



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 754104.



# Implement

TASK 6.2. | CO<sub>2</sub> monitoring

D.6.3. Monitoring report

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# 1. Expected impacts of the project

By implementing the eea programme, municipalities strongly enhance their local energy and climate policies, no matter how much preliminary work has been done.

Existing plans and conceptual work on energy and climate policy topics, which had already been done by the 30 pilot municipalities before the launch of the project were to be efficiently integrated into the eea-process since it is an instrument that consolidates, reactivates and monitors the initiatives and its implementation.

## **Enabling policy**

One of the main aims of the eea-programme is to enable and support energy and climate policies. With the eea, IMPLEMENT introduced an ongoing process that requires each of its pilot municipalities to create working plans that are continuously monitored and reinforced. These 30 working plans and associated climate protection measures had to be ratified by local policymakers, ensuring a high level of commitment and spurring a conscious energy and climate policy for the short, medium and long run.

## **Preparing the ground for investments and jobs creation**

IMPLEMENT was expected to contribute to preparing the ground for public and private investments in sustainable energy measures. The eea handbook contains individual measures on environmental standards for buildings, infrastructure development, and local renewable energy production and supply, creating incentives for private and public investments and creating jobs in those sectors.

## **Building capacities and skills**

The IMPLEMENT partners received training in order to qualify and operate as certified eea-advisors and to consult the pilot municipalities in the eea-process.

Each implementing partner had to bring together various stakeholders in national steering committees and thus transfer acquired knowledge to a broader group of influencers.

Furthermore, in every pilot municipality an energy team of 5-8 people (depending on the size of the municipality) had to be charged to take the lead in implementing the eea. The eea-advisors had to guide the energy team members through the eea process, who in turn were asked to use their knowledge to identify relevant measures and delegate work amongst colleagues.

The municipalities also had to communicate the importance of energy efficiency to their citizens, actively involving them through participatory projects.

Overall the skills, competencies and abilities of all people involved was expected to be strengthened and the course of action towards sustainable energy and climate policy enhanced, throughout and after the timeframe of the IMPLEMENT project.

Consequently, IMPLEMENT had the aim to have an impact that goes beyond the scale and scope of the project since:

- the pilot municipalities had to establish a programme that would allow them to continuously monitor, update and reinforce their energy and climate policy
- the implementing partners would be equipped with the right skills and instruments to establish a sustainable eea structure allowing the roll out of the quality management and certification programme in their countries so that more municipalities can follow the path of the IMPLEMENT pioneers.

## **Properly triggered energy savings and renewable energy production**

Those investments and behaviour changes were expected to result in proper energy savings and increase of local energy production which had to be monitored in order to estimate the impacts of the project in terms of CO<sub>2</sub> reduction.

## 2. Performance indicators and project targets

The following set of indicators was defined in order to evaluate the impacts of the project with regard to the expected impacts.

	Project target as announced in grant agreement	Project target with new approach proposed in periodic report 1
Reduction of GHG emission (tCO <sub>2</sub> eq/year)	1.436.627	1.082.248
Reduction of energy consumption (GWh/year)	43.599	2.670
RE production increase (GWh/year)	1.329	935
Number of people reached	-	1.651.023
Investment triggered	11.300.000 €	-
Cumulated cost savings	-	-
Jobs created	-	-

This table shows corrections that were given to the targets in the periodic report 1. We explain hereunder the process that led to those changes.

In the grant agreement, targets were set for some indicators based on the size of the expected pilot municipalities and two data-sources that investigated the performance of municipalities applying energy management tools in comparison to other ("average") municipalities that are not using a systematic climate protection process approach.

At periodic report 1 time, we identified several limits of that approach and likely deviations that should be observed between initial targets and proper results:

- Calculations made in the proposal were based on a 4 years implementation duration. This assumption was very critical since pilot municipalities would only be able to value 2 years of implementation of their EPP within the project duration (2020 – 2021). Indeed, it took more time than expected to come to the initial review and EPP. We concluded that expected results within the duration of the project would be lower than expected but the results would follow in the following years (long term minimal impacts).
- Calculations were based on the number of inhabitants per pilot municipality. But, since the signature of the grant agreement, the list of pilot municipalities and number of inhabitants had slightly changed.
- The approach applied to estimate primary energy savings set as target in the grant agreement seemed to lead to an aberrant result. Indeed, the targeted yearly energy savings calculated through that approach (123 GWh/year) equals 46% of the total final energy consumption in the pilot municipalities in the

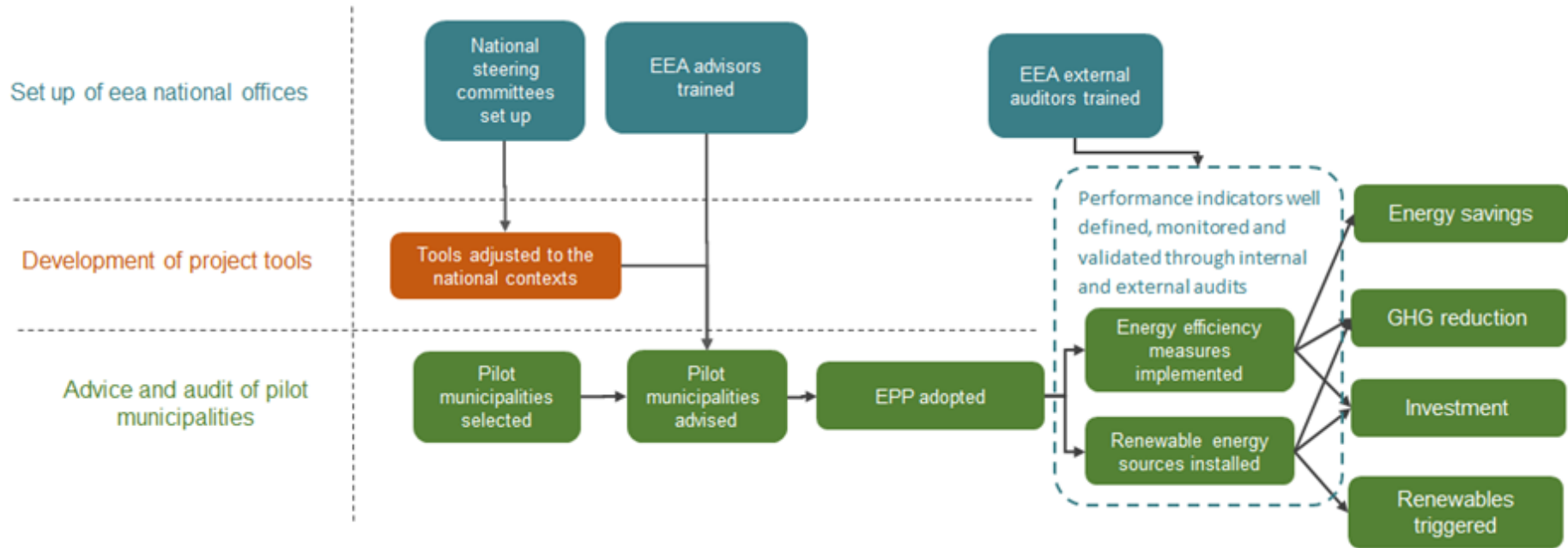
baseline consumption inventory (2014). Moreover, that value doesn't fit the CO<sub>2</sub> reduction expected (average emission factor = 0,032 tCO<sub>2</sub>eq/MWh).



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### 3. Intervention logic

The following chart shows how the work packages of the project lead to the impacts monitored here.



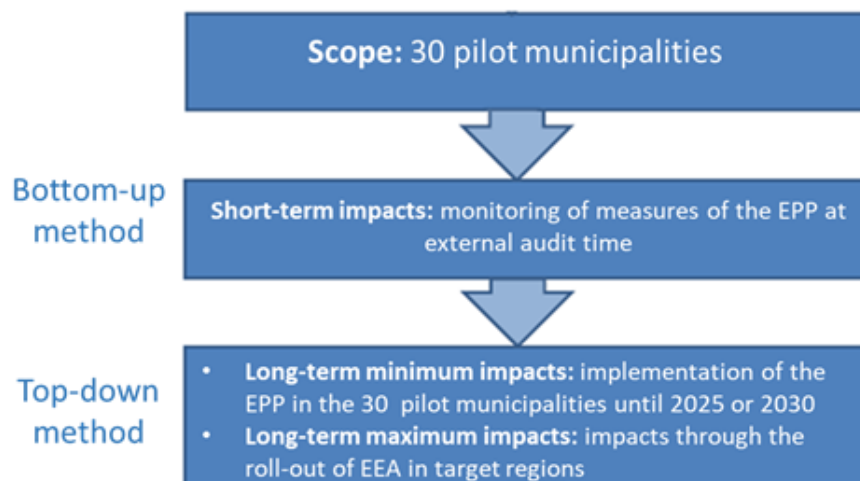


## 4. Approach

We consider as short-term impacts those that were reached so far thanks to the implementation of the EPPs of the 30 pilot municipalities. Thus, we calculated the actual values reached for each indicator through the monitoring of measures led within Energy Policy Programs between 2019 and 2021. The calculations are based on data collected after external audits.

As the eea process proved to support the proper implementation of the EPPs, we consider as long-term minimum impacts those that should occur if the targets of the EPPs of the 30 pilot municipalities are reached as planned.

Finally, we consider as long-term maximum impacts those that will be achieved thanks to the implementation of the EPPs of more municipalities that should join the eea thanks to the roll-out of the programme in partner countries. For this, we based calculations on the conclusions of each national feasibility study.



## 5. Methodology

### 5.1. Data collection and estimates

The following data was collected for each one of the 30 pilot Energy Policy Programs at external audit time of the eea process:

- List of the main measures impacting the CPIs to monitor
- For each measure:
  - o Sector targeted
  - o Area of intervention
  - o Start year
  - o End year
  - o Status of implementation at external audit time
  - o Targeted number of people reached
  - o Targeted energy savings
  - o Targeted renewable energy production
  - o Targeted CO<sub>2</sub> reduction

Investment triggered, cost savings and jobs created were estimated considering sectors targeted and energy savings or production targeted and reached. Those estimates were based on the following assumptions obtained through a crossed analysis of the tool TETE developed in France by ADEME and statistics from Eurostat or collected by the Walloon Region within its several energy policy programs and reporting process.

## Belgium

<b>Sector</b>	<b>Investment (€/MWh)</b>	<b>Cost savings (€/MWh)</b>	<b>Jobs created (/MWh)</b>
Tertiary buildings equipment facilities	1.639 €	174 €	0,0187
Residential buildings	1.537 €	65 €	0,0309
Industry	1.778 €	190 €	0,0213
Agriculture	1.778 €	190 €	0,0213
Transport	206 €	170 €	-
Renewables	1.449 €	101 €	0,0091

### Comparative price levels of final consumption by private households including indirect taxes (source: Eurostat)

2020

EU	100
Belgium WA	115,2
Belgium FL	115,2
Croatia	69,4
Greece	85,8
Poland	57,8

## 5.2. Short-term impacts

Actual number of people reached, energy savings, renewable energy production, CO<sub>2</sub> reduction were estimated considering the length and status of implementation of each measure.

Investment triggered, cost savings and jobs created were estimated considering sectors targeted and energy savings or production reached.

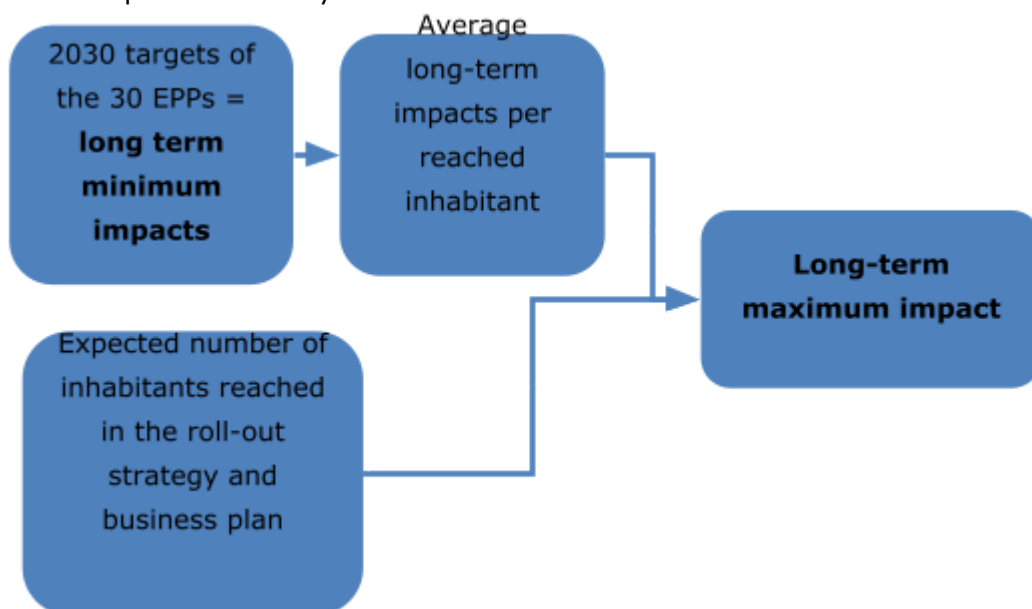
## 5.3. Long-term minimum impacts

Long-term minimum impacts were estimated taking into account the people reached, energy savings, renewable energy production, and CO<sub>2</sub> reduction set as targets in the EPPs. As EPPs have targets set from 2025 to 2030, we consider 2030 as the deadline for long-term impacts.



## 5.4. Long-term maximum impacts

To estimate the impacts of the roll-out of the eea programme in target countries, we calculated the average long-term (2030) impacts per inhabitant from targets set in the 30 EPPs of the pilot municipalities. We then crossed those average impacts with the expected number of inhabitants reached in the roll-out strategies and business plans of each partner country.



	Long-term minimum number of people reached (Target 2030 as set in EEPs)	Number of people reached in 2030 (as estimated in the roll-out business plan)
<i>Belgium_FL</i>	305.673	4.348.740
<i>Belgium_WA</i>	37.367	3.614.473
<i>Croatia</i>	299.925	514.403
<i>Greece</i>	35.361	62.235
<i>Poland</i>	831.082	1.500.000

## 6. Results

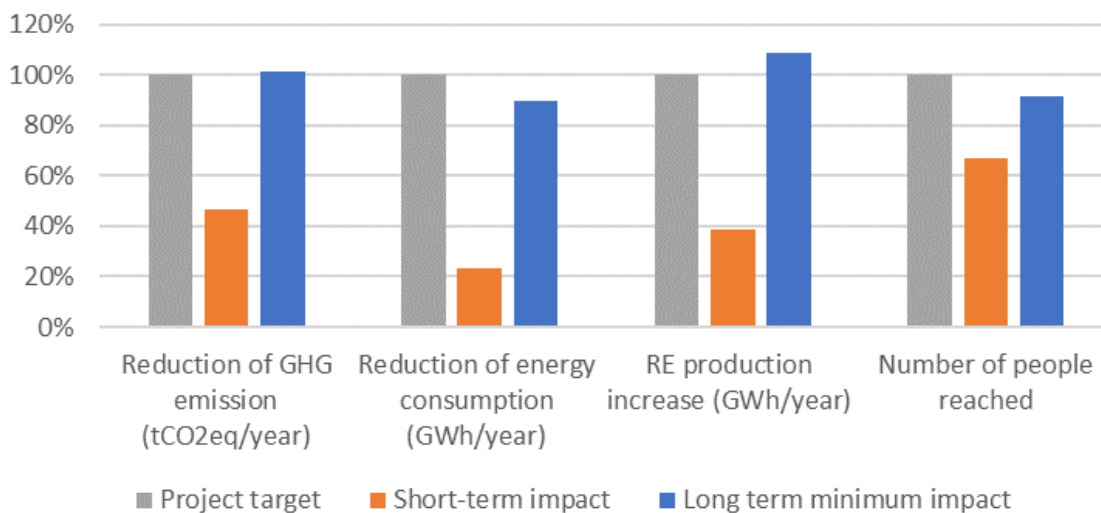
### 6.1. Short-term and long-term minimum impacts

	Long term minimum impacts Targets 2030 (as set in EEPs)	Short term impacts	
		Reached 2021 (monitored)	Project target with new approach proposed in periodic report 1
<b>Reduction of GHG emission (tCO2eq/year)</b>	<b>1.093.531</b>	<b>502.711</b>	<b>1.082.248</b>
<i>Belgium_FL</i>	<i>721.504</i>	<i>171.592</i>	<i>130.090</i>
<i>Belgium_WA</i>	<i>70.420</i>	<i>23.327</i>	<i>11.869</i>
<i>Croatia</i>	<i>7.653</i>	<i>6.927</i>	<i>162.460</i>
<i>Greece</i>	<i>41.257</i>	<i>4.559</i>	<i>42.712</i>
<i>Poland</i>	<i>252.697</i>	<i>296.306</i>	<i>735.116</i>
<b>Reduction of energy consumption (GWh/year)</b>	<b>2.399</b>	<b>624</b>	<b>2.670</b>
<i>Belgium_FL</i>	<i>1.792</i>	<i>347</i>	<i>321</i>
<i>Belgium_WA</i>	<i>251</i>	<i>56</i>	<i>29</i>
<i>Croatia</i>	<i>34</i>	<i>31</i>	<i>401</i>
<i>Greece</i>	<i>34</i>	<i>4</i>	<i>105</i>
<i>Poland</i>	<i>287</i>	<i>186</i>	<i>1.813</i>
<b>RE production increase (GWh/year)</b>	<b>1.016</b>	<b>360</b>	<b>935</b>
<i>Belgium_FL</i>	<i>990</i>	<i>325</i>	<i>112</i>
<i>Belgium_WA</i>	<i>23</i>	<i>34</i>	<i>10</i>
<i>Croatia</i>	<i>-</i>	<i>-</i>	<i>140</i>
<i>Greece</i>	<i>-</i>	<i>-</i>	<i>37</i>
<i>Poland</i>	<i>3</i>	<i>2</i>	<i>635</i>
<b>Number of people reached</b>	<b>1.509.408</b>	<b>1.102.198</b>	<b>1.651.023</b>
<i>Belgium_FL</i>	<i>305.673</i>	<i>79.006</i>	<i>476.341</i>
<i>Belgium_WA</i>	<i>37.367</i>	<i>8.005</i>	<i>37.367</i>
<i>Croatia</i>	<i>299.925</i>	<i>324.121</i>	<i>184.614</i>
<i>Greece</i>	<i>35.361</i>	<i>13.038</i>	<i>117.342</i>
<i>Poland</i>	<i>831.082</i>	<i>678.027</i>	<i>835.359</i>
<b>Investment triggered</b>	<b>4.610.300.705 €</b>	<b>1.148.976.057 €</b>	
<i>for energy savings</i>		<i>902.765.942 €</i>	
<i>for RE production</i>		<i>246.210.115 €</i>	
<i>Belgium_FL</i>	<i>3.881.501.714</i>	<i>800.744.522</i>	
<i>Belgium_WA</i>	<i>261.093.854</i>	<i>54.972.957</i>	
<i>Croatia</i>	<i>31.547.976</i>	<i>28.952.289</i>	
<i>Greece</i>	<i>37.936.354</i>	<i>4.466.374</i>	
<i>Poland</i>	<i>398.220.808</i>	<i>259.839.915</i>	
<b>Cumulated cost reduction</b>	<b>2.155.206.799 €</b>	<b>193.473.032 €</b>	
<i>Belgium_FL</i>	<i>1.797.051.090 €</i>	<i>77.512.554 €</i>	
<i>Belgium_WA</i>	<i>195.802.477 €</i>	<i>16.007.203 €</i>	
<i>Croatia</i>	<i>18.349.836 €</i>	<i>5.255.380 €</i>	
<i>Greece</i>	<i>14.090.362 €</i>	<i>493.231 €</i>	
<i>Poland</i>	<i>129.913.032 €</i>	<i>94.204.663 €</i>	
<b>Jobs created</b>	<b>5.999</b>	<b>1.756</b>	
<i>Belgium_FL</i>	<i>4.606</i>	<i>970</i>	
<i>Belgium_WA</i>	<i>391</i>	<i>77</i>	
<i>Croatia</i>	<i>269</i>	<i>272</i>	
<i>Greece</i>	<i>80</i>	<i>9</i>	
<i>Poland</i>	<i>653</i>	<i>427</i>	

The following summary table shows that expected long-term minimum impacts are in line with the targets of the project while impacts achieved so far are very encouraging.

	Long term minimum impacts Targets 2030 (as set in EEPs)	Short term impacts	
		Reached 2021 (monitored)	Project target with new approach proposed in periodic report 1
Reduction of GHG emission (tCO <sub>2</sub> eq/year)	1.093.531	502.711	1.082.248
Reduction of energy consumption (GWh/year)	2.399	624	2.670
RE production increase (GWh/year)	1.016	360	935
Number of people reached	1.509.408	1.102.198	1.651.023
Investment triggered	4.610.300.705 €	1.148.976.057 €	
Cumulated cost reduction	2.155.206.799 €	193.473.032 €	
Jobs created	5.999	1.756	

### Evaluation of impacts compared to the project targets



## 6.2. Long-term maximum impacts

	Average long-term minimum impacts per reached inhabitant	Long-term maximum impacts
<b>Reduction of GHG emission (tCO<sub>2</sub>eq/year)</b>		
<i>Belgium_FL</i>	2,36	10.264.677
<i>Belgium_WA</i>	1,88	6.811.673
<i>Croatia</i>	0,03	13.125
<i>Greece</i>	1,17	72.612
<i>Poland</i>	0,30	456.087
<b>Reduction of energy consumption (GWh/year)</b>		
<i>Belgium_FL</i>	0,005863	25.496
<i>Belgium_WA</i>	0,006726	24.310
<i>Croatia</i>	0,000113	58
<i>Greece</i>	0,000975	61
<i>Poland</i>	0,000345	518
<b>RE production increase (GWh/year)</b>		
<i>Belgium_FL</i>	0,003238	14.083
<i>Belgium_WA</i>	0,000625	2.260
<i>Croatia</i>	-	-
<i>Greece</i>	-	-
<i>Poland</i>	0,000003	5
<b>Number of people reached</b>		
<i>Belgium_FL</i>	1,00	4.348.740
<i>Belgium_WA</i>	1,00	3.614.473
<i>Croatia</i>	1,00	514.403
<i>Greece</i>	1,00	62.235
<i>Poland</i>	1,00	1.500.000
<b>Investment triggered</b>		
<i>for energy savings</i>		
<i>for RE production</i>		
<i>Belgium_FL</i>	12.698 €	55.221.238.918 €
<i>Belgium_WA</i>	6.987 €	25.255.350.550 €
<i>Croatia</i>	105 €	54.108.105 €
<i>Greece</i>	1.073 €	66.767.632 €
<i>Poland</i>	479 €	718.739.201 €
<b>Cumulated cost reduction</b>		
<i>Belgium_FL</i>	5.879,00 €	25.566.235.678,25 €
<i>Belgium_WA</i>	5.239,98 €	18.939.780.240,23 €
<i>Croatia</i>	61,18 €	31.471.904,32 €
<i>Greece</i>	398,47 €	24.798.906,91 €
<i>Poland</i>	156,32 €	234.476.920,92 €
<b>Jobs created</b>		
<i>Belgium_FL</i>	0,0151	65.531
<i>Belgium_WA</i>	0,0105	37.808
<i>Croatia</i>	0,0009	462
<i>Greece</i>	0,0023	140
<i>Poland</i>	0,0008	1.179

## 7. Conclusions

Short-term impacts monitored at the end of the project show that using the eea process as a tool to enhance the quality of local energy and climate policies and to support their implementation is very effective.

Long-term maximum impacts show that rolling out the eea in target countries could be one of the main measures that would allow them to reach their energy and climate engagements.