

Proof of concept for Low Energy Consumption Houses in Tajikistan



Achievements (2013-2023) and perspectives

A programme



French Agency for Development



Abbé Pierre Fondation



Energy & environmental awareness
TVET sector strengthening in EE
Scale-up in Rasht valley
EE in public buildings, resettlement sites



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Research on electricity demand,
complementary solutions
Catering EE for the most vulnerable

Key partnerships

Technical partners



SUE Loihakash



SUE SRICA

Financial partners



The First MicroFinanceBank



БАНК АРВАНД



imon
international

LEC single-family house

Why LEC house?

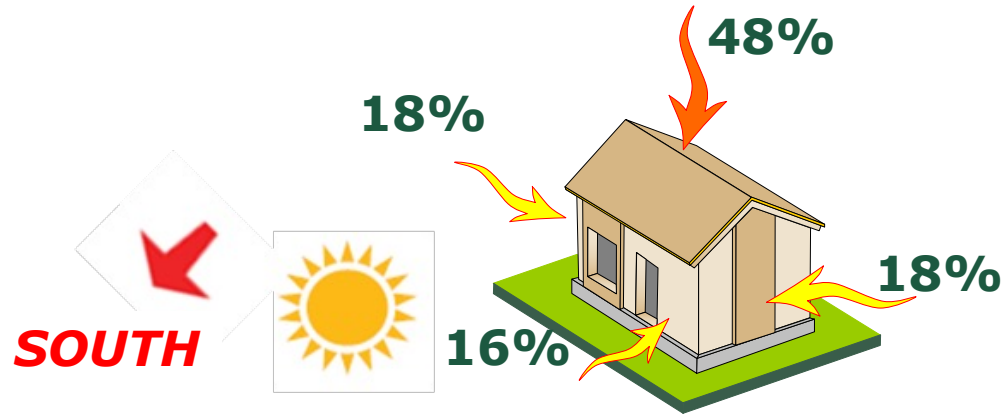
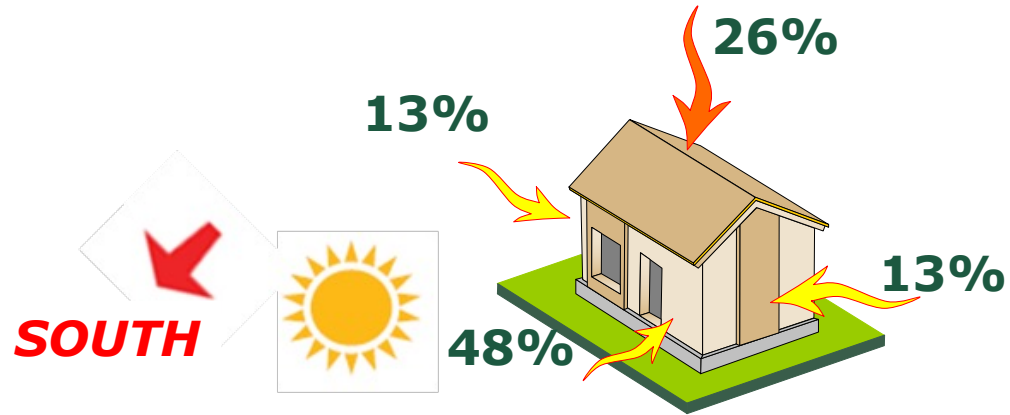
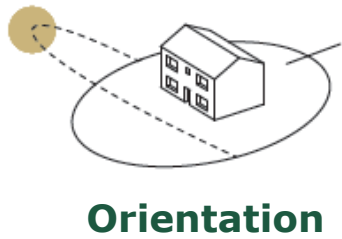
- High level of energy poverty
- Low thermal performance of existing and new single houses
(Specific heat consumption: **≈150 kWh/m²** per heating season)
- Tajik building code:
(Specific heat consumption-Energy class C: **≈ 65 kWh/m²** per heating season)

Why single-family house?

- Rural population: **70%**
- 1 400 000 families obtained land plots for single house construction since independence

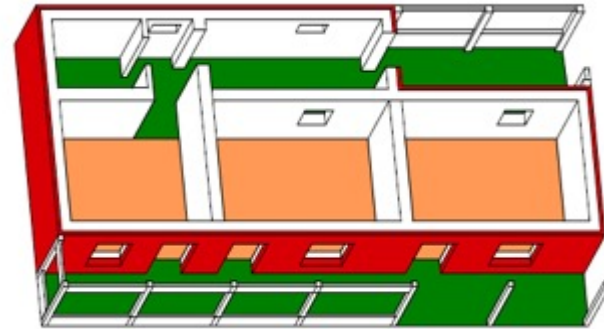
LEC single-family house

➤ Main Characteristics



LEC single-family house

➤ Main Characteristics



External Thermal Insulation



Insulation of exterior walls



Insulation of ceiling

LEC single-family house

➤ Main Characteristics



Double Glazed Windows



Doors and windows



Natural cross ventilation



Buffer Zones



Seism-resistant structure

LEC single-family house

➤ Construction process



LEC single-family house

- Construction of demo house in 2017/18



LEC single-family house

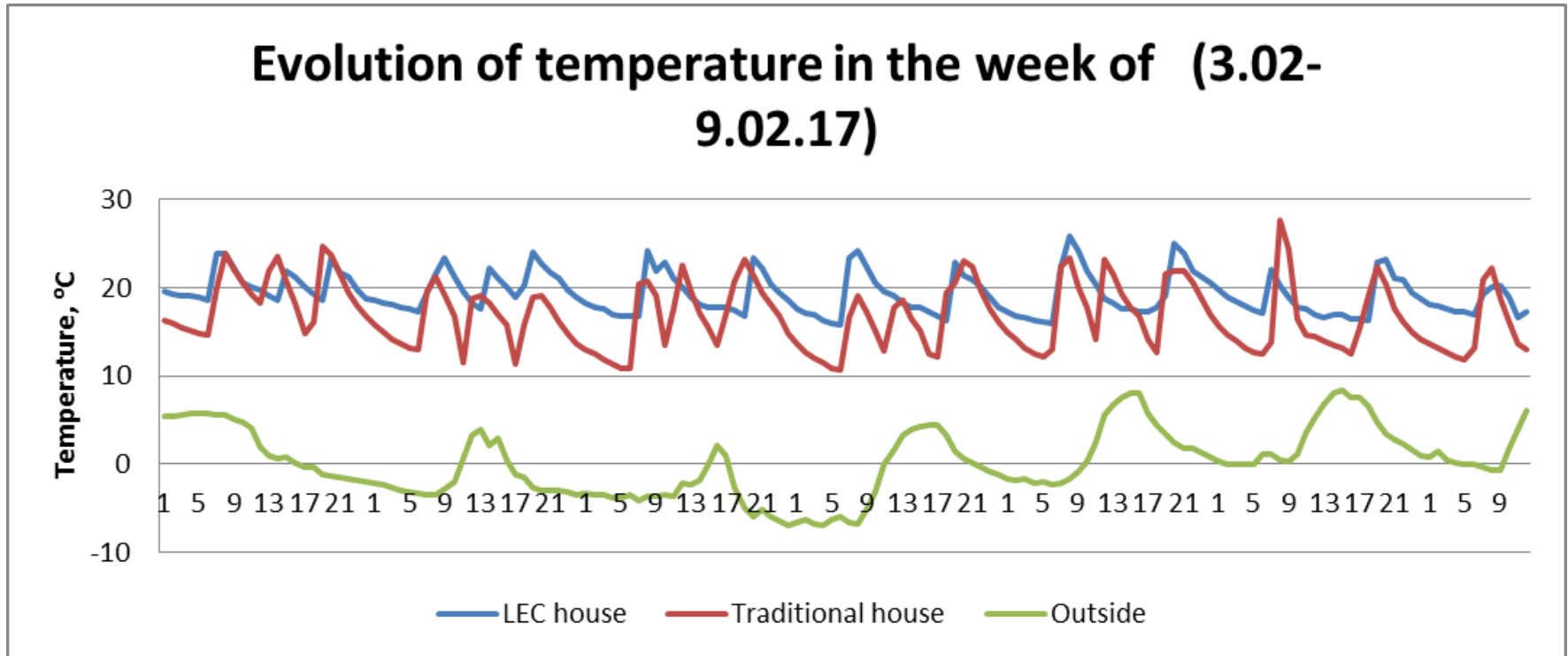
➤ Fuel consumption monitoring results

Period	Type of the house	Fuel consumption & temperature		
		kWh/day	Equivalent to coal, kg/day	Average temperature of the room, °C
03.02.17-2.03.17 04.01.18-28.02.18	<i>Traditional</i>	62,1	9,5	19,2
	<i>LEC demo house</i>	24,9	3,8	19,2
	<i>Difference</i>	37,2	5,7	0
	% of difference	-59,9%		

- **Number of heated rooms: 1 only**
- **Total saving per heating season: 726 kg of coal: 43€ (2017), 100€ (2023)**
- **Specific heat consumption: 56 kWh/m² per heating season**

LEC single-family house

➤ Thermal comfort monitoring result



➤ Maximum amplitude of temperature fluctuation per day

- **Traditional house : 12,5 °C**
- **LEC house : 7,5 °C**

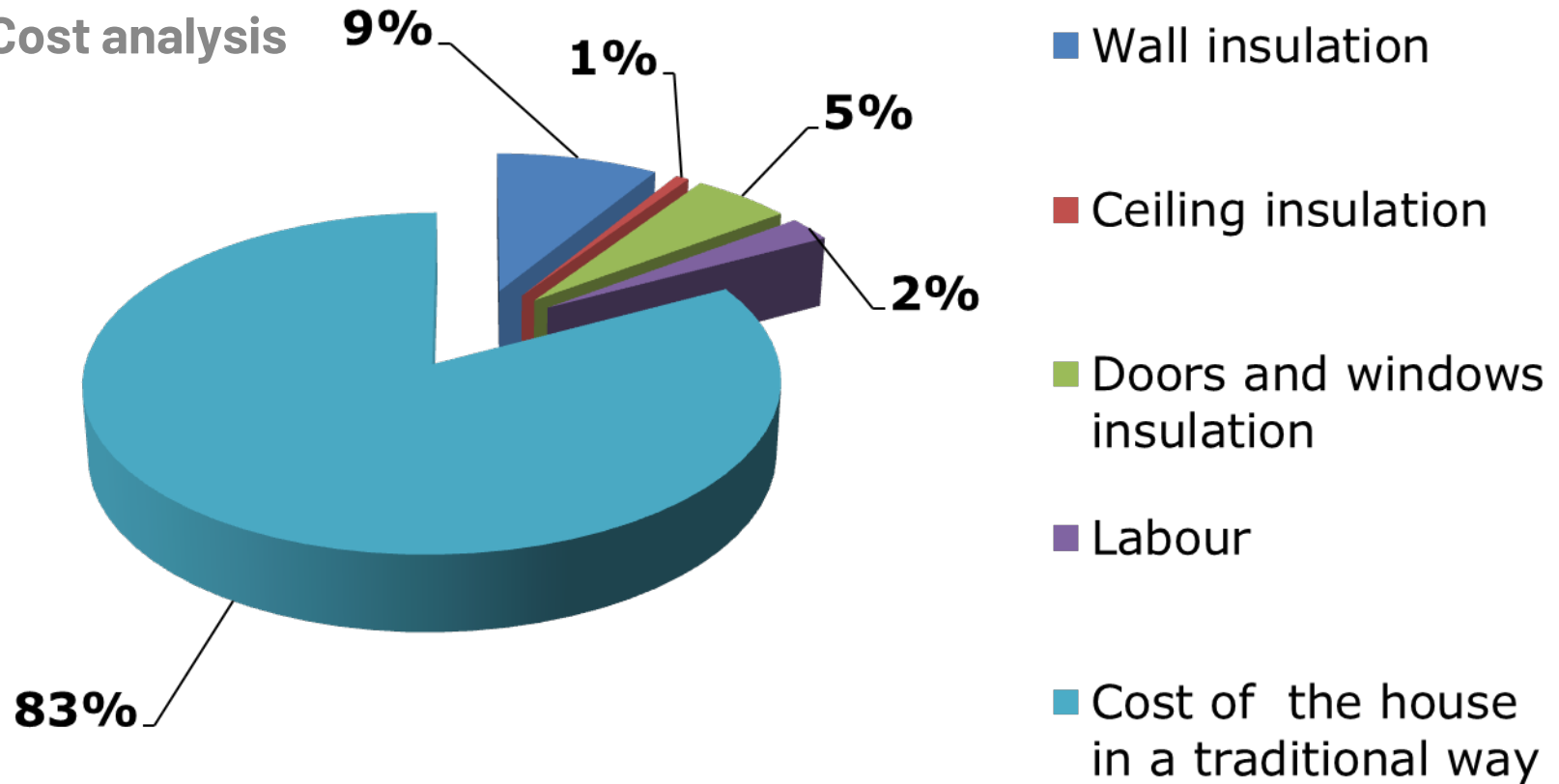
LEC single-family house

➤ Thermal comfort monitoring result

Type of the house	Average temperature of the inner surfaces, °C :				Air temperature, °C	Resultant temperature that people feel, °C
	Walls	Ceiling	Floor	Window		
LEC house	17,8	17,8	16,8	9,9	18,3	18,1
Traditional	12,5	10,9	13,6	6,6	14	13,1
Difference	5,3	6,9	3,2	3,3	4,3	5

LEC single-family house

➤ **Cost analysis**



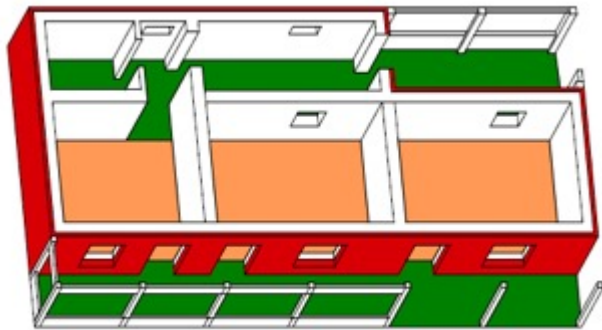
Full LEC House
Extra cost \approx 17%
Payback period \approx 30 years
Fuel savings \approx 60%

Adjustments to the model

High extra cost of EE measures

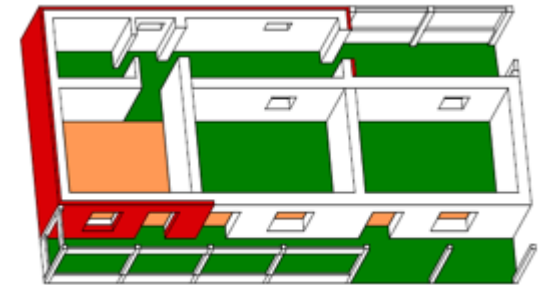
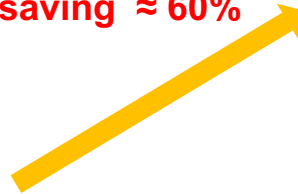


Focus on winter rooms;
diversify the categories of
the LECH performance



External full insulation

Result:
Extra cost from $\approx 7\%$
Fuel saving $\approx 60\%$



Winter rooms insulation

Result:
Extra cost from $\approx 1,5\%$
Fuel saving $> 20\%$



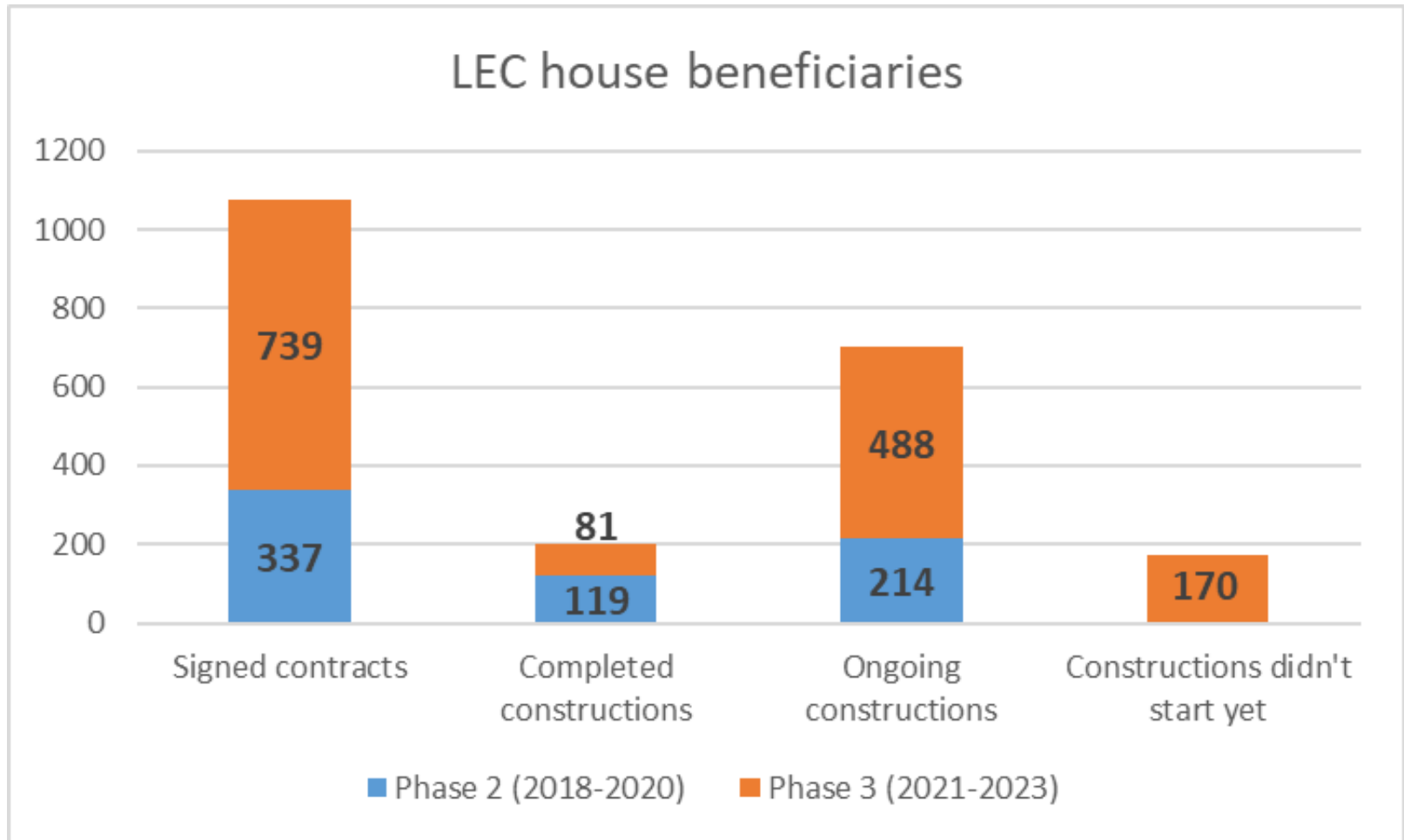
Ceiling insulation + double
glazed window installation
(focus in winter rooms)

Incentive system currently in place at household level

- 50% of interest rate subsidized at completion (and ad hoc revolving fund)
- 50% of the cost of album subsidized
- Winter room double glazed window(s) as incentive for homebuilders
- Performance monitoring cost (130€)



ACHIEVEMENTS to date



Proof of concept

More than 1000 households have decided to build LECH, even if fuel savings are not the strong selling point.

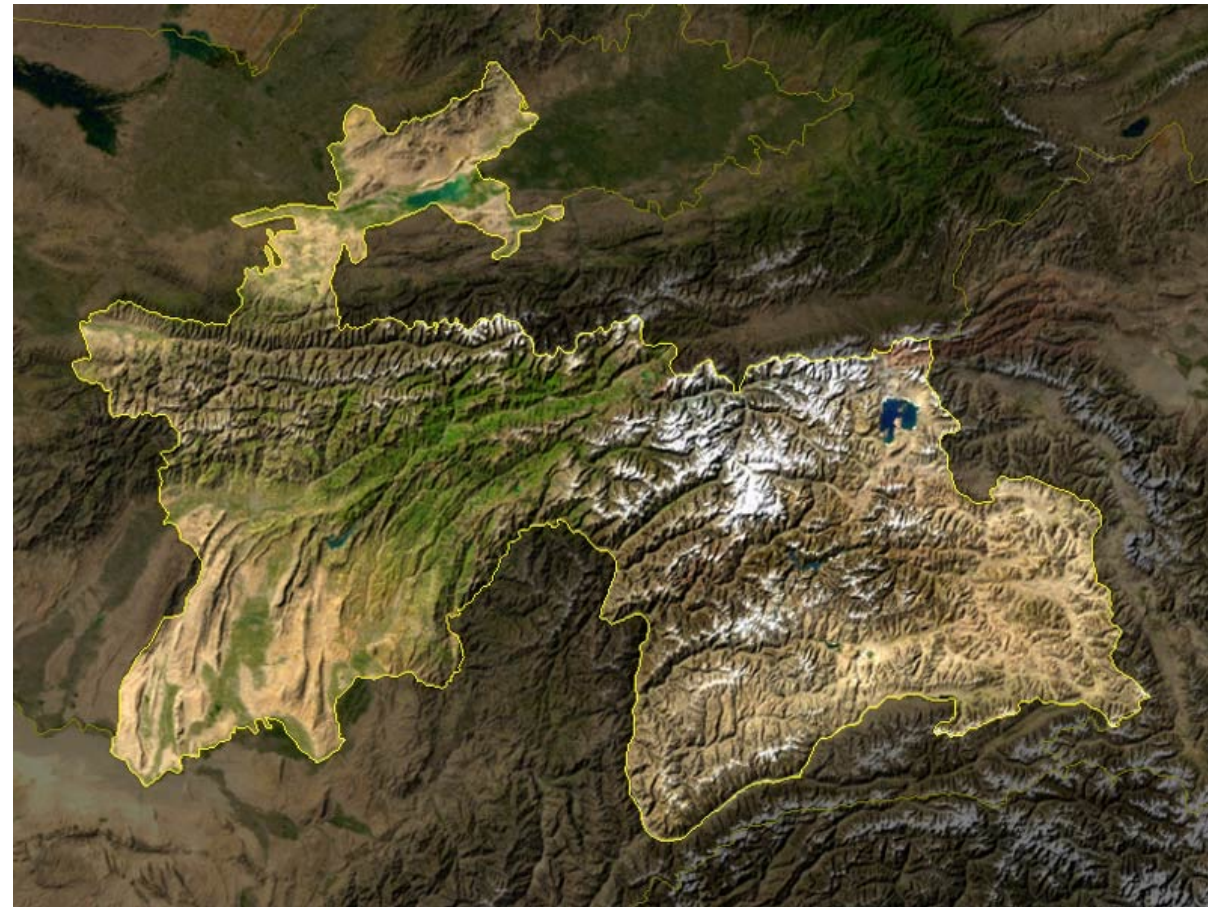
The offered LECH are economical in construction, adapted to wishes, aesthetically pleasing, with modern comfort.

Fuel savings range from 20% (additional costs 1,5%) to 60% (additional costs 7%).

The amount of support for the construction of LECH is less than 300 euros (with a global investment of 15,000 euros).

The mechanism has been developed, tested and implemented in 8 districts (DRS and Khujand with Rasht ongoing)

Perspectives on a scale-up programme



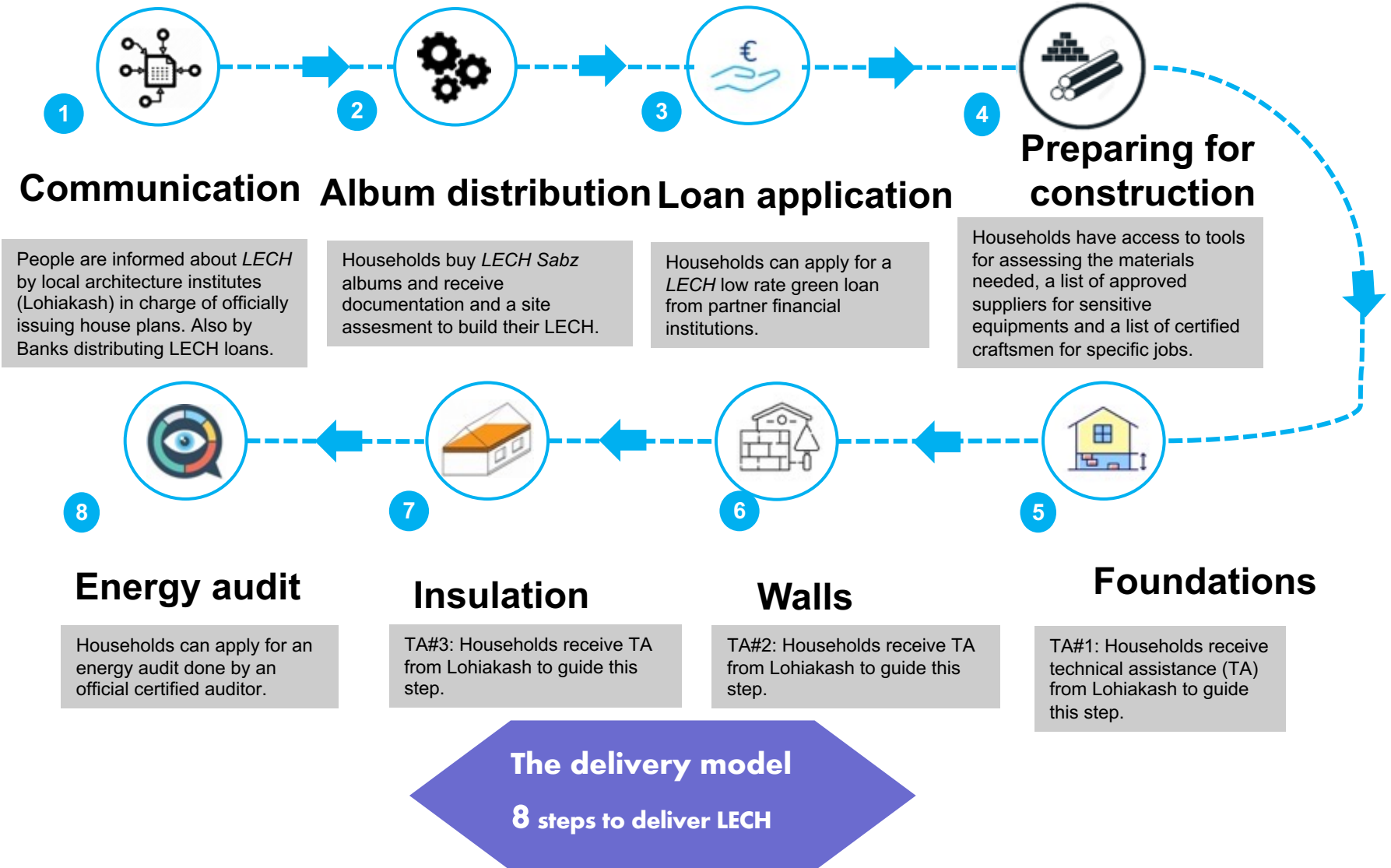
Building on demand

300 to 400.000 new houses
will be built in Tajikistan

Building on the consortium

State agencies, financial
Institutions, certified craftsmen,
Local authorities

Fine-tune the delivery model



Perspectives on a scale-up programme

100 000 to 150 000 LECH

30 to 50% of new houses are LECH

**200 € SUPPORT per
LECH**

Overall budget between 20 & 30 M€

30 to 45 M€ benefit*

for families and the community

NEXT STEPS

12/2023

**Cost Benefit
Analysis**

01/2024

**Programme
Management Unit
active**

**Engagement with
local and
international
funding
mechanisms**

06/2024

**Program
100% designed**

12/2024

**Fundraising
achieved for the
1st scale-up
phase**

**THANK YOU FOR
YOUR ATTENTION!**

