



solarcombi+

WP4 – Task1 : Standard configurations' optimization

Solar Combi+ Project meeting
Perpignan 10th-12th June 2009
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Identification of most promising markets and promotion of standardised system configurations for the market entry of small scale combined solar heating & cooling applications
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Intelligent Energy  **Europe**

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Agenda

1. Changes in ClimateWell-simulations
2. Run simulations
3. Sensitivity analysis



1. Changes in ClimateWell-simulations

1. Change of load file scaling:

- P_ref is listed for 95°C hot water temperature

	95-32-18	95-32-12	95-27-18	95-27-12
ClimateWell [kW]	5.4	4.3	6.9 (+37%)	5.2 (+22%)

2. Change in boiler operation:

boiler provides reference temperature only if

- a) temperature from solar below minimum driving temp.
 - ClimateWell: 70°C → dT=25K

- b) cooling load could not be covered in last time step

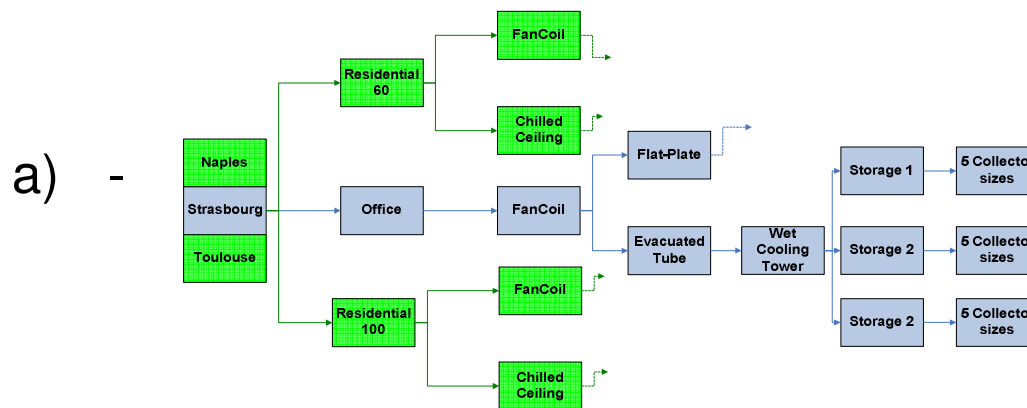
1. Change of max storage temperature

- The maximum storage temperature increases from 90 to 95°C.

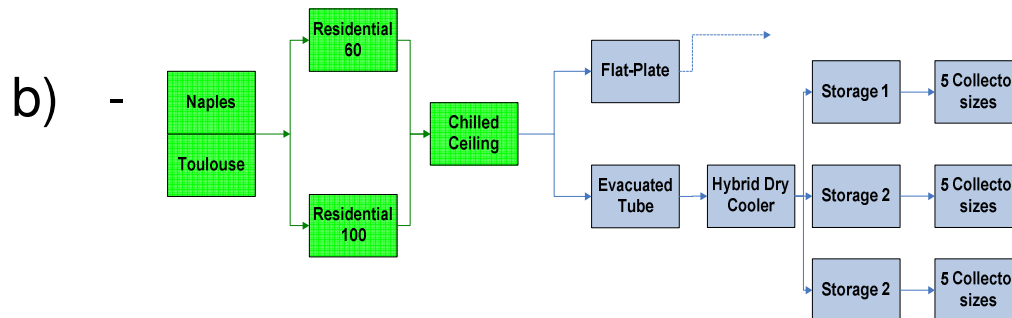


Run Simulations

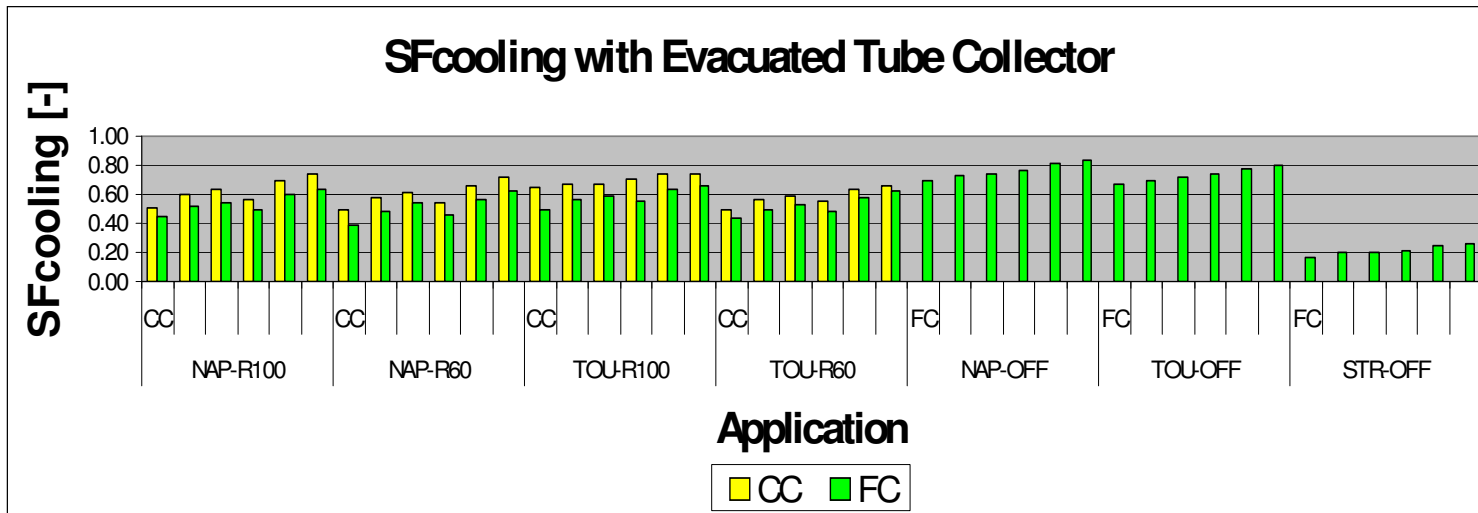
- 6 different combinations of A_coll and V_stor for each location, configuration and building (the 2 biggest A_coll combined with the 3 V_stor sizes)



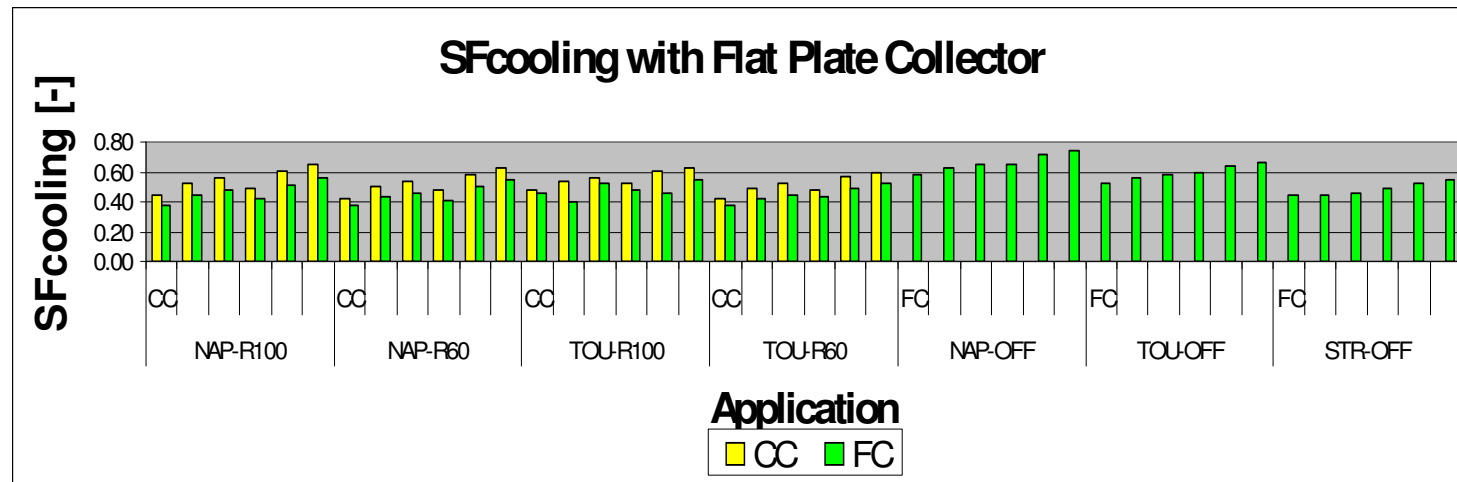
- Wet Cooling Tower (132) (95-32-18/12)
- FP,ET Collector
- CC, FC Distribution
- NAP, TOU, STR location
- Off, R60, R100 application



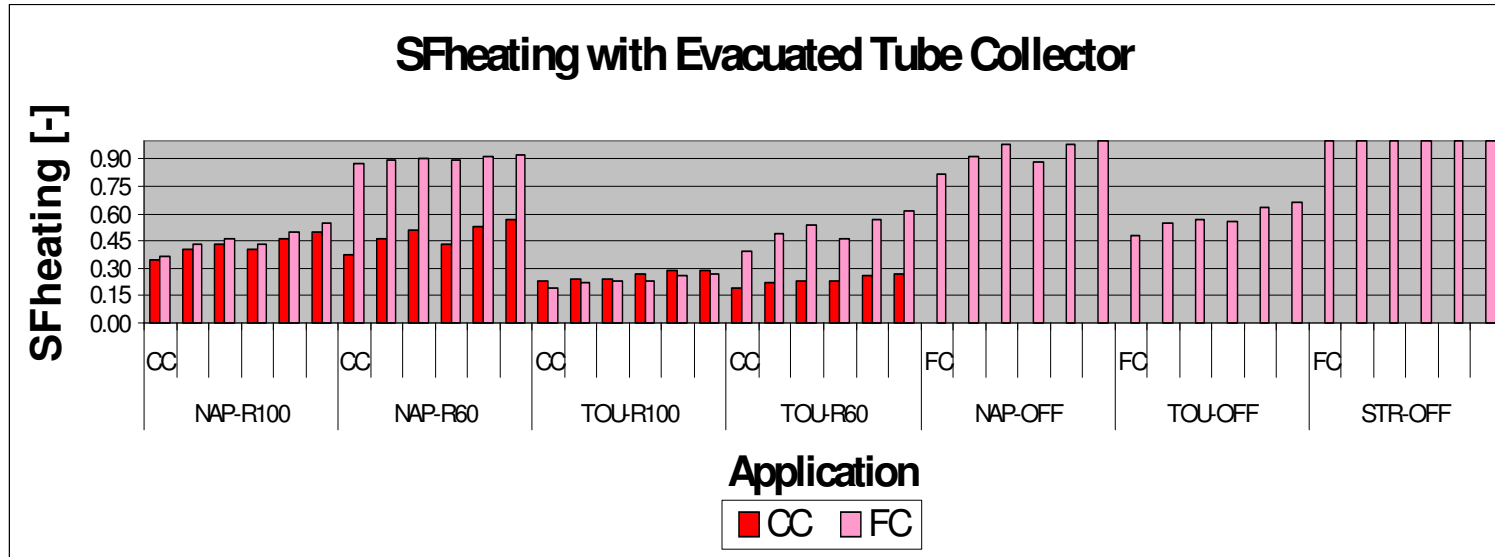
- Hybrid Dry Cooler (132) (95-32-18/12)
- FP,ET Collector
- CC, FC Distribution
- NAP, TOU, STR location
- Off, R60, R100 application



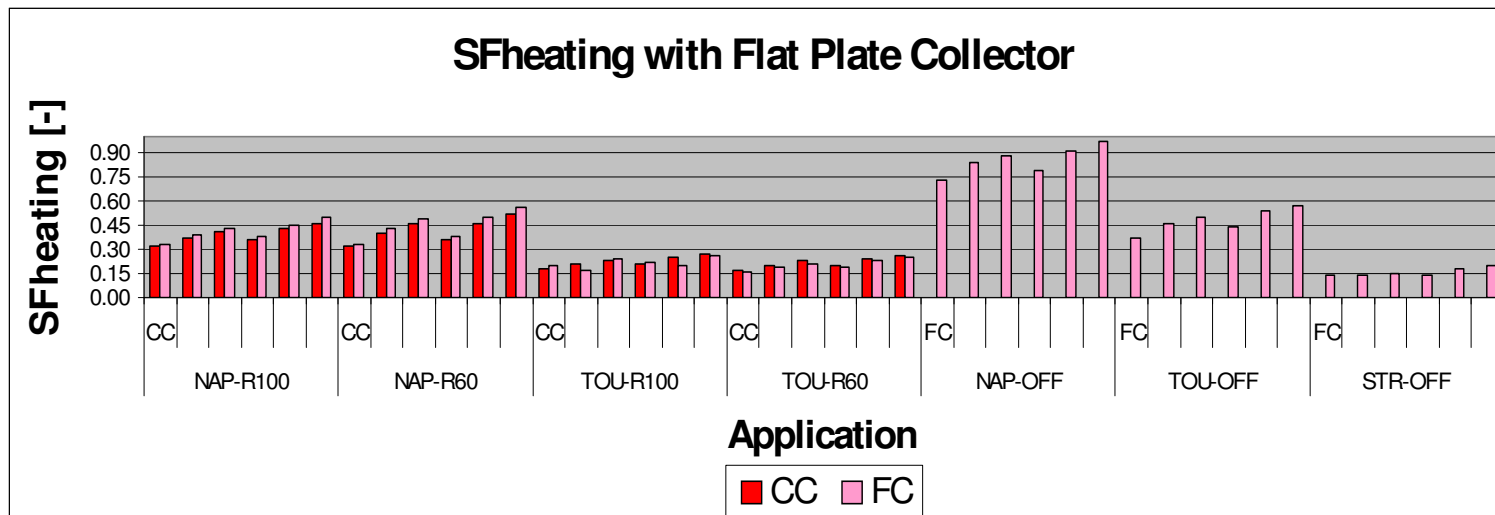
Increase of SFcooling:
between 10%÷32%
 Depending on application



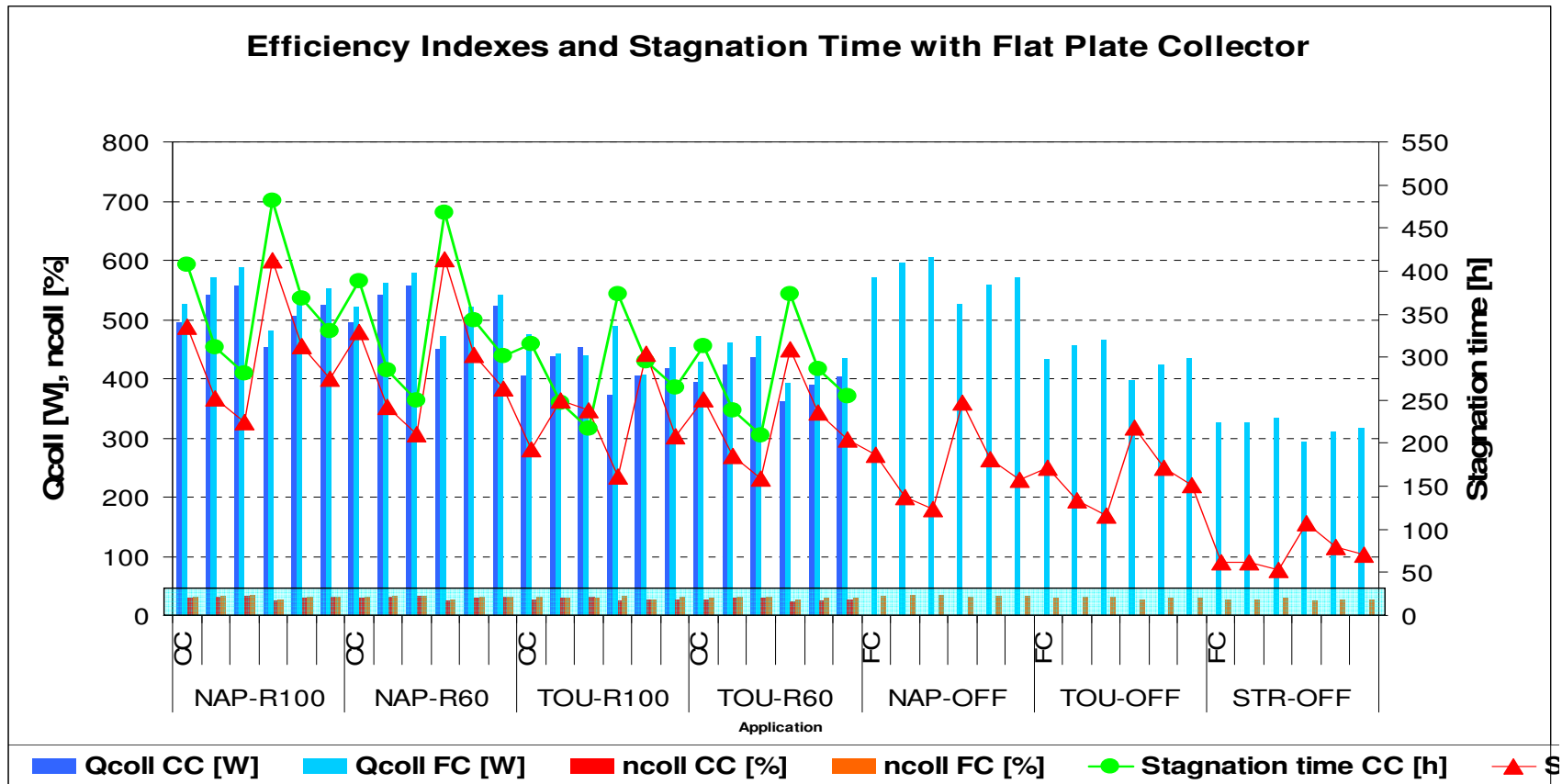
Increase of SFcooling:
between 20%÷58%
 Depending on application



Increase of SF_heating:
between 6%÷30%
Depending on application

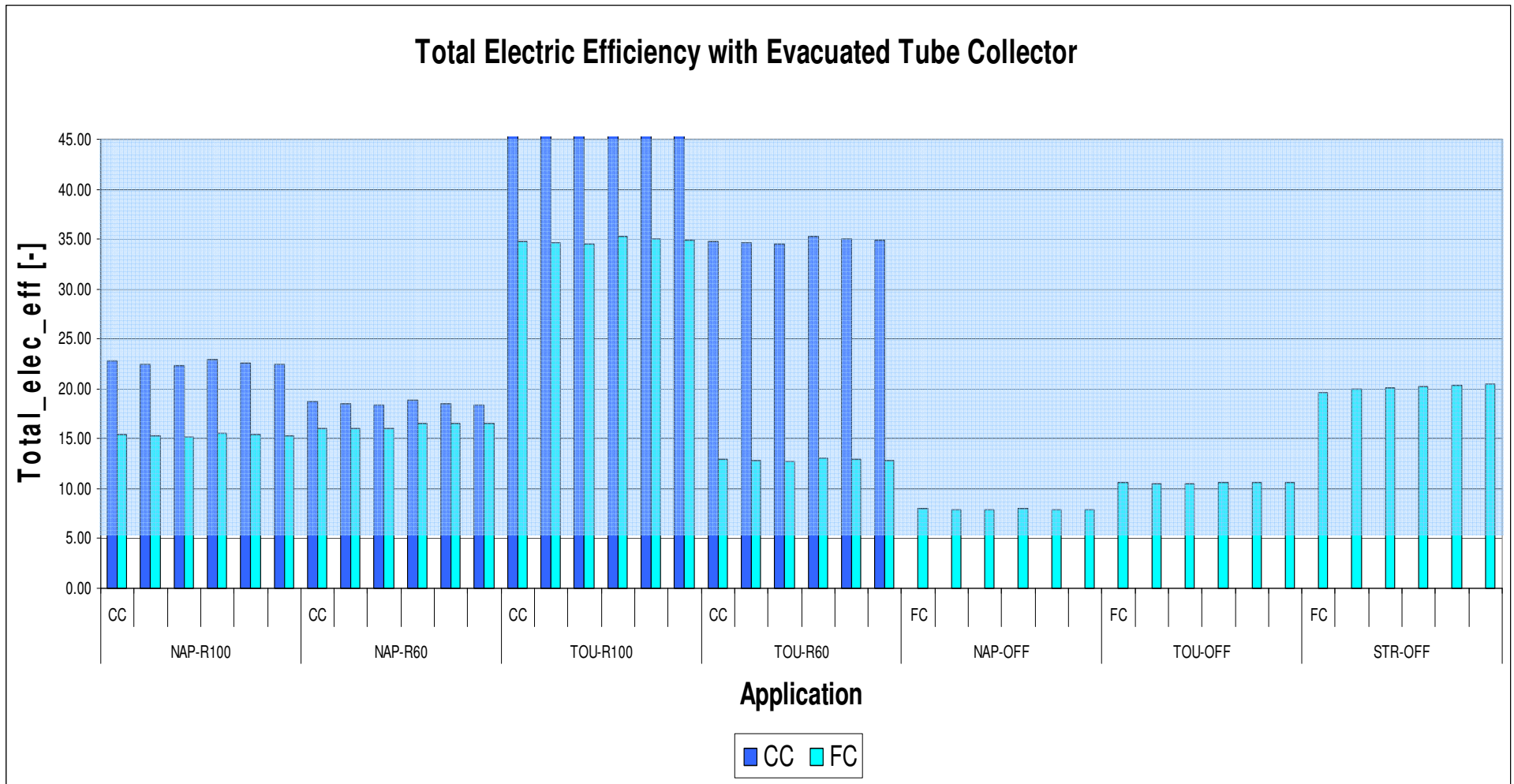


Increase of SF_heating:
between 6%÷14%
Depending on application



Reduction of Stagnation Time:

- 7%÷30% ET-CC
- 3%÷5% FP-CC
- 2%÷15% ET-FC (most of the cases increase)
- 4%÷30% FP-FC (-43%STR-OFF; -50% TOU-R100)





SOLAR FRACTION

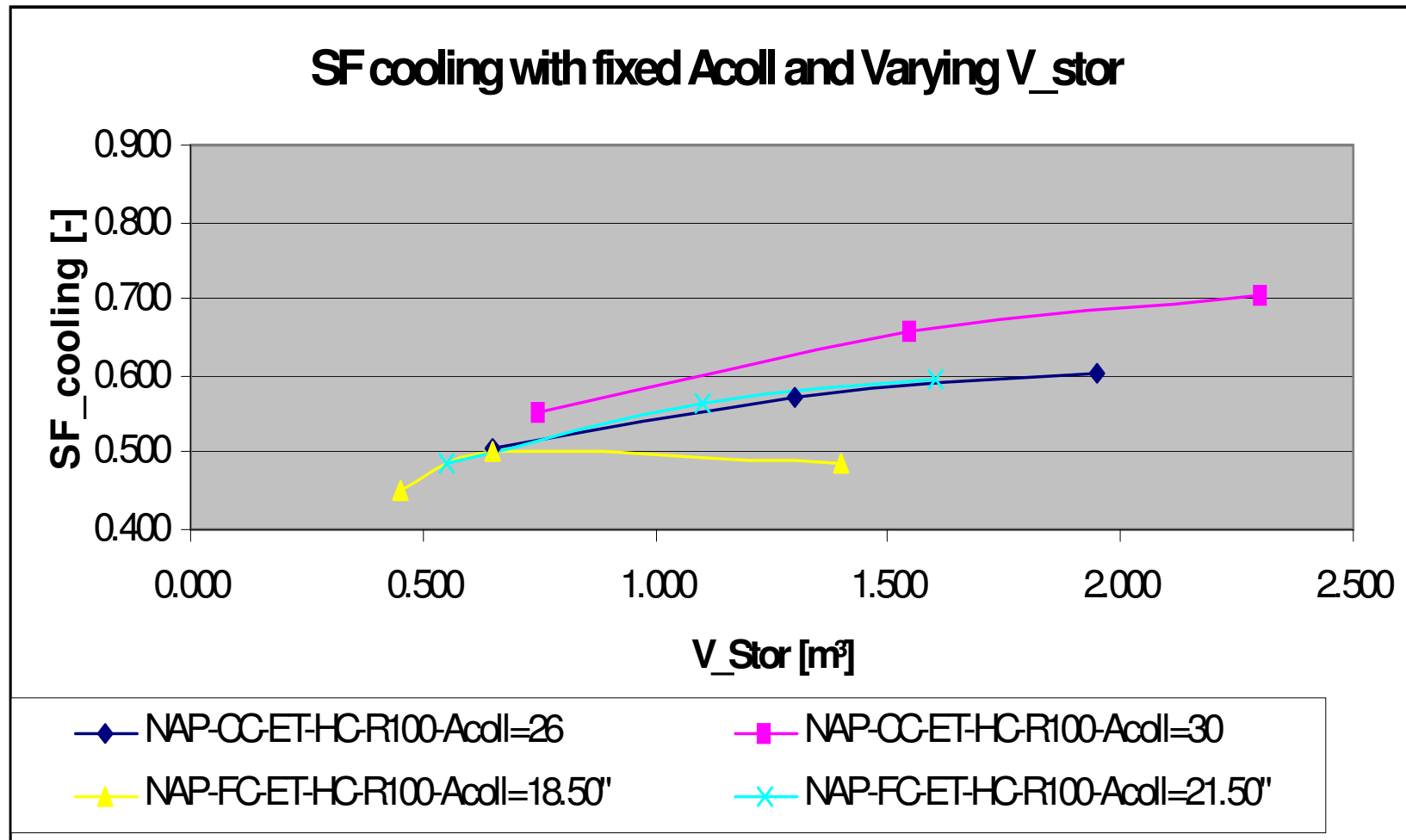
		NAPLES				RESIDENTIAL 10				CLIMATEWELL	
		WC				DC				HC	
		ET	FP	ET	FP	ET	FP	ET	FP	ET	F
FC	26	m ² /kW	26	m ² /kW	-	m ² /kW	-	m ² /kW	22	m ² /kW	22
	75.0	l/m ²	75.0	l/m ²	-	l/m ²	-	l/m ²	74.4	l/m ²	74.4
	SF (%)	64.8	SF (%)	59.0	SF (%)	-	SF (%)	-	SF (%)	61.1	SF (%)
CC	3.5	m ² /kW	3.5	m ² /kW	-	m ² /kW	-	m ² /kW	3.1	m ² /kW	3.1
	75.4	l/m ²	75.4	l/m ²	-	l/m ²	-	l/m ²	75.4	l/m ²	75.4
	SF (%)	67.9	SF (%)	62.7	SF (%)	-	SF (%)	-	SF (%)	65.9	SF (%)

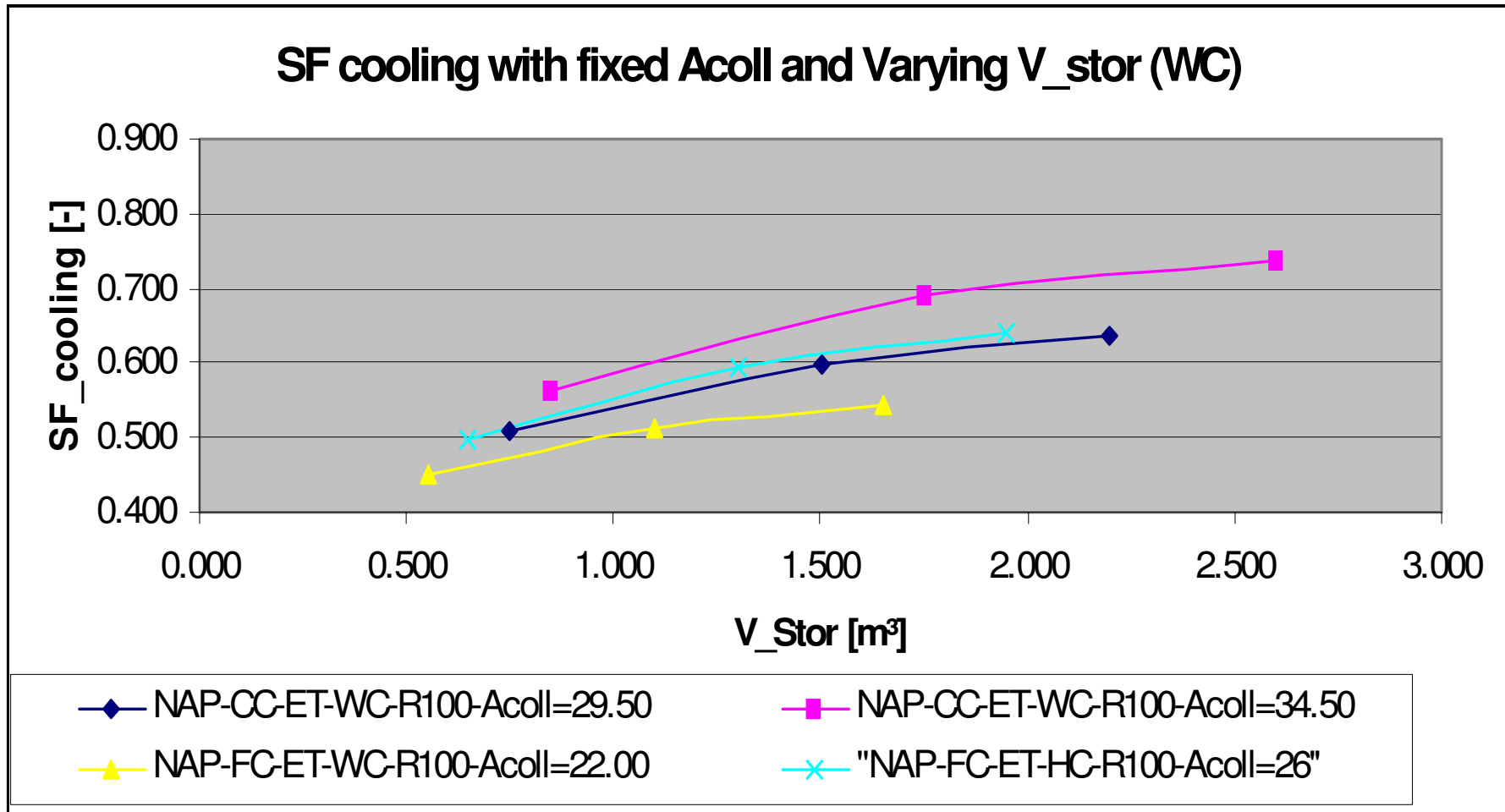
PES%

		WC				DC				HC	
		ET	FP	ET	FP	ET	FP	ET	FP	ET	F
FC	26	m ² /kW	26	m ² /kW	-	m ² /kW	-	m ² /kW	22	m ² /kW	-
	75.0	l/m ²	75.0	l/m ²	-	l/m ²	-	l/m ²	74.4	l/m ²	-
	PES (%)	20.6	PES (%)	9.7	PES (%)	-	PES (%)	-	PES (%)	8.0	PES (%)
CC	3.5	m ² /kW	3.5	m ² /kW	-	m ² /kW	-	m ² /kW	3.1	m ² /kW	3.1
	75.4	l/m ²	75.4	l/m ²	-	l/m ²	-	l/m ²	75.4	l/m ²	75.4
	PES (%)	40.8	PES (%)	32.5	PES (%)	-	PES (%)	-	PES (%)	35.1	PES (%)



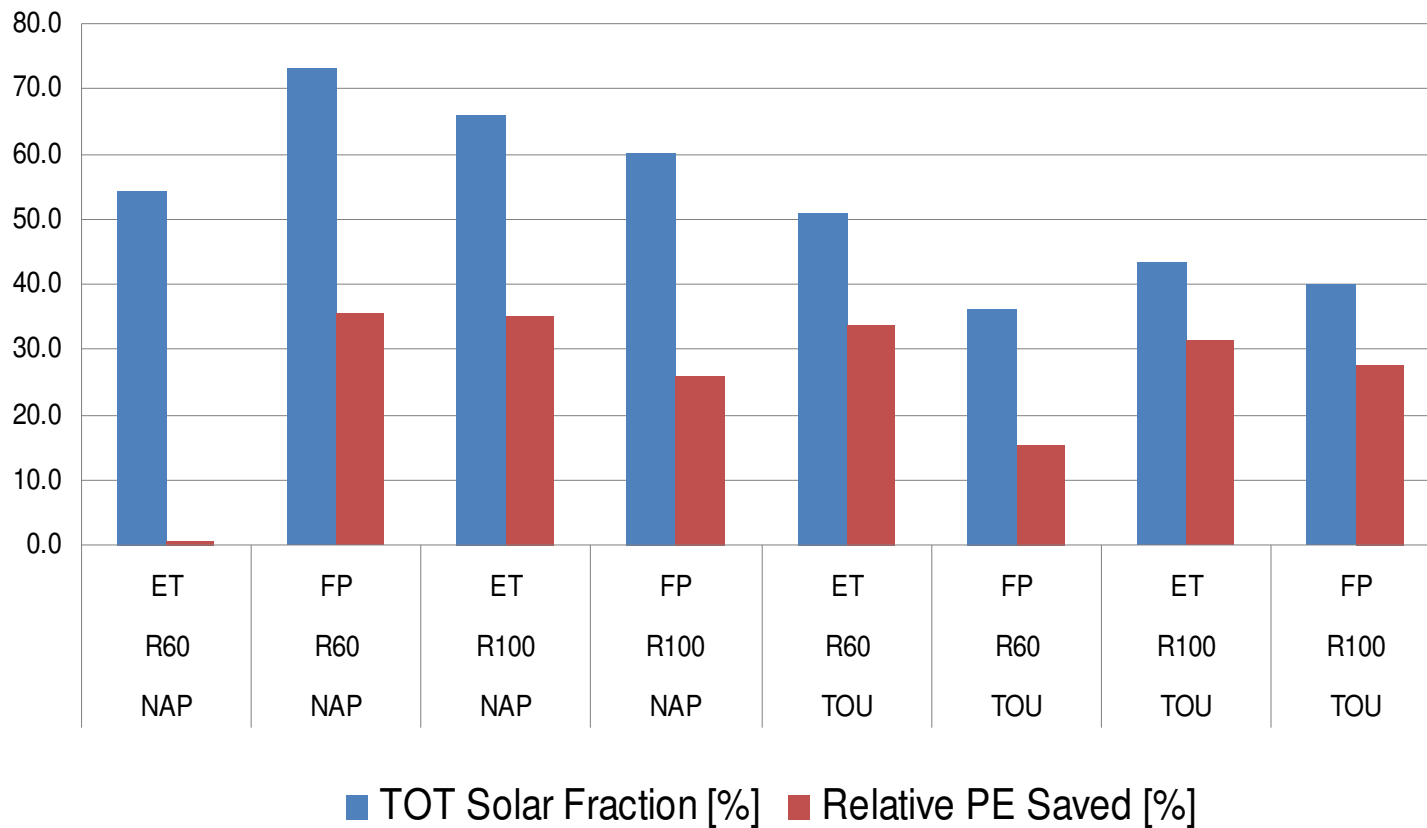
		TOULOUSE				RESIDENTIAL 10				CLIMATEWELL			
		WC		FP		DC		FP		HC		F	
SOLAR FRACTION	FC	ET		FP		ET		FP		ET		F	
		2.6	m ² /kW	2.6	m ² /kW	-	m ² /kW	-	m ² /kW	2.2	m ² /kW	2.2	
		75.0	l/m ²	75.0	l/m ²	-	l/m ²	-	l/m ²	74.4	l/m ²	74.4	
	SF (%)	43.1		39.8		-		-		41.8		SF (%)	
SOLAR FRACTION	CC	ET		FP		ET		FP		ET		F	
		3.5	m ² /kW	3.5	m ² /kW	-	m ² /kW	-	m ² /kW	3.1	m ² /kW	3.1	
		75.4	l/m ²	75.4	l/m ²	-	l/m ²	-	l/m ²	75.4	l/m ²	75.4	
	SF (%)	43.7		40.4		-		-		43.3		SF (%)	
PES%	FC	ET		FP		ET		FP		ET		F	
		2.6	m ² /kW	2.6	m ² /kW	-	m ² /kW	-	m ² /kW	2.2	m ² /kW	2.2	
		75.0	l/m ²	75.0	l/m ²	-	l/m ²	-	l/m ²	74.4	l/m ²	74.4	
	PES (%)	28.1		24.2		-		-		24.2		PES (%)	
PES%	CC	ET		FP		ET		FP		ET		F	
		3.5	m ² /kW	3.5	m ² /kW	-	m ² /kW	-	m ² /kW	3.1	m ² /kW	3.1	
		75.4	l/m ²	75.4	l/m ²	-	l/m ²	-	l/m ²	75.4	l/m ²	75.4	
	PES (%)	33.2		29.5		-		-		31.6		PES (%)	







Total Solar Fraction and Relat. PEsave with HC,CC , A=3.5 m²/kW, V=75 l/m²





Total Solar Fraction and Relat. PEsave with WC,CC , A=3.5 m²/kW, V=75 l/m²

