

pytrnsys suite

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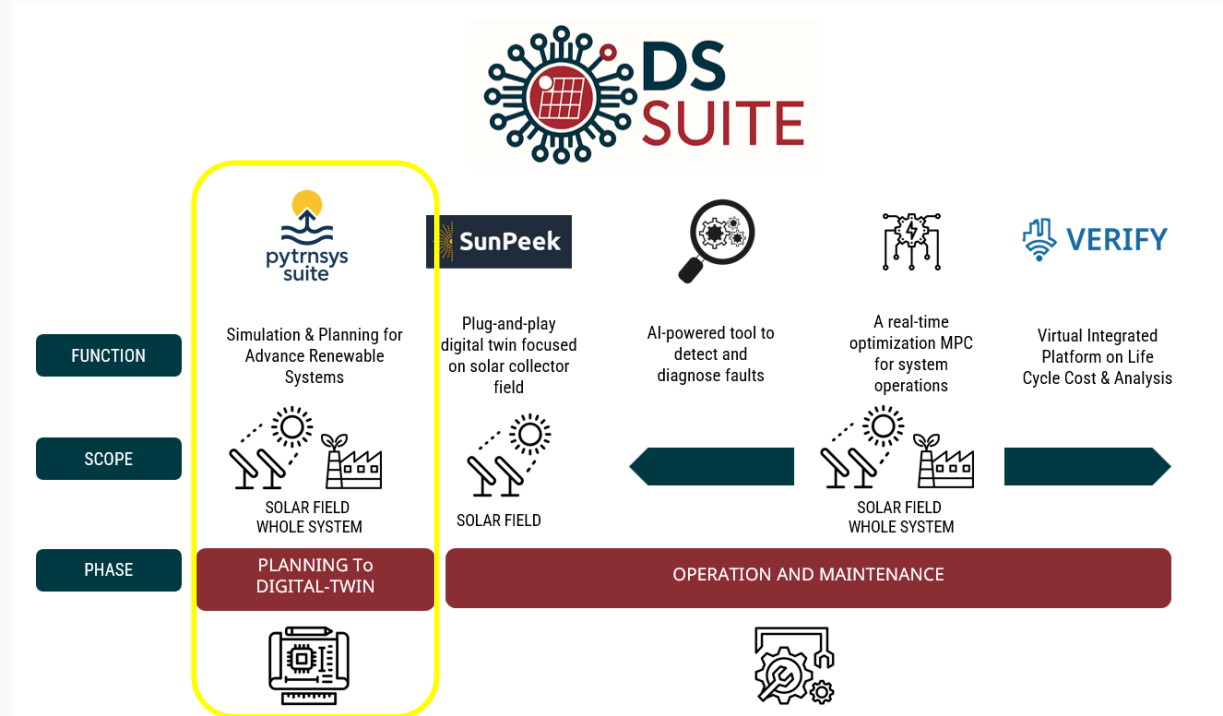
SPF Institute for Solar Technology

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The pytrnsys suite

- The all-in-one harmonized Planning-To-Digital-Twin framework
- It is
 - web-based
 - reliable, investor-trusted
 - applicable across all project phases
 - uses the same computational engine throughout (pyTRNSYS)



Current development

Future development

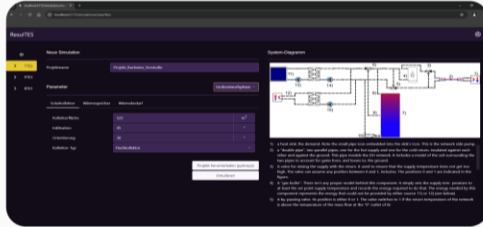
Feasibility analysis.

Design

Detailed design / engineering

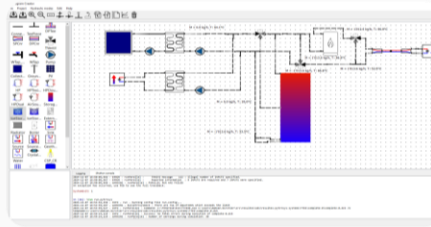
Operation

online frontend



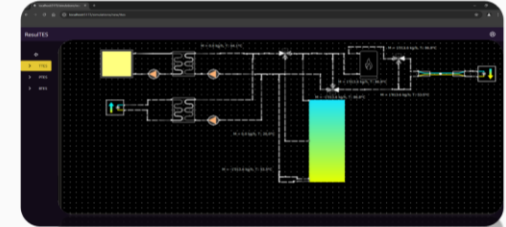
- Runs in cloud
- Easy-to-use **Free online** access tool.
- Predef. configurations hybrid ST systems.
- User must only parametrize predefined configurations. No modelling needed.
- **Export to pytrnsys GUI.**

pytrnsys



- Runs on user's computer
- Easy-to-use. **Import from Online tool.**
- Pytrnsys GUI for customisation.
- TRNSYS licence needed.
- All flexibility of pytrnsys available to tailor the scheme into the **Digital Twin.**

monitoring frontend



- Runs in cloud
- Custom GUI with SCADA connection.
- Performance evaluation.

Current state

Live at dev.resultes.net

Ask me for registration code if you're interested in trying it out.

The screenshot displays the ResultES web application interface. On the left, the 'Neue Simulation' (New Simulation) form is visible, showing parameters for a solar collector system. The 'Projektname' (Project Name) is 'Sonnensite'. The 'Entwurfphase' (Design Phase) is 'Entwurfphase'. The 'Speichervolumen' (Storage Volume) is set to 20 m³ and 200 m³. The 'Anschlössen' (Connections) section shows 'Oben' (Top) at 99%, 'Mitte' (Middle) at 50%, and 'Unten' (Bottom) at 1%. A 'Projekt herunterladen (getmy)' button is present.

In the center, the 'System-Diagramm' (System Diagram) shows a schematic of the solar collector system, including a heat sink, a double pipe, and a gas boiler. The diagram is labeled with numbers 1 through 10.

On the right, the 'Energy Balance' chart is displayed, showing the energy balance (kWh) over time (Jan 2025 to Dec 2025). The chart includes a legend with the following components: Q_{coll} (blue), P_{comp} (green), Q_{boiler} (red), Q_{source} (orange), Q_{demand} (yellow), Q_{PTES_Accum} (purple), Q_{PTES_Losses} (pink), Q_{pipes} (light blue), $Q_{district}$ (dark blue), and Q_{limb} (brown). The chart shows a significant energy deficit in the winter months, with the demand (red) exceeding the supply (blue and orange).

Developments within DigiSolar

New systems

- Model three DigiSolar plants in pytrnsys suite (Izmir, Bad Rappenau, Komotini)
- Five representative, big commercial hybrid-ST system “archetypes”

New functionality

- Digital Twin
 - Connect to plant
 - Compare expected KPIs from simulation to actual KPIs from measurements continuously



Funded by



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the European Union**

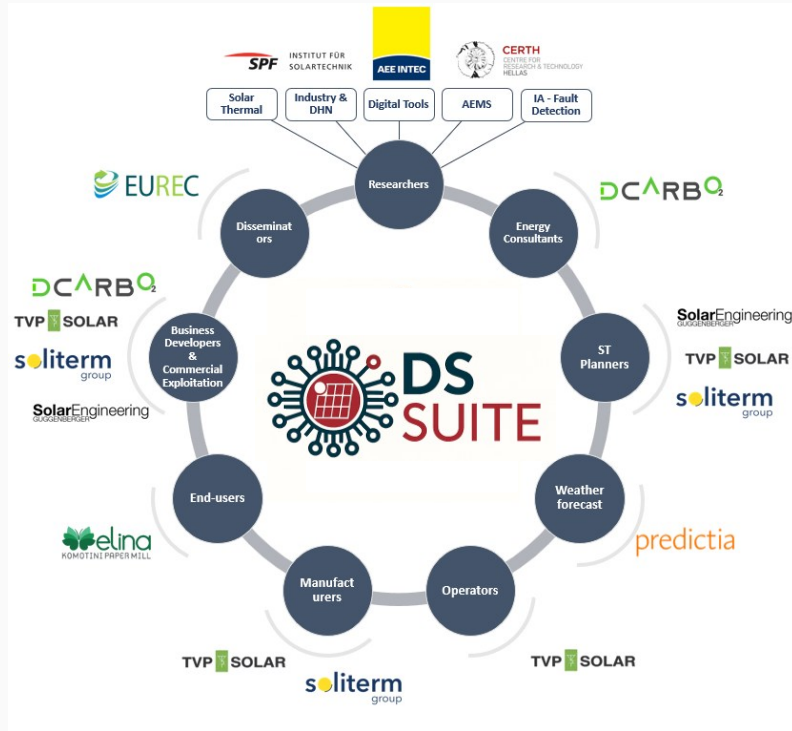
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Thank you



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