Data Dictionary

Name	Description	Remarks
1. Establishment of 75 building cases	Basic information of 75 building cases with building integrated PV glazing system	Column A_Range of SVF: Data type_Text Column B_No. of Buildings in Each SVF Range with Different Orientations: Data type_Text Column C_Conversion Efficiency: Data type_Text Column D_Total Building Cases: Data type_Numeric
2. Comparison on PV/T electricity and thermal energy by EnergyPlus	Comparison on PV/T electricity and thermal energy between measurement and simulation result by EnergyPlus	Column A_Date: Data type_Text Column B_Electricity Energy Generated (MJ) Measurement: Data type_Numeric Column C_Electricity Energy Generated (MJ) Simulation: Data type_Numeric Column D_% Difference: Data type_Numeric Column E_Thermal Energy Generated (MJ) Measurement: Data type_Numeric Column F_Thermal Energy Generated (MJ) Simulation: Data type_Numeric Column G_% Difference: Data type_Numeric
3. Comparison on PV/T electricity and thermal energy by TRNSYS	Comparison on PV/T electricity and thermal energy between measurement and simulation result by TRNSYS	Column A_Date: Data type_Text Column B_Electricity Energy Generated (MJ) Measurement: Data type_Numeric Column C_Electricity Energy Generated (MJ) Simulation: Data type_Numeric Column D_% Difference: Data type_Numeric Column E_Thermal Energy Generated (MJ) Measurement: Data type_Numeric Column F_Thermal Energy Generated (MJ) Simulation: Data type_Numeric Column G_% Difference: Data type_Numeric

4. EnergyPlus (PV electricity energy generated) cell efficiency 20	Summary of simulation results by EnergyPlus (PV electricity energy generated) for 25 building cases with and without ASE, cell efficiency = 20%.	Column A_ Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_PV Ele. Generated w/o ASE (MJ): Data type_Numeric Column F_PV Ele. Generated w/ ASE (MJ): Data type_Numeric Column G_Difference (MJ): Data type_Numeric Column H_ Difference (%): Data type_Numeric
5. EnergyPlus (saving in building cooling load) for 25 building cases	Summary of simulation results by EnergyPlus (saving in building cooling load) for 25 building cases with and without ASE	Column A_ Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_Saving in Cooling Load w/o ASE (MJ): Data type_Numeric Column F_Saving in Cooling Load w/ ASE (MJ): Data type_Numeric Column G_Difference (MJ): Data type_Numeric Column H_ Difference (%): Data type_Numeric
6. EnergyPlus (PV electricity energy generated) cell efficiency 15	Summary of simulation results by EnergyPlus (PV electricity energy generated) for 25 building cases with and without ASE, cell efficiency = 15%	Column A_ Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_PV Ele. Generated w/o ASE (MJ): Data type_Numeric Column F_PV Ele. Generated w/ ASE (MJ): Data type_Numeric Column G_Difference (MJ): Data type_Numeric Column H_ Difference (%): Data type_Numeric

7. EnergyPlus (PV electricity energy generated) cell efficiency 10	Summary of simulation results by EnergyPlus (PV electricity energy generated) for 25 building cases with and without ASE, cell efficiency = 10%	Column A_ Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_PV Ele. Generated w/o ASE (MJ): Data type_Numeric Column F_PV Ele. Generated w/ ASE (MJ): Data type_Numeric Column G_Difference (MJ): Data type_Numeric Column H_ Difference (%): Data type_Numeric
8. Electricity energy generated by free-standing PV system R1 EnergyPlus	Electricity energy generated by free-standing PV system (with and without ASE) in building roof R1 (by EnergyPlus)	Column A_Month: Data type_Text Column B_Electricity Generated (MJ) w/o ASE: Data type_Numeric Column C_Electricity Generated (MJ) w/ ASE: Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric
9. Electricity energy generated by free-standing PV system R2 EnergyPlus	Electricity energy generated by free-standing PV system (with and without ASE) in building roof R2 (by EnergyPlus)	Column A_Month: Data type_Text Column B_Electricity Generated (MJ) w/o ASE: Data type_Numeric Column C_Electricity Generated (MJ) w/ ASE: Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric
10. Electricity energy generated by free-standing PV system R3 EnergyPlus	Electricity energy generated by free-standing PV system (with and without ASE) in building R3 (by EnergyPlus)	Column A_Month: Data type_Text Column B_Electricity Generated (MJ) w/o ASE: Data type_Numeric Column C_Electricity Generated (MJ) w/ ASE: Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric

11. Electricity and thermal energy generated by free-standing PV/T system R1 EnergyPlus	Electricity and thermal energy generated by free-standing PV/T system (with and without ASE) in building roof R1 (by EnergyPlus)	Column A_Month: Data type_Text Column B_Electricity Generated MJ (w/o ASE): Data type_Numeric Column C_Electricity Generated MJ (w/ ASE): Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric Column F_Thermal Energy Generated MJ (w/o ASE): Data type_Numeric Column G_Thermal Energy Generated MJ (w/ ASE): Data type_Numeric Column H_Difference (MJ): Data type_Numeric Column I_Difference (%): Data type_Numeric
12. Electricity and thermal energy generated by free-standing PV/T system R2 EnergyPlus	Electricity and thermal energy generated by free-standing PV/T system (with and without ASE) in building roof R2 (by EnergyPlus)	Column A_Month: Data type_Text Column B_Electricity Generated MJ (w/o ASE): Data type_Numeric Column C_Electricity Generated MJ (w/ ASE): Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric Column F_Thermal Energy Generated MJ (w/o ASE): Data type_Numeric Column G_Thermal Energy Generated MJ (w/ ASE): Data type_Numeric Column H_Difference (MJ): Data type_Numeric Column I_Difference (%): Data type_Numeric

13. Electricity and thermal energy generated by free-standing PV/T system R3 EnergyPlus	Electricity and thermal energy generated by free-standing PV/T system (with and without ASE) in building roof R3 (by EnergyPlus)	Column A_Month: Data type_Text Column B_Electricity Generated MJ (w/o ASE): Data type_Numeric Column C_Electricity Generated MJ (w/ ASE): Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric Column F_Thermal Energy Generated MJ (w/o ASE): Data type_Numeric Column G_Thermal Energy Generated MJ (w/ ASE): Data type_Numeric Column H_Difference (MJ): Data type_Numeric Column I_Difference (%): Data type_Numeric
14. Energy payback time building case 1 with ASE EnergyPlus	Calculation of energy payback time for building case no. 1 with ASE (by EnergyPlus)	Column A_No.: Data type_Numeric Column B_Material: Data type_Text Column C_Embodied Energy Intensity (MJ/m2): Data type_Numeric Column D_Area (m2): Data type_Numeric Column E_Embodied Energy (MJ): Data type_Numeric Column F_Total Embodied Energy: Data type_Numeric Column G_Annual Energy Generated: Data type_Numeric Column H_Energy Payback Time (EPBT) (yr.): Data type_Numeric
15. Energy payback time 25 building cases cell efficiency 20 EnergyPlus	Summary of energy payback time for 25 building cases with and without ASE, cell efficiency = 20% (by EnergyPlus)	Column A_Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_EPBT w/o ASE (yrs.): Data type_Numeric Column F_EPBT w/ ASE (yrs.): Data type_Numeric Column G_Difference (yrs.): Data type_Numeric

16. Energy payback time 25 building cases cell efficiency 15 EnergyPlus	Summary of energy payback time for 25 building cases with and without ASE, cell efficiency = 15% (by EnergyPlus)	Column A_Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_EPBT w/o ASE (yrs.): Data type_Numeric Column F_EPBT w/ ASE (yrs.): Data type_Numeric Column G_Difference (yrs.): Data type_Numeric
17. Energy payback time 25 building cases cell efficiency 10 EnergyPlus	Summary of energy payback time for 25 building cases with and without ASE, cell efficiency = 10% (by EnergyPlus)	Column A_Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_EPBT w/o ASE (yrs.): Data type_Numeric Column F_EPBT w/ ASE (yrs.): Data type_Numeric Column G_Difference (yrs.): Data type_Numeric
18. Energy payback time R1 with PV system under ASE EnergyPlus	Calculation of energy payback time for building roof R1 with PV system under ASE (by EnergyPlus)	Column A_No.: Data type_Numeric Column B_Material: Data type_Text Column C_Embodied Energy Intensity (MJ/kg or MJ/m2): Data type_Numeric Column D_Mass (kg) or Area (m2): Data type_Numeric Column E_Embodied Energy (MJ): Data type_Numeric Column F_Total Embodied Energy: Data type_Numeric Column G_Annual Energy Generated: Data type_Numeric Column H_Energy Payback Time (EPBT) (yr.): Data type_Numeric

19. Energy payback time R1 with PVT system under ASE EnergyPlus	Calculation of energy payback time for building roof R1 with PV/T system under ASE (by EnergyPlus)	Column A_No.: Data type_Numeric Column B_Material: Data type_Text Column C_Embodied Energy (MJ/kg or MJ/m2): Data type_Numeric Column D_Mass (kg) or Area (m2): Data type_Numeric Column E_Embodied Energy (MJ): Data type_Numeric Column F_Total Embodied Energy: Data type_Numeric Column G_Annual Energy Generated: Data type_Numeric Column H_Energy Payback Time (EPBT) (yr.): Data type_Numeric
20. Energy payback time R1 – R3 with PV and PVT EnergyPlus	Summary of energy payback time for building roofs R1 – R3 with PV and PV/T systems (by EnergyPlus)	Column A_Location: Data type_Text Column B_PV Type: Data type_Text Column C_Energy Payback Time (w/o ASE): Data type_Numeric Column D_Energy Payback Time (w/ ASE): Data type_Numeric
21. A III-1 PV electricity energy generated 25 building cases cell efficiency 20 TRNSYS	A III-1 Summary of simulation results (PV electricity energy generated) for 25 building cases with and without ASE, cell efficiency = 20% (by TRNSYS)	Column A_ Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_PV Ele. Generated w/o ASE (MJ): Data type_Numeric Column F_PV Ele. Generated w/ ASE (MJ): Data type_Numeric Column G_Difference (MJ): Data type_Numeric Column H_ Difference (%): Data type_Numeric

22. A III-2 Saving in building cooling load 25 building cases TRNSYS	Summary of simulation results (saving in building cooling load) for 25 building cases with and without ASE (by TRNSYS)	Column A_ Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_Saving in Cooling Load w/o ASE (MJ): Data type_Numeric Column F_Saving in Cooling Load w/ ASE (MJ): Data type_Numeric Column G_Difference (MJ): Data type_Numeric Column H_ Difference (%): Data type_Numeric
23. A III-3 PV electricity energy generated 25 building cases cell efficiency 15 TRNSYS	Summary of simulation results (PV electricity energy generated) for 25 building cases with and without ASE, cell efficiency = 15% (by TRNSYS)	Column A_ Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_PV Ele. Generated w/o ASE (MJ): Data type_Numeric Column F_PV Ele. Generated w/ ASE (MJ): Data type_Numeric Column G_Difference (MJ): Data type_Numeric Column H_ Difference (%): Data type_Numeric
24. A III-4 PV electricity energy generated 25 building cases cell efficiency 10 TRNSYS	Summary of simulation results (PV electricity energy generated) for 25 building cases with and without ASE, cell efficiency = 10% (by TRNSYS)	Column A_ Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_PV Ele. Generated w/o ASE (MJ): Data type_Numeric Column F_PV Ele. Generated w/ ASE (MJ): Data type_Numeric Column G_Difference (MJ): Data type_Numeric Column H_ Difference (%): Data type_Numeric

25. A IV–1 Electricity energy generated PV system R1 TRNSYS	Electricity energy generated by free-standing PV system (with and without ASE) in building roof R1 (by TRNSYS)	Column A_Month: Data type_Text Column B_Electricity Generated (MJ) w/o ASE: Data type_Numeric Column C_Electricity Generated (MJ) w/ ASE: Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric
26. A IV–2 Electricity energy generated PV system R2 TRNSYS	Electricity energy generated by free-standing PV system (with and without ASE) in building roof R2 (by TRNSYS)	Column A_Month: Data type_Text Column B_Electricity Generated (MJ) w/o ASE: Data type_Numeric Column C_Electricity Generated (MJ) w/ ASE: Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric
27. A IV–3 Electricity energy generated PV system R3 TRNSYS	Electricity energy generated by free-standing PV system (with and without ASE) in building roof R3 (by TRNSYS)	Column A_Month: Data type_Text Column B_Electricity Generated (MJ) w/o ASE: Data type_Numeric Column C_Electricity Generated (MJ) w/ ASE: Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric

28. A IV–4 Electricity and thermal energy generated PVT system R1 TRNSYS	Electricity and thermal energy generated by free-standing PV/T system (with and without ASE) in building roof R1 (by TRNSYS)	Column A_Month: Data type_Text Column B_Electricity Generated MJ (w/o ASE): Data type_Numeric Column C_Electricity Generated MJ (w/ ASE): Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric Column F_Thermal Energy Generated MJ (w/o ASE): Data type_Numeric Column G_Thermal Energy Generated MJ (w/ ASE): Data type_Numeric Column H_Difference (MJ): Data type_Numeric Column I_Difference (%): Data type_Numeric
29. A IV–5 Electricity and thermal energy generated PVT system R2 TRNSYS	Electricity and thermal energy generated by free-standing PV/T system (with and without ASE) in building roof R2 (by TRNSYS)	Column A_Month: Data type_Text Column B_Electricity Generated MJ (w/o ASE): Data type_Numeric Column C_Electricity Generated MJ (w/ ASE): Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric Column F_Thermal Energy Generated MJ (w/o ASE): Data type_Numeric Column G_Thermal Energy Generated MJ (w/ ASE): Data type_Numeric Column H_Difference (MJ): Data type_Numeric Column I_Difference (%): Data type_Numeric

30. A IV–6 Electricity and thermal energy generated PVT system R3 TRNSYS	Electricity and thermal energy generated by free-standing PV/T system (with and without ASE) in building roof R3 (by TRNSYS)	Column A_Month: Data type_Text Column B_Electricity Generated MJ (w/o ASE): Data type_Numeric Column C_Electricity Generated MJ (w/ ASE): Data type_Numeric Column D_Difference (MJ): Data type_Numeric Column E_Difference (%): Data type_Numeric Column F_Thermal Energy Generated MJ (w/o ASE): Data type_Numeric Column G_Thermal Energy Generated MJ (w/ ASE): Data type_Numeric Column H_Difference (MJ): Data type_Numeric Column I_Difference (%): Data type_Numeric
31. A V-1 Energy payback time 25 building cases cell efficiency 20 TRNSYS	Summary of energy payback time for 25 building cases with and without ASE, cell efficiency = 20% (by TRNSYS)	Column A_Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_EPBT w/o ASE (yrs.): Data type_Numeric Column F_EPBT w/ ASE (yrs.): Data type_Numeric Column G_Difference (yrs.): Data type_Numeric
32. A V-2 Energy payback time 25 building cases cell efficiency 15 TRNSYS	Summary of energy payback time for 25 building cases with and without ASE, cell efficiency = 15% (by TRNSYS)	Column A_Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_EPBT w/o ASE (yrs.): Data type_Numeric Column F_EPBT w/ ASE (yrs.): Data type_Numeric Column G_Difference (yrs.): Data type_Numeric

33. A V-3 Energy payback time 25 building cases cell efficiency 10 TRNSYS	Summary of energy payback time for 25 building cases with and without ASE, cell efficiency = 10% (by TRNSYS)	Column A_Building No.: Data type_Numeric Column B_SVF: Data type_Numeric Column C_Orientation: Data type_Text Column D_PV Glazing Area (m2): Data type_Numeric Column E_EPBT w/o ASE (yrs.): Data type_Numeric Column F_EPBT w/ ASE (yrs.): Data type_Numeric Column G_Difference (yrs.): Data type_Numeric
34. A VI-1 Energy payback time R1 – R3 with PV and PV/T systems TRNSYS	Summary of energy payback time for building roofs R1 – R3 with PV and PV/T systems (by TRNSYS)	Column A_Location: Data type_Text Column B_PV Type: Data type_Text Column C_Energy Payback Time (w/o ASE): Data type_Numeric Column D_Energy Payback Time (w/ ASE): Data type_Numeric

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