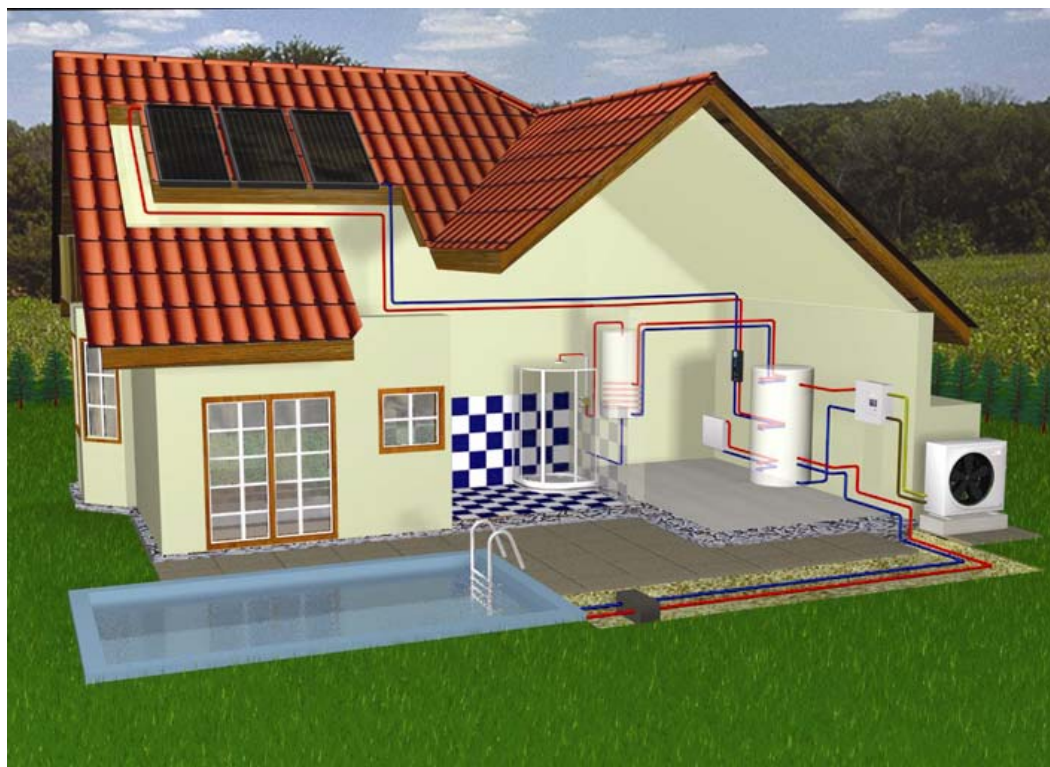


Conference **TRANS-SOLAR**

Practical experience with solar applications in the CR



Jiří Kalina – technical department

Regulus[®]

REGULUS spol. s r. o.

- Commercial – technical company, founded in 1991, components for production of boilers
- Co-operation at development of boilers in the CR
- Representation of leading world producers in the CR and SR
- Gradual assortment expansion as for installation products, service and maintenance in the field of heating
- Gradual own development in the field of renewable sources
- Sub-contracting own products at other producers
- Own production since 2000
- Production of solar collectors, heat pumps
- Production of dampers and TSV valves
- Production of mixing centres

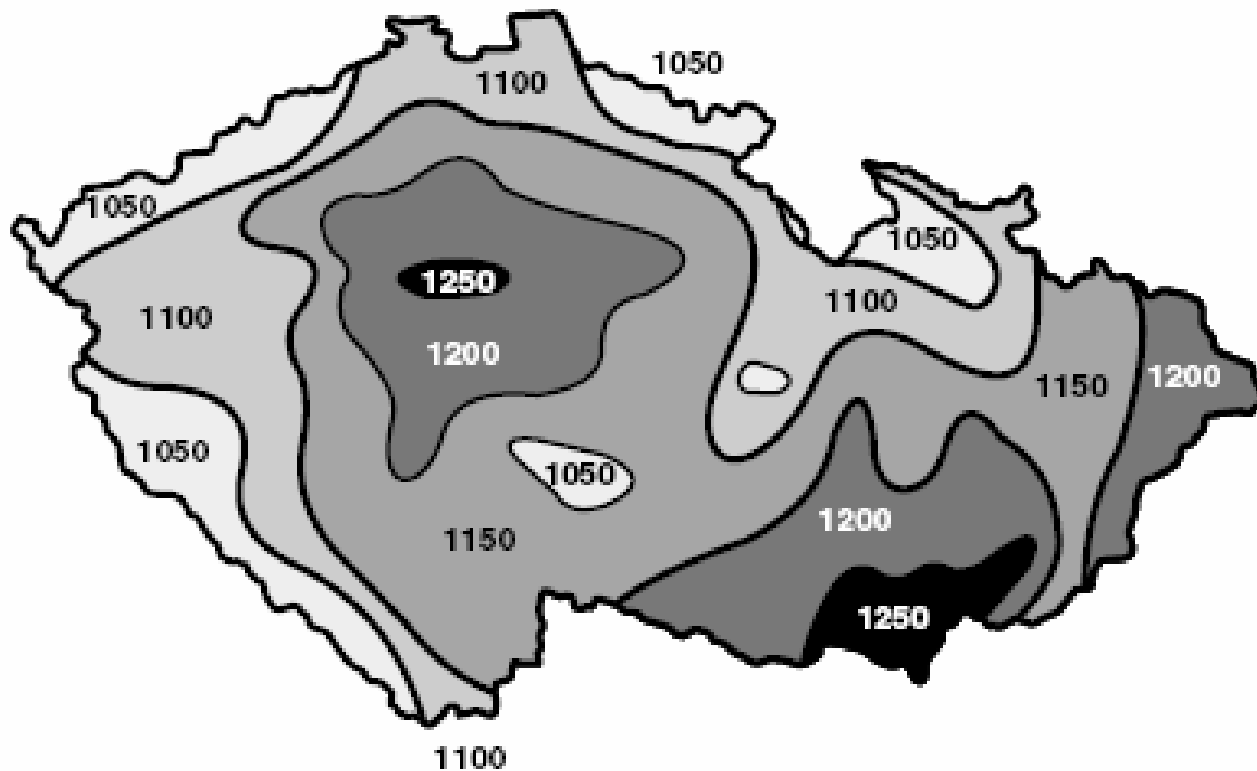




Regulus[®]

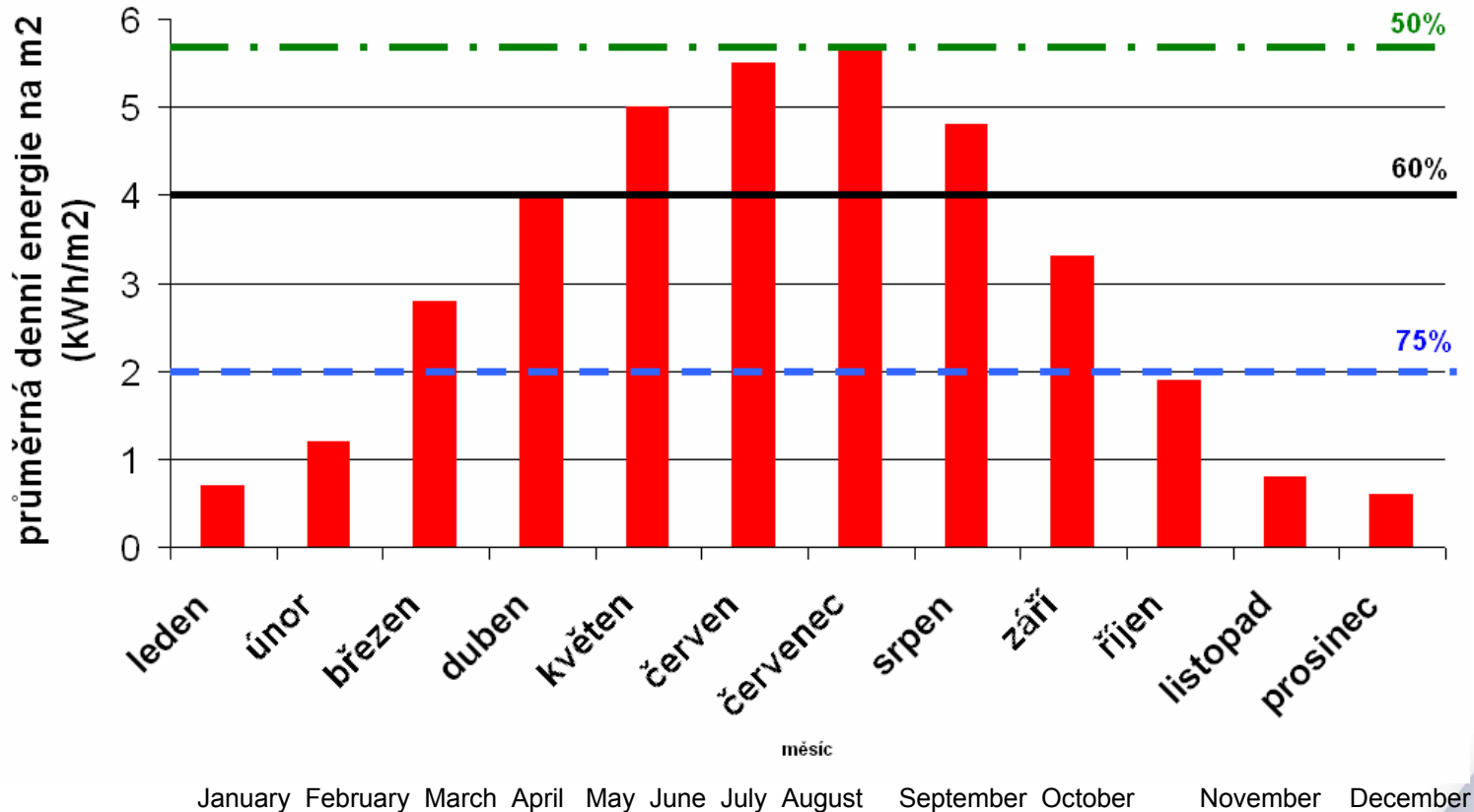
Conference **TRANS-SOLAR**

Yearly doses of global solar radiation
onto the horizontal area in the CR
[kWh/m²]



Conference **TRANS-SOLAR**

Dimensioning of solar systems in the CR



Flat-buildings

Project modification according to possibilities of the investor

- Possible extension or reduction of the project area (project options)

Maximum possible collector number at BD in Brno: 120 pcs
REGULUS KPC1 (80 pcs per calculation!!!)

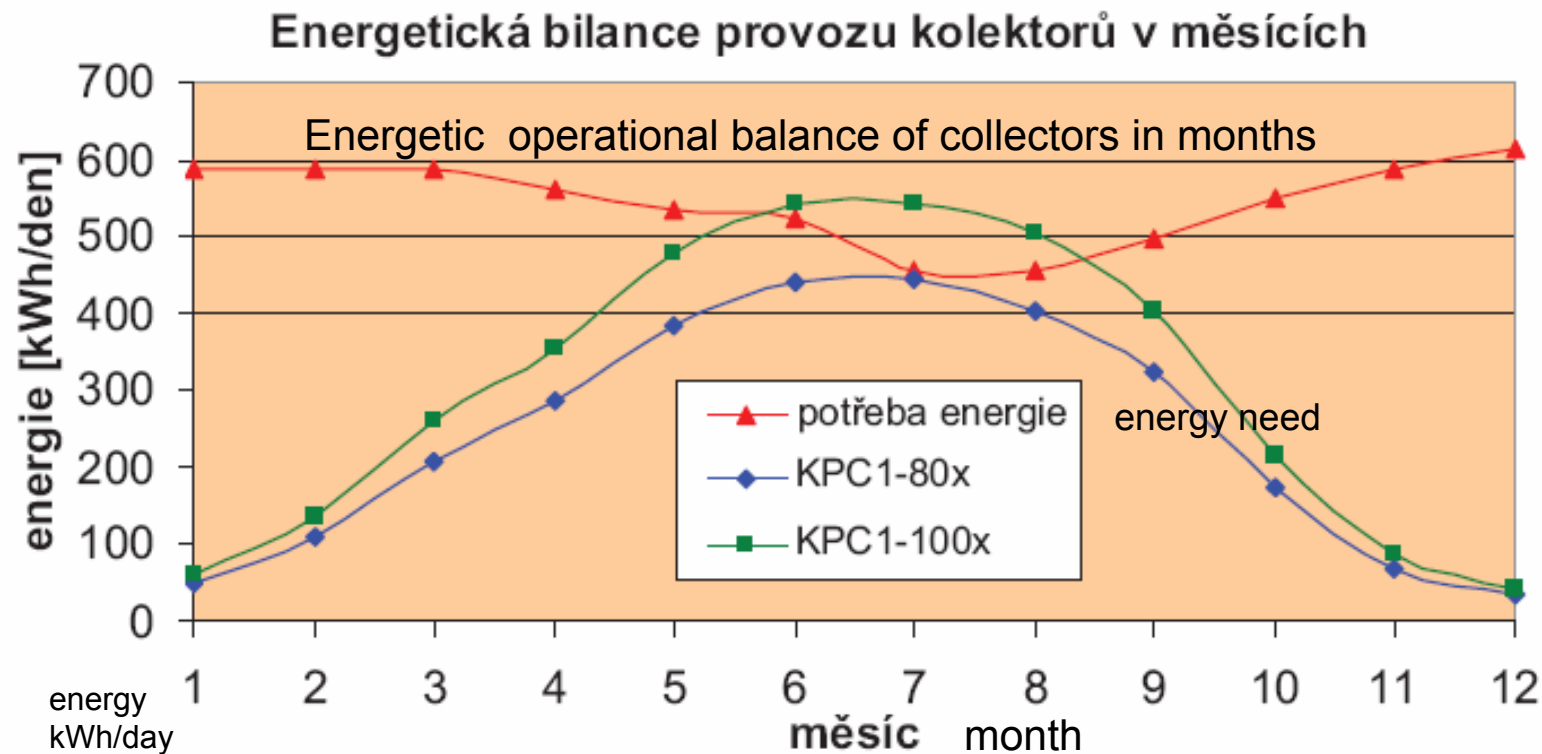


Option 2: 100 pcs of collectors REGULUS KPC1

Flat-buildings

Balance of the projected systems

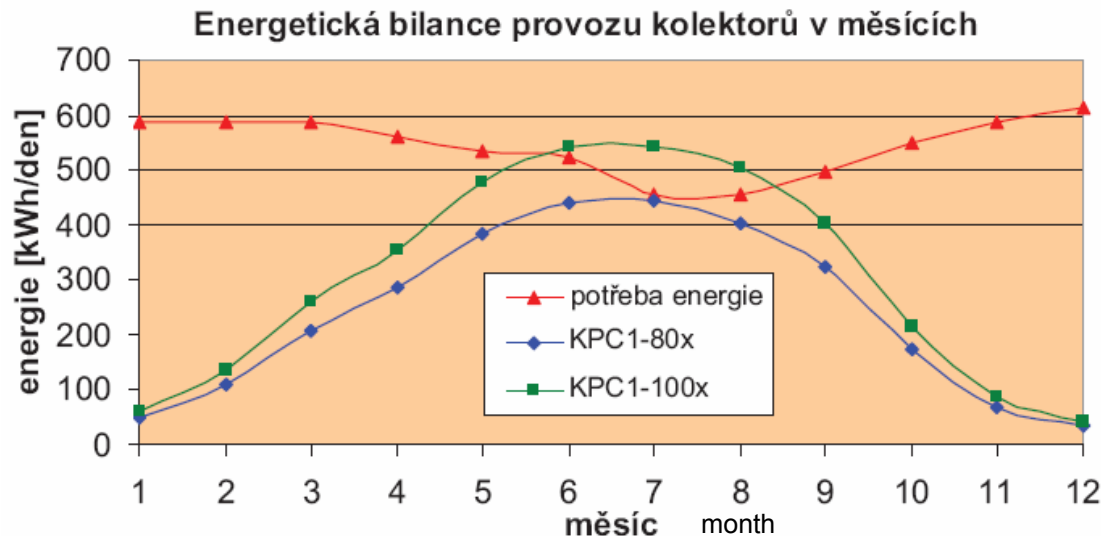
- Operational simulation of the projected solar systems in single months



Flat-buildings

Balance of the projected systems

	Option A	Option B
	varianta A	varianta B
počet kolektorů collector number	80	100
roční solární zisk [kWh] yearly solar gains	88 965	110 679
roční solární podíl yearly solar share	45%	56%
náklady na pořízení [mil. Kč] acquisition cost	2,2	2,7



See the
previous graph

Flat-buildings

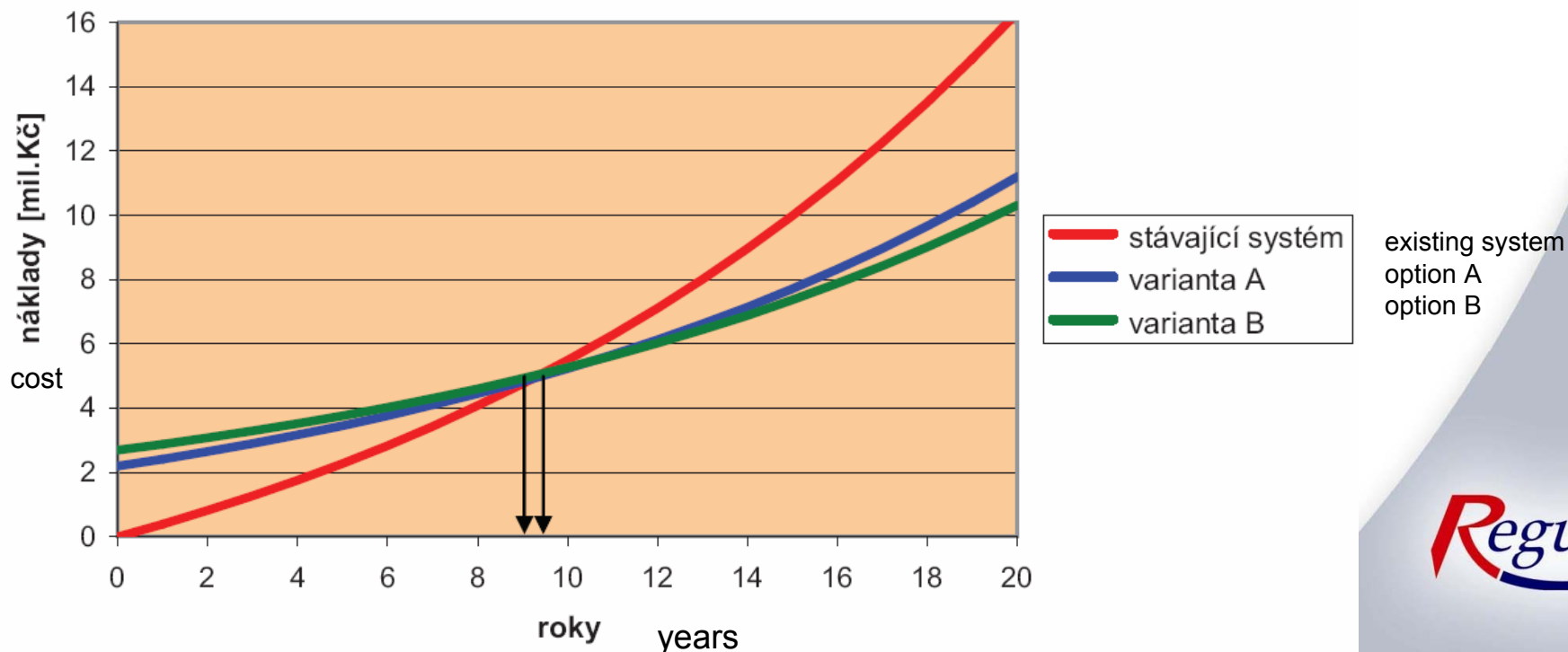
Balance of the projected systems

Price per 1 kWh in the year 0 = CZK 2,-

Assumed rise in the energy price = 7%

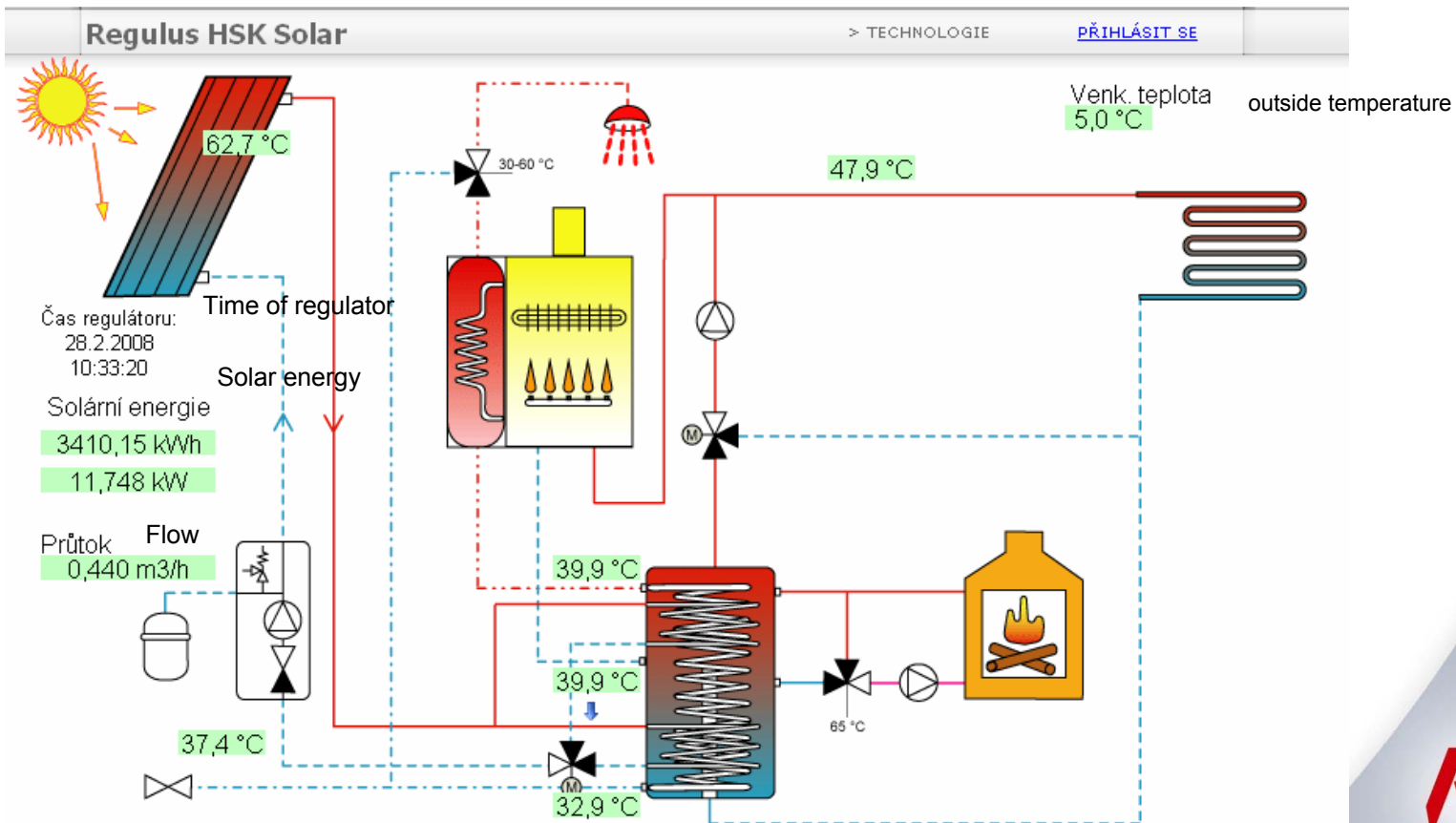
**Celkové náklady na přípravu TV v objektu s výhledem 20 let
– předpokládané roční zdražení energie 7%**

Total preparation cost regarding TV in the object with outlook of 20 years – assumed yearly rise in energy price 7 %

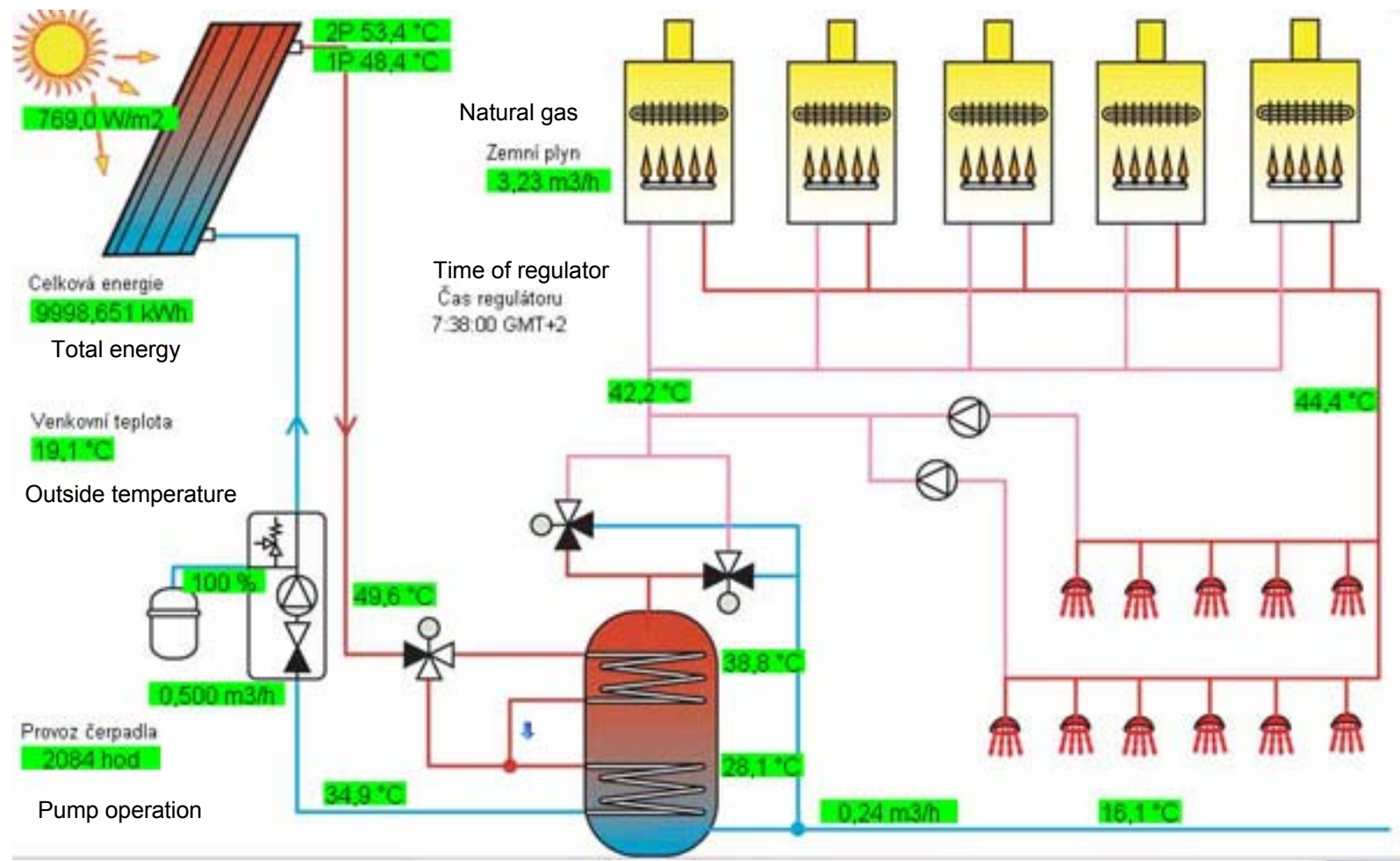


Examples of applications

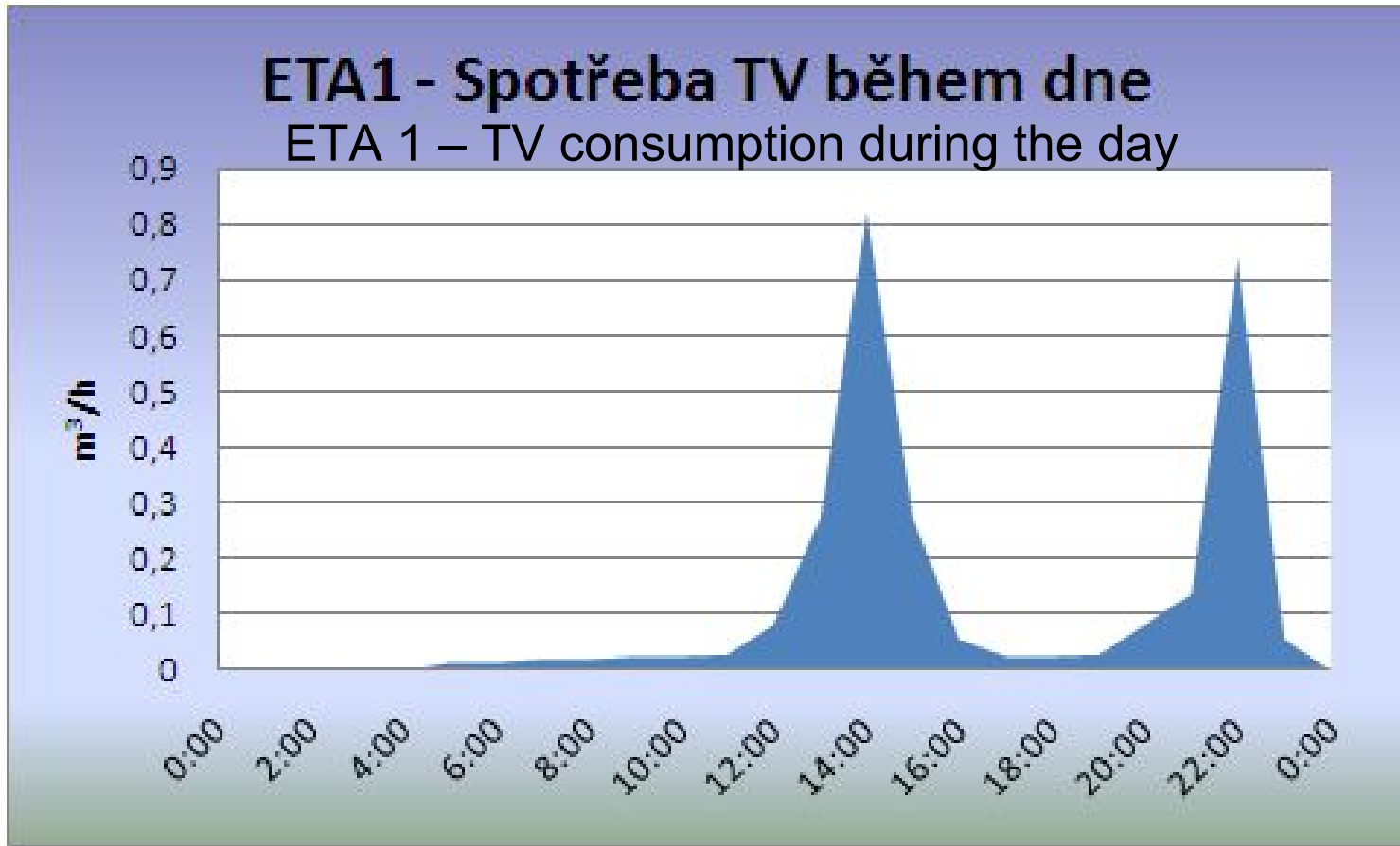
- www.regulus.cz - on-line monitoring of solar systems



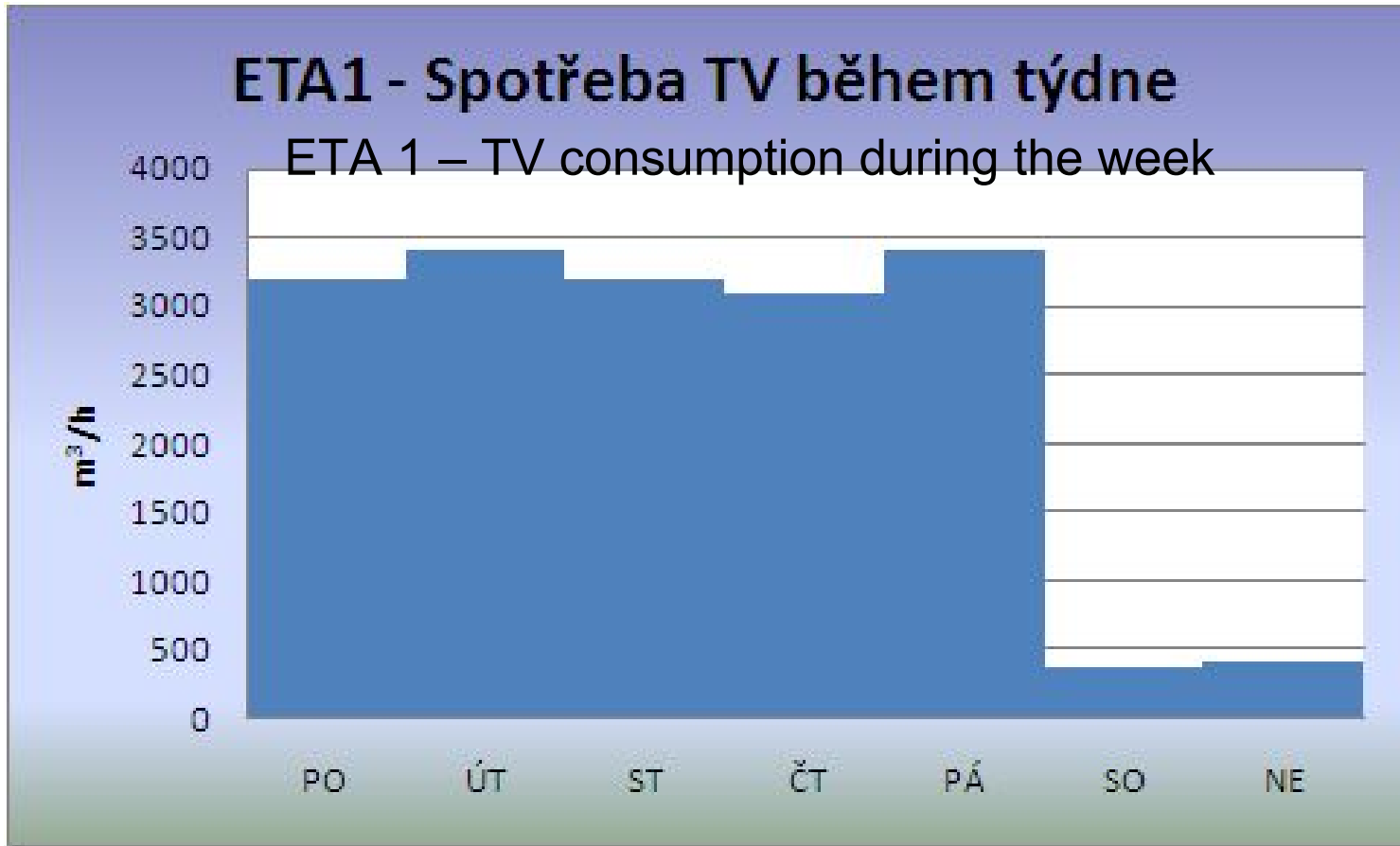
Description of systems – ETA 1



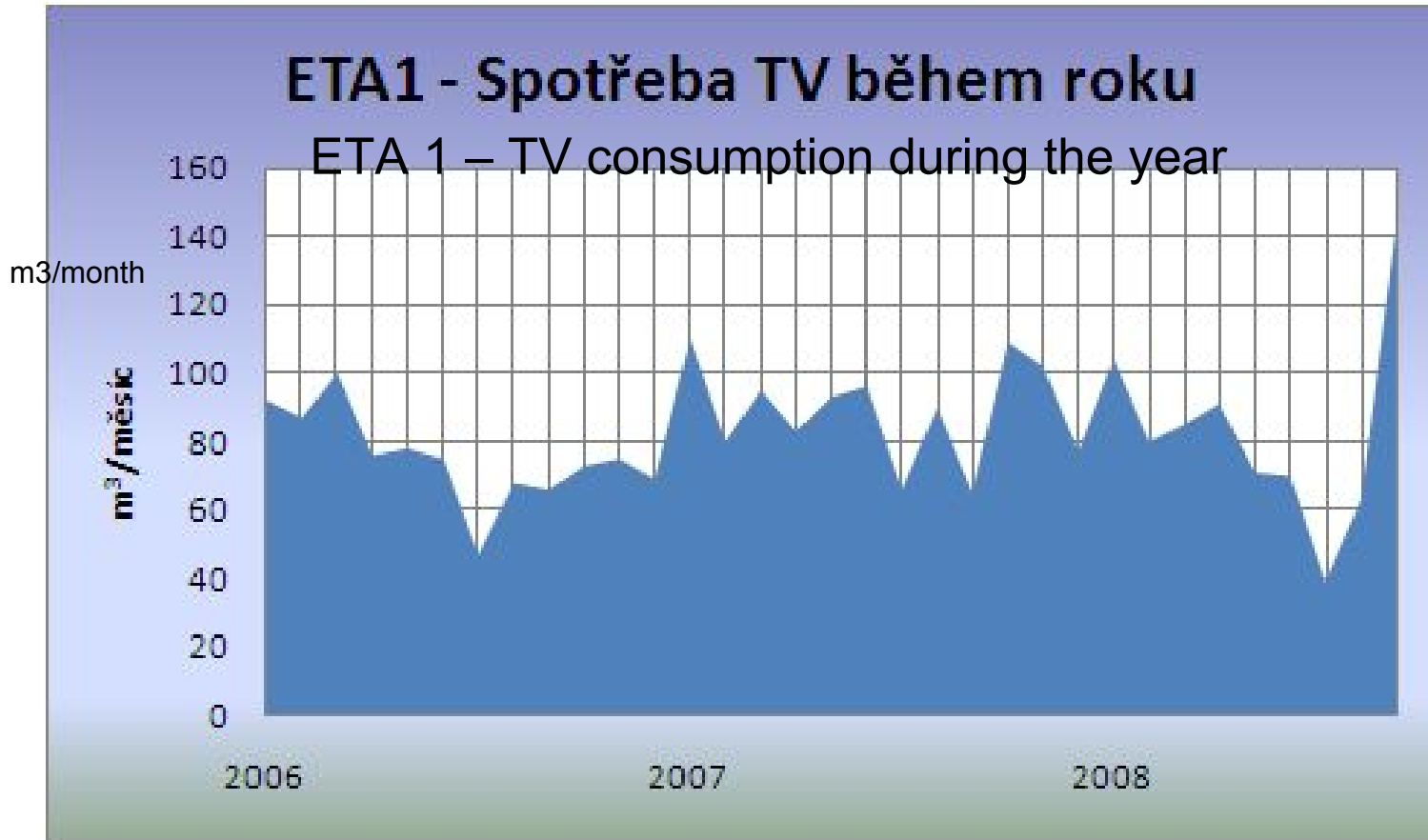
Description of systems – ETA 1



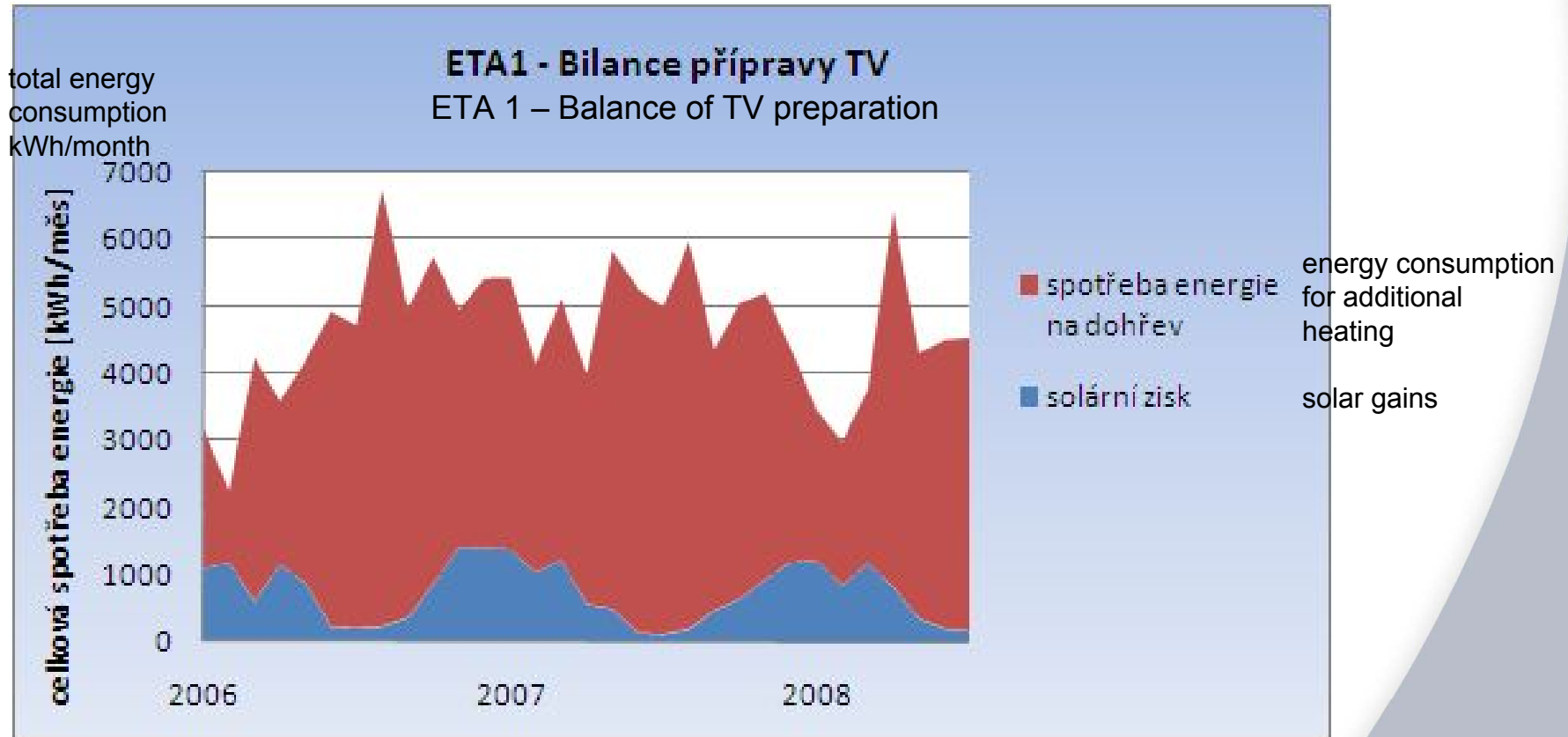
Description of systems – ETA 1



Description of systems – ETA 1



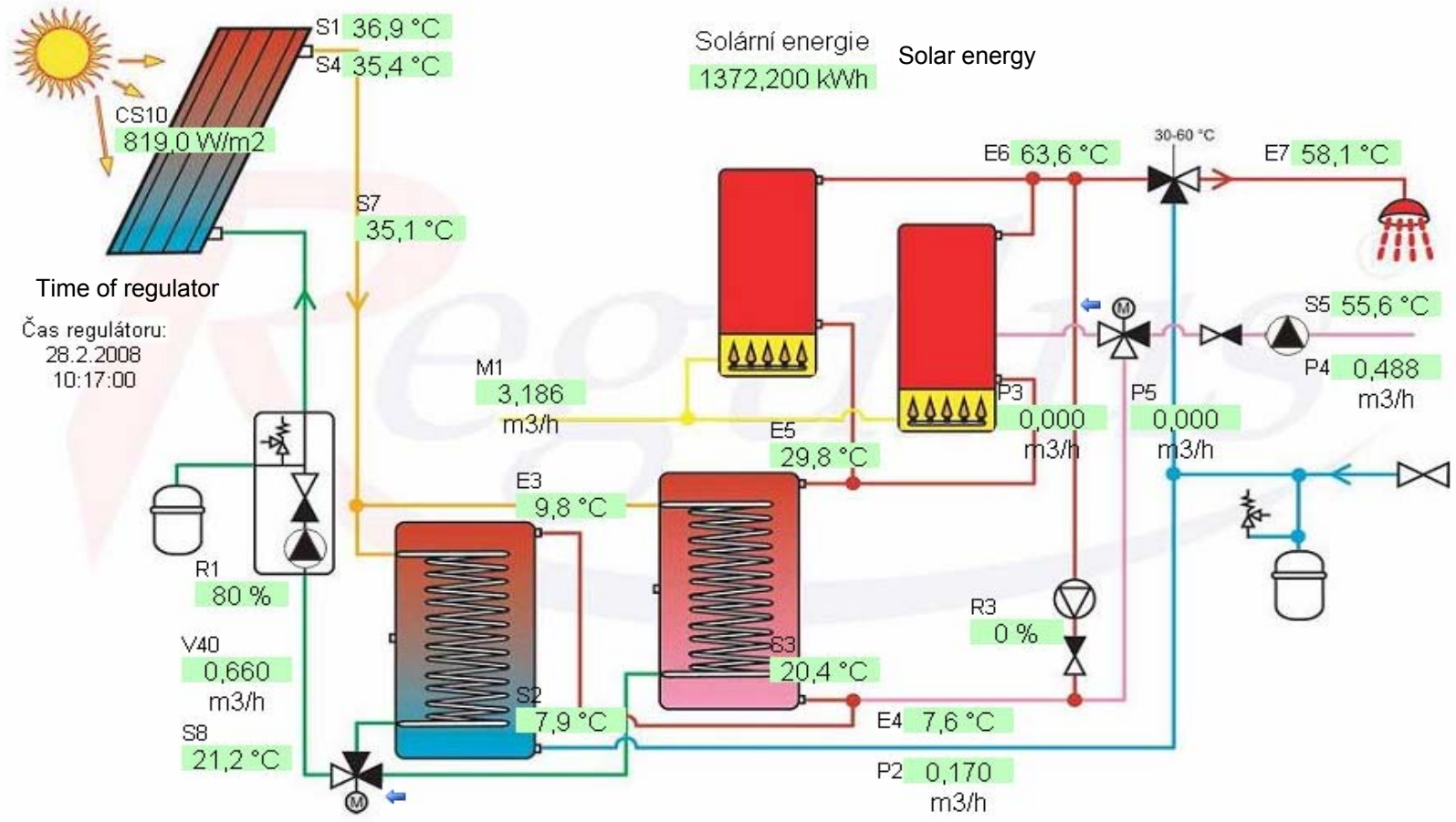
Description of systems – ETA 1



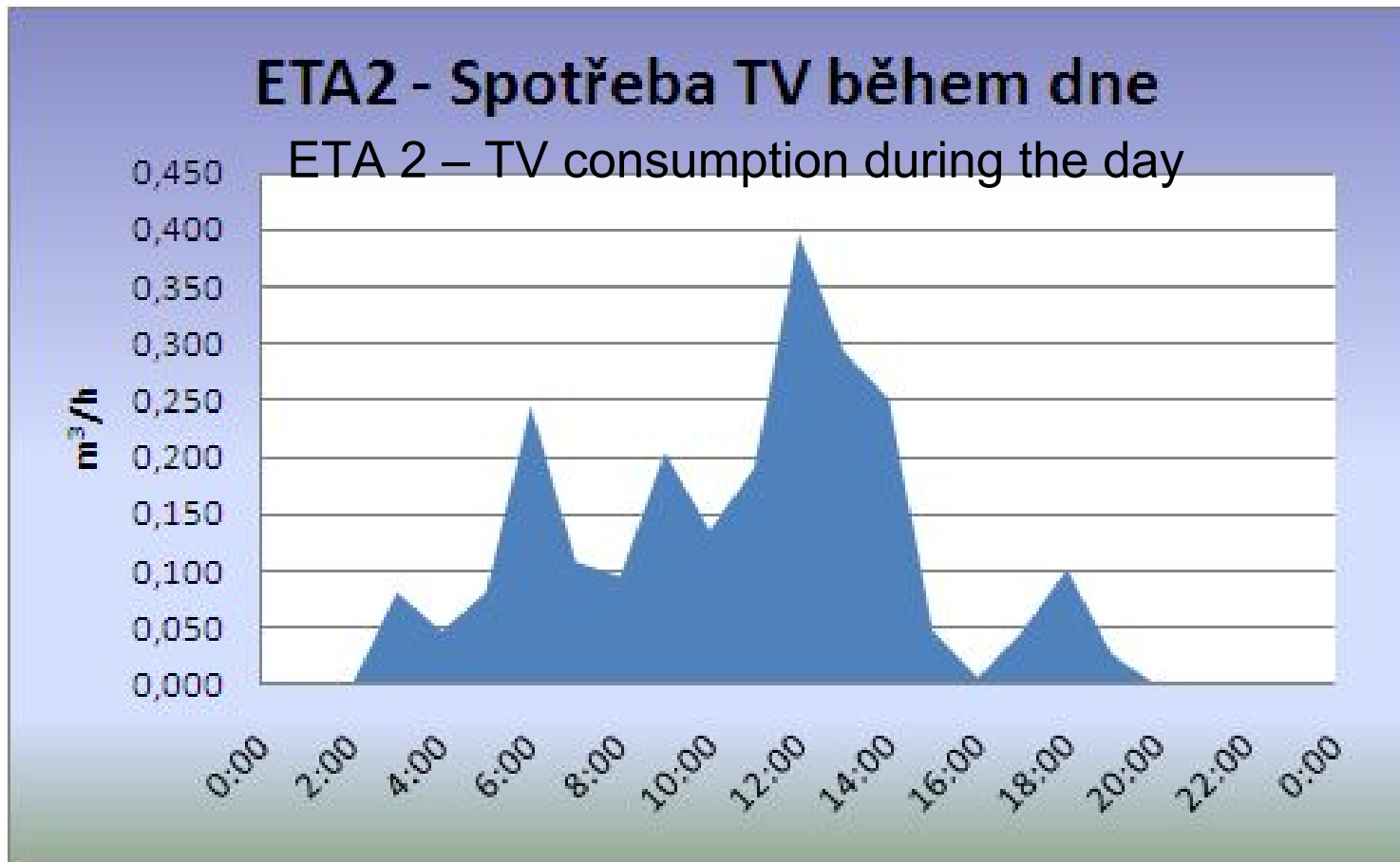
Description of systems – ETA 1

		TV consumption	Energy need	Solar gains	Gas consumption	Energy consumption for additional heating	Total energy consumption for TV preparation	Solar share in energy need	Solar share in energy consumption
ETA 1		spotřeba TV	potřeba energie	solární zisk	spotřeba plynu	spotřeba energie na dohřev	celková spotřeba energie na přípravu TV	solární podíl na potřebě energie	solární podíl na spotřebě energie
		m3	kWh	kWh	m3	kWh	kWh	%	%
rok year	2006	3,4	117,3	37,5	18,1	156,1	193,6	32%	19%
	2007	4,4	160,2	37,8	25,9	223,2	260,9	24%	14%
	2008	3,9	141,0	37,6	21,0	180,8	218,3	27%	17%

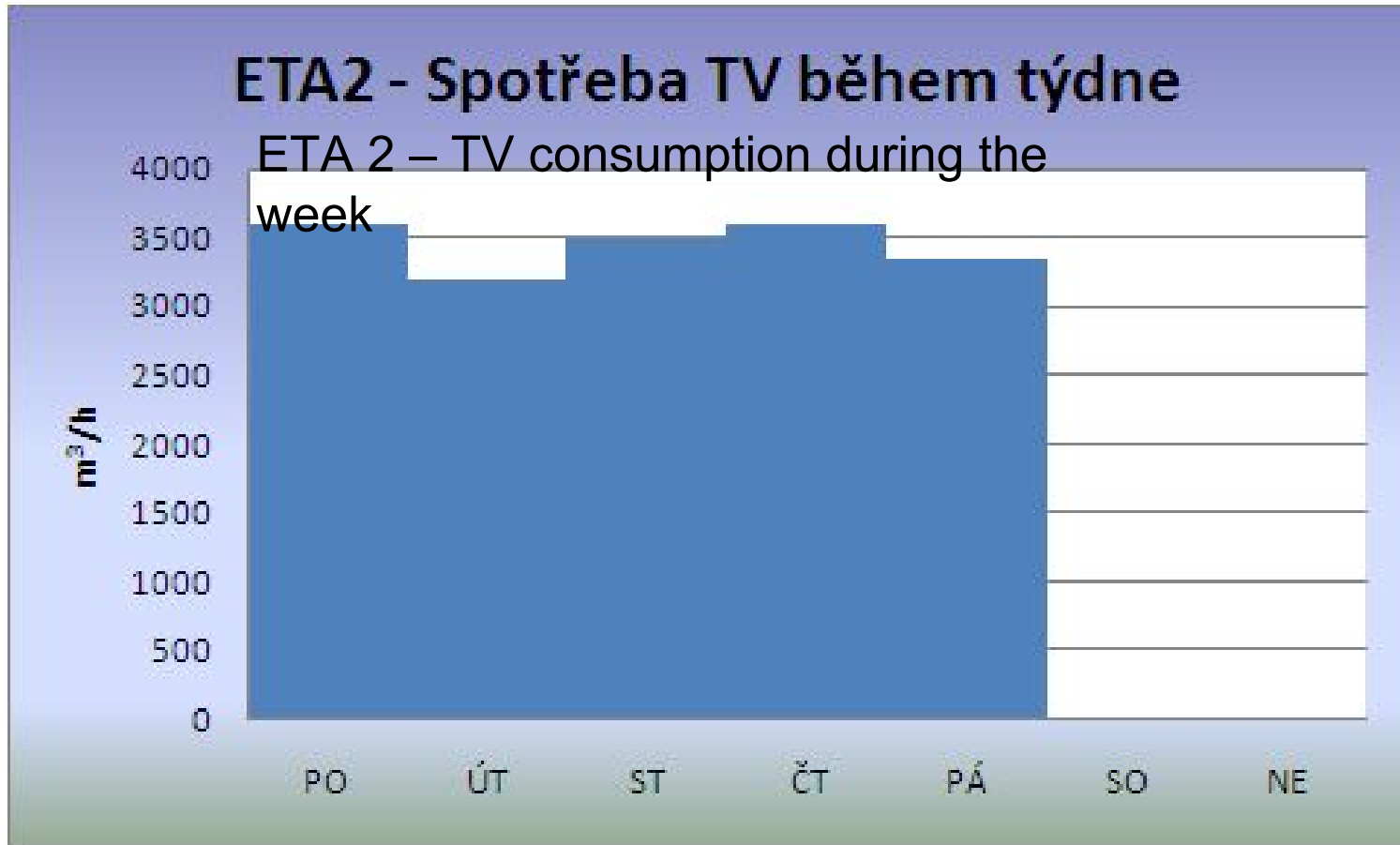
Description of systems – ETA 2



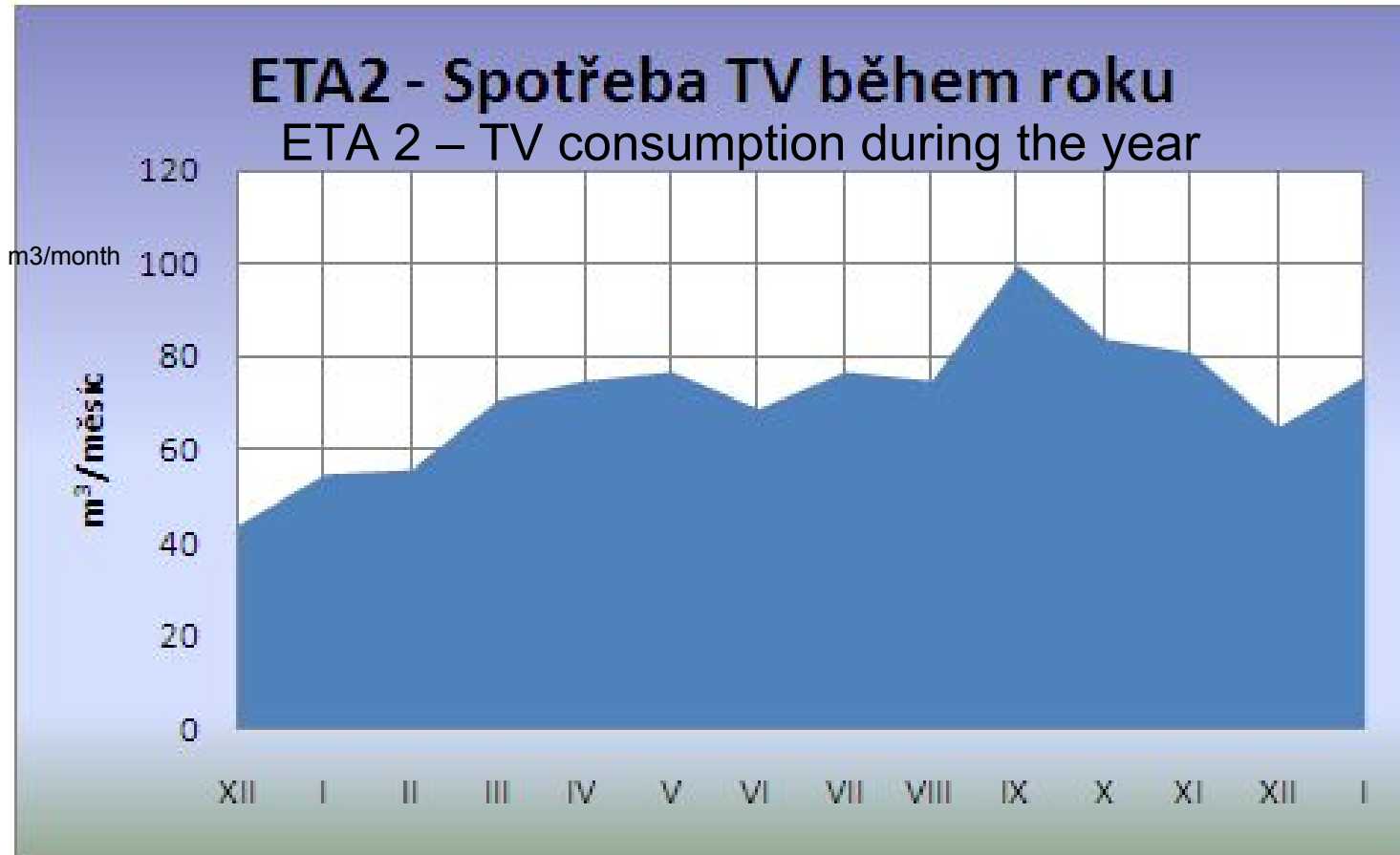
Description of systems– ETA 2



Description of systems– ETA 2



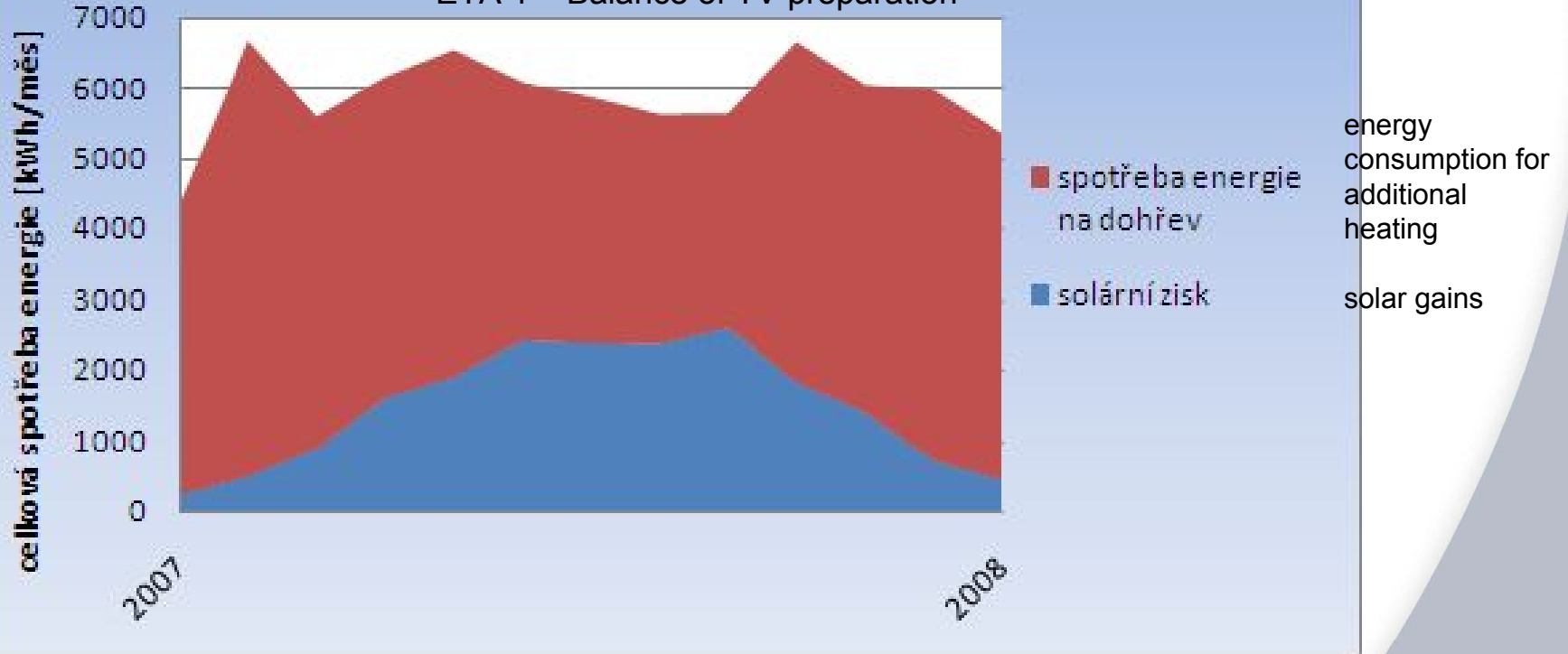
Description of systems – ETA 2



Description of systems – ETA 2

total energy
consumption
kWh/month

ETA2 - Balance přípravy TV
ETA 1 – Balance of TV preparation



Description of systems – ETA 2

TV consumption	Energy need	Solar gains	Gas consumption	Energy consumption for additional heating	Total energy consumption for TV preparation	Solar share in energy need	Solar share in energy consumption
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ETA 2		spotřeba TV	potřeba energie	solární zisk	spotřeba plynu	spotřeba energie na dohřev	celková spotřeba energie na přípravu TV	solární podíl na potřebě energie	solární podíl na spotřebě energie
		mB	kWh	kWh	mB	kWh	kWh	%	%
rok	2008	3,4	198,3	78,4	22,9	204,5	282,9	40%	28%

Description of systems – collector types

KPC 1 BP (ETA 1)



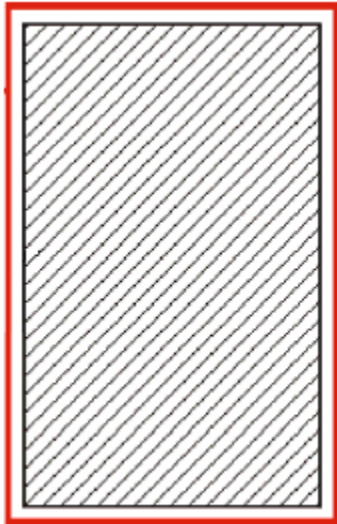
KTU 15 (ETA 2)



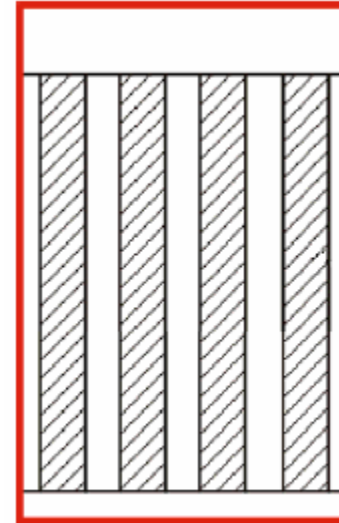
Collector type (system)	Number	Gross area	Aperture	Gross area tota	Aperture total
	pcs	m2	m2	m2	m2
KPC 1 BP (ETA 1)	10	2	1,75	20	17,5
KTU 15 (ETA 2)	16	2,66	1,41	42,56	22,56

Description of systems – collector types

KPC 1 BP (ETA 1)



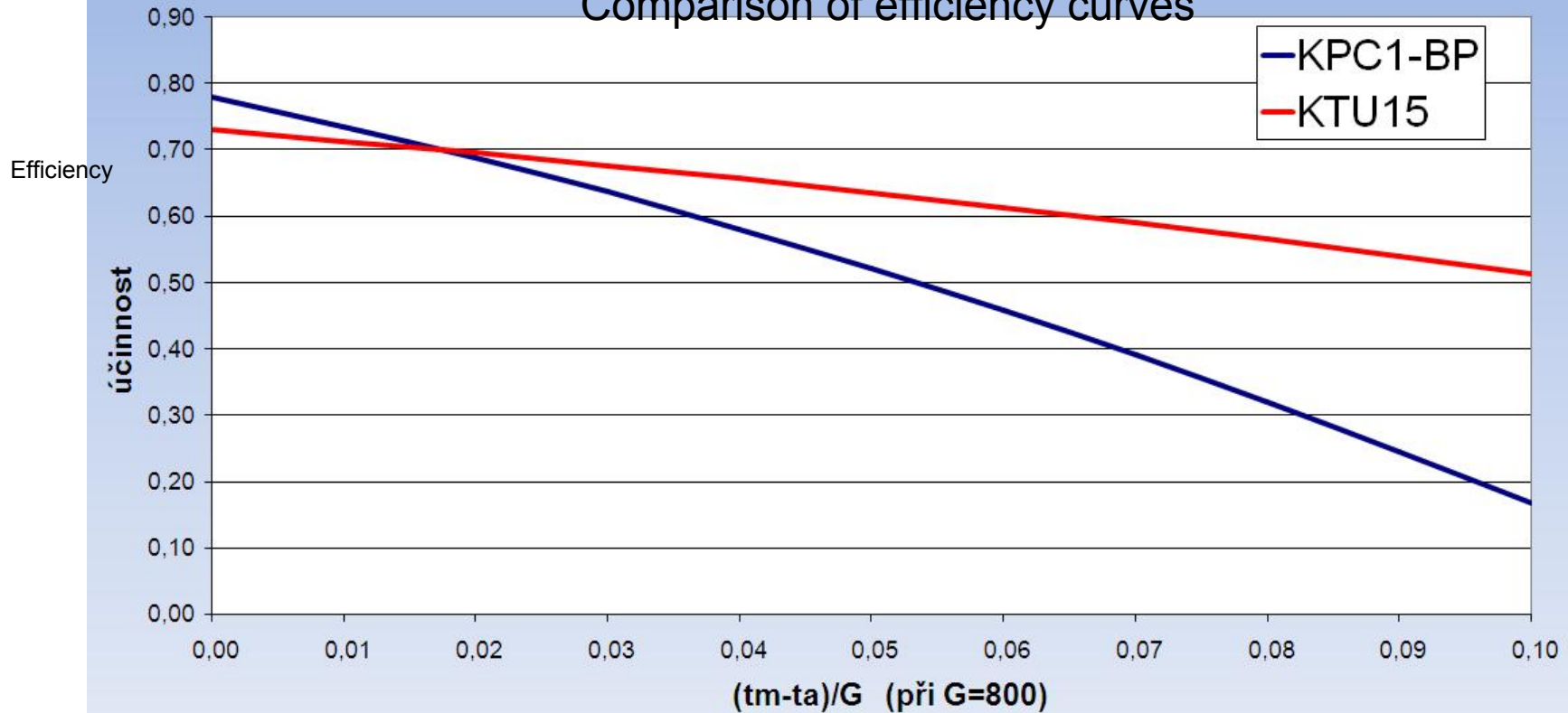
KTU 15 (ETA 2)



Aperture area vs. gross area!!!

Description of systems – collector types

Porovnání křivek účinnosti
Comparison of efficiency curves

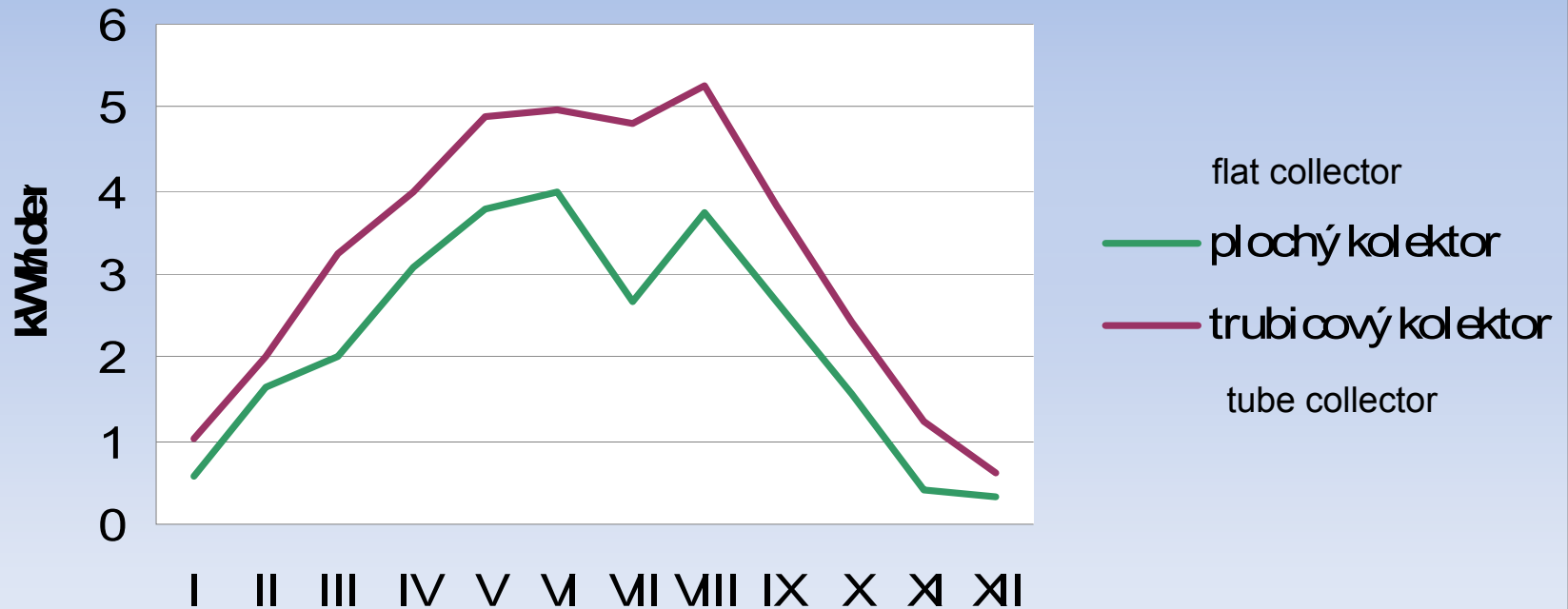


Note: Efficiency curves are across the aperture area

Comparison of systems

Solární zisk 1 kolektoru - den

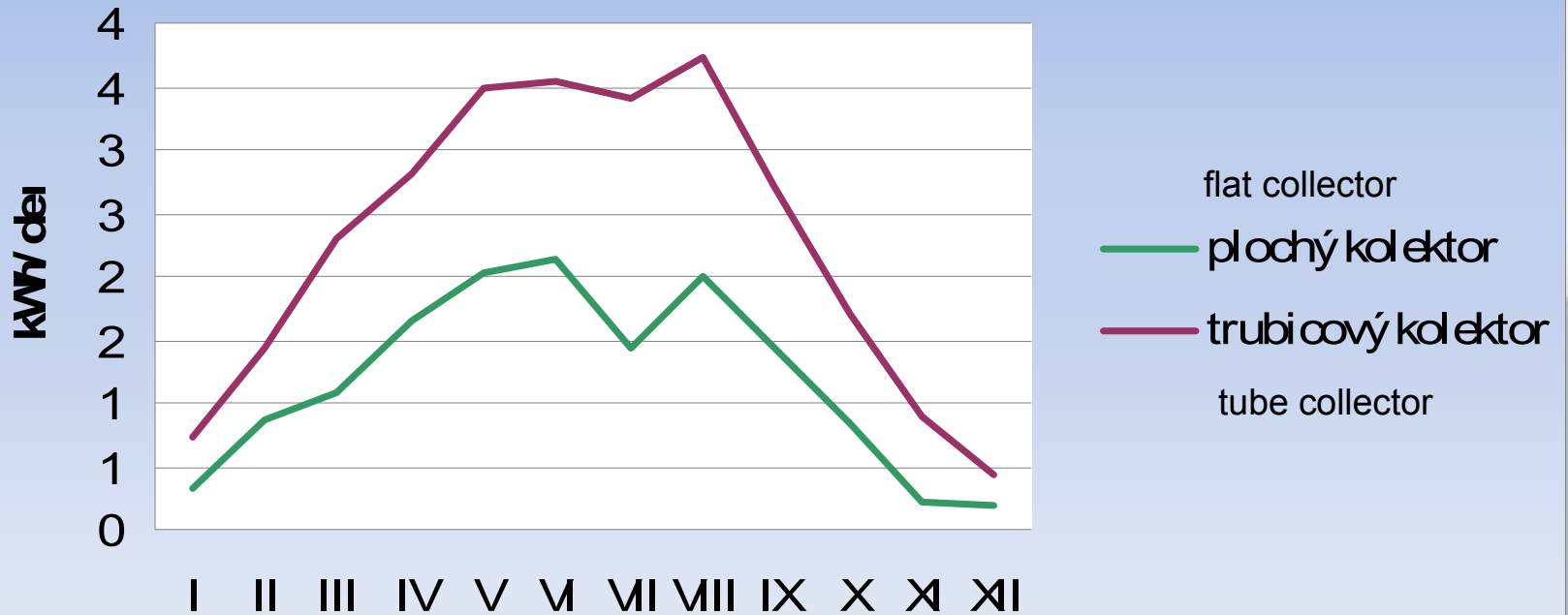
Solar gains of 1 collector per day



Comparison of systems

Solární zisk 1m² apertury - den

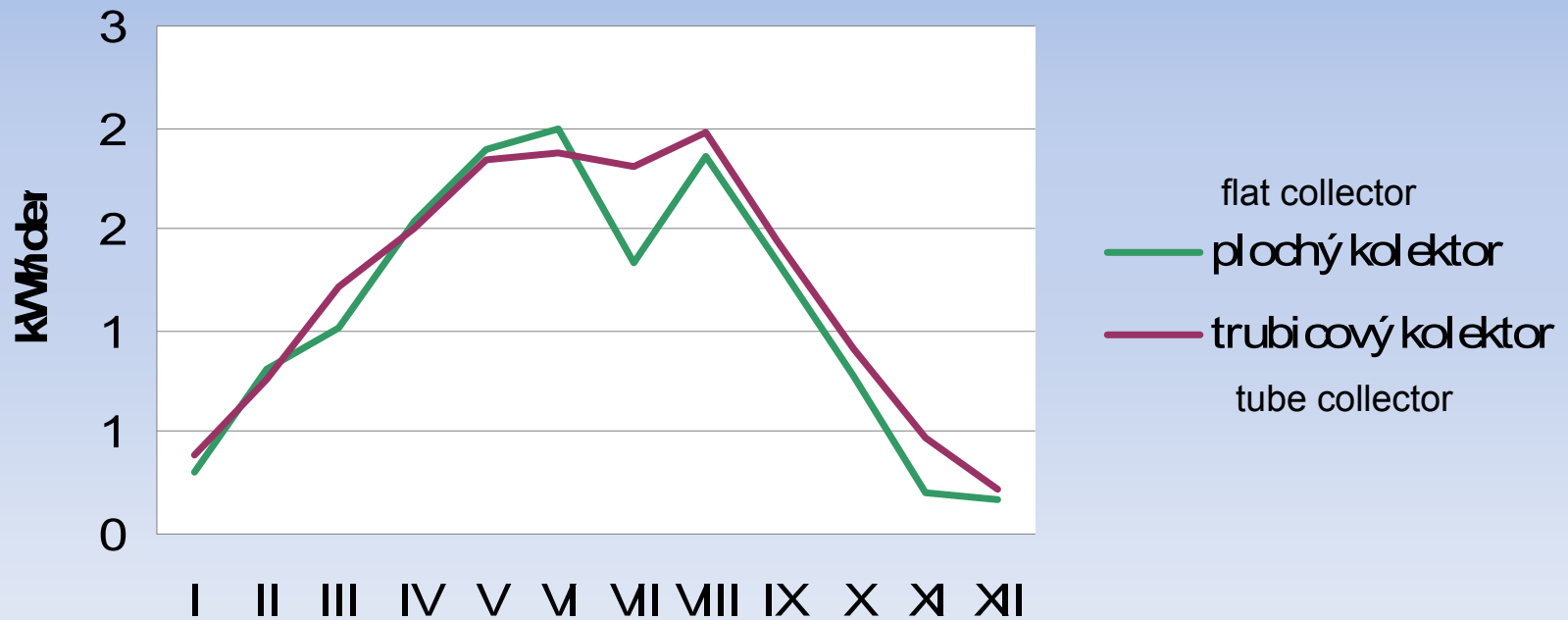
Solar gains of 1m² of the aperture per day



Comparison of systems

Solární zisk 1m² hrubé plochy - den

Solar gains of 1m² of the gross area per day



Several notices

- Flow-meter for solar system (liquid)
- Evaluation with enthalpy correction
- Calibration of sensors against each other
- Elimination (correction) of nonsense values



ETA 1



ETA 2



Thank you for your attention

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