

## MountEE Impact calculation

### Target 2015 : Direct influence during project

*We estimated that every pilot project gives rise to one influenced project under the duration of the project.*

### Target 2020 : Indirect influence and multiplication after the project

*We estimated that the number of influenced projects 5 years after the project is 5 times higher than at the end of the project.*

Comments on the calculation	All calculations were done on actual outcome according to measurements in the buildings or energy efficiency calculations.
Number of projects	Impact figures are available from 26 pilot projects and 21 influenced buildings
Budget in €	The investment done in pilots or influenced buildings, or in case of ongoing construction, calculated figures
Surface m2	The total surface of the pilots and influenced buildings
Initial or regulation PE consumption /m <sup>2</sup>	The initial energy consumption before renovation. For new buildings the standard regulation value was chosen.
final PE consumption /m <sup>2</sup>	The final energy consumption after construction measures. In case of ongoing construction the calculated energy consumption.
Energy savings per year	Initial consumption minus final consumption
Renewable Energy %	The calculated percentage of renewable energy in the energy mix used in the building.
CO2 reference g/kwh	The carbon dioxide content per kwh of the most common energy mix used in the area.
CO2 final g/kwh	The actual CO2 content/KWh for the used energy mix.
CO2 savings	CO2 content of the most common energy mix in the region minus CO2 content of the energy mix used.

<b>Summary savings mountEE</b>	Direct pilot	Influenced pilot	Total 2015	Target 2015	Estimated 2020	Target 2020	
	<b>2015</b>	<b>2015</b>	<b>2015</b>	<b>2015</b>	<b>2020</b>	<b>2020</b>	
Total projects (mountEE + influenced)	<b>26</b>	<b>21</b>	<b>47</b>	<b>56</b>	<b>235</b>	<b>280</b>	
Investment	122 913	61 297	184 211	8 400	921 053	42 000	k€
Ren Energy (25%) Toe per year	147	369	515	48	2 577	241	Toe
PE reduction (per year)	5 663	2 385	8 048	2 800	40 239	14 000	<b>MWh PE</b>
CO2 reduction (per year)	658	367	1 025	1 008	5 127	5 040	<b>t CO2</b>

**Summary: Savings MountEE pilots**

	Total
Number of pilots	26
Budget in €	122 913 400
Surface m2	51 896
Handover year	-
Initial or regulation PE consumption /m <sup>2</sup>	166
final PE consumption /m <sup>2</sup>	64
Renewable Energy %	70%
CO2 reference g/kwh	135
CO2 final g/kwh	40
Initial energy PE kWh	8 643 638
Final Energy PE kWh	2 981 051
Initial CO2 tons	785
Final CO2 tons	127
	-
Energy savings PE MWh	5 663
Renewable Energy TOE	147
CO2 savings tons	658

RAEE	Total	Montmélian	Chambery	St Alban	St Offenge	Montbonnot	Gresivaudan	Oisans	SMUriage
		Renov	renov	renov	New	renov	new	new	renov
Budget in €	17 240 000	4 000 000	-	400 000	1 800 000	1 500 000	4 700 000	2 000 000	3 240 000
Surface m2	14 589	840	6200	300	800	1529	2800	1000	1120
Handover year		2017	2016	2016	2015	2014	2013	2016	2014
Initial or regulation PE consumption /m <sup>2</sup>	186	250	250	250	120	150	150	120	200
final PE consumption /m <sup>2</sup>	55	80	10	80	-24	100	100	15	80
Renewable Energy %	46%	40%	0%	40%	100%	40%	0%	110%	40%
CO2 reference g/kwh	205	250	40	250	250	250	100	250	250
CO2 final g/kwh	55	50	40	50	50	50	100	50	50
Initial energy PE kWh	2 924 350	210 000	1 550 000	75 000	96 000	229 350	420 000	120 000	224 000
Final Energy PE kWh	671 500	67 200	62 000	24 000	- 19 200	152 900	280 000	15 000	89 600
Initial CO2 tons	343	53	62	19	24	57	42	30	56
Final CO2 tons	47	3	2	1	- 1	8	28	1	4
Energy savings PE MWh	2 253	143	1 488	51	115	76	140	105	134
Renewable Energy TOE	16	2	-	1	3	5	-	1	3
CO2 savings tons	296	49	60	18	25	50	14	29	52



Nenet	Total	Hedlunda	Vännäs	Kiruna	Sunderby	Vuollerim 6000
		New	New	New	New	Renovation
Budget in €	67 967 200	4400000	9680000	37500000	16300000	87200
Surface m2	21 500	1580	4260	9700	5500	460
Handover year		2014	2015	2016	2014	2016
Initial or regulation energy consumption /m <sup>2</sup>	130	130	130	132	160	200
Final energy consumption /m <sup>2</sup>	54	15	15	56	95	88
Renewable Energy %	84%	100%	100%	85%	50%	85%
CO2 reference g/kwh	61	70	70	70	70	23
CO2 final g/kwh	13	0	0	23	21	23
Initial energy kWh	3 011 600	205 400	553 800	1 280 400	880 000	92 000
Final Energy kWh	1 193 780	23 700	63 900	543 200	522 500	40 480
Initial CO2 tons	206	14	39	90	62	2
Final CO2 tons	24	-	-	12	11	1
Energy savings MWh	1 818	182	490	737	358	52
Renewable Energy TOE	62	2	6	40	12	3
CO2 savings tons	182	14	39	77	51	1

Dalarna	Total	Aspeboda	Säter	Älvdalen	Orsa	Vansbro		
		ersättning	new	ersättning	new	ersättning		
Budget in €	32 856 000	2580000	2784000	21505000	3299000	2688000		
Surface m2	11 511	1253	800	7438	1220	800		
Handover year		2014	2014	2016	2016	2015		
Initial or regulation PE consumption /m <sup>2</sup>	169	250	110	185	110	190		
final energy consumption /m <sup>2</sup>	64	36	69	70	79	65		
Renewable Energy %	97%	100%	95%	97%	95%	97%		
CO2 reference g/kwh	61	32	108	51	94	19		
CO2 final g/kwh	61	32	108	51	94	19		
Initial energy PE kWh	2 063 480	313 250	88 000	1 376 030	134 200	152 000	-	-
Final Energy PE kWh	769 348	45 108	55 200	520 660	96 380	52 000	-	-
Initial CO2 tons	105	10	10	70	13	3	-	-
Final CO2 tons	44	1	6	27	9	1	-	-
Energy savings PE MWh	1 294	268	33	855	38	100	-	-
Renewable Energy TOE	52	4	5	31	8	4	-	-
CO2 savings tons	61	9	4	44	4	2	-	-

Vorarlberg	Total	St.Gerold	Lorüns
		optimization	optimization
Budget in €	3 200	1 600	1 600
Surface m2	920	528	392
Handover year		2009	2012
Initial or regulation PE consumption /m²	44	66	22
final PE consumption /m²	23	34	12
Renewable Energy %	66%	66%	66%
CO2 reference g/kwh	30	45	15
CO2 final g/kwh	16	23	8
Initial energy PE kWh	43 472	34 848	8 624
Final Energy PE kWh	22 656	17 952	4 704
Initial CO2 tons	2	2	0
Final CO2 tons	0	0	0
Energy savings PE MWh	21	17	4
Renewable Energy TOE	1	1	0
CO2 savings tons	1	1	0

**Savings mountEE influenced buildings** Result influenced

	<b>2015</b>
Total projects (mountEE + influenced)	<b>21</b>
Investment	61 297
Ren Energy (25%) Toe per year	369
PE reduction (per year)	2 385
CO2 reduction (per year)	367

**Summary: Savings of Influenced buildings, 21 buildings**

	Total
Budget in €	61 297 200
Surface m2	50 719
Handover year	-
Initial or regulation PE consumption /m <sup>2</sup>	154
final PE consumption /m <sup>2</sup>	72
Renewable Energy %	1
CO2 reference g/kwh	99
CO2 final g/kwh	39
Initial energy PE kWh	13 478 230
Final Energy PE kWh	8 564 690
Initial CO2 tons	572
Final CO2 tons	187
	-
<b>Energy savings PE MWh</b>	<b>2 385</b>
<b>Renewable Energy TOE</b>	<b>369</b>
<b>CO2 savings tons</b>	<b>367</b>



RAEE	Total	AVRIEUX	INT HELENE DU L	LES MARCHES	PUYGROS	BEAUREPAIRE			
Budget in €	7 094 000		1 800 000	1 500 000	560 000	3 234 000			
Surface m2	3 830	180	950	1000	700	1000			
Handover year		2016	2014	2017	2015	2018			
Initial or regulation PE consumption /m²	274	250	250	120	631	120			
final PE consumption /m²	53	80	35	-10	99	60			
Renewable Energy %	59%	40%	100%	100%	53%	0%			
CO2 reference g/kwh	230	150	250	250	250	250			
CO2 final g/kwh	46	30	50	50	50	50			
Initial energy PE kWh	964 200	45 000	237 500	120 000	441 700	120 000	-	-	#
Final Energy PE kWh	166 950	14 400	33 250	- 10 000	69 300	60 000	-	-	#
Initial CO2 tons	237	7	59	30	110	30	-	-	#
Final CO2 tons	8	0	2	- 1	3	3	-	-	#
Energy savings PE MWh	797	31	204	130	372	60	-	-	#
Renewable Energy TOE	4	0	3	- 1	2	-	-	-	#
CO2 savings tons	228	6	58	31	107	27	-	-	#

PNR	Total			CATTLAR	FONTPEDROUSE	PORTE PUYMORENS	MASSIF DU CANIGOU		
				Town Hall	Hot water baths center	Mountain Lanoux Refuge	4 Mountain refuges		
				Renov	Renov	Construction	Renov		
Budget in € cost of work without	-								
Surface m2	1 200			200	1000				
Handover year									
Initial or regulation PE consumption /m²	2 851			152	5551				
final PE consumption /m²	3 053				3053				
Renewable Energy %	77%				77%				
CO2 reference g/kwh	10			12	7				
CO2 final g/kwh	7				7				
Initial energy PE kWh	5 581 320	-	-	30 320	5 551 000	-	-		
Final Energy PE kWh	3 053 000	-	-	-	3 053 000	-	-		
Initial CO2 tons	39	-	-	0	39	-	-		
Final CO2 tons	21	-	-	-	21	-	-		
Energy savings PE MWh	2 498	-	-	Planning in progress, no quantifiable energy savings	2 498	Planning in progress, no quantifiable energy savings	Planning in progress, no quantifiable energy savings		
Renewable Energy TOE	203	-	-		203				
CO2 savings tons	17	-	-		17				





Vorarlberg	Total	St.Gerold	Lorüns
		optimization	optimization
Budget in €	3 200	1 600	1 600
Surface m2	920	528	392
Handover year		2009	2012
Initial or regulation PE consumption /m <sup>2</sup>	44	66	22
final PE consumption /m <sup>2</sup>	23	34	12
Renewable Energy %	66%	66%	66%
CO2 reference g/kwh	30	45	15
CO2 final g/kwh	16	23	8
Initial energy PE kWh	43 472	34 848	8 624
Final Energy PE kWh	22 656	17 952	4 704
Initial CO2 tons	2	2	0
Final CO2 tons	0	0	0
Energy savings PE MWh	21	17	4
Renewable Energy TOE	1	1	0
CO2 savings tons	1	1	0

## mountEE

### Calculation of energy and CO2 savings in MountEE pilots and influenced buildings

	<b>Definition</b>	<b>Comments</b>
General	All calculations were done on actual outcome according to measurements in the buildings or energy efficiency calculations. However assumptions had to be made on reference values for CO2 content where the most common energy mix in the region was used.	
Number of projects	The results are based on real figures from 26 pilot projects and 21 influenced buildings	
Budget in €	The investment done in pilots or influenced buildings, or in case the buildings are under construction the estimated investment costs	The average investment cost was 2360 euro per m2 and pilot and about 8 times higher than the cost used in the proposal which is a reasonable price for renovation. The difference can be explained by the new and quite big buildings that were constructed as MountEE pilots
Surface m2	The total surface of the pilots and influenced buildings	The average surface of the pilots was close to 2000 m2 and a lot bigger than the estimated surface of 500 m2 that was used in the proposal.
Handover year	The average handover year	
Initial or regulation PE consumption / into account	The initial energy consumption before renovation. For new buildings the standard regulation value is chosen. Only heating, hot water and in some cases management electricity were taken into account	The average initial energy consumptions are quite close to the estimated ones

final PE consumption /m <sup>2</sup>	The final energy consumption after construction measures. In case the buildings are still under construction the calculated energy consumption was used	The average final energy consumptions are quite close to the estimated ones
Energy savings per year	Initial consumption minus final consumption	The savings /m <sup>2</sup> are the estimated ones. The real total savings are higher than the estimated ones because of the bigger pilot buildings.
Renewable Energy %	The calculated percentage of renewable energy in the energy mix used in the building.	The achieved amount ren energy was 70% compared to estimated 25% in the proposal. Many of the objects were connected to distance heating systems fired with renewable energy sources such as wood.
CO2 reference g/kwh	The carbon dioxid content per kwh of the most common energy mix used in the area.	The real average value is under the estimated one because some pilot projects were already using renewables
CO2 final g/kwh	The real carbon dioxid content pr kwh for the used energy mix. Differences to the reference value can e.g. be due to own renewable energy production or changes to district heating systems with renewable energysources	The real average value was lower than the estimated one because of the high amount of renewables used in the pilots
CO2 savings	CO2 content of the most common energy mix in the region minus CO2 content of the energy mix used.	The CO2 savings are close to the estimated ones due to high renewable energy contribution. Quite many of the pilots were constructed in areas with well established district heating systems fired by renewable energy and in these cases only CO2 reductions due to energy saving and own energy production were taken into account.