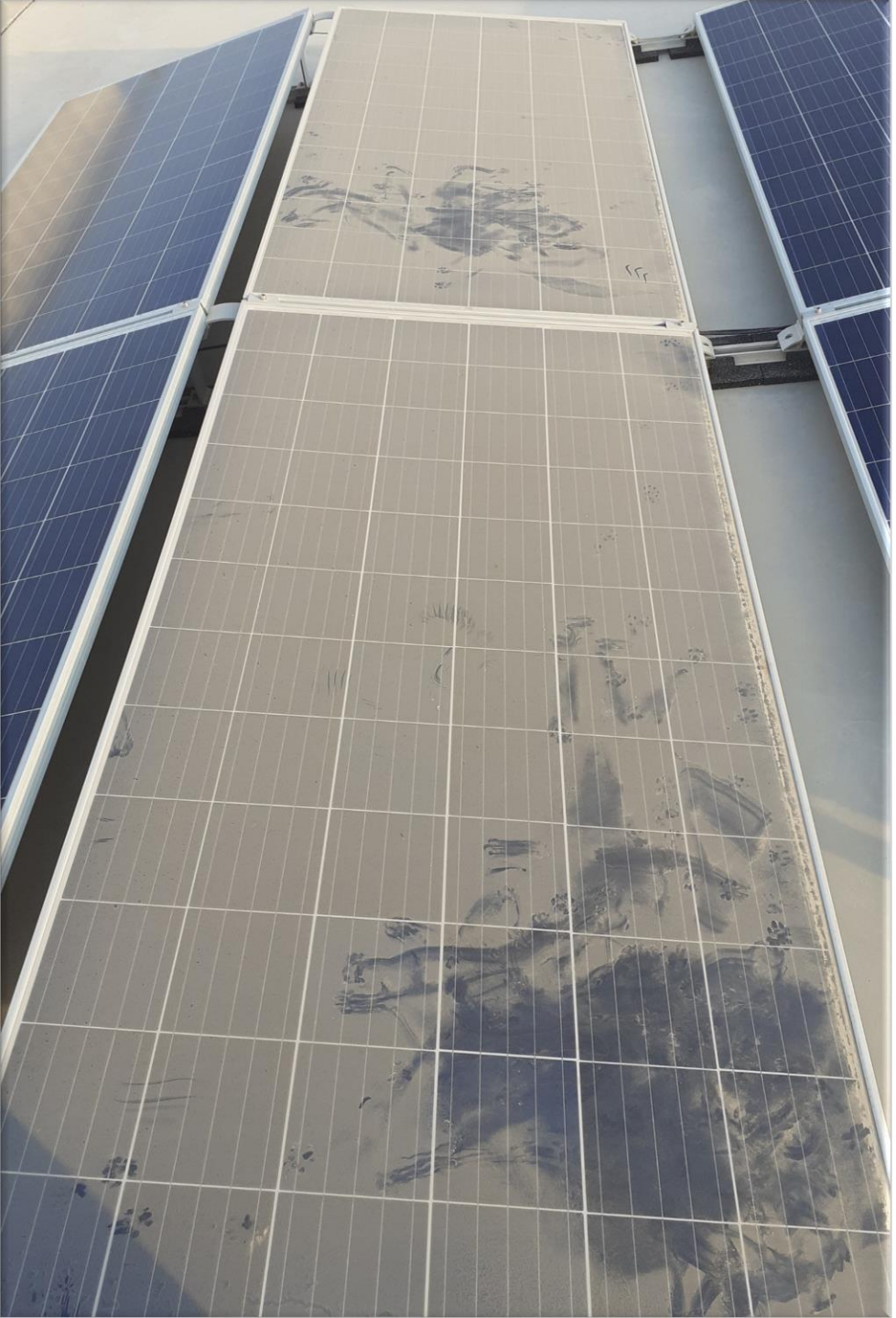
- Temperature
- Irradiance
- Shading
- Dust





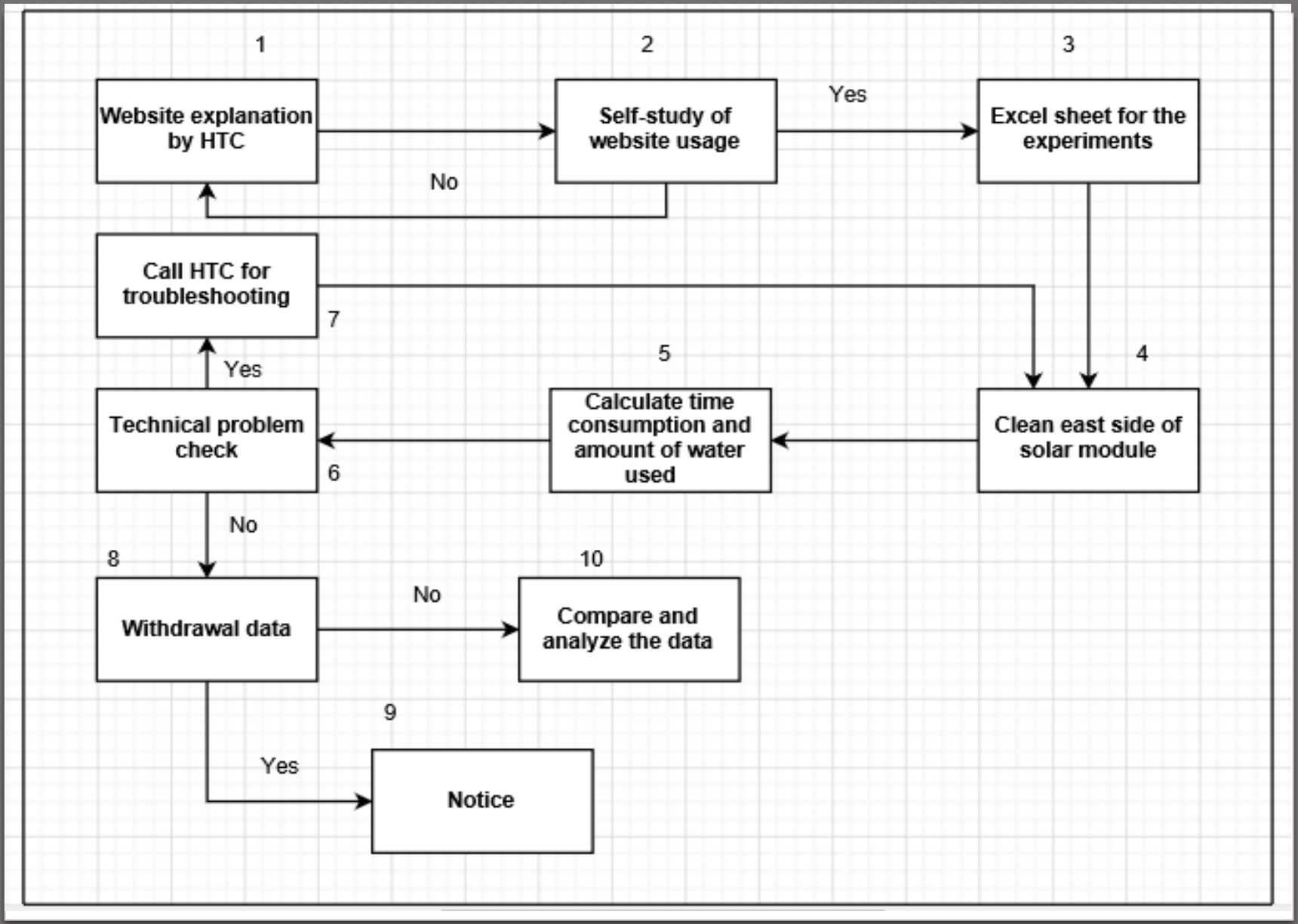
6) Case study & Methodology

- System Components
  - Solar panel technology
  - Inverter
  - Sensors
- Location of the site
- Website



6) Case study & Methodology

1. Site explanation by Dr.Ali
2. Solar cell facility (East-west) (Inverter-2 MPPT)
3. Agreement of wash side and cleaning method of solar cells
4. Investigate the parameter to be examined for the study
5. Agreement of cleaning solar panels duration
6. Visiting the site for assuring cleaning methodology

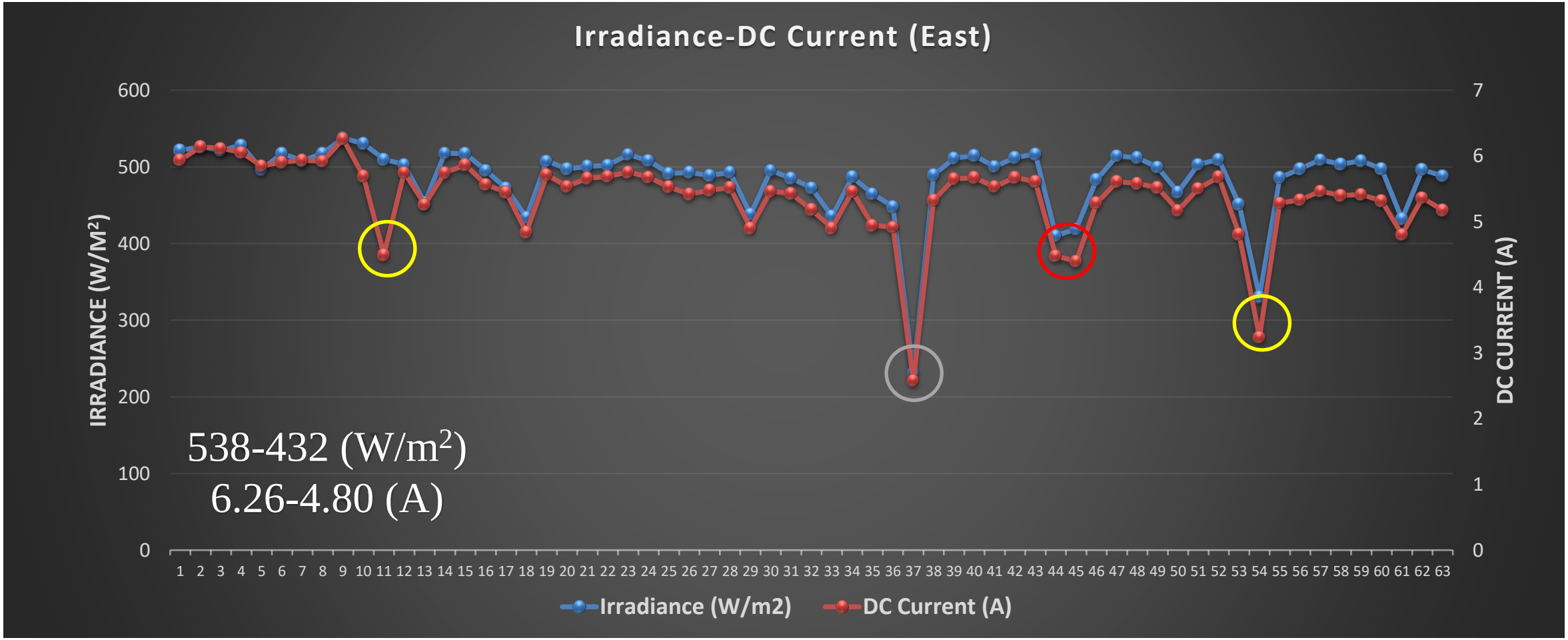


6) Case study & Methodology

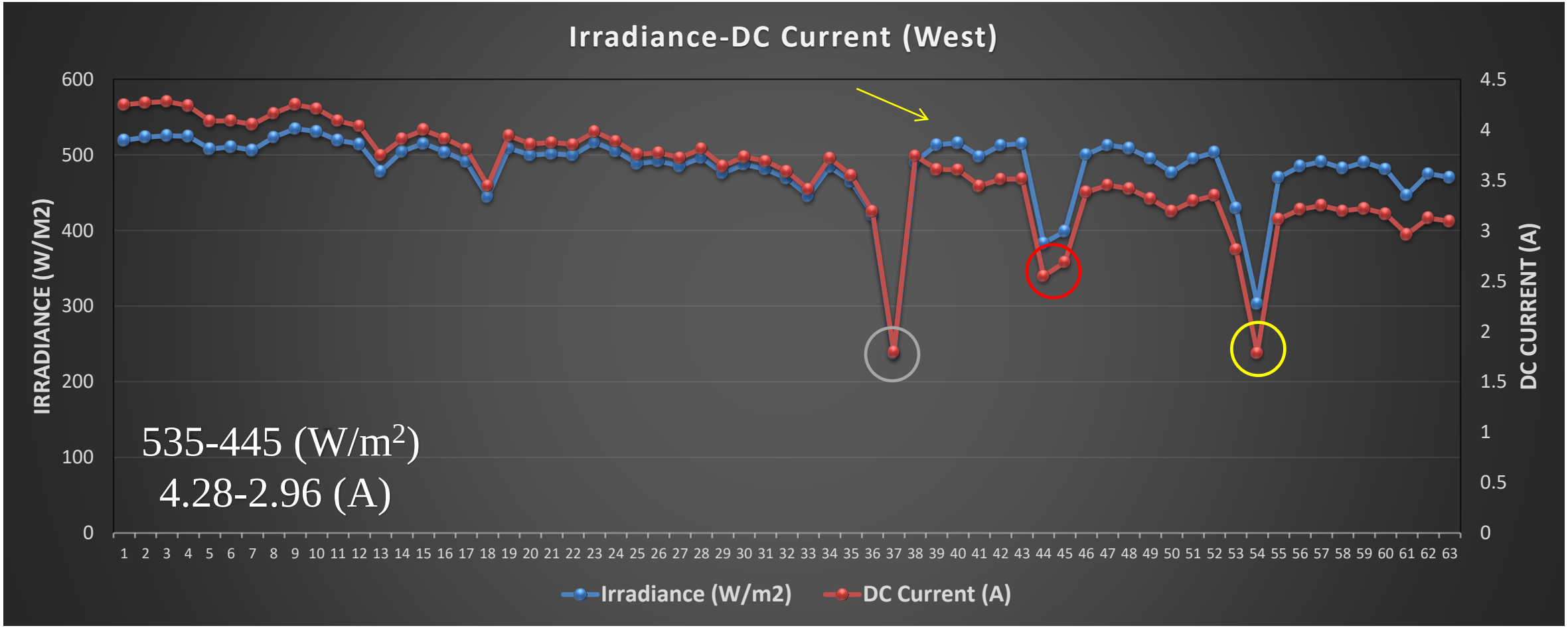
7) Results

- Only East panels are cleaned
- Results collected (4th June- 5th August)
- Not cleaned both side panels (25th of June -10th of July)

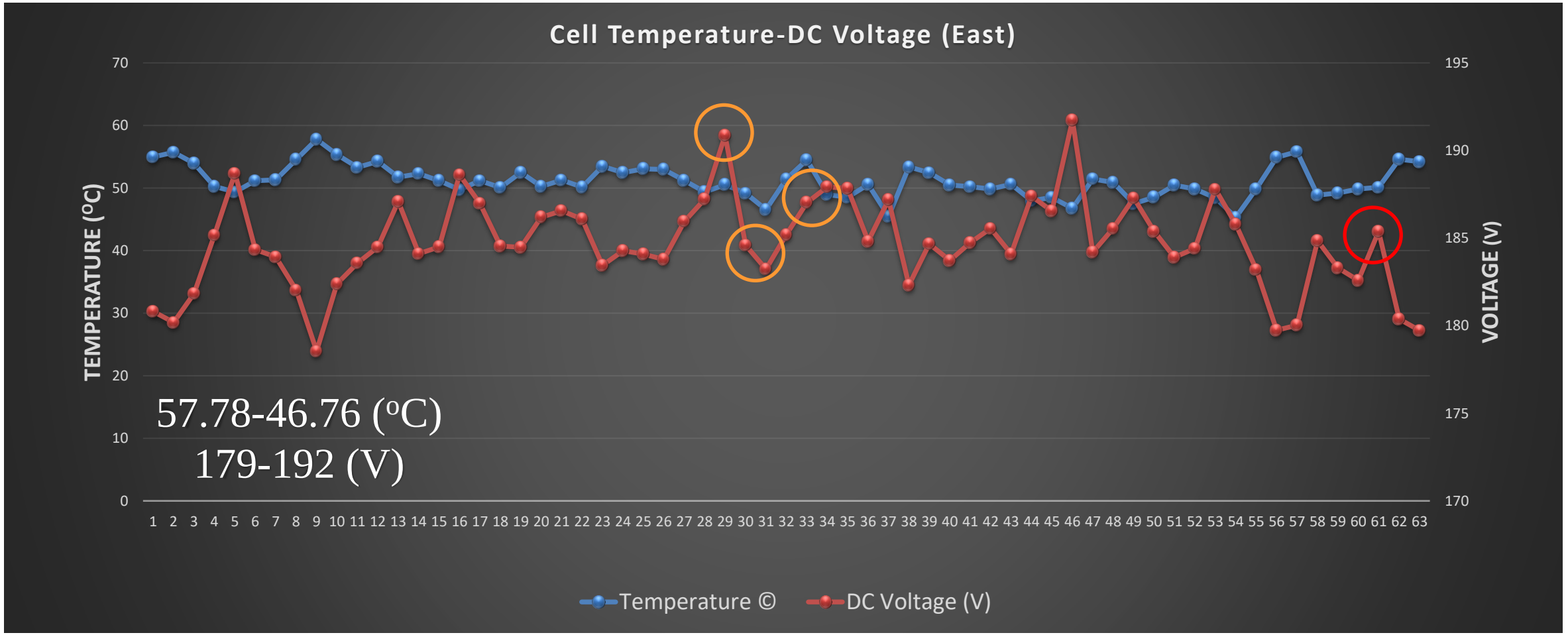
A. Cleaned panels results



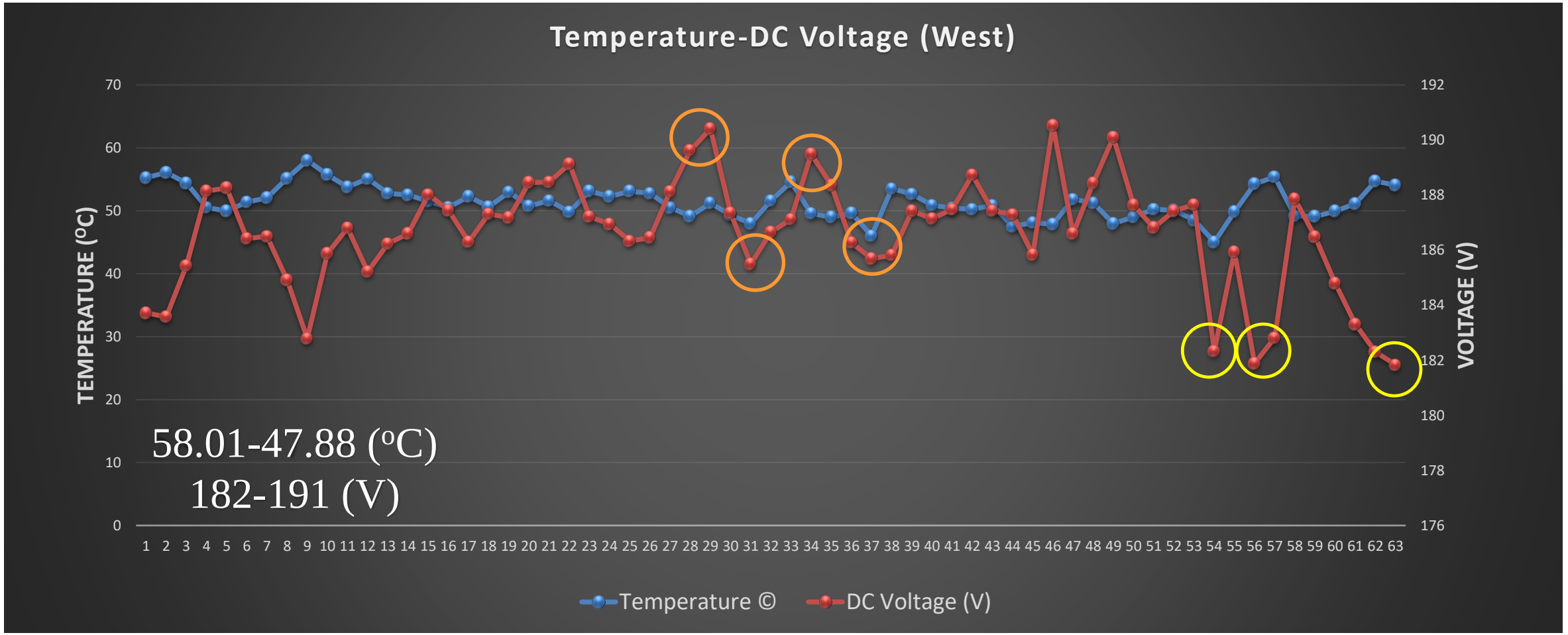
A. Non-cleaned panels results



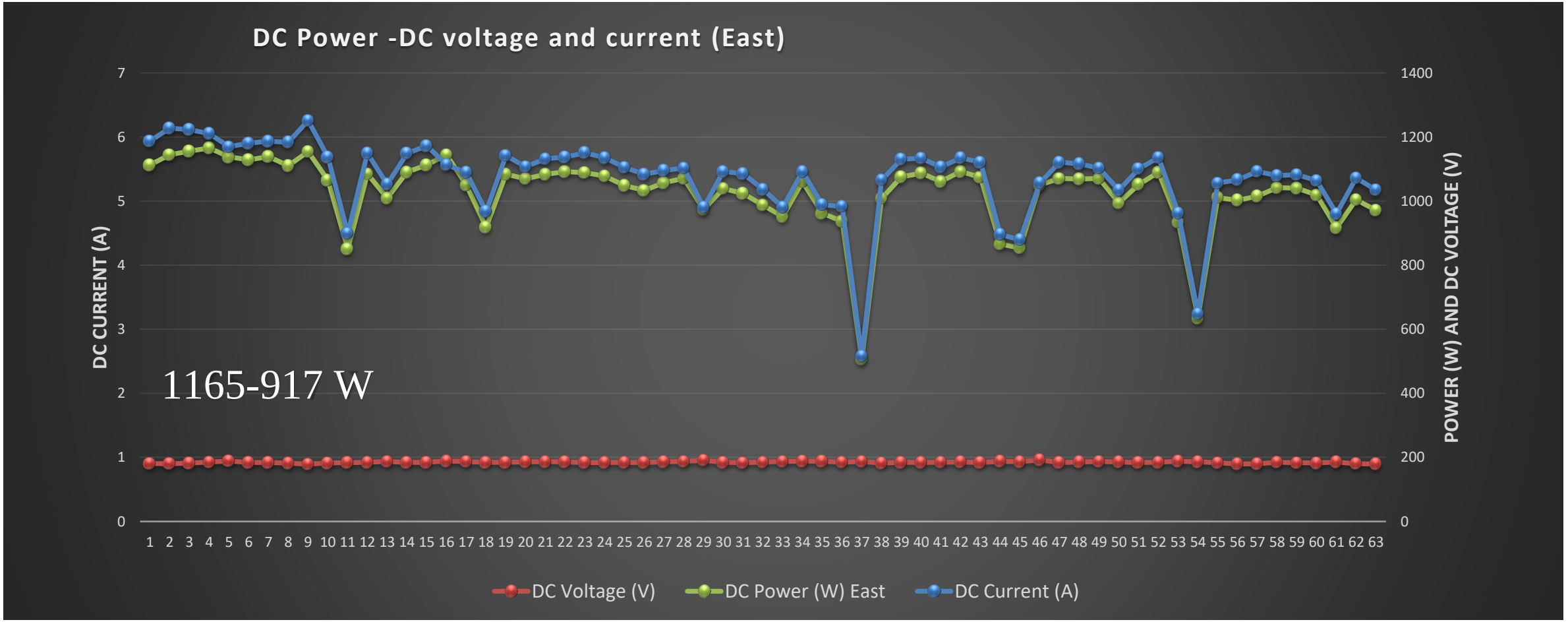
B. Cleaned panels results



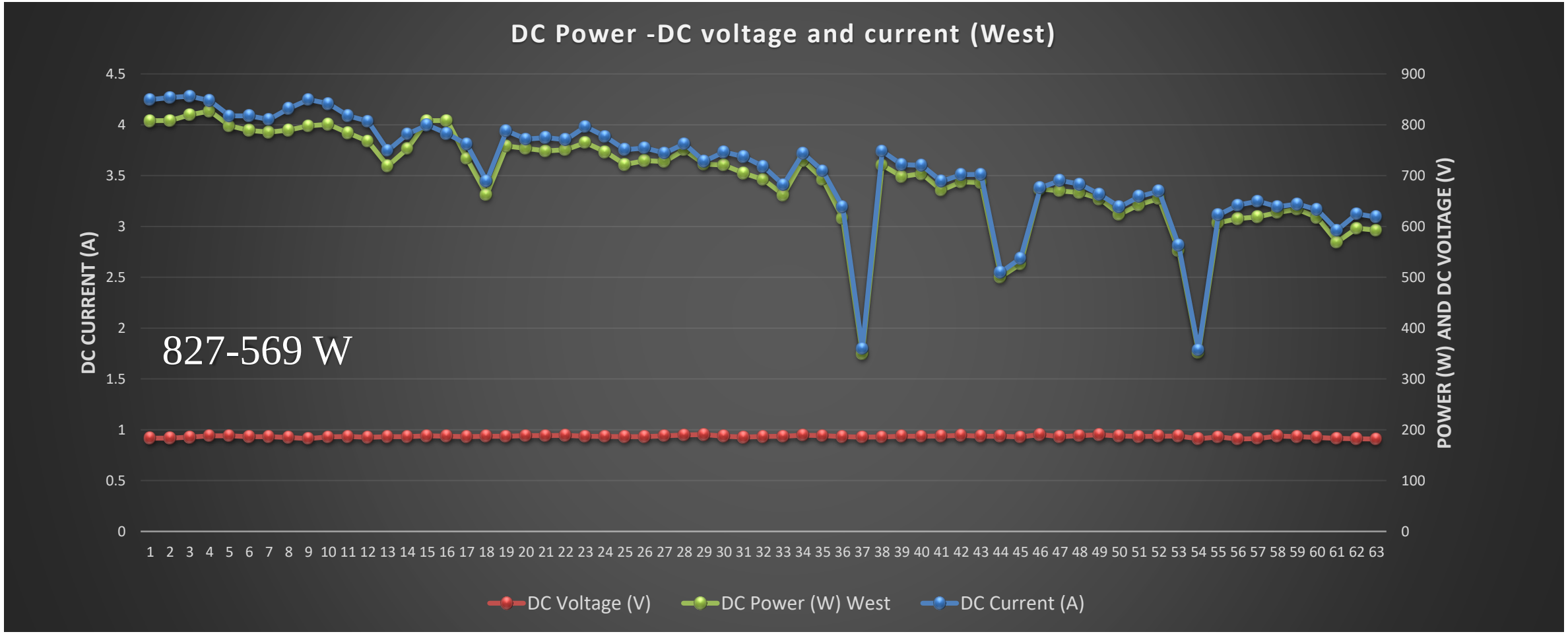
B. Non-cleaned panels results



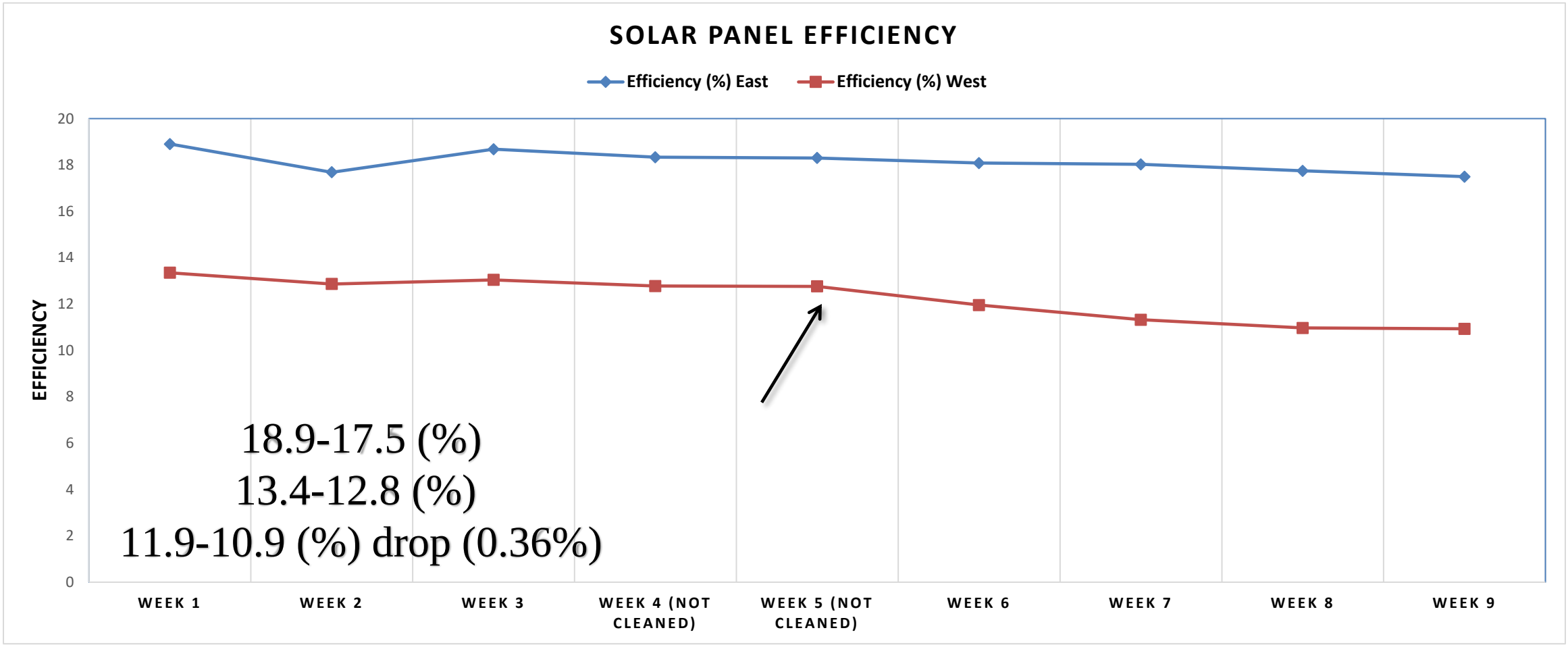
C. Cleaned panels results



C. Non-cleaned panels results



D. Solar panel efficiency results



8) Discussion

1. Almost constant values of voltage
2. Power change with changing in current
3. The efficiency of west solar cells started to drop (week five)
4. Low efficiency and power of west solar cells compared to east solar cells

9) Conclusion and Future Improvement

1. The dust on solar panel influence only irradiance
2. The solar panel losses high power due to dust
3. West solar cell can produce more efficiency if it is cleaned
4. Solar panel should be cleaned monthly
5. Sensors should be cleaned
6. Use self-cleaning coating
7. Make experiments in another sites

Thanks for your attention

Any question?
Comments?

References

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