# Promoting Low Cost Energy Efficient Wooden Buildings in Turkey

## Part I: Project Information

**GEF ID**
**10090**

**Project Type**
FSP

**Type of Trust Fund**
GET

**Project Title**
Promoting Low Cost Energy Efficient Wooden Buildings in Turkey

**Countries**
Turkey

**Agency(ies)**
UNDP

**Other Executing Partner(s):**
General Directorate of Forestry, Ministry of Agriculture and Forestry

**Executing Partner Type**
Government

**GEF Focal Area**
Climate Change

**Taxonomy**
Focal Areas, Climate Change, Climate Change Mitigation, Energy Efficiency, Agriculture, Forestry, and Other Land Use, United Nations Framework Convention on Climate Change, Climate Change Adaptation 0, Sustainable Urban Systems and Transport, Financing, Nationally Determined Contribution, Enabling Activities, Influencing models, Demonstrate innovative approache, Transform policy and regulatory environments, Strengthen institutional capacity and decision-making, Convene multi-stakeholder alliances, Stakeholders, Type of Engagement, Information Dissemination, Partnership, Consultation, Participation, Civil Society, Non-Governmental Organization, Academia, Trade Unions and Workers Unions, Communications, Education, Awareness Raising, Behavior change, Public Campaigns, Private Sector, Financial intermediaries and market facilitators, Capital providers, SMEs, Gender Equality, Gender results areas, Capacity Development, Knowledge Generation and Exchange, Gender Mainstreaming, Women groups, Sex-disaggregated indicators, Gender-sensitive indicators, Beneficiaries, Capacity, Knowledge and Research, Knowledge Exchange, North-South, Conference, Field Visit, South-South, Exhibit, Twinning, Peer-to-Peer, Knowledge Generation, Course, Master Classes, Professional Development, Seminar, Workshop, Training, Learning, Theory of change, Adaptive management, Indicators to measure change, Climate Finance (Rio Markers), Climate Change Mitigation 1

**Duration**
6
In Months

**Agency Fee($)**
361,000

**Submission Date**
10/4/2018

**A. Indicative Focal/Non-Focal Area Elements**

| Programming Directions | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|
| CCM-1_P3 | GET | 3,800,000 | 34,000,000 |
| | **Total Project Cost ($)** | **3,800,000** | **34,000,000** |

**B. Indicative Project description summary**

Project Objective

To promote and replicate the use of innovative wood based technologies as low carbon construction materials in Turkey as a means of reducing the embedded carbon content of construction material and enhancing carbon sequestration over the building life time leading to an additional 1.5 million m2 of new construction in Turkey coming from wood by 2026 or by 6 years from the project start date.

| Project Component | Financing Type | Project Outcomes | Project Outputs | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|---|---|---|
| 2. Financial Support Mechanism (including demo projects) | Technical Assistance | Outcome 2-1<br><br>Financial support mechanism is operational and sustainable beyond the lifetime of the project providing incentives to SMEs for greater use of wood in construction in Turkey | * Feasibility studies and Investment<br><br>• At least 6 buildings (2 public, 4 residential) are constructed using CLT technologies, with some support from grants and some support from the FSM (GEF Inv: $1,600,000)<br><br>• Financial Support Mechanism (FSM) for supporting forestry small and medium size | GET | 400,000 | 2,000,000 |

| Project Component | Financing Type | Project Outcomes | Project Outputs | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|---|---|---|
| | | | entrepreneurships (forestry SMEs) to produce wood materials, building on the existing credit programmes using concessional loans or other non-grant instrument (Co-finance Inv. $24,000,000)<br><br>• Detailed training programmes for stakeholders on the financial support mechanism | | | |
| 2.- Financial Support Mechanism (including demo projects) | Investment | Outcome 2-1<br><br>Financial support mechanism is operational and sustainable beyond the lifetime of the project providing incentives to SMEs for greater use of wood in construction in | • Feasibility studies and Investment<br><br>• At least 6 buildings (2 public, 4 residential) are constructed using CLT technologies, with some support from grants and some support from the FSM (GEF Inv: $1,600,000)<br><br>• Financial Support Mechanism (FSM) for supporting forestry small | GET | 1,600,000 | 24,000,000 |

| Project Component | Financing Type | Project Outcomes | Project Outputs | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|---|---|---|
| | | Turkey | and medium size entrepreneurships (forestry SMEs) to produce wood materials, building on the existing credit programmes using concessional loans or other non-grant instrument (Co-finance Inv. $24,000,000)<br><br>• Detailed training programmes for stakeholders on the financial support mechanism | | | |
| 1.- Policy, Legislative, and Regulatory Support | Technical Assistance | Outcome 1-1<br><br>Enhanced Legislation and Regulations<br><br>Outcome 1-2<br><br>Stronger Institutional Support within the Ministry of Agriculture and Forestry for supporting | • Establishment of Wood Promotion for Housing Working Unit within the General Directorate of Forestry<br><br>• Review of EU and other country legislation, regulations, and programmes aimed at promoting wood based construction and assessment of their relevance for | GET | 440,000 | 2,000,000 |

| Project Component | Financing Type | Project Outcomes | Project Outputs | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|---|---|---|
| | | construction from wood in Turkey | Turkey.<br><br>• Legislation that promotes government programmes to support low cost energy efficient wooden buildings<br><br>• National Strategy for low cost energy-efficient wooden buildings to support development in urban areas<br><br>• National Standards for designing and using timber for construction in Turkey'<br><br>• MRV system ready to monitor and evaluate GHG reductions associated with low cost wooden housing – including calculations of GHG reductions<br><br>• Joint policy and working documents among General Directorate of Forestry, and TOKİ (Housing Development Administration of Turkey), and Ministry of | | | |

| Project Component | Financing Type | Project Outcomes | Project Outputs | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|---|---|---|
| | | | Environment and Urbanization<br><br>• At least (3) municipalities develop Low Cost EE Wooden Housing Strategy Documents | | | |
| 3.- Public Awareness Campaign and Training Programmes for Construction Companies on Benefits of Wooden Houses | Technical Assistance | Outcome 3-1<br><br>Increased training and awareness about the benefits of using wood in construction<br><br>Outcome 3-2<br><br>An additional 1.50 million m2 of construction per annum in Turkey comes from wood by 2025 | - Capacity Building and Training provided to Construction Companies in Turkey on the benefits of using wood for construction (includes training and awareness raising related to the financial support mechanism)<br><br>- Marketing Materials created and disseminated to Construction Companies on the benefits of CLT for new housing construction<br><br>- National Marketing Strategy and Public Awareness Campaign on the benefits of low cost EE wooden buildings | GET | 1,200,000 | 5,000,000 |

| Project Component | Financing Type | Project Outcomes | Project Outputs | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|---|---|---|
| | | | - Short video prepared and disseminated<br><br>- Project website and outreach | | | |
| | | | | **Sub Total ($)** | **3,640,000** | **33,000,000** |
| | | **Project Management Cost (PMC)** | | **GET** | **160,000** | **1,000,000** |
| | | | | **Total Project Cost ($)** | **3,800,000** | **34,000,000** |

**For multi-trust fund projects, provide the total amount of PMC in Table B and indicate the list of PMC among the different trust funds here:**

**C. Indicative sources of Co-financing for the Project by name and by type**

| Sources of Co-finiancing | Name of Co-financier | Type of Co-finiancing | Investment Mobilized | Amount($) |
|---|---|---|---|---|
| Government | General Directorate of Forestry, Ministry of Agriculture and Forestry | Grant | Investment mobilized | 20,000,000 |
| Government | General Directorate of Forestry, Ministry of Agriculture and Forestry | In-kind | Recurrent expenditures | 1,000,000 |
| Government | General Directorate of Construction, Ministry of Environment and Urbanization | Grant | Investment mobilized | 1,000,000 |
| Government | General Directorate of Construction, Ministry of Environment and Urbanization | In-kind | Recurrent expenditures | 1,800,000 |
| Government | TOKI (Housing Development Administration of Turkey) | In-kind | Investment mobilized | 2,000,000 |
| Government | KOSGEB (Small and Medium Enterprises Development Program) | Grant | Investment mobilized | 4,000,000 |
| Government | KOSGEB (Small and Medium Enterprises Development Program) | In-kind | Recurrent expenditures | 400,000 |
| CSO | MDF and Particleboard Manufacturers Association | In-kind | Recurrent expenditures | 200,000 |
| CSO | National Wood Association | In-kind | Recurrent expenditures | 200,000 |
| CSO | TMMOB Union of Chambers of Turkish Engineers and Architects | In-kind | Recurrent expenditures | 200,000 |

| Sources of Co-finiancing | Name of Co-financier | Type of Co-finiancing | Investment Mobilized | Amount($) |
|---|---|---|---|---|
| CSO | TOBB (Union of Chambers and Commodity Exchanges in Turkey) | In-kind | Recurrent expenditures | 200,000 |
| CSO | Turkish Business Association for Wood Products (TORID) | In-kind | Recurrent expenditures | 200,000 |
| CSO | Nature Conservation Center | In-kind | Recurrent expenditures | 200,000 |
| CSO | Yale School of Forestry | In-kind | Recurrent expenditures | 200,000 |
| GEF Agency | UNDP | Grant | Investment mobilized | 80,000 |
| GEF Agency | UNDP | In-kind | Recurrent expenditures | 320,000 |
| Government | TOKI (Housing Development Administration of Turkey) | Grant | Recurrent expenditures | 2,000,000 |
| | | | **Total Project Cost($)** | **34,000,000** |

**Describe how any "Investment Mobilized" was identified**

All “investment mobilized” were identified in consultation with the government, CSO and other sources. Related co-financing letters will be provided during the PPG phase.

**D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds**

| Agency | Trust Fund | Country | Focal Area | Programming of Funds | Amount($) | Fee($) |
|---|---|---|---|---|---|---|
| UNDP | GET | Turkey | Climate Change | | 3,800,000 | 361,000 |
| | | | | **Total Project Cost($)** | **3,800,000** | **361,000** |

**E. Project Preparation Grant (PPG)**

PPG Amount ($)
100,000

PPG Agency Fee ($)
9,500

| Agency | Trust Fund | Country | Focal Area | Programming of Funds | Amount($) | Fee($) |
|---|---|---|---|---|---|---|
| | | | | **Total Project Costs($)** | **0** | **0** |

# Core Indicators at Project Identification Form (PIF)

## Indicator 6 Greenhouse Gas Emissions Mitigated

| Total Target Benefit | (Expected at PIF) | (Expected at CEO Endorsement) | (Achieved at MTR) | (Achieved at TE) |
|---|---|---|---|---|
| Expected metric tons of $CO_2e$ (direct) | 434926.00 | 0.00 | 0.00 | 0.00 |
| Expected metric tons of $CO_2e$ (indirect) | 0.00 | 0.00 | 0.00 | 0.00 |

## Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

| Total Target Benefit | (Expected at PIF) | (Expected at CEO Endorsement) | (Achieved at MTR) | (Achieved at TE) |
|---|---|---|---|---|
| Expected metric tons of $CO_2e$ (direct) | | | | |
| Expected metric tons of $CO_2e$ (indirect) | | | | |
| Anticipated year | | | | |

## Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

| Total Target Benefit | (Expected at PIF) | (Expected at CEO Endorsement) | (Achieved at MTR) | (Achieved at TE) |
|---|---|---|---|---|
| Expected metric tons of $CO_2e$ (direct) | 434,926.00 | | | |
| Expected metric tons of $CO_2e$ (indirect) | | | | |
| Anticipated year | 2025 | | | |

## Indicator 6.3 Energy Saved

| Total Target Benefit | Energy (MJ) (Expected at PIF) | Energy (MJ) (Expected at CEO Endorsement) | Energy (MJ) (Achieved at MTR) | Energy (MJ) (Achieved at TE) |
|---|---|---|---|---|
| Target Energy Saved (MJ) | 326,803.00 | | | |

## Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology

| Technology | Capacity (MW) (Expected at PIF) | Capacity (MW) (Expected at CEO Endorsement) | Capacity (MW) (Achieved at MTR) | Capacity (MW) (Achieved at TE) |
|---|---|---|---|---|

## Core Indicators at Project Identification Form (PIF)

### Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

| | Number (Expected at PIF) | Number (Expected at CEO Endorsement) | Number (Achieved at MTR) | Number (Achieved at TE) |
|---|---|---|---|---|
| Female | 200 | | | |
| Male | 240 | | | |
| Total | 440 | 0 | 0 | 0 |

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

**Part II. Project Justification**

**1a. Project Description**

**Briefly Describe**

a. **The global environmental and/or adaptation problems, root causes and barriers that need to be addressed;**
b. **The baseline scenario or any associated baseline Programs;**
c. **The proposed alternative scenario with a brief description of expected outcomes and components of the Program;**
d. **alignmenet with GEF Focal Area and/or Impact Program Strategies**
e. **Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, CBIT and co-financing;**
f. **global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and**
g. **Innovation, sustainability and potential for scaling up.**

1. The Government of Turkey places high priority for improving energy efficiency as a means of both promoting economic development, enhancing energy security, and reducing greenhouse gas emissions. Turkey has signed and ratified the UNFCCC (in 2004) and is committed towards participating in international efforts aimed at reducing greenhouse gas emissions, which includes participation in international efforts to negotiate and agree a successor agreement to the Kyoto Protocol. Under the Paris Accord the government of Turkey has set itself an NDC target of reducing emissions up to 21 percent compared to business as usual by 2030 The Government of Turkey aims to realize its own energy security by diversifying energy supply routes and by increasing the share of renewables (and nuclear energy) in the economy as well as by promoting energy-efficiency. Globally the buildings sector represents approximately 33% of all global greenhouse gas emissions and energy-efficiency in the housing sector offers huge potential for reducing GHG emissions. In Turkey, the building sector is the second largest (after the energy sector) in terms of both energy consumption (representing 36% of the total final energy consumption) and greenhouse gas emissions, which are estimated as approximately 32% of all total national energy related GHG emissions which is approximately 128 million tonnes CO2 per annum based upon total estimated GHG emissions of approximately 400 million tonnes CO2e (2010). It is estimated that overall greenhouse gas emissions could be reduced in the buildings sector by up to 30% meaning that reductions of 38.4 million tonnes of CO2e per annum are theoretically possible.

2. Population growth in Turkey has averaged over 1.3% for more than 30 years. The population of Turkey has almost doubled from 44 million in 1980 to almost 80.8 million today. This represents almost a doubling of the population in just 45 years. In addition, life expectancy in Turkey has grown from an average of 48.27 years in 1960 to 78 years (75.3 for men and 80.7 for women) in 2017. The combination of a significantly increased population and longer life expectancy has meant that the demand for housing in Turkey has grown significantly meaning that there is currently a construction boom in the country. As the demand for housing grows, the demand for energy-intensive building products such as steel, aluminum, and cement also grows.

3. The global environmental problem that this project is addressing is the fact that the construction of new housing in Turkey is typically very energy intensive and is a significant source of rising greenhouse gas emissions. The housing sector in Turkey has one of the highest proportions of energy consumption with its share around 26% (Source: Ministry of Energy and Natural Resources) meaning that opportunities and potential for energy savings are very large. With a 18.7% growth rate at the end of the 3rd quarter of 2017, housing sector is one of the largest economic sectors in Turkey. TOKI (Housing Development Administration of Turkey), started to construct 565,000 houses as of 15 February 2013. In major housing projects the usage of wood as the building material is low when compared to concrete and steel building materials which are the main sources of GHG emissions related to housing sector. Unlike in some other countries (e.g. Nordic countries in Europe) where use of wood in construction is widespread, in Turkey both for State constructed housing and for houses and apartment buildings built by private construction companies, the percentage of wood used in construction in Turkey is extremely low. Wood construction and the use of wood products have two key positive environmental and climatic effects. Firstly, items made from wood, such as wooden buildings, wood-based structural components, wooden furniture, or any other wood or wood-based products, serve as carbon stores. Secondly, when energy-efficient and renewable wood is used to replace energy-intensive materials which contain non-renewable raw materials and which generate carbon emissions during their production, the overall substitution effect in terms of CO2 reduction is considerable in wood's favor where estimates are that the savings are on average 0.172 kg m2 of built floor space for substituting away from cement to wood. (Source: Yale School of Forestry – Carbon, Fossil Fuel and Biodiversity Mitigation with Wood and Forests, - 2014).

4. The construction industry has been growing continuously in Turkey with a 10.2% growth at the end of 3rd quarter of 2017. The construction sector has been booming in the last two decades in Turkey due to a combination of economic growth and population growth. Between 2004 and 2014, it is estimated that approximately 954.77 million m² of new buildings were constructed over a 10 years period and over 99 percent of this new construction has been using and continues to use traditional building products such as cement, concrete, and steel. In each of the past three years, the number of buildings constructed using wood products has been less

than 1 percent. In 2012, it is estimated that 95,763 new buildings were constructed in Turkey representing some 106,950,000 m2 in floor area of which only 196 buildings were made from wood representing some 44,327m2 in floor area. In 2013, it is estimated that 120,847 new buildings were constructed in Turkey representing some 138,393,000 m2 in floor area of which only 114 buildings were made from wood representing some 142,216 m2 in floor area. In 2014, it is estimated that 123,554 new buildings were constructed in Turkey representing some 151,016,000 m2 in floor area of which only 222 buildings were made from wood representing some 289,681m2 in floor area. Finally, in 2017 234,296 new buildings were constructed with a total area of 323,104,890 m2, and only 188 of them were made from wood. During the period of 2004 – 2014, it has been estimated that less than only approximately 0.13% all new housing construction in Turkey comes from wood related products as the following table clearly demonstrates.

**Table 1-1: Construction of New Buildings in Turkey over the Period 2004 – 2014**

**Using Non-Wood and Wood Products (Source: TOKI : Housing Development Administration of Turkey)**

| **Total Construction of Buildings (in $m^2$) over the period 2004 - 2014** | | |
|---|---|---|
| Building Type | *Square Metres ($m^2$)* | *Percentage* |
| Wooden Frame | 1,253,087 | 0.13% |
| Non-Wooden Frame | 954,779,880 | 99.87% |

5. Despite the fact that so few buildings in Turkey are constructed using wood, the potential for using wood for construction is very large. The total forested area in Turkey amounts to 22.3 million ha which constitutes 27% of the total surface area of the country with an estimated total volume of 1.6 billion $m^3$. 99.8% of the forest areas in Turkey are owned and managed by the State. General Directorate of Forestry (GDF) operating under the Ministry of Agriculture and Forestry (MoAF) is the responsible institution for the protection, development and management of forests and forest areas. Today annual round wood consumption reaches about 31 million $m^3$ in Turkey**,** including both industrial (22 $m^3$) and fuel wood (9 $m^3$). This consumption is made up of domestic production of around 26 million $m^3$ and imports (mainly from Ukraine, followed by Russia and then USA) of approximately 5 million $m^3$ (as of 2017). Besides, huge amount of chips, saw wood and other processed wood products are imported. The General Directorate of Forestry (GDF) is the main industrial wood supplier with 68% market share. Between 2008 and 2014, consumption of wood grew at an average 7.6% per year due to developments in construction sector. The breakdown in production figures (2013) is currently logs (34%), farmer wood (16%), fibre board (41%), industrial wood (5%) and mine timber (4%). (Source: General Directorate of Forestry, Ministry of Agriculture and Forestry).

6. Most of the 31 million m³ wood consumption in Turkey is used for furniture (38%), timber (32%) and firewood (28%) with only limited amounts (< 2%) going for the construction of new wooden housing and in Turkey there is currently very limited experience with new technologies which use wood as technology in construction. The number of new buildings in Turkey using wood for each of the last three years is tiny, estimated at 194 buildings in 2012, 114 buildings in 2013, 222 buildings in 2014 and 188 buildings in 2017. In particular, there is one technology with a lot of environmental and economic benefits which has not been widely used. This technology is called Cross Laminated Timber (CLT) which is an engineered wood building system designed in such a way as to complement light and heavy timber framing options. CLT is a technology of which there is almost no experience in Turkey. CLT is made from several layers of lumber board, stacked crosswise (usually at 90 degree angles) and glued together on their wide faces. The cross lamination provides dimensional stability, strength, and rigidity and therefore there are significant advantages in using CLT as a construction material. CLT forms the structural floor and wall element of buildings and has been used successfully to build up to nine storeys in the UK (The Stadthaus building, London) and it has been popular in Europe for more than 20 years. Similarly, the Brock Commons student's residence at the University of British Columbia in Canada has 18 storeys and is currently the tallest of its kind in the world. Currently, there are no barriers to producing more of it beyond the fact that there is limited awareness about the benefits and advantages of using CLT as a building material.

7. Timber (and in particular cross laminated timber - CLT) is an effective carbon sink which can sequester carbon dioxide. It is estimated the construction related emissions from wooden construction are 10-15 percent lower than from concrete and steel are produced from energy intensive processes that release large amounts of carbon dioxide into the atmosphere. (Source: Yale School of Forestry – Carbon, Fossil Fuel and Biodiversity Mitigation with Wood and Forests, - 2014) This means that low cost energy efficient wooden housing using CLT can be considered to be an environmentally friendly technology which sequesters carbon dioxide and helps Turkey with meeting its climate change goals. In particular, CLT has the following social, economic, and environmental benefits which are demonstrated in Table 1-2 below as follows:

**Table 1-2: Advantages of using Cross Laminated Timber (CLT) as a Carbon Sink**

8. Enhanced legislation, technology, and cooperation between the housing and forestry sector in Turkey will increase use of cross laminated timber and increase its use in new housing construction by creating market demand. In fact, once construction companies realize the benefits of using CLT including rapid installation and decreased costs, the use of CLT can be expected to rise quickly as it has in the European Union. During 2010-2017, the global production of cross-laminated timber grew at a CAGR of around 14% with Europe accounting for most of this market. Increased use of wood with CLT technology will help to save energy during the building life cycle, as the wood cell structure gives extraordinary heat insulation: 15 times higher than concrete, 400 times than steel and 1770 times than aluminum. It will lead to CLT inspired wooden homes being built as passive homes which has the advantage that CLT is a higher value product than round wood or timber for furniture. Another of the advantages of CLT is that it can make use of smaller dimension material that might not otherwise be used in structural applications.

9. Moreover, using wood will help Turkey's housing sector to be a low carbon economy in line with European regulations on energy in the building sector where it is stated that by 2020 for EU member states all new public buildings should be near zero emissions buildings. EU Member states are also requested to draw up plans on how they intend to increase the number of near zero buildings as part of the total building stock. The development of a national strategy for low cost energy efficient wooden houses for Turkey is consistent with the goals and objectives of the EU in this regard. In the EU, there is a need and demand for promoting wood construction. As early as in 2004, the benefits and advantages of wood construction were examined within the EU and the analysis came back with positive results. The EU experts came to the conclusion that the benefits of wood construction, both economic and environmental among other advantages, outweighed significantly any possible disadvantages. Of the EU Member States, France has begun to take measures to promote wood construction and related legislation has been drawn up requiring the use of wood in new buildings. Other countries have displayed increasing interest in wood construction, too. Great Britain and Sweden have demonstrated their openness to wood construction by constructing wooden multi-storey residential buildings. At the EU level, several related initiatives have been made in recent years and strategies, action programmes and surveys prominently featuring sustainable development and green construction have been implemented and are being planned. Given Turkey's status vis-à-vis the EU, it makes sense to closely review EU legislation and regulations and programmes related to wood construction and assess their relevance.

**2. Baseline scenario and associated baseline projects**

10. Following the tradition of the Ottoman Empire, there has historically been in the past an emphasis on using wood for construction in Turkey. However, since the 1970s and following the advance of cement building technologies, timber based construction has been neglected for the past thirty years. Interviews with market players in the forestry sector in Turkey revealed that only approximately 5% of all wood produced in Turkey is used for the construction of wooden houses. The majority of the wood produced by the $3.3 billion

USD forestry sector in Turkey goes for export and for furniture production and as timber. The market demand for a domestic timber production industry for housing is very limited. Today, the main prevailing structural materials used in construction in Turkey are concrete and steel and the use of timber is somewhat limited. Even when timber is used (typically for roof structures) most of the building is using low quality products aimed at minimizing costs. The Turkish wood industry has made several attempts to produce several materials that can be used in construction sectors. These included production of Glue-Laminated Timber (GLT) in early 90ties by a private company called Şişmanoğulları Lamine that followed by use of GLT in some buildings in İzmir region by a company called Vedat Tokyay. Later GLT was used in several other occasions including construction of small outside facilities of several touristic hotels. However, use of GLT never passed the threshold to be an industrial product. In addition to the GLT, the idea of using CLT like in several other countries has been owned by several Turkish companies. Most of the CLT used in a number implementation were exported from other countries. Only local CLT production is currently realized by a company called Naswood based in Antalya. However, due to the lack of demand, their production line is working with 30% capacity mainly providing CLT for companies' own need. The facility produces CLT with 14m length and 3.7m height with a thickness of 6-40cm. Moreover, advanced building technologies using wood such as cross laminated timber is not commonly used and, as has been mentioned, only approximately 0.13% of all buildings constructed in Turkey have used wood. The main reasons of avoiding wood in construction besides its advantages can be listed as (i) absence of examples of wooden structures that are built with the new technology, (ii) lack of proven examples regarding the costs and benefits associated with the wooden buildings such as real pricing, associated costs, time necessary for construction, environmental advantages such as carbon, waste management, energy efficiency, wood product supply in local market etc... and (iii) unclarity in terms of construction standards associated with specific wood products. In a business as usual scenario, therefore the majority of new urban construction will continue to use concrete, steel, cement, brick, and aluminum and timber will remain the construction material of choice for only a few companies.

11. In the baseline scenario, less than 0.2% of all new buildings constructed in Turkey will be constructed using wood products and this figure will not be expected to increase over time. No additional incentives will be in place to support wood as a construction material. No government programs or regulations will provide a regulatory incentive to promote the increased use of wood and there will continue to be limited awareness among construction companies of the benefits of using wood. Awareness of the benefits of using wood in construction among construction companies will remain very low and hence their usage will also remain low. Finally, the forestry sector and the construction sector will continue to not work closely together and the majority of wood in Turkey will be utilized as logs for export or for furniture. In the baseline scenario, there remains limited awareness and knowledge among the general public about the advantages and benefits of using CLT technologies in the housing sector in Turkey and no comprehensive public awareness campaign is likely to take place. Stagnation will continue in domestic markets and the majority of all wood produced in Turkey will be continued to be used for export. These factors mean that in a business as usual scenario, wood including CLT and other

related technologies will continue to receive very limited application in the buildings sector in Turkey and the majority of new construction will continue to use traditional building materials such as cement, steel, aluminum and steel. In the baseline scenario, we can expect that by 2025 that construction from wood will continue to represent less than 0.2% of all overall construction in Turkey each year.

12. The cost of using wood as a construction material is very similar to the cost of a concrete frame building. It is estimated that the average cost of building a 1m² concrete frame building in 2014 was 781.8 Turkish Lira per m² whereas for wood it was estimated as being 745.20 Turkish Lira per square meter. These estimates need to be updated during the project preparation grant phase. This is an estimate from the Turkish Statistical Institute and for individual buildings the costs may differ as the cost of construction depends on several things such as material cost, land cost, labor cost which will not be the same in different parts of the country. However, the fact that wood construction is on average around 5% cheaper than construction using traditional building materials is a good factor in support of this project. Moreover, wooden buildings have other advantages related to cost. Steel and cement prices are highly dependent on the energy market prices and foreign currency rates whereas wood material is not energy dependent, therefore prices are expected be even lower in the future in comparison to steel and cement-based ones. Moreover, wooden buildings have lower costs associated with transportation of materials, shorter construction time and lower costs in worksite expenses, and thanks to minimal waste output, lower costs in terms of waste management. In the baseline scenario, evidence clearly demonstrates that the fact that wood materials are slightly cheaper has not led to any significant increase in usage of wood for construction over the past 10 years.

**3. Proposed alternative scenario, GEF operational focal area strategies, with a brief description of expected outcomes and components of the project**

13. The project is consistent with GEF 7 CCM : Objective 1 of the GEF 7 Programming Directions document - Promote innovation and technology transfer for sustainable energy breakthroughs Program 3: Promotions of innovation and technology transfer for sustainable energy breakthroughs for energy efficiency adoption.” The project is supporting the accelerated adopted of wood based technologies (in particular cross laminated timber) in Turkey in the construction sector where currently only 0.2% of all buildings are constructed using wood. Substituting away from concrete, steel, cement, brick, and aluminum technologies will lead to significant greenhouse gas emission reduction savings, thereby helping Turkey with meeting its commitments under the Paris Accord. With GEF support, the project will support the development of new legislation that promotes government programmes to support low cost energy efficiency wooden houses for urban populations in Turkey. With GEF support, a new and innovative technology called cross

laminated timber will be supported for its economic and environmental benefits. In addition, the project will support the development and adoption of a National Strategy for low cost energy-efficient wooden houses to support development in low income communities. In addition, to these tools the project will develop and support a MRV system ready to monitor and evaluate GHG reductions associated with low cost wooden housing. The project will also support the development, launch, and implementation of a financial support mechanism within a well-established financing organization or more than one organizations (Such as KOSGEB) to further support new energy efficient wooden housing projects and increase the overall level of investment. The main reason for defining a finance mechanism within the project is to support the transition to wooden buildings foreseen by the project as the additional initial construction costs for cross laminated timber are expected to be higher in the initial phases. These can include provision of high quality wood products by SMEs that fulfill the standards of construction sector; encouraging the construction sector through lower financial expenditure; and fulfilling the standards associated with wooden buildings and necessary technical capacity within the companies. Finally, marketing, awareness and capacity building activities will be undertaken to achieve better overall results and coordination. Production of wood products in Turkey is managed by the Ministry of Agriculture and Forestry and planning take place based upon the market demand. This is the rationale for this project focusing on the demand side of the equation. With increased demand for wood products used in construction the supply side can easily be adjusted to meet the demand. The barrier that needs to be overcome, however, is that there is currently only very limited demand for wood products for construction in the Turkish market.

14. With GEF support, the lower cost of construction (approximately 5% lower cost compared to traditional building materials) is likely to become a factor in encouraging increased use of wood in construction. While 5% may seem like a small number when a new building costs 200 million USD to construct, 5% is in fact $10 million USD so the number is in fact significant. In the situation, where the building company has only a 10% profit margin this is the difference between say $10 million profit or $20 million profit on a building that costs $200 million to construct. This means that with the additional support for regulations and financial incentives and with increased knowledge and awareness of the benefits of wood, including in particular CLT, it can be expected that the cost factor will also act as a stimulus in order to encourage construction companies to consider and to use wood as a building material. With GEF support, the aim will be to support regulatory/legislative improvements, financial incentives, and capacity building/awareness activities that will act as a catalyst for construction companies to empower and enable them to use wood in construction more frequently. In addition to the GEF Support, the General Directorate of Forestry, the Executing Agency of the project, will be providing 20 million USD grant co-financing to the project through providing the wood and related products to the market in order to ensure the successful achievement of the Project, supported by the Wood Promotion for Housing Working Unit within the General Directorate of Forestry. The Unit will also support the acceleration of innovative wood and related products to the domestic construction market which means that for every $1 of GEF financing provided, approximately$9 is expected to be provided through co-financing with a total of 34 million USD. The three components of the project are as follows:

15. **Component 1** of the project will focus on the development of national legislation, regulations and policies to support increased use of timber as a construction material and will include the development of a national strategy for low cost energy-efficient wooden houses as well as support for national standards for design and usage of wood in construction. The project will involve the key stakeholders into the strategy making through workshops and face to face meetings. At least three workshops related to legislation, regulations, and policy will be carried out in different cities of Turkey. One of the objectives of the strategy will be to focus on how to make wooden buildings more low cost to further encourage their utilization. A second objective of the strategy will be to define how to maximize CO2 savings from greater construction of wooden buildings. Component 1 will include a review of all relevant EU legislation, regulations, and programmes aimed at promoting wood-based construction and assess their relevance for Turkey. Turkey has already put the EU Directive 2010/30/EU into operation through Ministry of Environment and Urbanization on Energy Performance of Buildings. The content of the directive will be the baseline for the implementations of the project and the project will work to improve regulations in such a manner that it promotes new and additional investment in wooden buildings.Work under this component will also include putting in place an MRV system ready to monitor and evaluate GHG reductions associated with low cost wooden housing – including calculations of GHG. MRV preparation activity will include a training session targeting the public, private and NGO sector members. The Turkey Energy Efficiency Law (2008) stipulates minimum energy performance standards of buildings but it gives no preference or incentives for using wood as a construction material despite the fact that wood is more energy-efficient and sequesters carbon. Currently, no normative document exists on 'Standards for designing and using timber in construction in Turkey.' This type of document would be very useful to assist construction companies and to promote the increased use of wood products and in particular CLT. Component 1 will also establish a Wood Promotion for Housing Working Unit within the General Directorate of Forestry who will coordinate the issues related to how to increase the use of wood in the construction industry in Turkey with at least 10 members. Several capacity building activities will be delivered by the project targeting the members of the Unit and other key governmental counterparts who are in charge of the implementation of the policies. These will include at least 3 training activities and 2 study visits to view international best practice in countries which have strong policies and incentives in place to encourage wooden construction outside of Turkey.

16. **Component 2** of the project will focus on designing and putting in place a **financial support mechanism** either within well established financing organization(s) such as KOSGEB or General Directorate of Forestry or within another appropriate governmental structure to further support the development of the market for wood related technologies for construction of new houses in Turkey. The rationale behind putting in place a financial support mechanism is that new wood technologies in the construction industry are not widely known in Turkey, and therefore the appropriate design of such a mechanism will help with accelerating the adoption of such technologies. The design of this financial support mechanism will be carried out during the PPG phase of the full project development and different financing options will be envisaged and defined in detail. The support will be aimed mainly at SME's (small and

medium sized enterprises) who are more in need of financial support, as opposed to large construction companies whom have many more financing options available to them. The Financial Support mechanism will help with providing the right set of incentives to promote increased use of wood as a construction material. It will be used to support a minimum of 6 demonstration projects (2 public buildings using wood which will most likely be school dormitories and 4 residential wooden homes) It is envisaged that the Ministry of Agriculture and Forestry ($20 million) and the other financing organizations ($4 million) will work closely together to capitalize the financial support mechanism of at least $14 million USD which will be complemented with some $1 million of GEF grant funding to help support the first initial 2 pilot demonstration projects only. Initial thoughts are that GEF capital subsidy grants during the pilot phase of the financial support mechanism during the demonstration phase will later be replaced by a soft loan mechanism during the full commercialization phase. This is a model that is being followed by UNDP in the ongoing UNDP GEF ORKOY Forest Villages Solar PV project in Turkey. However, the exact details of how the financial support mechanism will work will need to be defined during the project preparation grant (PPG) phase. Different options to be considered include a variety of incentives including performance grants, soft loans, loan guarantees, revolving funds and other forms of credit enhancement schemes. The financial support mechanism will be implemented in two phases (i) a demonstration phase where additional GEF support and assistance will be provided only for the first 2 demonstration projects (ii) a commercialization phase where GEF support will be limited to design related studies only but the actual cash to be used for the full scale implementation will come from Ministry of Agriculture and Forestry and key financing organizations. The definition of the exact differences between how the demonstration phase and the commercialization phase will work will need to be carried out during the PPG phase.

17. Different options to be considered include a variety of incentives including performance grants, soft loans, loan guarantees, revolving funds and other forms of credit enhancement schemes. UNDP is in the process of putting in place new financial modalities such as reimbursable grants and performance based grants and these will also be explored. The financial support mechanism will be implemented in two phases (i) a demonstration phase where GEF support and technical assistance as well as an investment grant of up to 25% of the total building cost will be provided only for the first 6 demonstration projects (2 dormitories, 4 wooden homes) (ii) a commercialization phase where GEF support will be limited to design for technical assistance for architectural drawings, feasibility studies, and business plans only but the actual cash to be used for the construction will come from Ministry of Agriculture and Forestry and from the private sector (i.e – construction companies), from banks, and from the financial support mechanism.During the commercialization phase, no investment grant subsidy will be available. The definition of the exact differences between how the demonstration phase and the commercialization phase will work will need to be carried out during the PPG phase. The exact place of the demonstration projects will be identified during the PPG phase depending on the co-financing that will be assured by the stakeholders who are keen on realizing their building projects with wooden products. Moreover, the demonstrations will also aim to ensure best adoption of energy efficiency principles and also use of renewable energy as much as possible to demonstrate a holistic

approach to green buildings. As a part of this component, specific capacity building activities will be developed for the construction companies, their engineers and architects and SMEs from the wood industry sector in order to ensure best use of methods and implementation of standards. At least three (3) training activities will be held targeting different players in the sector explaining the financial support mechanism and how the commercialization phase will work. The details of training package will be defined during the PPG phase. Moreover, the project will initiate cooperation with several Turkish universities with civil engineering departments to plan to include courses in the curriculum. The UNDP Turkey is already working with universities in Ankara and İstanbul on diversification of wood products and their use in construction sector. This baseline will be further developed to ensure the dissemination of knowledge regarding wooden buildings for the undergraduate students. Moreover, the representatives of Turkish project partners Turkish Wooden Products Importers & Industrialists Association (TORID) and National Timber Association (UAB) will look for options to design a certification system in collaboration with construction sector NGOs to be provided to companies who are interested to invest in wooden buildings. Furthermore, UNDP and GDF will aim to ensure best selection of 6 demo projects with several key public and private organizations during the PPG phase. The key sector NGOs TORID and UAB as well as GDF and UNDP will continue supporting for maintenance services to ensure a strong demonstration and sustainability of the buildings.

18. **Component 3** of the project focuses on developing a **comprehensive national public awareness campaign** related to wooden housing and providing training programmes for construction companies. Raising awareness of the benefits to the construction industry of using wood related technologies for new housing focused on poorer urban communities should help to stimulate domestic sales of wood related products. The marketing and awareness raising activities will be complemented with detailed training activities of key stakeholders on the benefits of wooden housing. The public awareness activities will include at least 5 regional workshops/ seminars to disseminate the findings as well as other communication activities. Each regional workshop/seminar will target a different region of Turkey in which the project is active. Interviews with market actors across the forestry sector in Turkey revealed that 85% of all respondents said that they have marketing related problems which were attributed primarily to stagnation in domestic markets with low domestic consumption of wood products. Stagnation in local markets means that many local producers do not even produce wood products at full capacity and there is therefore the capability to increase production once demand rises. Lack of demand was seen as being a major barrier to hampering industry growth and a main way that this lack of demand can be overcome would be through the implementation of a comprehensive national public awareness campaign focusing on those key stakeholders who would be the natural purchasers/procurers of wood related products for the wooden housing industry in Turkey. Local NGOs and key international partners such as the Yale School of Forestry, which has extensive experience in this area, will be key partners in the implementation of component 3.

19. A number of barriers currently exist which are preventing the development of the construction market in Turkey for low cost wooden housing. These barriers can be described in Table 1-3 as follows:

**Table 1-3: Barriers to Increased Use of Wood in Construction Industry in Turkey**

| **Barrier** | **Proposed Means of Overcoming Barrier** | **Component of the Project which Deals with Barrier** |
|---|---|---|
| Legislative, Regulatory Barriers: Although the voluntary national standards adopting international standards are in place in Turkey, necessary legislation to regulate construction of wooden buildings as well as to take necessary measures to promote and disseminate them is not in place. | -Preparation / updating legislation and standards of wood as a construction material<br><br>- Preparation / updating legislation on public procurement and public tender for promoting wood | Component 1 |
| Institutional Barriers: Current organization of relevant authorities in Turkey including GDF, KOSGEB and MoEU have not necessary departments and job descriptions to develop and implement technical specifications an financial mechanisms for use in implementation of wooden buildings construction techniques. | -Capacity building/technical courses on wood construction<br><br>- Establishing a unit to promote wood with participation of General Directorate of Forestry, TOKİ, General Directorate of Construction | Component 1 and Component 3 |
| Cost and Financial Barriers: Since the proposed technology will require the manufacturers (SMEs) to make additional investments in their production lines, their existing financial profile and difficulties in accessing finance require creation of innovative financial support schemes. | - A wooden house value chain mechanism should be prepared with involvement of all stakeholders<br><br>- Financial support mechanism to promote the increased use of wood products in construction in Turkey<br><br>- Financial incentives for construction companies using wood<br><br>- Legislative support for public companies procure or tender construction out of wood | Component 2 |

| | | |
|---|---|---|
| Awareness and Capacity Barriers: Both potential building owners and users and the SMEs to produce wooden construction materials are not fully aware of the benefits of wooden buildings and construction materials as the same is not common in Turkey. | -A national awareness raising on the advantages of houses such as earthquake, health, climate friendly.<br><br>-Awareness raising on sustainable forest management and use of wood instead of non-renewable materials such as plastic and concrete. | Component 3 |
| Training Related Barriers: Since introduction of the proposed technology requires untraditional knowledge and skills, existing level of experience, knowledge and skills of SMEs' production staff is considered not sufficient or successful introduction of this new technology. | -Qualified work power need to be established through several training programmes on wood construction.<br><br>-Universities need to include wood construction, design, and material into their syllabus.<br><br>-Current architectures, engineers, need to be able to reach adequate data on wood construction.<br><br>-Governmental staff working in the housing sector shall receive training on wood construction. | Component 3 |

**4. Alignment with GEF Focal Area and/or Impact Program Strategies**

20. The project contributes to the CCM-1-3 - Promotions of innovation and technology transfer for sustainable energy breakthroughs for energy efficiency adoption. Mitigation benefits of the use of massive wood products in wooden buildings are well known globally and are explained in the project justification. However, despite the known benefits from wooden buildings there are a number of barriers that mean for the most part new and innovative wooden building technologies are not yet adopted by the Turkish construction and forestry sector. Although the raw material is provided to the market by the General Directorate of Forestry, most of the wood is used for export and as the benefits of wooden buildings in terms of energy efficiency is well known, the uptake of this technology has not been achieved in Turkish context yet. The forestry sector needs to establish the baseline for transformation to the high added value

wood technologies for wooden buildings. Lack of demonstration projects on wooden buildings, lack of related standards or related incentives and the lack of a relevant institutional structure and capacity in the sector creates strong barriers against the greater adoption of energy efficient wooden buildings in Turkey. The project will create a best case that will serve as an accelerator for the sector to overcome those barriers including defining and improving promoting global best practices, fostering harmonization of testing, developing and securing approval for the related legislation and standards, capacity building, and most important, demonstrating the energy efficient wooden buildings with high added value massive wood products such as CLT supported by a sustainable financing mechanism. The model defined in this project will create a strong best practice for other sectors related to energy efficiency in Turkey and elsewhere and ensure the scaling up of the preference of wooden buildings which has a great potential for reducing the embedded carbon content of construction material and enhancing the carbon sequestration in the buildings sector.

**5. Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF and co-financing**

21. This project will play a critical and vital role in accelerating the adoption of new wood based technologies in Turkey related to the domestic construction industry. The General Directorate of Forestry estimates that in the absence of the GEF project it is likely that there will be no new legislation in Turkey in the next five years to promote the further development and enhancement of the construction industry using wood products. In addition, there will be no national financial support mechanism put in place and no need to put in place a comprehensive marketing, awareness, capacity building and training programme to outline more clearly to all key stakeholders the benefits of low cost energy-efficient wooden homes. As a result, and despite the fact that in Turkey construction using woods costs on average 5% less than construction using cement it is estimated that the amount of wood used in construction in Turkey is not likely to grow significantly in the next five years. The reasoning behind this is simply that there are a number of barriers (described in table 1-3) that have and continue to prevent the increase in the use of wood in the construction industry in Turkey. With the support of the GEF these barriers can be overcome which will then pave the way for significant new and additional investment in wooden buildings in Turkey.

## 6. Global Environmental Benefits (GEFTF)

22. Global Environmental benefits from the success of this project will be very significant. During construction it is estimated that construction of a wooden house is approximately 15% less energy intensive than using traditional construction materials such as cement, brick, and concrete. Every square meter of a floor with four walls made out of wood, instead of concrete and other building materials, the energy saving will be 2,490 MJ Fossil Fuel (FF) which equals to 288 kg of CO2. In terms of the 6 demonstration projects that this project will support, the floor space for 4 wooden homes is estimated as 2,000m2 (500m2 x 4 = 2000m2) and for the 2 dormitories the size is estimated at 6000m2 per dormitory or 12,000m2 in total. This means that the floor space from the 6 demonstration project is estimated as 14,000m2 for the 4 wooden homes and the 2 dormitories. The direct CO2 savings are therefore estimated as 14,000 m2 x 0.288 tonnes CO2/m² which is equal to 4,032 tonnes of CO2e in direct emission reductions from the construction activities. During repair and retrofitting, it is logically assumed from experience that a wooden building will last as long as steel, concrete, and brick buildings. And, they will all need approximately the same amount of repair and retrofitting. There would be about a 15% savings in repairs and retrofitting in wood structures because the repairs/retrofitting would be done with wood to match the original design. This wood would require less CO2. Emission reductions from heating and cooling during the building lifespan depends on both the use of hygrothermal mass (in wood buildings) or thermal mass in concrete buildings and the use of wall and glass insulation—and the aspect of building windows. Wooden buildings generally last about as long (or longer) than other buildings, so there is no more or less energy consumption required from heating or cooling the amount is assumed to be the same

23. In 2014, it was estimated that there were 151,016,151m2 of new buildings constructed in all of Turkey (over 50,000 new buildings) of which only 289,681m2 (0.19%) used wooden frames and wooden materials. The greenhouse gas savings from this construction in the baseline is estimated as 289,691 x 0.288 tonnes CO2/m² = 83,428 tonnes CO2e reduced in 2014 due to the fact that 0.19% of all new buildings in Turkey were constructed from wood. However, with the support of this project it is estimated that by the year 2026 (or 6 years from when the project starts) it is ambitious but possible that an additional 1% of all new buildings in Turkey will be constructed from wood (approximately 1.51 million m³) going from currently approximately 0.19% to 1.19% of total building stock in 2026 meaning that the greenhouse gas emissions from construction will be reduced by 1,510,161 x 0.288 tonnes CO2/m² = 434,926 tonnes would be reduced in the event that an additional 1% of new buildings constructed in Turkey use wood. If by 2026, the percentage of buildings constructed in Turkey using wood products reached around 5 percent, then overall annual CO2e savings would be approximately 2.2 million tonnes of CO2e in the year in which 5% of the new buildings comet from wood. Wooden buildings which typically last 100 years need approximately the same amount of repair and retrofitting with concrete and steel buildings. The GHG emissions reduction potential from switching from wood to concrete and steel is massive during two of the three

phases of a building's lifetime: during construction (known as "cradle to gate" and during repair and retrofitting). However, there are likely to be no GHG emission reductions from heating and cooling requirement for wooden buildings during the lifetime of these buildings as experience shows the wooden buildings require the same amount of heating and cooling as those buildings that are constructed with concrete.

24. All forests in Turkey are owned and managed by the State meaning that private companies are only allowed to cut trees and produce timber if they have a permit. The allowable cut in Turkey is 17.6 million $m^3$ per annum (not including stem and branches beneath 8 cm in diameter which explains why allowable cut is less than annual consumption) while the annual average growth rate in forested land in Turkey is 33 million $m^3$ per annum which is almost double the allowable cut. The high growth rate means that sustainable forest management practices will be followed with regards to this project and there is no risk that the increased use of wood products will result in more forest being harvested than the allowable cut. In addition, the required amount of wood needed to add +1% of all newly constructed buildings using wood is currently estimated at 1,510,000 $m^3$ which is easily within the allowable cut. Increased use of wood products in Turkish construction industry will not lead to the allowable cut being exceed as it will only be done in such a way so that the allowable cut remains significantly lower than the annual growth increment in forested land. For example, even if the percentage of wooden houses/buildings in Turkey rose to +5% it would only require +7.55 million $m^3$ of harvesting and the difference between the allowable cut and the forest growth increment is 33 million $m^3$ - 17.6 million $m^3$ = 15.4 million $m^3$. Due to the fact that all forests in Turkey are state owned and the fact that there is already a large buffer between the allowable cut and the annual increment in growth in forested land, there is no risk whatsoever of this project leading to large scale deforestation.

**7. Innovation, sustainability and potential for scaling up**

25. The innovativeness of the project lies in the fact that it is promoting a new technology called cross laminated timber which is taking wood buildings to the next level in terms of their suitability and durability as a construction material. The cross lamination provides dimensional stability, strength and rigidity which makes it a visible and viable alternative to concrete, masonry, and steel in many building applications. It can be used for an entire building or it can be used for part of a building. The project is innovative because it is supporting and promoting a technology, CLT, which has not been proven in Turkey and where there is significant potential for scaling up and replication.

26. The potential for scaling up the results of this project is enormous given that so little wood is currently used in construction in Turkey. If the target is reached of an additional 1% of all new construction in Turkey each year coming from wood products then there will be significant CO2 savings, estimated at around 197,716 tonnes of CO2e per annum. With the assistance of this project in overcoming legal, regulatory, financial, and awareness barriers it is estimated that the potential for CO2 savings from scaling up will be even more significant reaching around 1 million tonnes of CO2e per annum if eventually around 5% of all new construction in Turkey comes from wood products.

**1b. Project Map and Coordinates**

**Please provide geo-referenced information and map where the project interventions will take place.**

The project will cover all of Turkey so this is not applicable.

**2. Stakeholders**

**Select the stakeholders that have participated in consultations during the project identification phase:**

**Indigenous Peoples and Local Communities** ☐

**Civil Society Organizations** ☑

**Private Sector Entities** ☑

**If none of the above, please explain why:** ☑

**In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement.**

27. The roles of key project stakeholders are described in the table 1-4 below.

| **Stakeholder** | **Proposed roles in the Project** |
|---|---|
| General Directorate of Forestry, Ministry of Agriculture and Forestry | Ministry of Agriculture and Forestry (MoAF) is the organization that is responsible from management and protection of natural resources including forests and water resources in Turkey. Currently, 99.9% of all forests in Turkey are managed by MoAF. General Directorate of Forestry (GDF) is the organization responsible from management, development and protection of forests in Turkey. Organization's mission is to protect forest resources against any threats and danger, to develop forest resources in a nature-friendly manner and to achieve sustainable forest management at a level that will provide far-reaching sustainable benefits for society in ecosystem integrity.Production and supply of industrial and fuel wood to the market from the State Forests is under responsibility of the "Production and Marketing Department" of GDF. According to Article 10$^{th}$ of Forestry Law No. 3234 dated 31.10.1985, primary duties of the Production and Marketing Department are as following:<br><br>a) Managing, organizing and controlling the procedures of the production, transport, storage and marketing of main and secondary forest products, |

| Stakeholder | Proposed roles in the Project |
|---|---|
| | b) Determining the facilities that are necessary for these services and must be built, conducting the business of determining the storage locations,<br><br>c) Carrying out duties given by the GDF.<br><br>Production and Marketing Department, General Directorate of Forestry is the executing partner of the project. |
| General Directorate of Construction, Ministry of Environment and Urbanization | The Function of Directorate General of Construction Works<br><br>a-) identifying and implementing strategies and standards of General principles relating to all kinds of buildings owned by public institutions and organizations.<br><br>b-) Determining and ensuring the implementation of the nature of the project with public investment projects and construction -related business and operations related to the principles<br><br>c- ) Ministry of National Defense of the building to prepare national and NATO infrastructure services and given the construction authority by law to the general directorate attached to the Ministry of Transport specialized work of public institutions and organizations demands except for buildings and facilities needs of the program , all kinds of studies , projects and make cost calculations or to make , confirm or provide your approval , build , strengthen , and make modifications based repair , to make and to provide control or supervision.<br><br>d-) Perform the tasks assigned to the Ministry of Law No. 5543<br><br>e-) To make, confirm or provide your approval, make the construction of buildings of all kinds will be built for permanent housing or to make accordance with the 5543 Act will be made public institutions and organizations for permanent housing to make the study and planning work on all kinds of construction and housing . |

| Stakeholder | Proposed roles in the Project |
|---|---|
| | f-) Performing duties given to Ministry with Law No. 4708 on Building Inspection.<br><br>g-) Providing group to coordinate services for execution with date 12.18.2013 and published in the Official Gazette No. 28855 of Disaster and Emergency Response Services infrastructure in accordance with the Regulations , the removal of debris and damage assessment. |
| TOKI (Housing Development Administration of Turkey) | TOKİ, with the models it has developed, functions as an umbrella rather than a competing body in the housing sector of Turkey in awareness of its responsibility as a guiding, supervising and educating organization and undertakes a significant role in production prioritizing the demands and solvency of the target masses in need.<br><br>900.000 individuals profited directly or indirectly from involvement in TOKİ's projects.<br><br>New vision of TOKİ within the scope of the programme of the Government of the Republic of Turkey is to realize the project target of 1 million housing units by the end of 2023. In this context, the Administration carries on its housing production activities throughout the country in view of priorities and needs;<br><br>• Urban Regeneration and Slum Transformation Projects in cooperation with Municipalities,<br><br>• Social housing projects toward the Middle and Low Income Group,<br><br>• Establishing example settlement units in our medium-scale provinces and districts,<br><br>• Development of the historic fabric and local architecture,<br><br>• Increase of educational and social facilities as well as other social facilities, forestation and |

| Stakeholder | Proposed roles in the Project |
|---|---|
| | landscapes, and<br><br>• Production of lands with substructure shall be highlighted. |
| TOBB (Union of Chambers and Commodity Exchanges of Turkey | Within the context of its organic law and other applicable legislation, TOBB aims, parallel to the developments elsewhere in the world and in its capacity of the highest level representative of the Turkish private sector, at ensuring unity and solidarity between chambers and commodity exchanges, enhancing development of the professions in conformance with general interest, facilitating professional work of members, promoting honesty and confidence in the relations of members with one another and with the general public, and preserving professional discipline and ethics. |
| UCTEA (Union of Chambers of Turkish Engineers and Architects) | UCTEA (www.tcmob.org.tr) was established in 1954 by the Law 7303 and Law 6235. At the establishment stage, UCTEA had 10 Chambers and8.000 members. However, as of December 31, 2005, the number of Chambers has increased to 23, while the number of members reached 280.293. |
| KOSGEB (Small and Medium Enterprises Development Program) | As the national agency for SME innovation and technology promotion in Turkey, KOSGEB has established itself as a key player in the economic landscape, having contributed successfully to the delivery of a series of strategic objectives through a range of intervention activities and assistance mechanisms for SMEs and partners and this can be extended to SMEs working in the forestry/construction sector.<br><br>KOSGEB provides the following support programmes:<br><br>1. SME Loan Interest Support Programme.<br>2. SME Project Support Programme<br>3. Thematic Project Support Programme<br>4. Co-operation-Collaboration Support Programme<br>5. R&D, Innovation and Industrial Application Support Programme<br>6. Entrepreneurship Support Programme including:<br>7. General Support Programme<br>8. Emerging Enterprises Market SME Support Programme<br>9. KOSGEB Credit Support Partnerships |

| Stakeholder | Proposed roles in the Project |
|---|---|
| General Directorate of Sectors and Public Investments, Strategy and Budget Department (GDSPI) | The Ministry of Development has been merged with other ministries in Turkey during the transition period as a result of the presidency system. GDSPI will assume the previous role of Ministry of Development in GEF projects in Turkey. GDSPI is the natural member of the Project Board/Steering Committee, with a responsibility for defining, assessing, and monitoring programme outputs towards country-level outcomes to ensure that the project results have been linked to the national development plans. GDSPI will work closely with UNDP to ensure that the plan of the programme includes necessary aspects, including identification of projects required to achieve the expected outcomes. |
| **NGOs and Academia** | |
| TORID (Turkish Wooden Products Importers & Industrialists Association) | TORID is an important organization, established by major importers and traders of wood and wooden products. The association is a lobbying platform protecting the rights of wood and wooden product exporters in Turkey. |
| National Wood Association | National Wood Association (UAB) is the main institution bringing all actors interested in promoting timber usage in different fields of construction together including planners, architects, engineers, academics and other experts. |
| Yale School of Forestry | Yale School of Forestry will play an important role in estimating the global environmental benefits of this project (carbon sequestration) and in providing training and capacity building support to key project stakeholders. |

## 3. Gender Equality and Women's Empowerment

**Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).**

28. Special consideration will be given to working with women groups in the preparation and implementation of at least one of the demonstration projects. This will include taking gender considerations into account in the preparation of the demonstration projects and with regards to their construction and operations. The special needs, roles, and priorities of men and women will be elaborated and

defined in the selection and implementation of the demonstration projects and further work will be undertaken to elaborate on gender considerations during the PPG phase.

**Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes**

**closing gender gaps in access to and control over natural resources;** ☐

**improving women's participation and decision-making; and/or** ☑
**generating socio-economic benefits or services for women.** ☐

**Will the project's results framework or logical framework include gender-sensitive indicators?**

Yes
**4. Private sector engagement**

**Will there be private sector engagement in the project?**

Yes
**Please briefly explain the rationale behind your answer.**

29. One of the stakeholders of the Project is Union of Chambers and Commodity Exchanges of Turkey (TOBB) will ensure unity and solidarity between chambers and commodity exchanges, enhancing development of the professions in conformance with general interest, facilitating professional work of members, promoting honesty and confidence in the relations of members with one another and with the general public, and preserving professional discipline and ethics. Another key private sector partner will be the construction industry in Turkey which will benefit from the training, awareness, and capacity building activities of the project.

30. In addition, as the national agency for SME innovation and technology promotion in Turkey, KOSGEB has established itself as a key player in the economic landscape, having contributed successfully to the delivery of a series of strategic objectives through a range of intervention activities and assistance mechanisms for SMEs and partners and this can be extended to SMEs working in the forestry/construction sector.

## 5. Risks

**Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)**

31. The risks associated with the implementation of this project are assessed as follows:

**Table 1-5: Risk Assessment**

| Risk | Rating | Risk Mitigation Measure |
|---|---|---|
| New policies and legislation is proposed but not enacted | Low | The project will hire national consultants / national staff who have the ability to lobby the government related to new legislation. In the event that the lobbying is not successful the project will examine alternative strategies. However, given that the project has the strong support of the Ministry of Agriculture and Forestry this risk is rated as low. |
| Financial Support Mechanism (FSM) does not materialize or work effectively | Medium | One option for the FSM is to locate it within KOSGEB. KOSGEB already has significant experience in managing for SME's. This project will build upon existing financial support mechanisms but another success factor for smooth implementation of FSM will be the level of engagement of SMEs n the FSM. Therefore, the level of risk is considered medium and the mitigation measures will include strong, effective and to-the-point awareness raising campaigns on the benefits of wooden buildings and wooden construction materials towards ensuring energy efficiency and to promote the FSM among relevant OIZs and SMEs. Another option is to locate the FSM within the General Directorate of Forestry. Other options will also be explored. The risk of the FSM is reduced significantly by the fact that various options will all be considered and that during the PPG phase an international consultant will be hired of the course of some 12 months to look at specifically how to best design the financial support mechanism. |

| | | |
|---|---|---|
| Co-financing does not materialize both for the demo projects and for the full Financial Support Mechanism (FSM) | Medium | The risk that co-financing does not materialize (for demo projects) and later under the FSM is minimized by choosing project partners who have already secured finance for their construction projects (during the PPG phase and during the implementation of the project). The strategy for mitigating this risk will be to choose alternative partners (for demo projects) in the event that co-financing does not materialize and to move quickly and decisively to choose new partners and make such changes if co-financing with the original partners does not materialize. |
| Public Awareness Campaign and Targeted Capacity Building Programmes with Construction Companies has limited impact | Low | Previous experience with public awareness campaigns in Turkey has shown that when designed properly they can have a big impact. Similarly, targeted training and capacity building programmes with companies can be shown to have a big impact. UNDP has considerable experience (e.g – UNDP/UNIDO GEF Industrial Energy-Efficiency project) with running training programmes in Turkey and achieving positive results. In addition, the General Directorate of Forestry will significantly help to promote public awareness about the benefits of wood technologies in construction and decrease the risks of the public awareness campaign not working. |
| Climate risks make use of wooden products less attractive | Low | Climate change can have significant impacts on the health of forests. Although there are no in-depth studies and models related to climate change and forest ecosystems in Turkey, some studies in the Mediterranean region have revealed that forests may have a lesser yield in terms of timber and tree species distribution patterns may change. Although, over the five-year life time of this project climate change is expected to have negligible impact on these matters, over the longer term it is crucial to respond and adapt to those expected changes. The General Directorate of Forestry has already initiated some measures to adapt to these changes through adoption of SFM focused implementations and new and innovative integrated forest management approaches through functional forest planning. These include specific adaptation measures and conservation of biodiversity as a key part of forest management plans. Furthermore, GDF is the key organization that is responsible for conservation of forests and biodiversity within the Turkish Government and places great priority in carrying out this mandate.However, in case of a decrease in the value of timber in Turkey, |

| | | |
|---|---|---|
| | | GDF may end up in losing funding that goes to support forest conservation which is a negative impact.Therefore, this project through increasing the value of wood products in Turkey will support a strengthenedforest conservation mechanism as providing more funds to help forests withadapting to climate change. |
| Unsustainable Forestry Practices lead to increased deforestation in Turkey. | Low | Ministry of Agriculture and Forestry controls the 'Allowable Cut' in Turkey and makes sure that the annual increment in new forested area is always considerably more than the harvested amount. This means that in 100% of cases, sustainable forestry practices are always followed. The Ministry of Agriculture and Forestry will not allow unsustainable forestry practices to be used so this risk is considered low. |

## 6. Coordination

**Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.**

32. The project falls under the UNDP programmatic approach to energy efficiency in Turkey and will be closely coordinated with other relevant UNDP-GEF projects in Turkey working in the area of energy-efficiency. In particular, the project will cooperate with and learn lessons from the recently finalizedUNDP GEF 'Energy-Efficiency in Buildings in Turkey Project (GEF ID: 2492)" which finished in mid 2017 that made demonstration buildings in Turkey using the integrated building design approach (IBDA) and promoting the adoption of this approach for all public buildings in Turkey as well as promoting minimum energy performance standards (MEPs) and guidelines for near Energy Zero Buildings in Turkey. The lessons learned and results from this finalized project are complementary and supportive of the objective of this new project. Other relevant GEF projects include the "Market Transformation of Energy Efficient Appliances in Turkey" (GEF ID: 3565) and "Improving Energy Efficiency in Industry" (GEF ID 3747) which had a broader approach to energy efficiency in industry in Turkey with some lessons learned on financing energy efficiency in Turkey. Important lessons learned from these finalized projects will be applied to the design of this project and a lessons learned study from all UNDP GEF energy-efficieny projects carried out by UNDP in Turkey over the past 5 years is available upon request. From the energy-efficiency appliances project, the importance of harmonizing closely Turkish legislation with EU legislation will be given priority and emphasis. From the industrial energy efficiency project the importance of providing strong and comprehensive training programmes to end users will be taken into account. This means that in this project there should be an

emphasis on providing training, awareness, and capacity building support for Turkish construction companies and other key stakeholders. In addition, in 2017, UNDP has started the implementation of a new project called 'Promoting Energy-Efficiency in Electric Motors in Small and Medium Enterprises (SMEs) (GEF ID: 9081) where the project document was signed in July 2017 and the project is ongoing. UNDP will make sure to coordinate this new project with this new initiative also, especially since the EE motors project also develops a financial support mechanism within KOSGEB.

33. The UNDP country office in Turkey will be fully involved in the project development through its participation in the various aspects of the project such as workshops, stakeholder consultation and co-finance meetings. UNDP Turkey will contribute $500,000 USD to the project which includes an $80,000 cash contribution to project management costs calculated as $20,000 per year and a $520,000 in-kind contribution towards awareness raising and capacity building activities.

## 7. Consistency with National Priorities

**Is the Project consistent with the National Strategies and plans or reports and assesments under relevant conventions**
Yes

**If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc**

34. The project is strongly linked with a number of national legislations, strategies and plans of the government of Turkey, these are outlined in the table below:

**Table 1-6 – Consistency with National Plans and Strategies of the Government of Turkey**

| Plan or strategy: | Description of consistency |
|---|---|
| The Fifth National Communication of Turkey to the | The 5th National Communication of Turkey to the UNFCCC was formally published and submitted in 2013. The 5th NC places critical importance on energy efficiency technologies and low emissions pilot solutions for Turkey. The GEF project represents both an innovative policy |

| | |
|---|---|
| UNFCCC.<br><br>*And*<br><br>The National Climate Change Strategy (NCCS) of 2010 and subsequent National Climate Change Action Plans (NCCAPs).<br><br>And<br><br>Turkey's Nationally Determined Contribution | package promoting low cost EE wooden housing with particular emphasis on CLT technology which is unproven in Turkey and can therefore be viewed as new and innovative. It is also new and innovative for UNDP which has a lot of experience with EE in buildings project but this is the first project to specifically promote wood technologies for GHG reduction and increased carbon sequestration.<br><br>Finally, Turkey has adopted its INDC as "up to 21 percent reduction in GHG emissions from the Business as Usual level by 2030. This includes economy wide scope and coverage including energy and industrial processes and products use. This project will support Turkey's efforts on achieving its targets for climate change mitigation through adoption of energy efficient wooden buildings in construction sector which currently has a reasonable amount of energy consumption share with the goal of reducing at least 197 716 tonnes of CO2e per annum by the end of the project. |
| Turkey 10th National Development Program 2014-2018. | The 10th National Development Plan specifically outlines the housing sector as an important priority. The project is directly consistent with this development goal and works to achieve the goals of supporting the work of the General Directorate of Forestry in the area of energy efficiency. |
| Energy efficiency laws: "Energy Efficiency Law no. 5627" 2007; Official Gazette no. 27035 "Regulation On Increasing Efficiency in the use of Energy Resources and Energy. | The project supports the purpose of these laws by increasing energy efficiency through promoting the use of environmentally friendly new wooden houses. |
| Turkey's Sustainable Development Report 2012. | The report outlines the need for improved housing for the Turkish population as a Sustainable Development priority. |

## 8. Knowledge Management

**Outline the Knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.**

35. The project will undertake knowledge management activities through the development of a project website which will make available information about all of the work that the project is carrying out. In addition, the project will carry out knowledge management activities through regular UNDP channels concerning communications, outreach and knowledge management. In particular, the project will learn the lessons and apply the results from the UNDP GEF 'Energy Efficient Buildings" Project in Turkey (GEF ID: 2492) which has been completed in April 2017. A lessons learned study has been prepared for this project and can be made available, upon request.

## Part III: Approval/Endorsement By GEF Operational Focal Point(S) And Gef Agency(ies)

**A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).**

| Name | Position | Ministry | Date |
|---|---|---|---|
| Akif Ozkaldi | Deputy Minister | Ministry of Agriculture and Forestry | 9/20/2018 |

## ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place

The project will cover all of Turkey so this is not applicable.

**ANNEX B: GEF 7 Core Indicator Worksheet**

Use this Worksheet to compute those indicator values as required in Part I, Table F to the extent applicable to your proposed project. Progress in programming against these targets for the program will be aggregated and reported at any time during the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and SCCF.

| **Core Indicator 6** | **Greenhouse gas emission mitigated** | | | | | ***(Tons)*** |
|---|---|---|---|---|---|---|
| | | Tons (6.1+6.2) | | | | |
| | | Entered | | Entered | | |
| | | PIF stage | Endorsement | MTR | TE | |
| | Expected CO2e (direct) | *434,926* | | | | |
| | Expected CO2e (indirect) | | | | | |
| Indicator 6.2 | Emissions avoided | | | | | |
| | | Hectares | | | | |
| | | Tons | | Achieved | | |
| | | PIF stage | Endorsement | MTR | TE | |
| | Expected CO2e (direct) | *434,926* | | | | |
| | Expected CO2e (indirect) | | | | | |
| | Anticipated Year | *2025* | | | | |
| Indicator 6.3 | Energy saved | | | | | |
| | | MJ | | | | |
| | | Expected | | Achieved | | |
| | | PIF stage | Endorsement | MTR | TE | |
| | | *326,803* | | | | |
| | | | | | | |

| **Core Indicator 11** | **Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment** | | | ***(Number)*** |
|---|---|---|---|---|
| | | | | Number Achieved |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | MTR | TE |
| | | | | Female | *200* | *946* |
| | | | | Male | *240* | *994* |
| | | | | *Total* | *440* | *1940* |
| | | | | | | |

**ANNEX C: Project Taxonomy Worksheet**

Use this Worksheet to list down the taxonomic information required under Part1 by ticking the most relevant keywords/topics//themes that best describes the project

| **Level 1** | **Level 2** | **Level 3** | **Level 4** |
|---|---|---|---|
| **Influencing models** | | | |
| | **Transform policy and regulatory environments** | | |
| | **Strengthen institutional capacity and decision-making** | | |
| | **Convene multi-stakeholder alliances** | | |
| | **Demonstrate innovative approaches** | | |
| **Stakeholders** | | | |
| | **Private Sector** | | |
| | | Capital providers | |
| | | Financial intermediaries and market facilitators | |
| | | SMEs | |
| | **Beneficiaries** | | |

**Civil Society**

Non-Governmental Organization
Academia
Trade Unions and Workers Unions

**Type of Engagement**

Information Dissemination
Partnership
Consultation
Participation

**Communications**

Awareness Raising
Education
Public Campaigns
Behavior Change

**Capacity, Knowledge and Research**

**Enabling Activities**
**Capacity Development**
**Knowledge Generation and Exchange**
**Learning**

Theory of Change
Adaptive Management
Indicators to Measure Change

**Innovation**
**Knowledge and Learning**

Knowledge Management
Innovation
Capacity Development
Learning

**Stakeholder Engagement Plan**

**Gender Equality**

**Gender Mainstreaming**

Beneficiaries
Women groups
Sex-disaggregated indicators
Gender-sensitive indicators

**Gender results areas**

Capacity development
Awareness raising
Knowledge generation

**Focal Areas/Theme**

**Integrated Programs**

Sustainable Cities

Buildings
Energy efficiency

**Climate Change**

**Climate Change Mitigation**

Energy Efficiency
Financing
Enabling Activities

**United Nations Framework on Climate Change**

Nationally Determined Contribution

**Climate Finance (Rio Markers)**

Climate Change Mitigation 1