IWT-WP-DIRECT Project:

SPF-metingen op bestaande residentiële warmtepompinstallaties in Vlaanderen: vergelijking van verschillende installatieconcepten

Projectleiders: Willy Van Passel (De Nayer)
Lieve Helsen(KULeuven)

Projectuitvoerders: Geeraart Franck (De Nayer)
Jan Hoogmartens(KULeuven)

CAMPUS DE NAYER

Empowered by Lessius | Associatie KULeuven

DOEL?

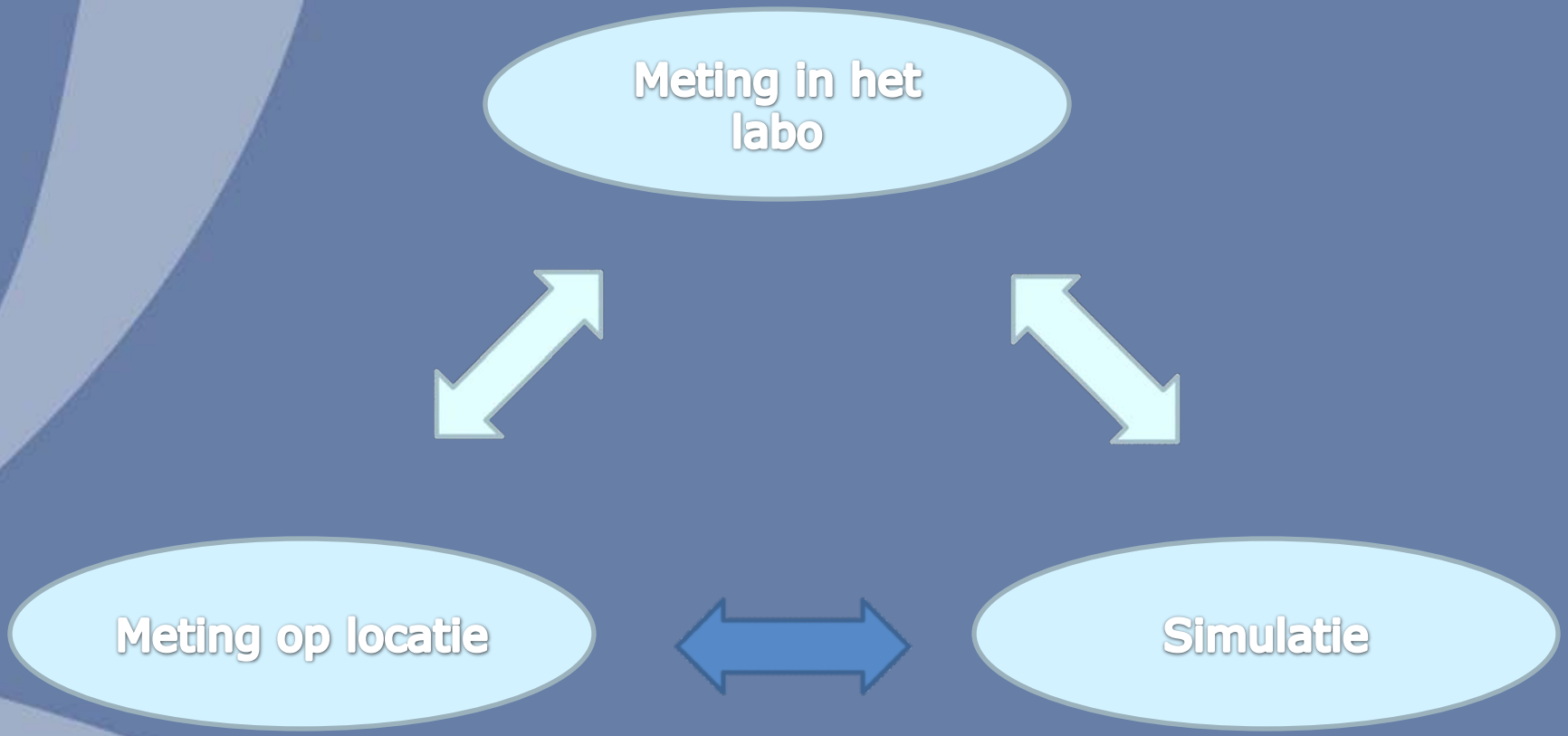
- SPF evaluatie
  - Metingen op locatie
  - Gedetailleerde meting in het labo
  - Simulatiemodel opstellen

- Vergelijking toekomstige systemen
  - SWW
  - Woningverwarming

CAMPUS DE NAYER

Empowered by Lessius | Associatie KULeuven

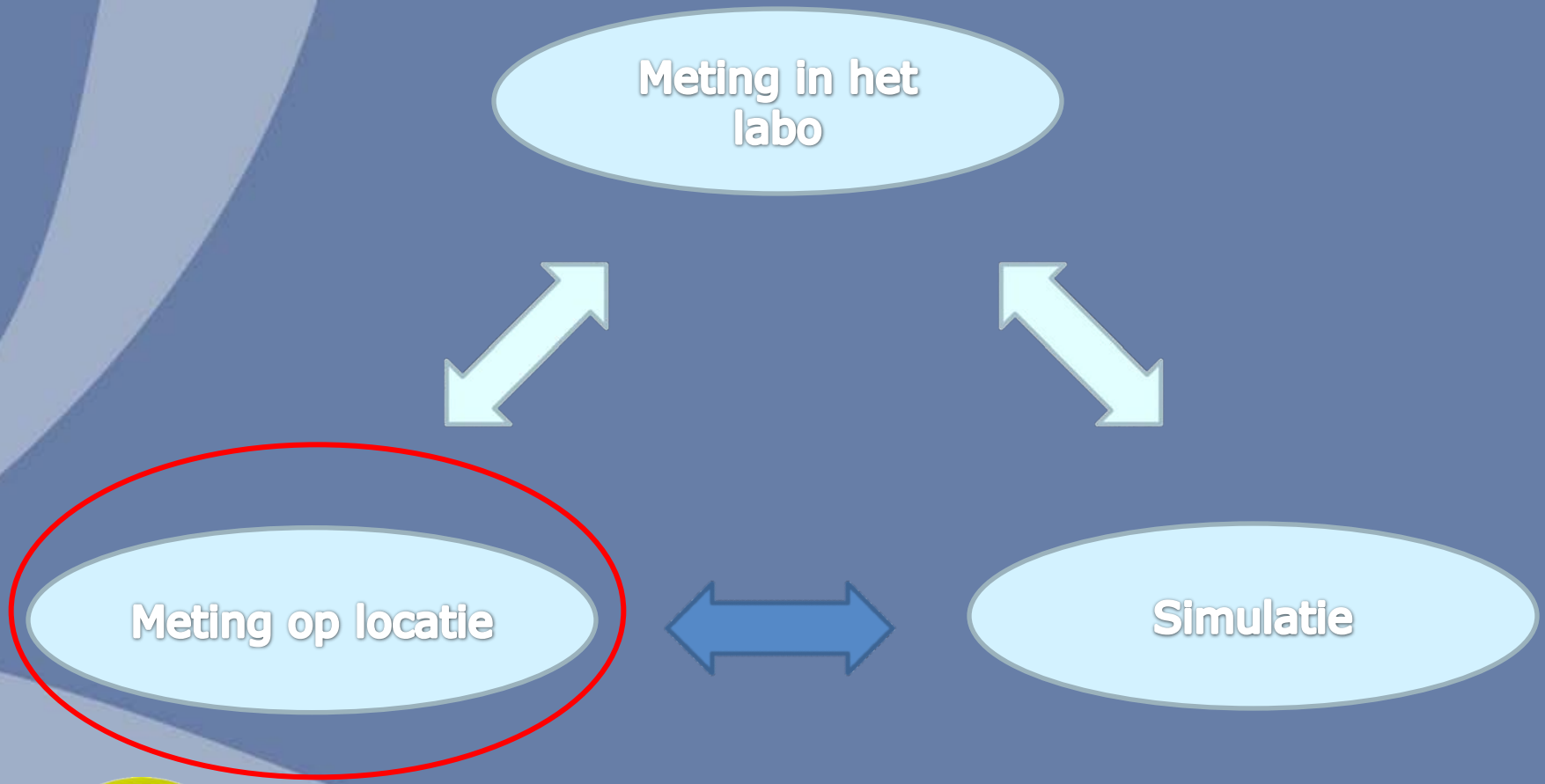
DOEL?



CAMPUS DE NAYER

Empowered by Lessius | Associatie K.U.Leuven

DOEL?



CAMPUS DE NAYER

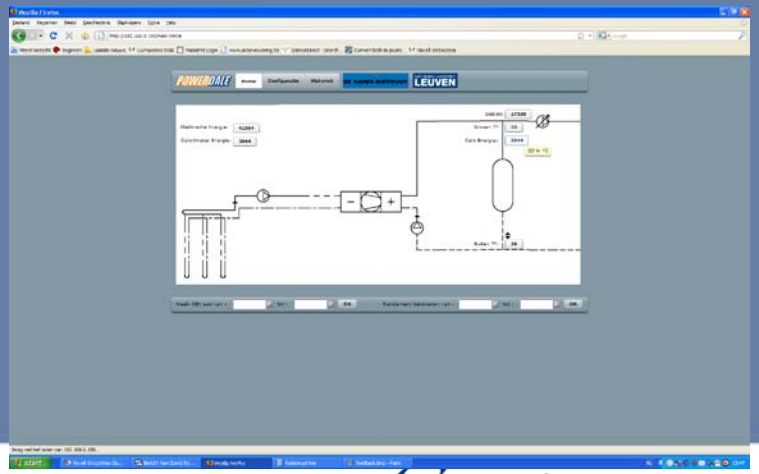
Empowered by Lessius | Associatie K.U.Leuven

Inhoud project





- Metingen op locatie:
  - SPF meting volgens EN 15316-4-2
  - Caloriemeters en kWh_{el} meters
  - Ruwe meetdata kunnen uitgelezen worden in De Nayer en KULeuven
  - …



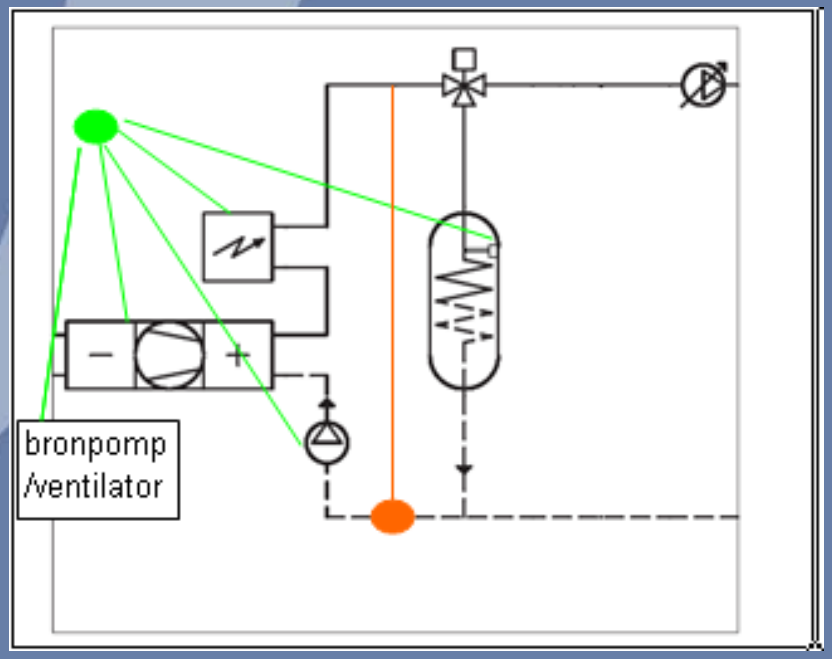


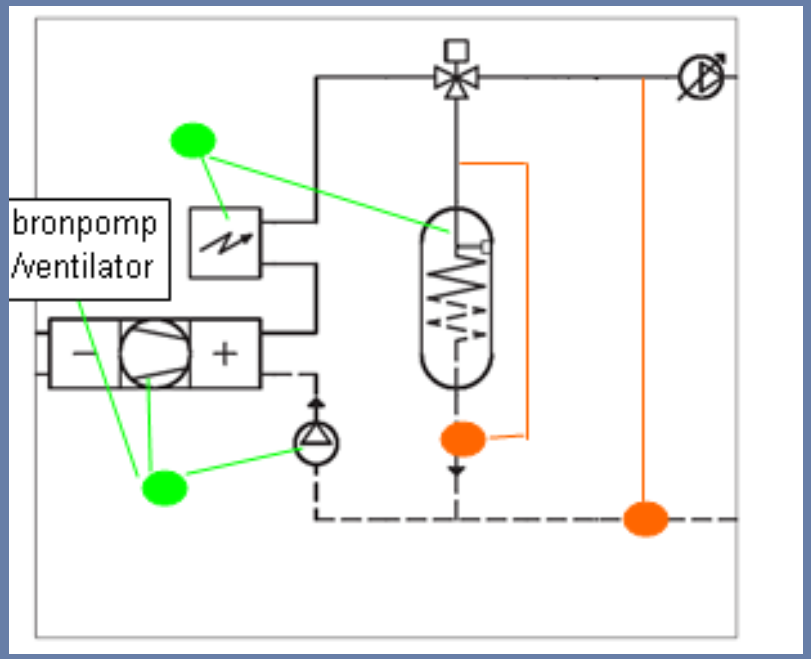
CAMPUS DE NAYER

Empowered by Lessius | Associatie KULeuven

Hoe gaan we meten?

- **Meetprincipe**





Groen= elektrische energiemeting meting (kWh)

Rood= thermische energiemeting (kWh)

CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Wie doet er mee?

Gebo bvba
Verheyden putboringen bvba
Thercon NV
Viessmann bvba
Geoservices
Geotherma
Masser NV
Nathan Import/Export N.V.
Stiebel Eltron Bvba
Mitsubishi Electric Europe B.V. Belgium
Daikin
Cloet koeltechniek bvba

Klimaterra
Airwell/Camair
Linea Trovata SunTec NV.
Accubel
Izen energy systems
Siemens
Laborelec
Sibomat
Verbeke-geotechniek

CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Wat kunnen we meten?

On field metingen:

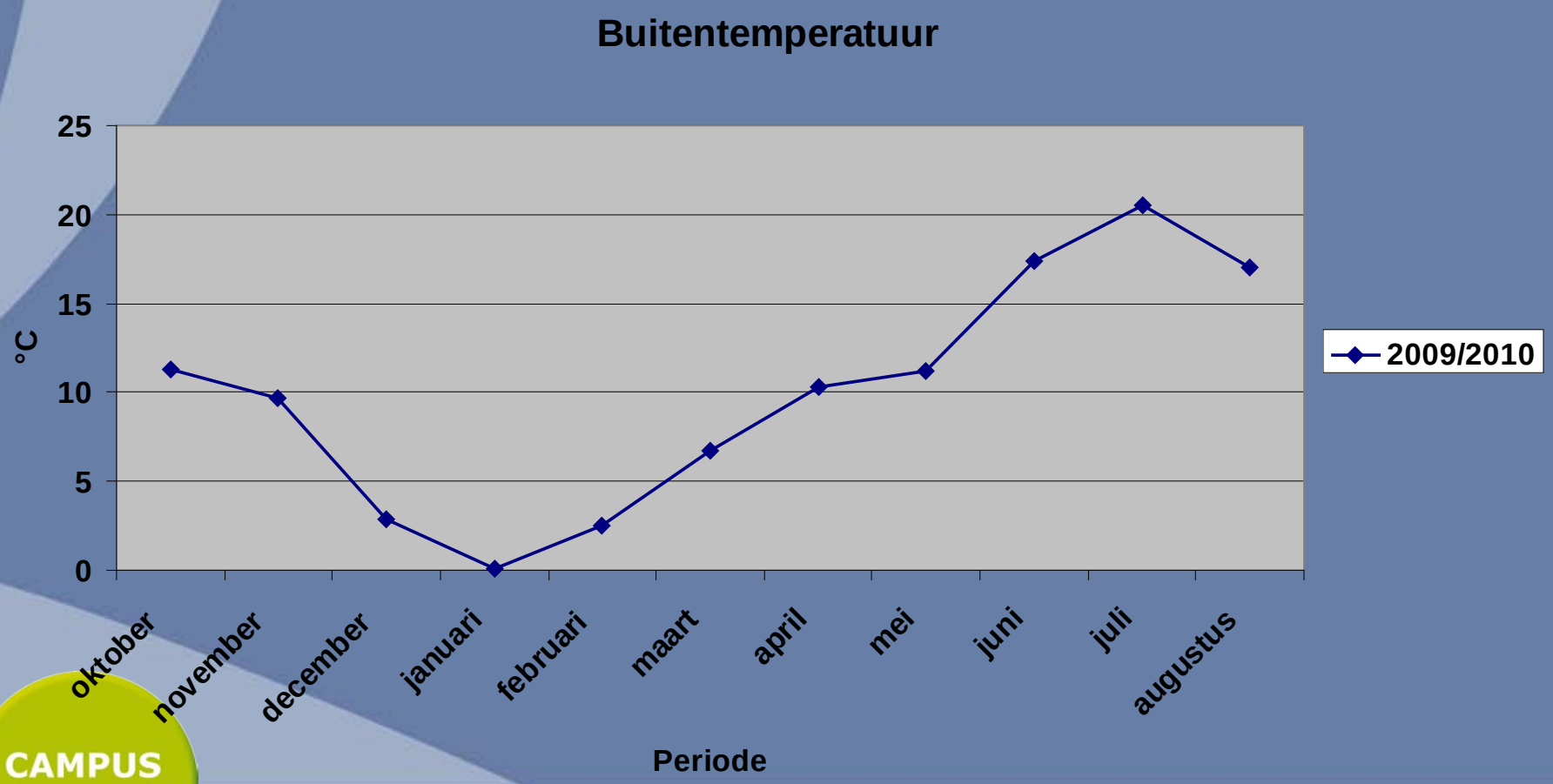
Installatie	afgifte	Ruimteverwarming	SWW	Pasieve koeling	Actieve koeling	bron	Dx	Lucht	Water	Bodem	afgifte	Radiatoren	Oppervlakte verwarming	Lucht	Renovatie	Nieuwbouw
1		x	x	x						x		x			x	
2		x	x							x			x			x
3		x	x	x						x		x	x		x	
4		x	x	x			x						x			x
5		x		x				x					x			x
6		x			x		x						x			x
7		x	x	x					x				x			x
8		x	x	x						x						x
9		x	x	x						x			x			x
10		x	x	x						x		x	x			x
11		x	x		x			x					x			x
12		x	x		x			x				x	x		x	
13		x	x					x					x			x
14		x	x					x								x
15		x	x				x						x			x

CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Resultaten

Buitentemperaturen

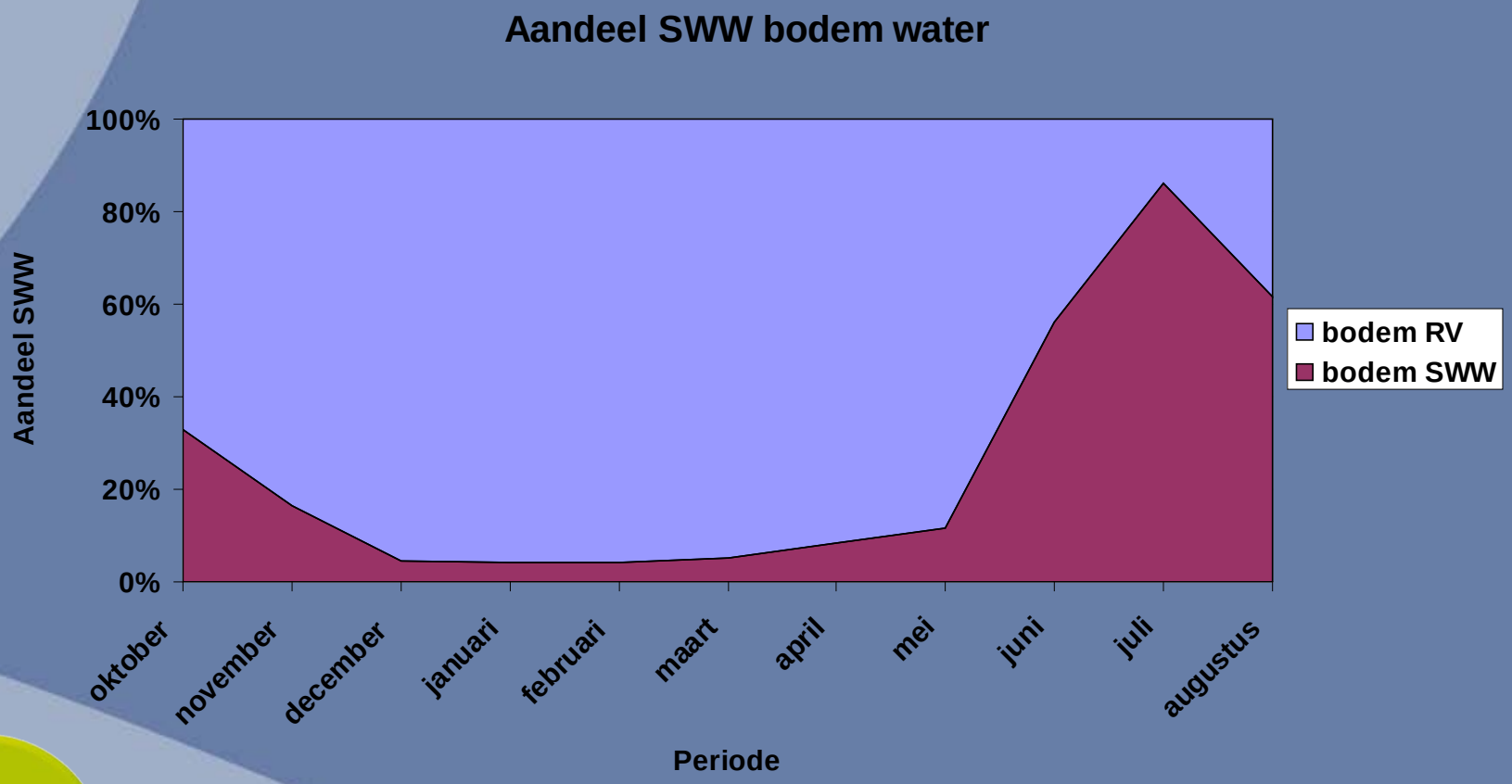


CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Resultaten

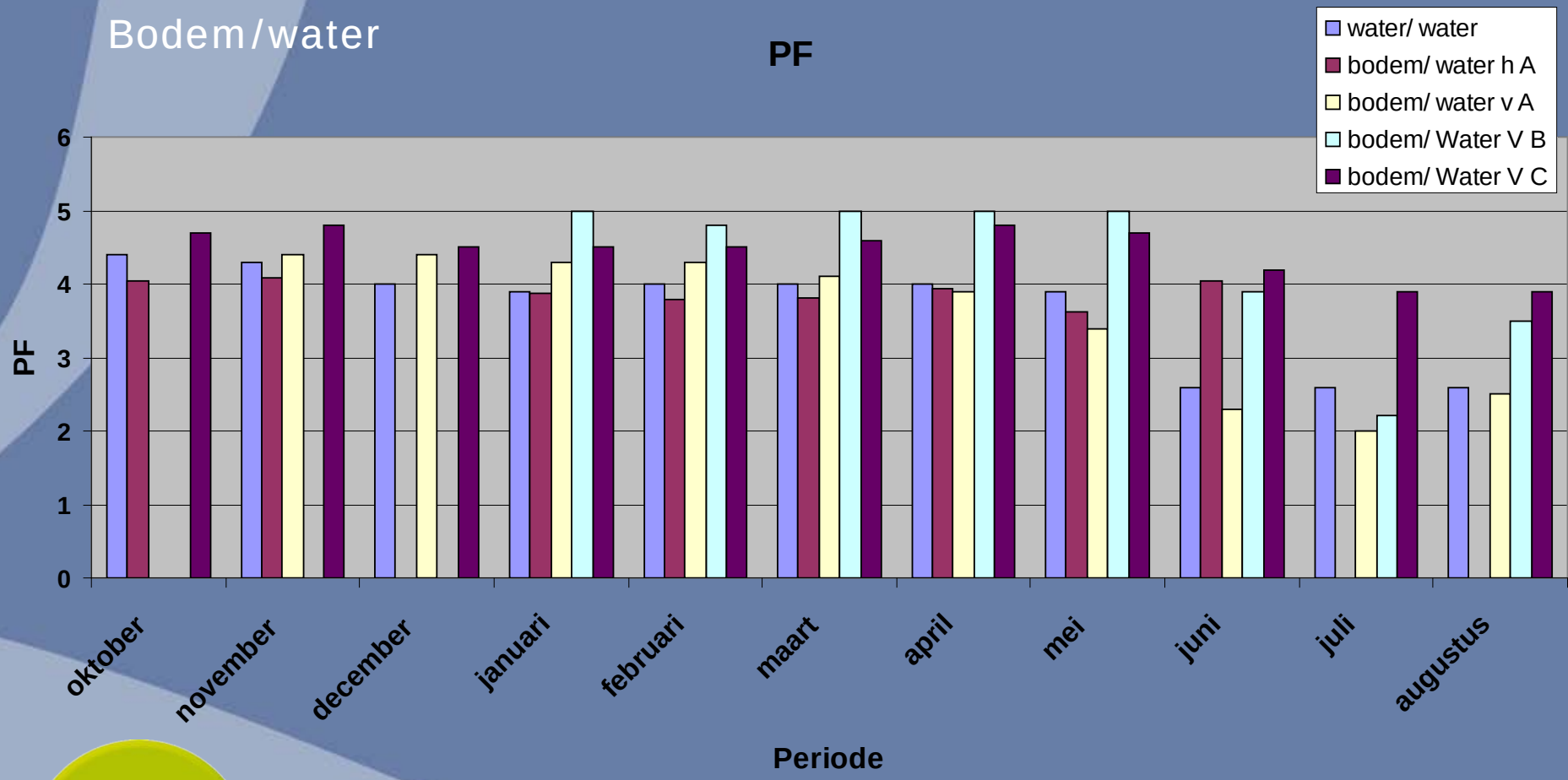
Bodem/water



CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Resultaten

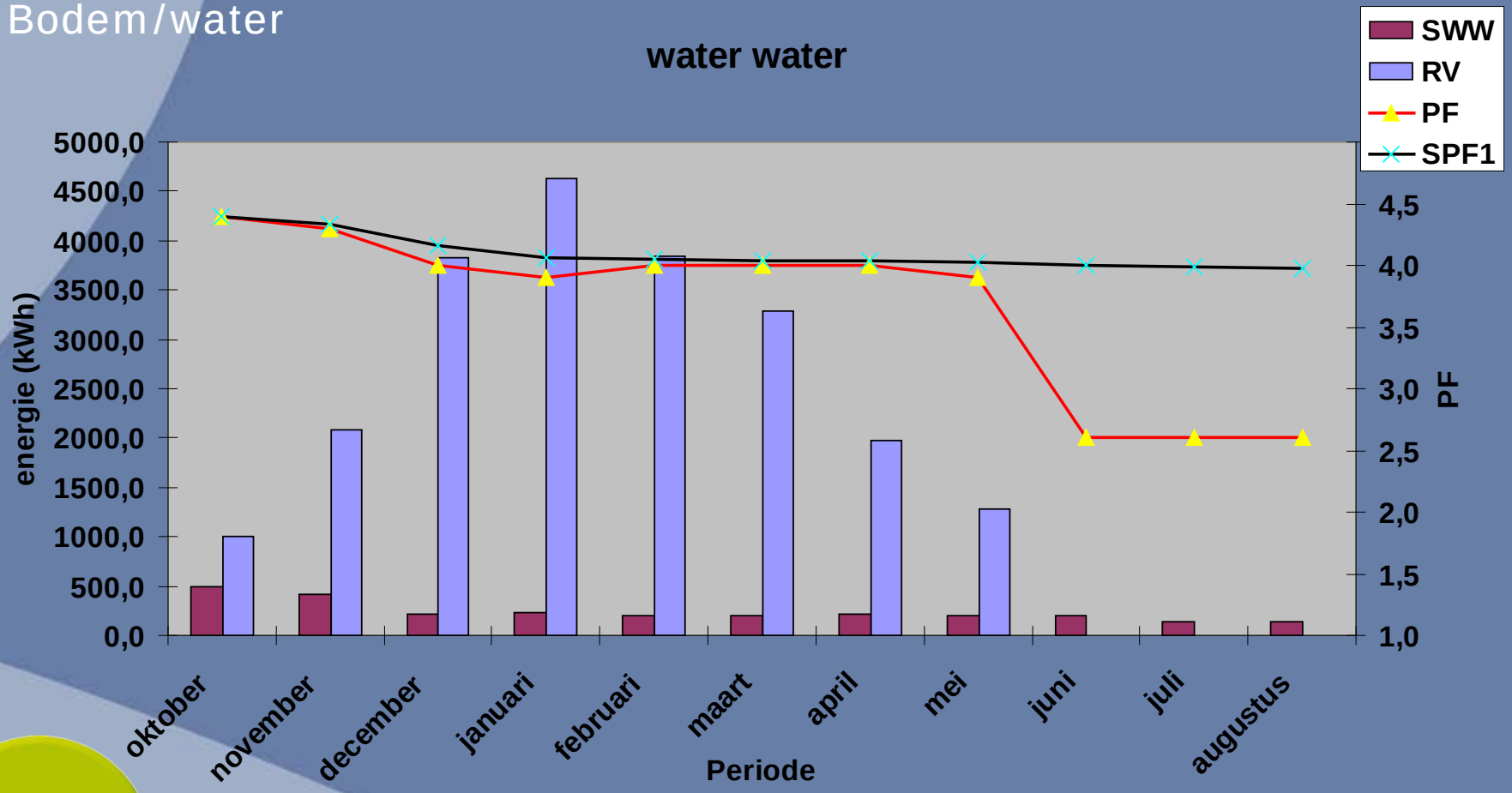


CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Resultaten

Bodem/water

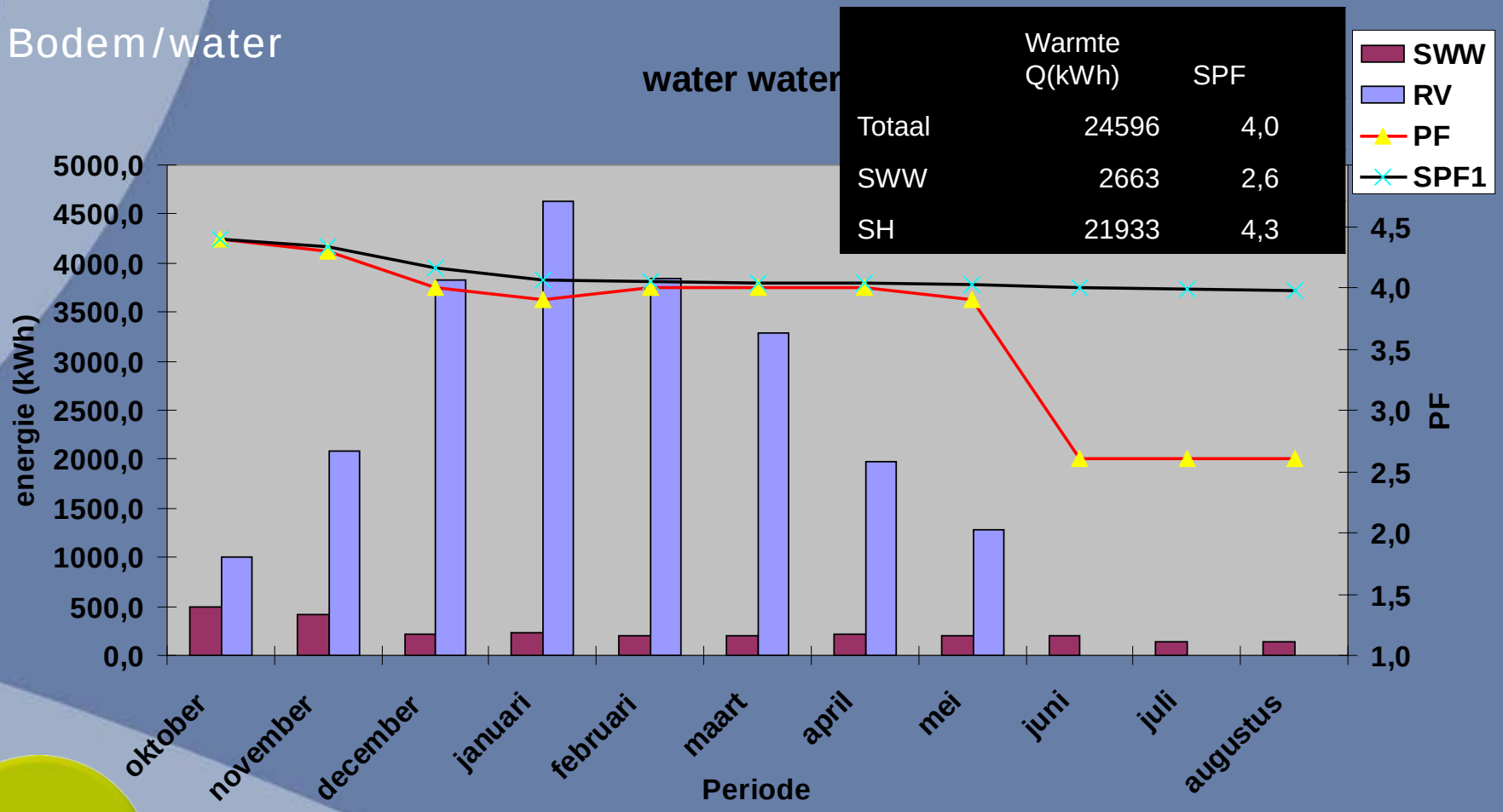


CAMPUS DE NAYER

Empowered by Lessius | Associatie Kuleuven

Resultaten

Bodem/water

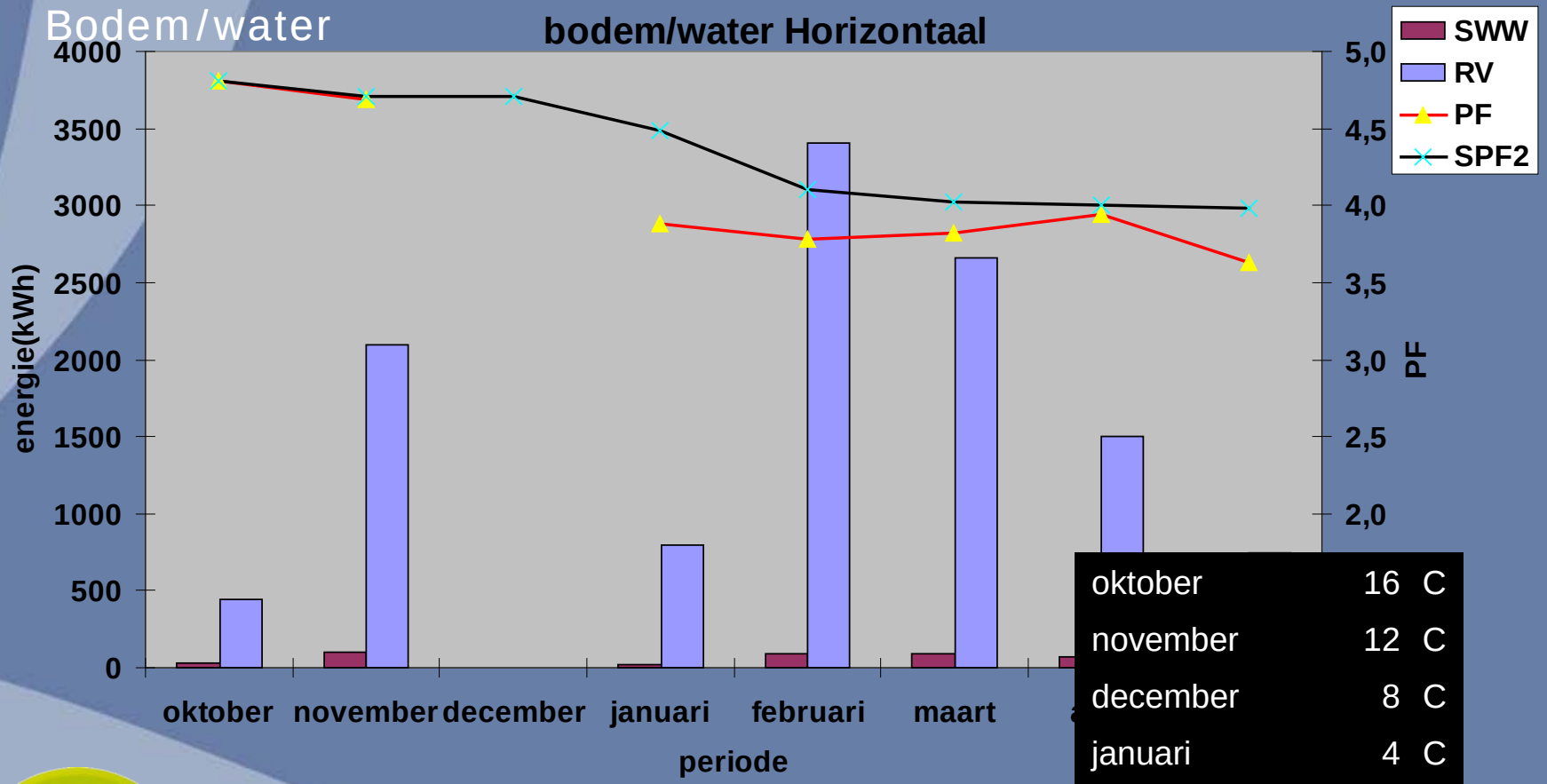


CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Resultaten

Bodem/water



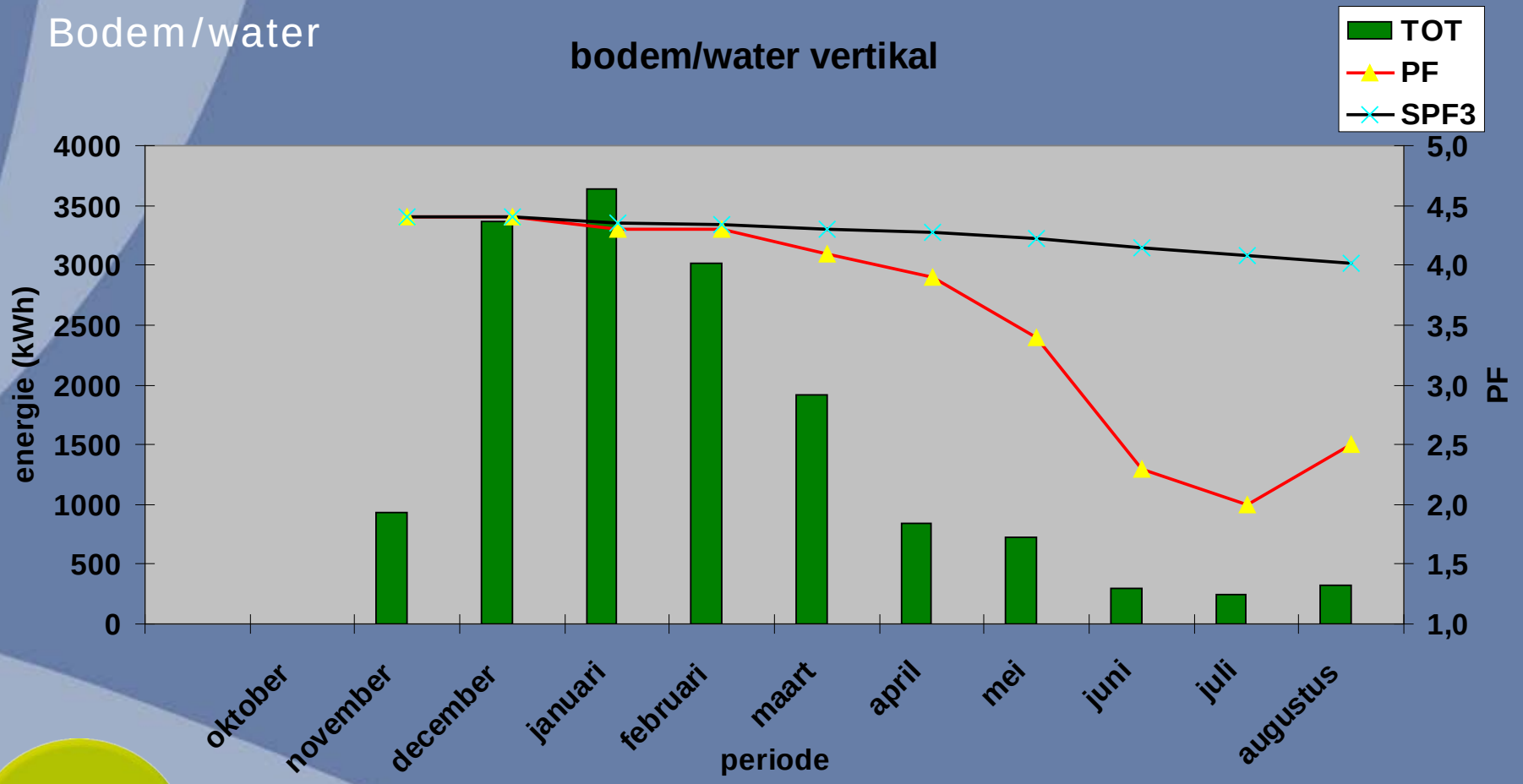
oktober	16	C
november	12	C
december	8	C
januari	4	C
februari	2	C

CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Resultaten

Bodem/water

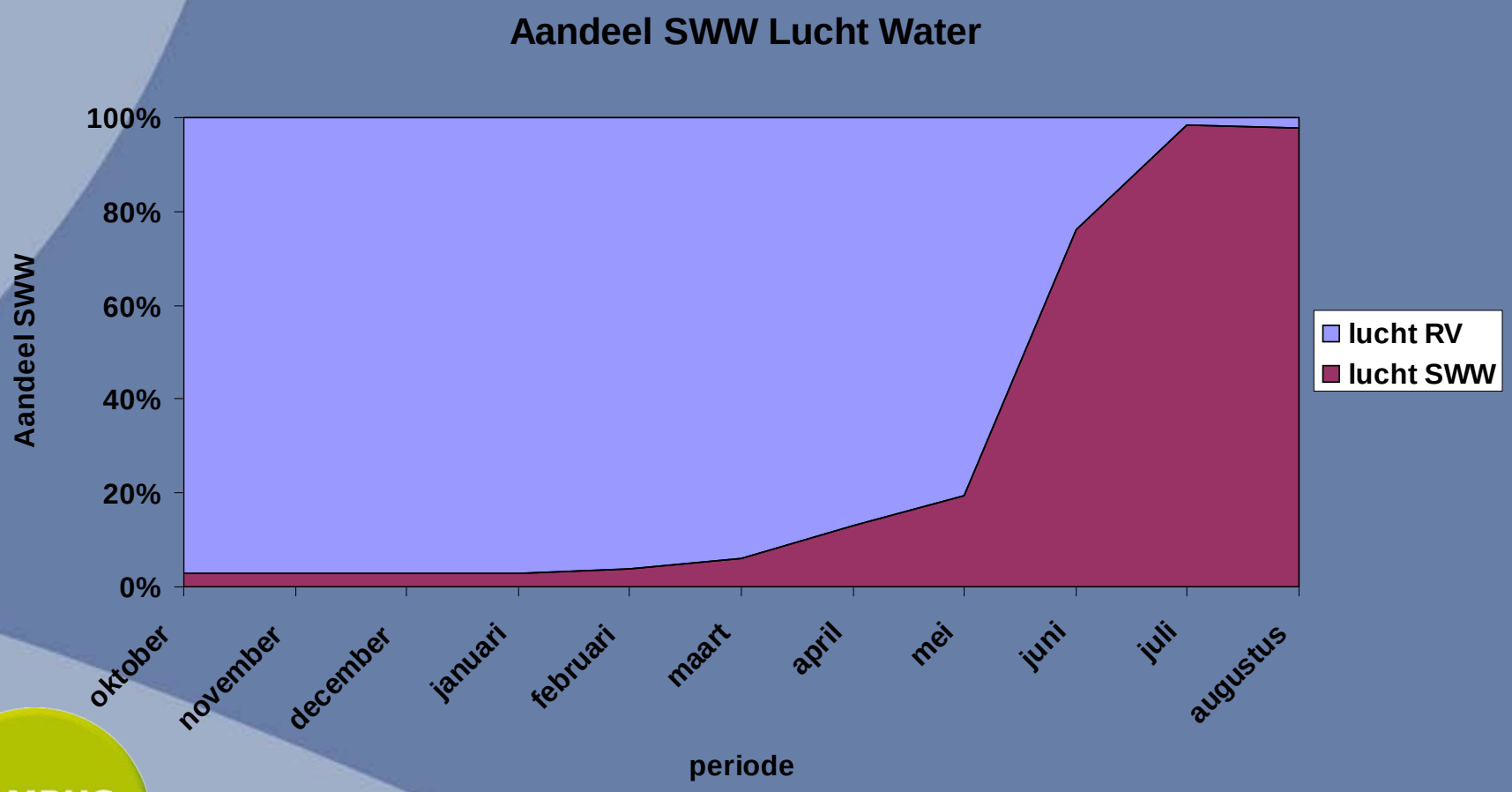


CAMPUS DE NAYER

Empowered by Lessius | Associatie Kuleuven

Resultaten

lucht/water

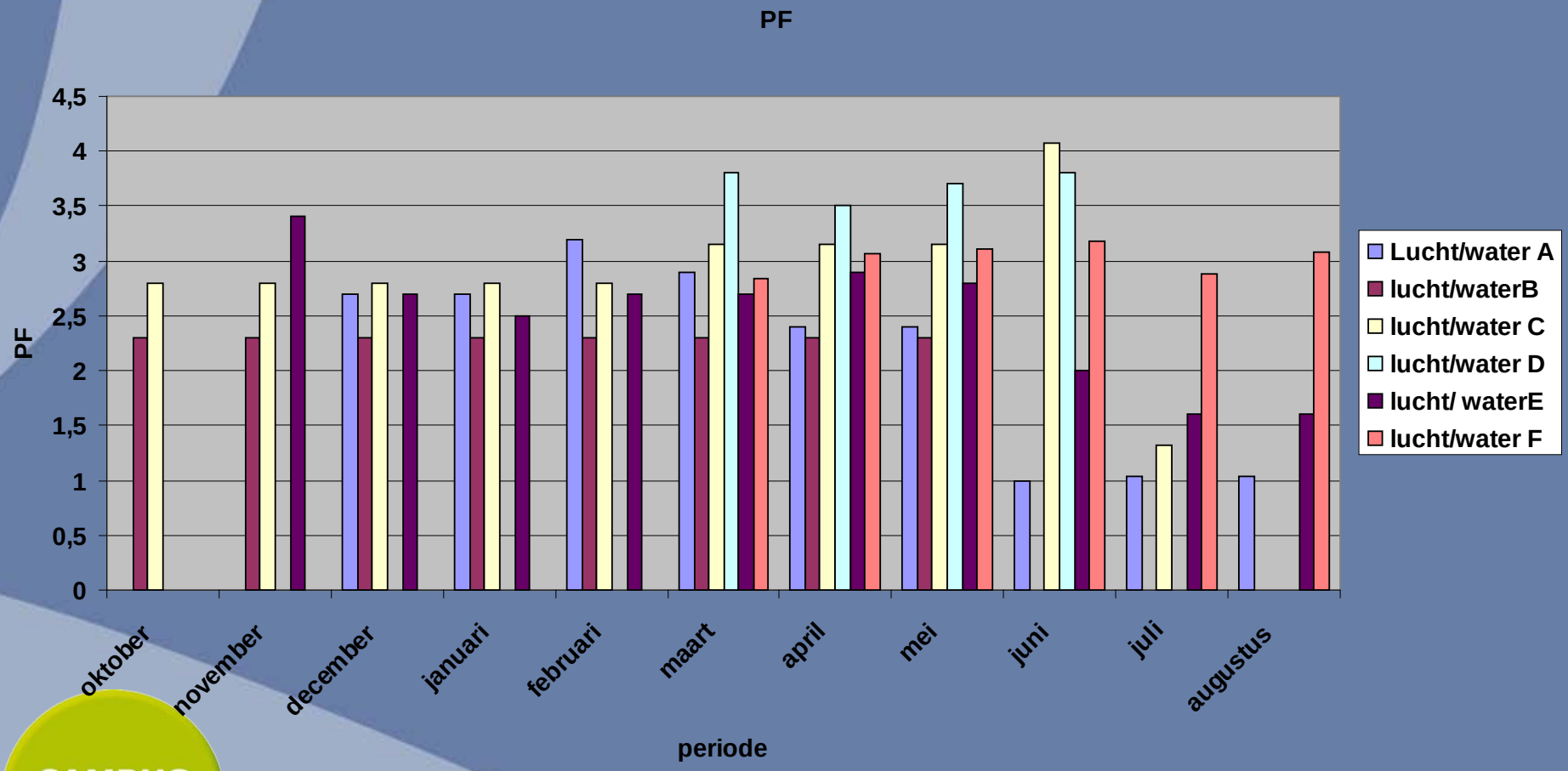


CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Resultaten

lucht/water



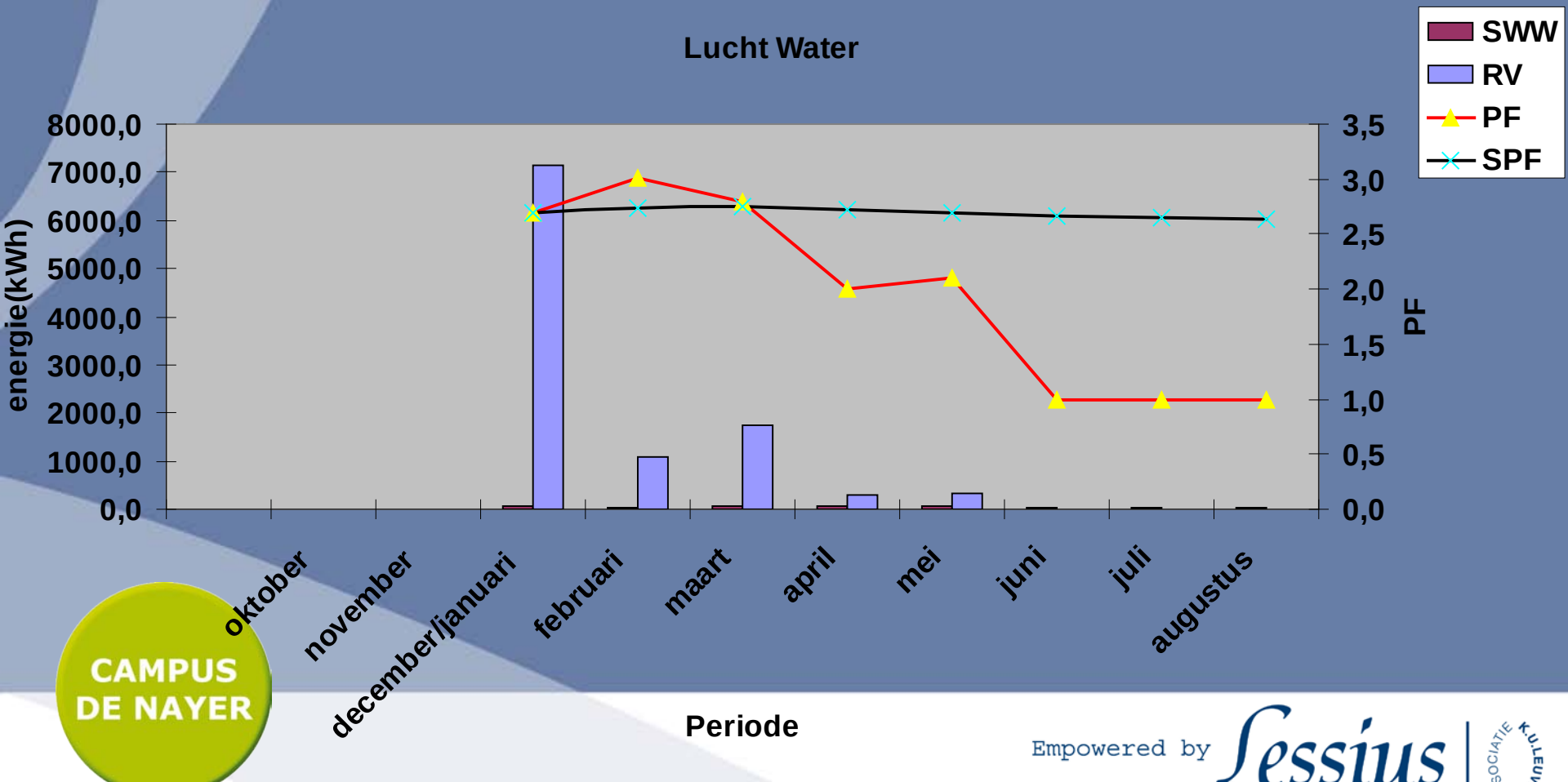
CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Resultaten

lucht/water

Secundaire pomp
volledig ingerekend



CAMPUS DE NAYER

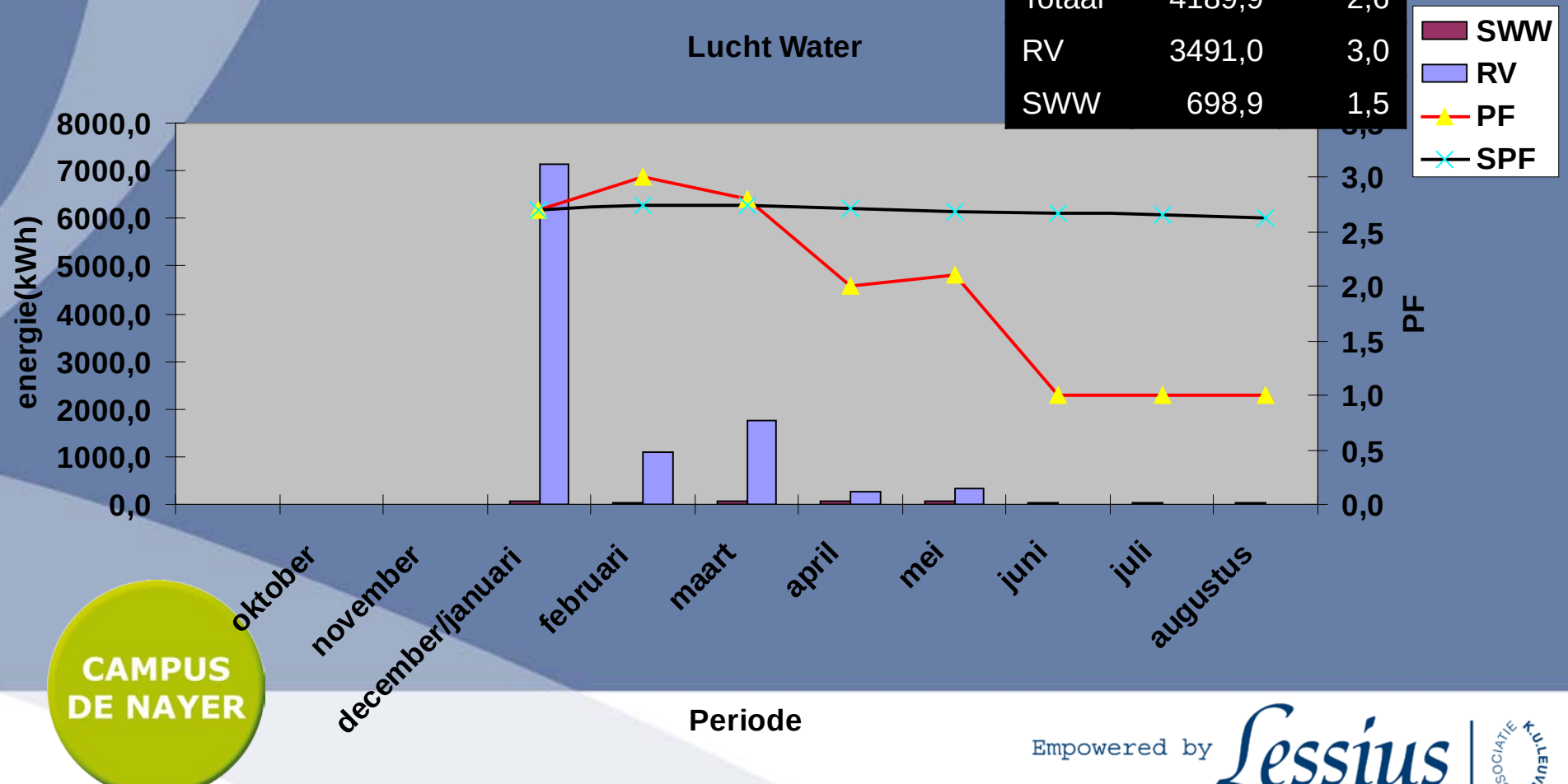
Empowered by Lessius | Associatie KULEUVEN

Resultaten

lucht/water

Secundaire pomp
volledig ingerekend

	Warmte Q (kWh)	SPF
Totaal	4189,9	2,6
RV	3491,0	3,0
SWW	698,9	1,5

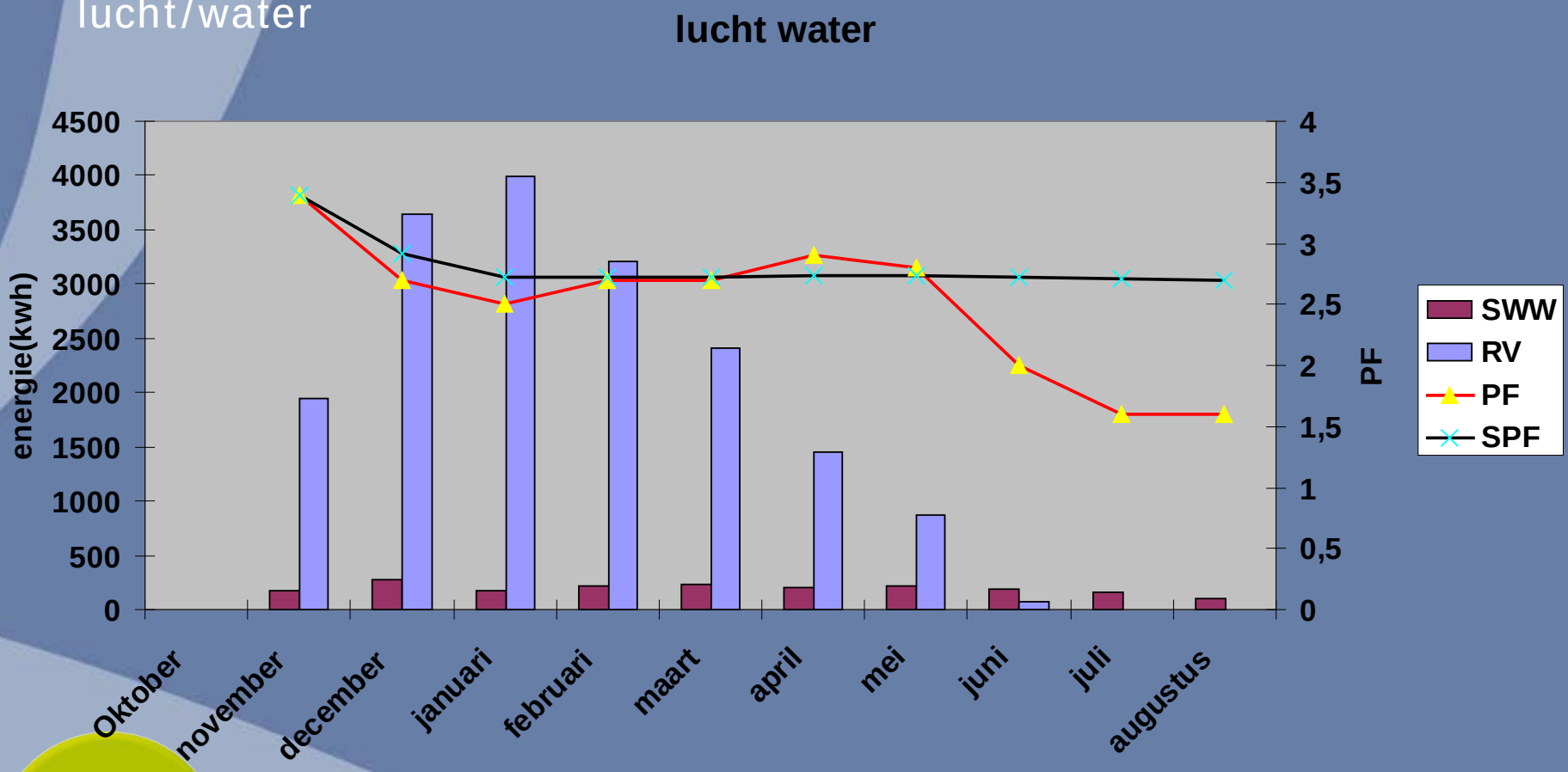


CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Resultaten

lucht/water

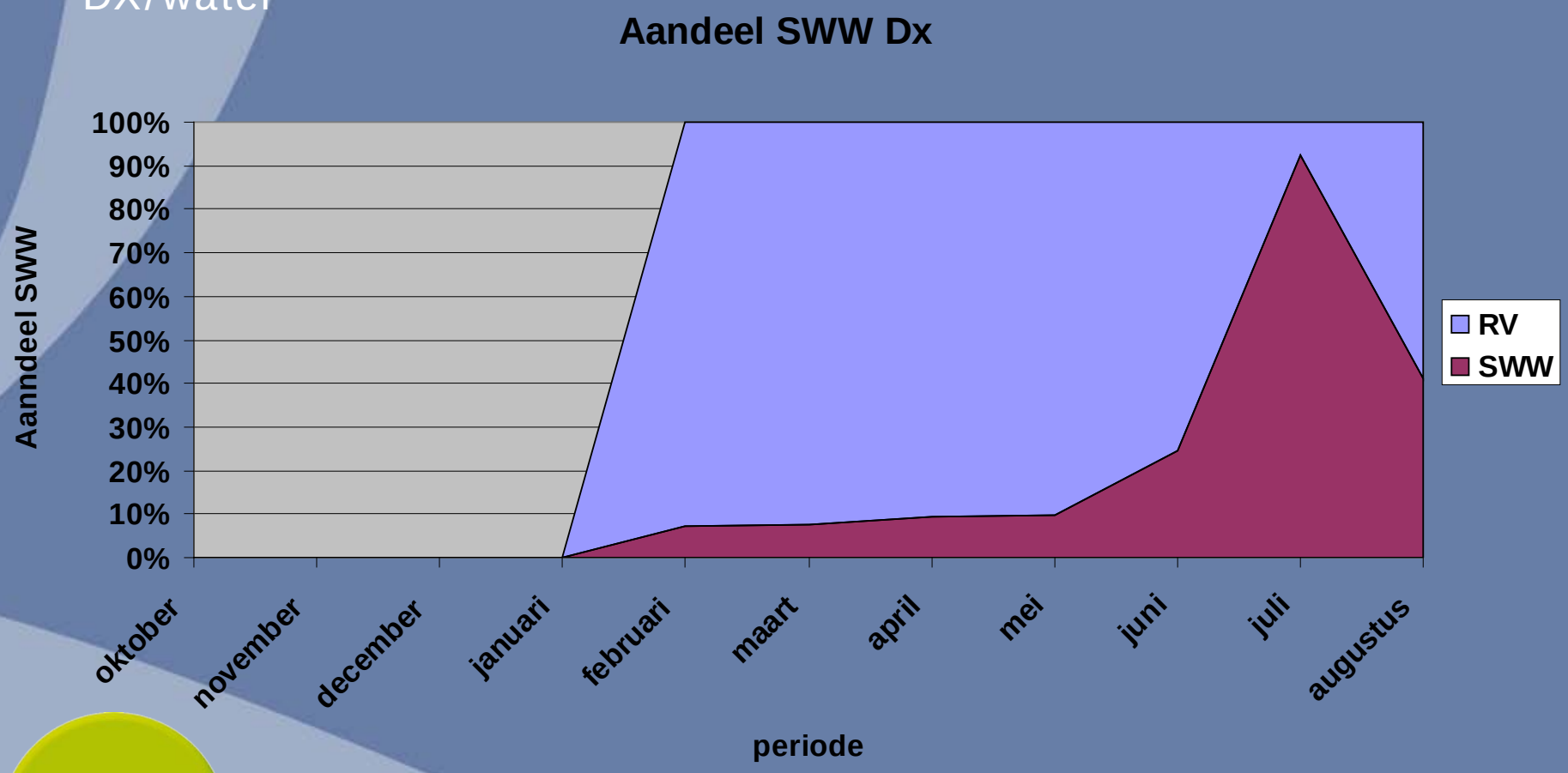


CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Resultaten

DX/water

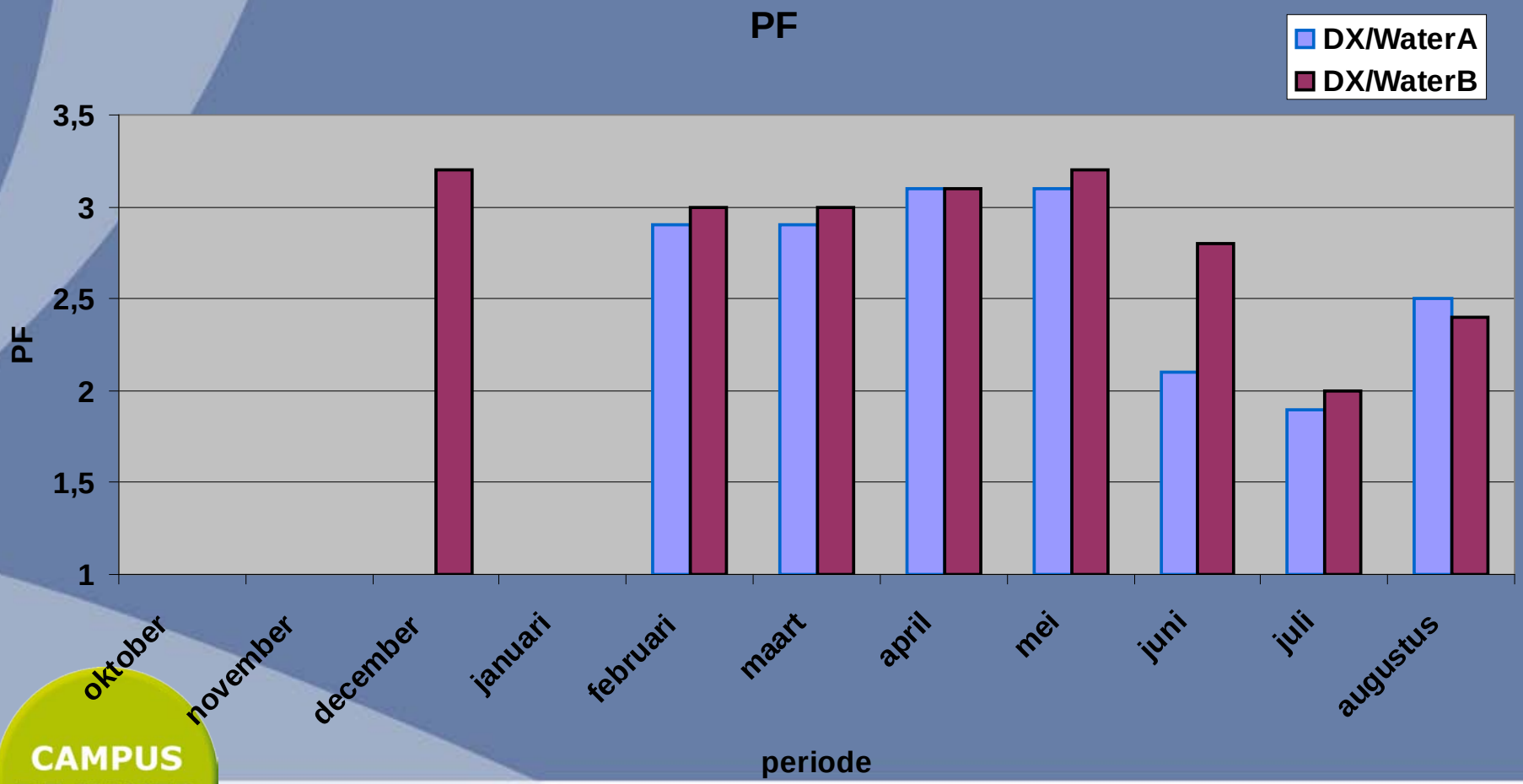


CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Resultaten

DX/water

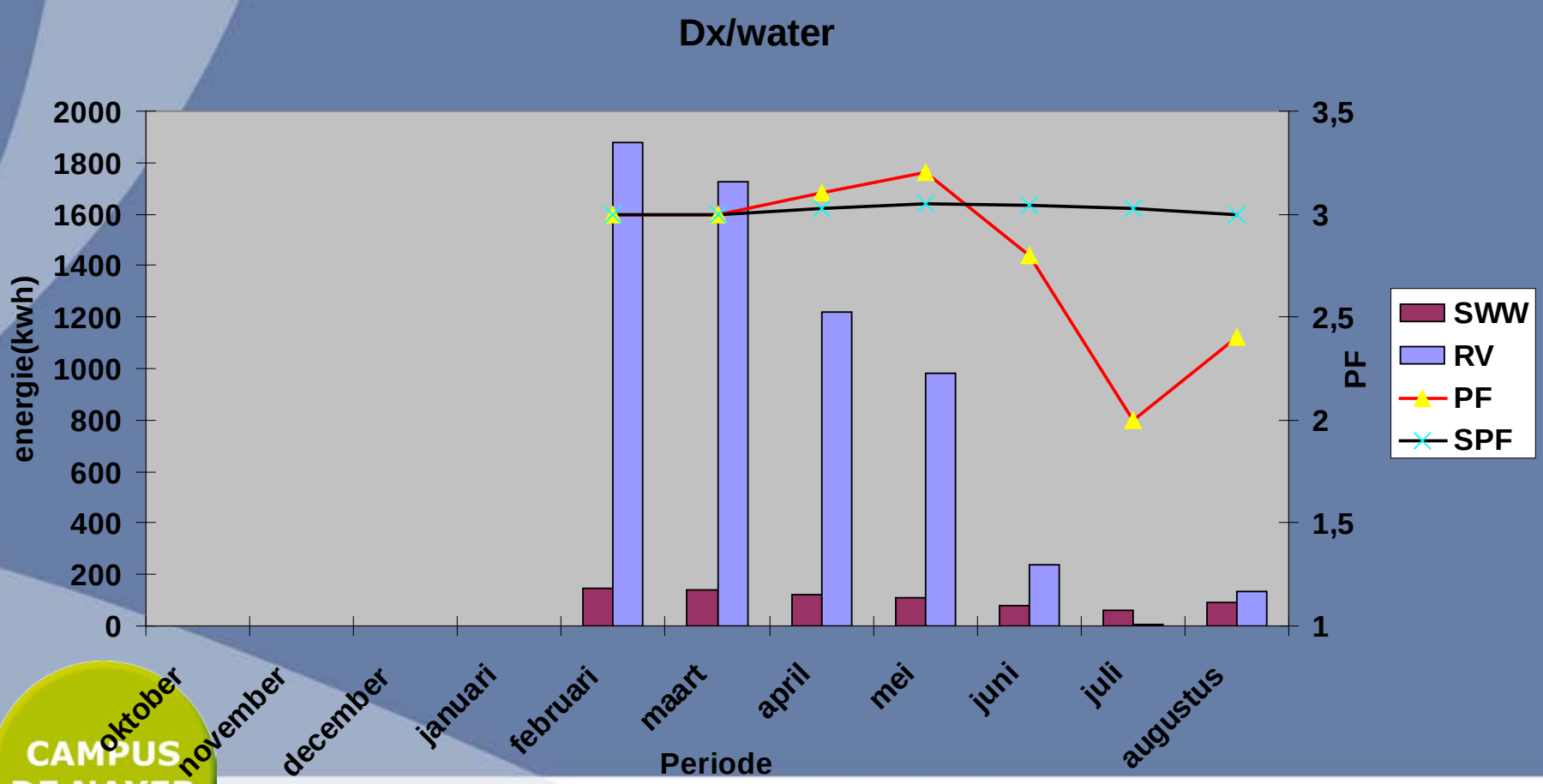


CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Resultaten

DX/water



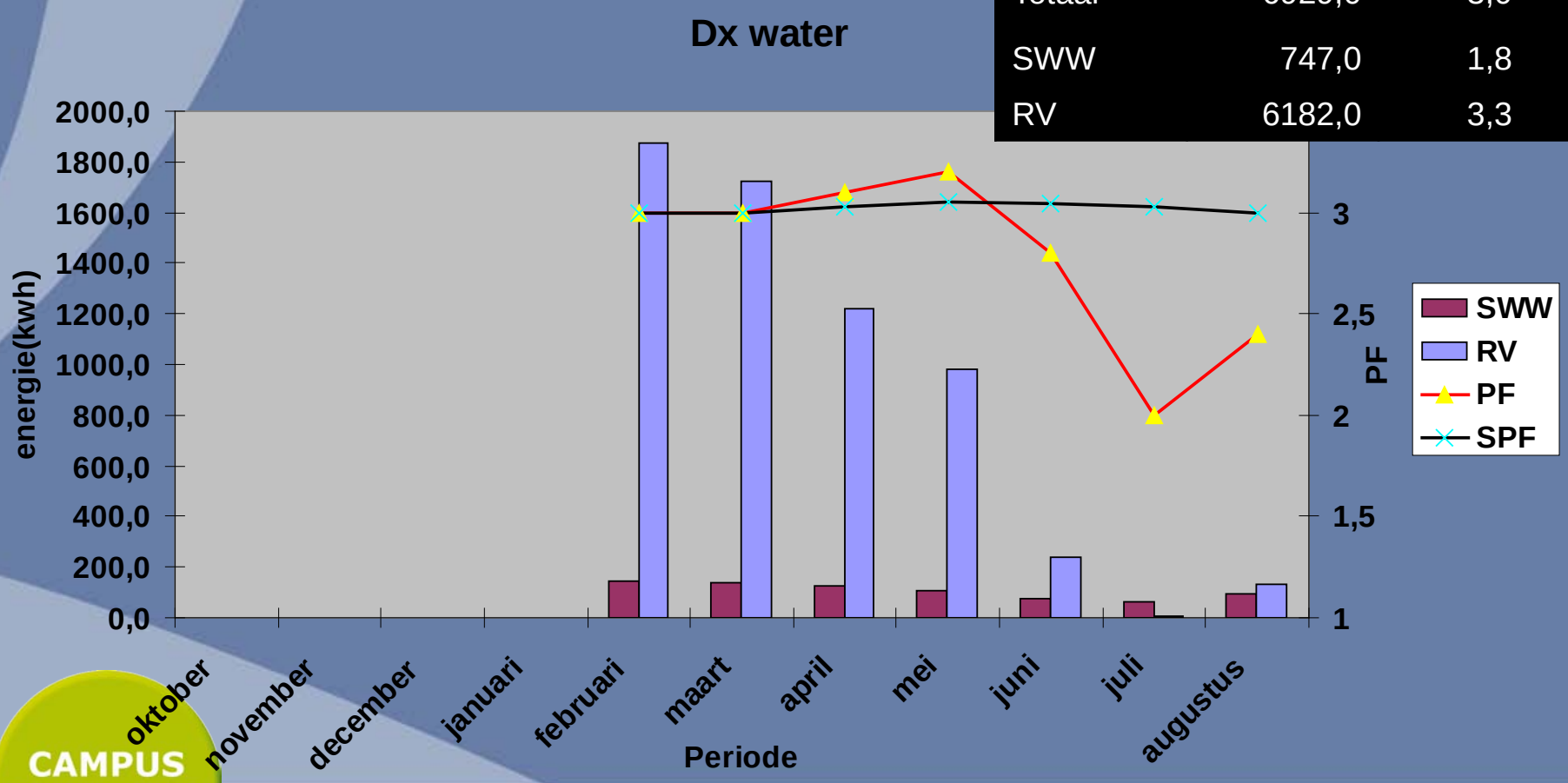
CAMPUS DE NAYER

Empowered by Lessius | Associatie KULEUVEN

Resultaten

DX/water

	Warmte Q(kWh)	SPF
Totaal	6929,0	3,0
SWW	747,0	1,8
RV	6182,0	3,3



CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Conclusie

3 installaties volledig ontleed vanaf februari

Lucht	Warmte Q(kWh)	SPF	% SWW
Totaal	4189,9	2,6	16,7
SWW	698,9	1,5	
SH	3491,0	3,0	

Bodem	Warmte Q(kWh)	SPF	% SWW
Totaal	11707	3,9	11,2
SWW	1316	2,9	
SH	10391	4,1	

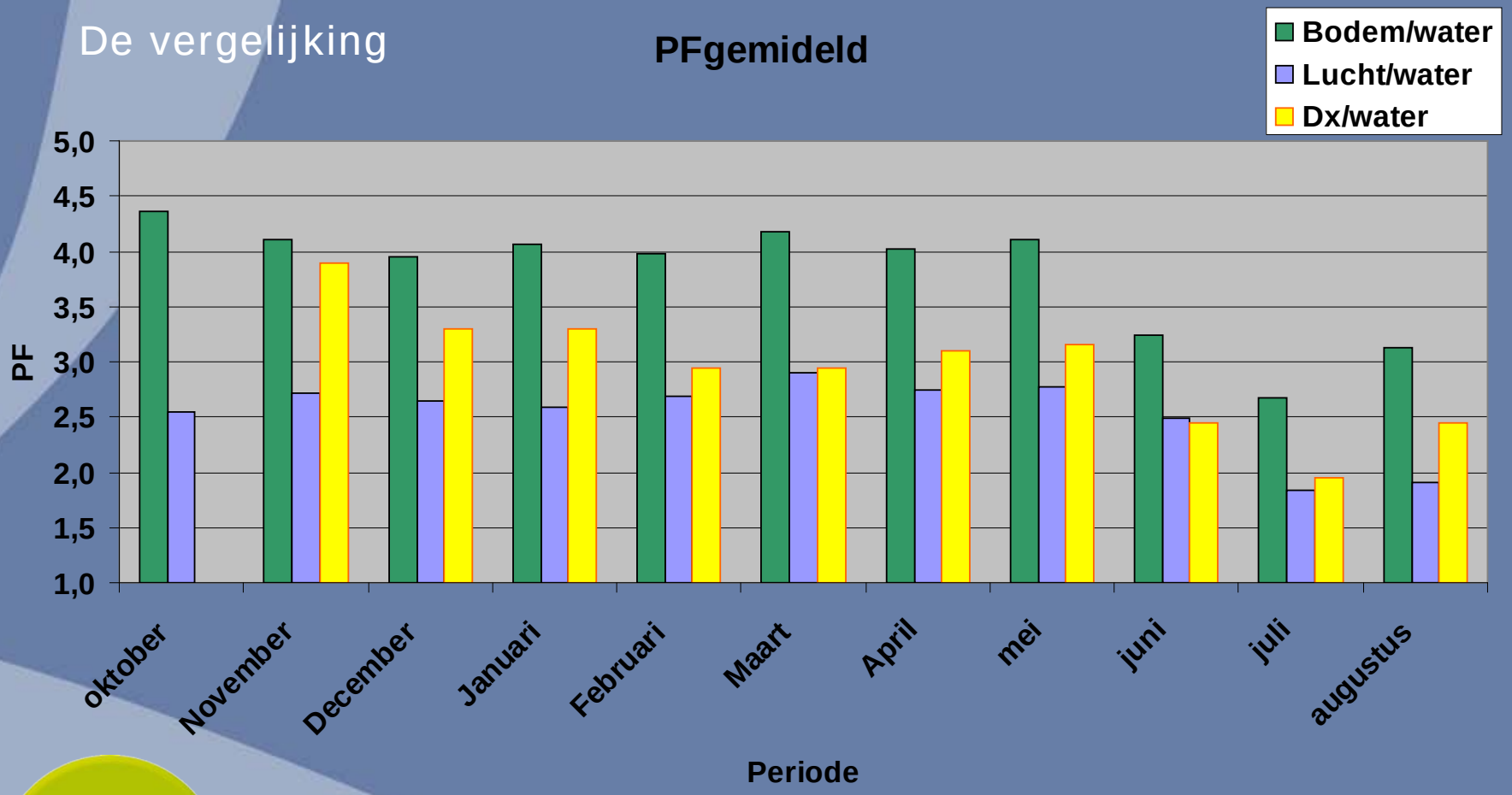
DX	Warmte Q(kWh)	SPF	% SWW
Totaal	6929	3,0	10,8
SWW	747	1,8	
SH	6182	3,3	

CAMPUS DE NAYER

Empowered by Lessius | Associatie KULeuven

Conclusie

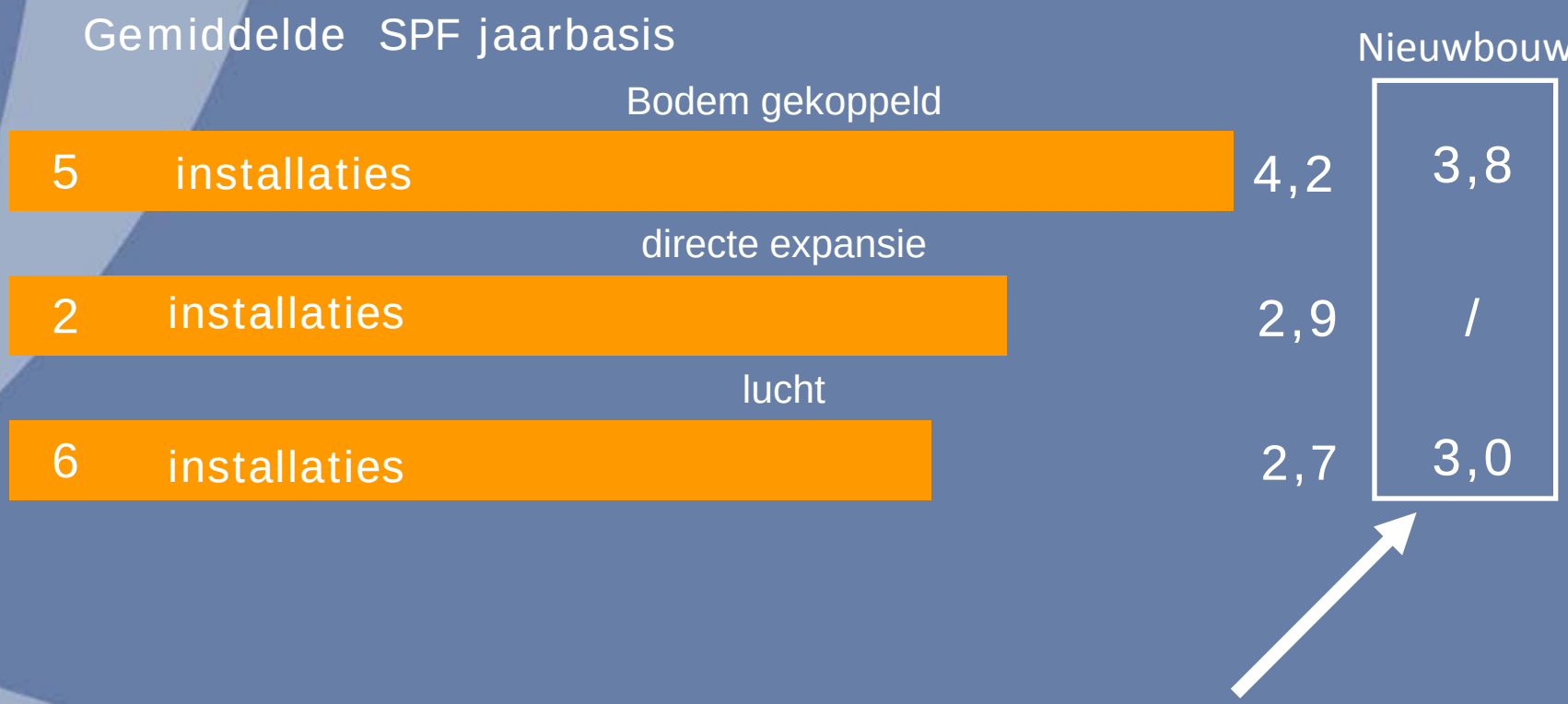
De vergelijking



CAMPUS DE NAYER

Empowered by Lessius | Associatie K.U.Leuven

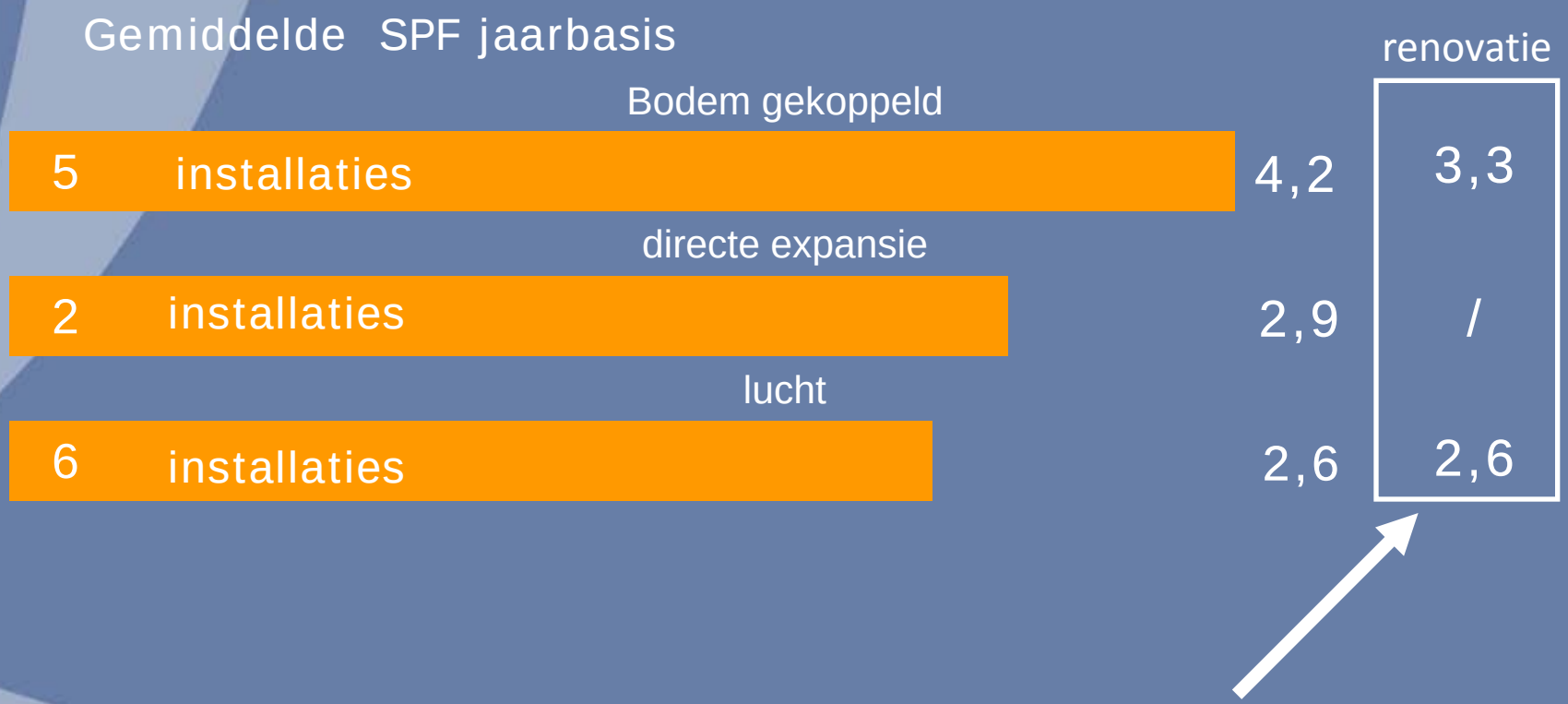
Conclusie



CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Conclusie



CAMPUS DE NAYER

Empowered by Lessius | Associatie KU Leuven

Conclusie

- Metingen sluiten goed aan bij buitenlandse meetcampage
- De PF daalt in de zomermaanden
  - Stilstandverliezen nemen toe
  - Aandeel SWW stijgt >Hogere afgifte temperaturen(SWW)

CAMPUS DE NAYER

Empowered by Lessius | Associatie K.U.Leuven

Conclusie

- Dimensionering is enorm belangrijk
  - Vermogen
  - Temperatuursregime
  - Bron en afgifte
- Regeling en sturing wegen sterk op SPF
- SWW weegt aanzienlijk op de totale SPF

CAMPUS DE NAYER

Empowered by Lessius | Associatie K.U.Leuven

Bedankt voor jullie aandacht.

CAMPUS DE NAYER

Empowered by Lessius | Associatie K.U.Leuven