SIOM (System Integration and Optimisation Model) is a decision-making support tool for greenhouse builders and investors. It provides information on the consequences of design decisions, enabling greenhouse builders to produce more precise designs more quickly for better-quality greenhouses, for the most common crops in a range of climate zones.

**SOURCES**
Once the geographic location has been chosen, SIOM provides information on local resources and their availability. The resource side of SIOM comprises:

- **CLIMATE:** Seasonal rainfall and hours of sun;
- **NATURAL SOURCES:** Availability of groundwater, energy and fuel, and the related costs;
- **LABOUR:** Availability and skills level of the labour pool, wage costs;
- **ENVIRONMENT:** Urban planning factors such as accessibility, traffic, noise and air quality, orientation of the greenhouse;

**SYSTEMS**
SIOM has an extensive database of specific components and systems for glasshouse horticulture. The catalogue contains the most relevant and up-to-date information on the technical properties and performance of these components and systems.

The systems are:
1. Construction and greenhouse shells
2. Screening
3. Heating
4. Ventilation / cooling
5. Irrigation systems
6. Energy supply/storage
7. Cultivation system

**VARIANTS**
Within SIOM, different variants of a design can be compared, which means that the consequences of alternative construction systems and different components can be assessed and weighed against each other. SIOM accelerates the design process and provides valuable information on aspects such as the cost recovery periods, operating results and efficiency of design variants.

**INVESTING**
Suppose a grower wishes to invest in a new project in Turkey. He has a specific location in mind and wants to grow tomatoes there all year round. He can use the technical and financial SIOM calculations to examine his business case and decide which combination of systems and components is best for his unique situation.

**RETURN ON INVESTMENT**

<table>
<thead>
<tr>
<th>Years</th>
<th>Investment / Yield</th>
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**USE OF ENERGY (kwh)**

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<tr>
<th>Yield per M² (€)</th>
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<tr>
<td>35</td>
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<td>45</td>
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**EXPERTISE TNO**
TNO has extensive experience with calculation tools for greenhouse construction sector and the related design support processes. Twenty-five years ago, TNO began developing CASTA, a programme that provides support in the constructive design of greenhouses. With SIOM, TNO offers an integrated tool for the key aspects of greenhouse construction projects.