QualiBuild  
IEE/12/BWI/339/SI2.659728

Energy Training for Construction Workers for Low Energy Buildings

BUILD Up Skills QualiBuild

Report Title: Performance Indicators

Report No: D8.1v3
Report Published Date: 22nd August 2016
Prepared By: Lis O’Brien

Co-funded by the Intelligent Energy Europe Programme of the European Union
**Disclaimer**

The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.
Table of Contents

Contents
Table of Contents .................................................................................................................. 3
1 Introduction ....................................................................................................................... 4
2 Performance Indicators ..................................................................................................... 5
3 Calculation Methods ......................................................................................................... 8
  3.1 Primary Energy Savings .............................................................................................. 8
  3.2 Renewable Energy Production Triggered ................................................................. 9
  3.3 CO₂ savings ................................................................................................................. 9
1 Introduction

The main impact from the QualiBuild project is due to start in 2015 as the training programmes will be rolled out and the communication strategy will take effect. The Tables presented in the next section, outline the performance indicators which were included in the contract (Annex I) and outline the impact of the QualiBuild project to 2022.

The analysis study of the impact of QualiBuild on the market to 2022 indicates an 11% savings for the average annual energy consumption and reduction in CO₂ emissions between 2014 and 2022. If we consider the figures after 2022 the savings will be significant higher as 100% of the workforce will be trained to construct low energy quality buildings. From 2022 the additional average annual energy consumption savings of 24,870 toe per year and the additional annual CO₂ savings of 72,300 tCO₂ will provide an improvement to the existing levels by a percentage of approximately 25%.

It should be noted that the level of activity in the construction sector in Ireland is likely to increase from the current baseline figure of 60,000 construction workers to an anticipated 20% increase to 72,000 construction workers in 2022.

The energy savings potential is dependent on relevant supports, policies and measures being in place to stimulate investment in energy efficiency and renewable energy. The figures outline the required levels of activity which are needed if Ireland is to reach its 2020 targets but at the time of writing this level of activity is not being met due to stagnation in the construction sector in Ireland. A final review of impacts will be completed at the end of the project once the training activities have been completed.
# Performance Indicators

<table>
<thead>
<tr>
<th>Performance indicator</th>
<th>Planned Target to 2022</th>
<th>Actual achievement</th>
<th>Comment on performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of training courses triggered by the action</strong></td>
<td>Foundation Energy (FES) (Workers): 14 courses 7 pilot courses phase 1 M23 to M26 7 pilot course phase 2 M26 to M30</td>
<td></td>
<td>Phase 1 was slow to start but with minor issues around delivery. Phase 2 ran smoothly fully attended and on time.</td>
</tr>
<tr>
<td><strong>Number of training courses triggered by the action</strong></td>
<td>Foundation Energy (Workers): 9 courses Obtained funding for 3 FES courses with financial support from Sustainability Skillnet in short term. Additional 9 courses proposed for 2017</td>
<td></td>
<td>Foundation Energy (Workers): 9 courses Started 3 courses subsidised Oct-Dec 2016. Additional FES training in Dublin due in Oct/Nov with 2 more in Dublin and Cork before the end of the year at £296 per place.</td>
</tr>
<tr>
<td><strong>Number of people that will be trained</strong></td>
<td>Foundation Energy (Workers) Pilot: 196</td>
<td></td>
<td>Foundation Energy (FES) (Workers): Phase 1: 82 workers Phase 2: 114 workers</td>
</tr>
<tr>
<td><strong>Number of people that will be trained</strong></td>
<td>Foundation Energy (FES) (Workers) National Roll Out: 60,000 workers</td>
<td></td>
<td>Foundation Energy (FES) (Workers): 2016: anticipate 10% trained 2017: anticipate 20% trained 2018: anticipate 40% trained 2019: anticipate 60% trained 2020: anticipate 80% trained 2021: anticipate 100% trained 2022: anticipate 100% trained</td>
</tr>
<tr>
<td><strong>Number of people that will be trained</strong></td>
<td>Trainers: 5 courses 3 courses phase 1 M12 to M17 2 courses in phase 2 M24 to M29</td>
<td></td>
<td>Phase 1 deemed the programme as too short as there was a lot of content to cover. An extra month was provided to facilitate trainers in phase 2.</td>
</tr>
<tr>
<td><strong>Number of people that will be trained</strong></td>
<td>Trainers: 3 courses 1 course every 2 years from 2018 - 2022</td>
<td></td>
<td>Trainers: 60 20 trainers per year from 2018 – 2022</td>
</tr>
<tr>
<td><strong>Number of hours taught in the frame of the courses triggered</strong></td>
<td>Foundation Energy (Workers): short term: Anticipate: 648 (72xcourse)</td>
<td></td>
<td>Foundation Energy (Workers): short term: Anticipate: 648 (72xcourse)</td>
</tr>
<tr>
<td><strong>Number of hours taught in the frame of the courses triggered</strong></td>
<td>Foundation Energy (Workers): short term: Anticipate: 648 (72xcourse)</td>
<td></td>
<td>3 courses in 2016: 216 hours 9 courses in 2017: 648 hours</td>
</tr>
</tbody>
</table>

*Income Summary*
| Number of hours taught in the frame of the courses triggered | Foundation Energy (Workers) National Roll Out: 216,000 hours | 3000 courses over 6 years with a total of 216,000 hours  
500 courses and 36,000 hours per year |
| --- | --- | --- |
| Trainers: 320 hours | Phase 1: 192 hours  
Phase 2: 128 hours |
| Trainers National Roll Out: 192hrs | 2018: anticipate 64hrs  
2020: anticipate 64hrs  
2022: anticipate 64hrs |
| Estimated specific cost to qualify each trainee | Foundation Energy (Workers): Short term 240 workers | €300-500 worker. Costs calculated as €500 to cover registration fees and CWSR fee. Subsidised at €296  
Total: €7,104 |
| Foundation Energy (Workers) National Roll Out: 60,000 workers | €500 unsubsidised for 60,000  
Total: €30,000,000  
€296 subsidised  
Total: €17,760,000 |
| Trainers: 59 | Free for pilots |
| Trainers National Roll Out: 60 | Costs estimated at €2300 due to expert talks and site visits €46,000 every 2 years or  
Total: €138,000 till 2022 |
| Renewable Energy production triggered | 10,720 toe | 1,340 toe/year |
| 2015: 74,603 toe/year  
2016: 74,727 toe/year  
2017: 77,214 toe/year  
2018: 82,188 toe/year  
2019: 92,136 toe/year  
2020: 107,058 toe/year  
2021: 126,954 toe/year  
2022: 155,824 toe/year  
Total: 861,307 toe/year | 2016: 74,727 toe/year  
Additional 2016: 124 toe/year | This target assumes 5% of dwelling install renewables, form 2015 |
| Primary energy savings compared to projections | 2015: 216,909 tCO2/year  
2016: 224,139 tCO2/year  
2017: 238,599 tCO2/year  
2018: 267,519 tCO2/year  
2019: 310,899 tCO2/year  
2020: 368,739 tCO2/year  
2021: 441,039 tCO2/year  
2022: 513,339 tCO2/year  
Total: 2,581,182 tCO2/year | 2015: 216,909 tCO2/year  
2016: 224,139 tCO2/year  
Total: 441,048 tCO2/year | Delay in piloting of FES training, impact from 2016 only. |
| Reduction of greenhouse gas emissions | 2015: 216,909 tCO2/year  
2016: 224,139 tCO2/year  
2017: 238,599 tCO2/year  
2018: 267,519 tCO2/year  
2019: 310,899 tCO2/year  
2020: 368,739 tCO2/year  
2021: 441,039 tCO2/year  
2022: 513,339 tCO2/year  
Total: 2,581,182 tCO2/year | The piloting of the FES courses having most impact on CO2 savings was delayed and only starts to show an impact from 2016. Additional training implemented in Ireland recently not just through QualiBuild will progress these results faster. |

### Specific indicators for your action

| No of workers on Quality Building Registration System | 60,000 | Pilot registration: Total 38 | Underperformed due to delays but piloting will continue in the short term |
| % of workers who perceived quality as important | 90% by 2022. | 10% of 196 participants | Feedback survey on both courses imply a high % believe quality is important |
| €funding in place for Training Programmes | €3m | €12,240 (€204 per trainee x 60 in place till end of 2016) Intend to apply for 2017 also. | Sustainability Skillnet funding for 3 FES courses covering 40% of costs |
1. The FES training programme was piloted in two phases: September 2015 to February 2016 and again in February 2016 to April 2016. 14 courses were delivered around the country with 238 construction workers registering and 196 fully trained.

2. Three additional FES courses are to be rolled out in 2016 to train 60 more construction workers.

3. The Foundation Energy Skills Training programme is 3 day programme (equivalent in evenings) with a total contact time of 24 hours.

4. Five Train the Trainer courses were piloted during the action training 59 trainers.

5. The Train the Training programme includes 8 days contact time which equates to 64 hours.
3 Calculation Methods

Calculation of relevant indicators is completed as follows:

3.1 Primary Energy Savings

The following assumptions are made:

- The Government will stimulate consumer demand and industry activity to achieve its 2020 energy targets.
- 800,000 residential units will be retrofitted by 2020 (Better Energy Scheme, DCENR, 2011)
- Average annual energy consumption per residential unit: 2.23 toe/yr (25,300 kWh/yr) (SEAI Energy in the Residential Sector 2010) (1 toe = 11630kWh)
- Savings achieved by untrained workforce: 30%
- Savings achieved by quality trained workforce: 40% i.e. 25% differential by provision of training
- 800,000 units retrofitted (untrained) @ 30% savings: 522,00 toe (0.65 toe/unit)
- 800,000 units retrofitted (trained) @ 40% savings: 696,000 toe (0.85 toe/unit)
- Differential: 174,000 toe by 2020 if all workers were to be trained immediately.
- Assumptions: the retrofitting of 800,000 units is spread equally per annum over the period 2014 to 2022 (114,286 units per year). The piloting began in 2016 and it is estimated to carry out the national roll out over 6 years. The Pilot/National Roll Out of Training is as follows (0.05% in 2016, 10% in 2017, 20% in 2018, 40% in 2019, 60% in 2020, 80% in 2021 and 100% in 2022) the estimated savings are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Units Retrofitted/Year</th>
<th>30% Saving/Unit</th>
<th>40% Saving/Unit</th>
<th>Total Saving (toe)</th>
<th>Additional Savings (toe)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>114,286</td>
<td>100%</td>
<td>0%</td>
<td>74,603</td>
<td>-</td>
</tr>
<tr>
<td>2015</td>
<td>114,286</td>
<td>100%</td>
<td>0%</td>
<td>74,603</td>
<td>-</td>
</tr>
<tr>
<td>2016</td>
<td>114,286</td>
<td>95.5%</td>
<td>0.5%</td>
<td>74,727</td>
<td>124</td>
</tr>
<tr>
<td>2017</td>
<td>114,286</td>
<td>90%</td>
<td>10%</td>
<td>77,214</td>
<td>2,487</td>
</tr>
<tr>
<td>2018</td>
<td>114,286</td>
<td>80%</td>
<td>20%</td>
<td>82,188</td>
<td>4,974</td>
</tr>
<tr>
<td>2019</td>
<td>114,286</td>
<td>60%</td>
<td>40%</td>
<td>92,136</td>
<td>9,948</td>
</tr>
<tr>
<td>2020</td>
<td>114,286</td>
<td>40%</td>
<td>60%</td>
<td>107,058</td>
<td>14,922</td>
</tr>
<tr>
<td>2021</td>
<td>114,286</td>
<td>20%</td>
<td>80%</td>
<td>126,954</td>
<td>19,896</td>
</tr>
<tr>
<td>2022</td>
<td>114,286</td>
<td>0%</td>
<td>100%</td>
<td>155,824</td>
<td>24,870</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>861,307</td>
<td>77,221</td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td>784,086</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Renewable Energy Production Triggered

The BUILD UP Skills QualiBuild project does not foresee a significant impact in terms of additional Renewable Energy Production triggered. There is a robust training programme for renewable energy systems in place (biomass, solar, heat pump) but due to lack of consumer demand and supports there is a reduction in the number of installations. However, the activities under the Quality Building Communication Campaign should stimulate some additional activity. The latest data shows that there were approximately 22,000 Solar Water Heating Systems installed between 2008 and June 2012 (approx. 5,500 per year) and approximately 15,000 other systems (biomass heating, heat pumps etc.). There is no data now available on number of systems being installed as National supports are no longer available.

It is assumed that, as part of the National retrofitting programme, an additional 5% of dwellings install renewable energy systems which supply 10% of heat demand (0.2 toe/unit/year). Therefore the RES triggered is:

- No of housing units: 5% x 800,000 = 40,000
- Start of impact: 2015
- Housing Units per Year: 6,700 units per year
- RES Heat Supply/Unit: 0.2 toe/year
- RES Heat Supply per Year: 1,340 toe/year
- Total RES Supply Triggered till 2022: 10,720 toe.

3.3 CO₂ savings

The average dwelling in Ireland emits 6.4 Tonnes CO₂ per annum (SEAI 2012). Assuming that energy savings is in heating demand and the majority of heating is provided by oil (0.25 kg CO₂/kWh average emission value taken). The CO₂ savings are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Units/annum</th>
<th>30% Saving/Unit</th>
<th>40% Saving/Unit</th>
<th>Total Saving (toe)</th>
<th>Additional Savings</th>
<th>CO₂ Savings (tCO₂)</th>
<th>Additional CO₂ Savings (tCO₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>114,286</td>
<td>100% 0%</td>
<td>74,603</td>
<td>-</td>
<td>216,909</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>114,286</td>
<td>100% 0%</td>
<td>74,603</td>
<td>-</td>
<td>216,909</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>114,286</td>
<td>90% 10%</td>
<td>74,727</td>
<td>124</td>
<td>224,139</td>
<td>7,230</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>114,286</td>
<td>80% 20%</td>
<td>77,214</td>
<td>2,487</td>
<td>238,599</td>
<td>14,460</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>114,286</td>
<td>60% 40%</td>
<td>82,188</td>
<td>4,974</td>
<td>267,519</td>
<td>28,920</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>114,286</td>
<td>40% 60%</td>
<td>92,136</td>
<td>9,948</td>
<td>310,899</td>
<td>43,380</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>114,286</td>
<td>20% 80%</td>
<td>107,058</td>
<td>14,922</td>
<td>368,739</td>
<td>57,840</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>114,286</td>
<td>0% 100%</td>
<td>126,954</td>
<td>19,896</td>
<td>441,039</td>
<td>72,300</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>114,286</td>
<td>0% 100%</td>
<td>155,824</td>
<td>24,870</td>
<td>513,339</td>
<td>72,300</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>861,307</td>
<td>77,221</td>
<td>2,581,182</td>
<td>195,217</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>