Available software and equipment
(Pieejamā programmatūra un iekārtas)

	Renewable energy system simulation with Polysun software Polysun is a software that enables users to effectively simulate solar-thermal, photovoltaic and geothermal systems. The Polysun product family includes all the main tools required to configure, enhance and simulate systems in the renewable energy field. If it is for solar thermal energy, heat pumps, photovoltaics or cooling. Unique combi-version with solar thermal, heat pumps, PV and cooling in one program. In addition it supports the simulation of all kinds of hybrid systems in the field of renewable energies. Solar hot water, space and pool heating systems, worldwide weather data, huge hydronic template selection, updated collector catalogs (flat plate, tube, concentrating and unglazed collectors). Ground-source and ground-water loops, water-to-water and air-to-water heat pumps. Updated catalogs with certified heat pumps. Precise calculation of COP. Solar thermal and heat pumps in one program, including hybrid systems; collectors combined with heat pumps, recover ground temperatures, seasonal storage, increase COP of heat pumps with collectors, etc. Version 7. Designer level.
	Renewable energy system simulation with Trnsys software TRNSYS is a simulation program primarily used in the fields of renewable energy engineering and building simulation for passive as well as active solar design. Trnsys applications include: Solar systems (solar thermal and PV) Low energy buildings and HVAC systems with advanced design features (natural ventilation, slab heating/cooling, double facade, etc.) Renewable energy systems. Version 17 Cogeneration, fuel cells

Equipment title	manufacturer	model	short description	technical specification
Pyranometer	Kipp & Zonen	CMP3	Instrument for measuring the solar irradiance. The thermopile sensor construction measures the solar energy that is received from the total solar spectrum and the whole hemisphere.	Spectral range (50% points) 300 to 2800 nm Sensitivity 5 to 20 µV/W/m² Response time 18 s Zero offset A < 15 W/m² Zero offset B < 5 W/m² Directional response (up to 80° with 1000 W/m² beam) < 20 W/m² Temperature dependence of sensitivity (-10 ℃ to +40 ℃) < 5 % Operational temperature range -40 °C to +80 °C Maximum solar irradiance 2000 W/m² Field of view 180 ° ISO 9060:1990
Pyranometer	Kipp & Zonen	CMP21	High performance research grade pyranometer. The CMP21 pyranometer is designed for measuring the irradiance (radiant flux, Watt/m²) on a plane surface, which results from the direct solar radiation and from the diffuse radiation incident from the hemisphere above.	Spectral range (50% points) 285 to 2800 nm Sensitivity 7 to 14 µV/W/m² Response time 5 s Zero offset A < 7 W/m² Zero offset B < 2 W/m² Directional response (up to 80° with 1000 W/m² beam) < 10 W/m² Temperature dependence of sensitivity (-20 ℃ to +50 ℃) < 1 % Operational temperature range -40 °C to +80 °C Maximum solar irradiance 4000 W/m² Field of view 180 ° ISO 9060:1990
Pyrgeometer	Kipp & Zonen	CGR3	A pyrgeometer designed for meteorological measurements of downward atmospheric long wave radiation. It provides a voltage that is proportional to the net radiation in the far infrared.	Spectral range (50% points) 4.5 to 42 µm = 4500 to 42000 nm Sensitivity 5 to 15 µV/W/m² Response time < 18 s Window heating offset < 15 W/m² Zero offset B < 4 W/m² Temperature dependence of sensitivity (-10 ℃ to +40 ℃) < 5 % Operational temperature range -40 to +80 °C Net irradiance range -250 to +250 W/m² Field of view 150 ° Non-linearity < 1 %
Pyrheliometer	Kipp & Zonen	CH1	The CH1 pyrheliometer is radiometer for the measurement of direct normal irradiance and offers high accuracy and reliability.	CHP1 Spectral range (50% points) 200 to 4000 nm Sensitivity 7 to 14 µV/W/m² Response time < 5 s Zero offset B < 1 W/m² Temperature dependence of sensitivity (-20 ℃ to +50 ℃) < 0.5 % Field of view 5 ±0.2 ° Operational temperature range -40 to +80 °C Non-linearity < 0.2 % Maximum solar irradiance 4000 W/m² International standards (ISO) First Class
Sun Tracker	Kipp & Zonen	SOLYS 2	SOLYS 2 is sun tracker. It has Baseline Surface Radiation Network levels of performance and reliability.	Pointing accuracy < 0.1° passive tracking / < 0.02° active tracking (with optional sun sensor) Payload 20 Kg Power supply 18 to 30 VDC and 90 to 264 VAC (50/60Hz) Operating temperature range, DC -20 to + 50 Operating temperature range, AC -40 to +50 Mounting base Tripod stand Dimensions 50x34x38 cm / 23 kg (tracker) 5kg (tripod) Communication interface Ethernet / Web interface Transmission type Inverted tooth belts