Passive House for India

Emerging Building Technologies
10th GRIHA Summit, Delhi

13th December 2018

Camille Sifferlen
M. Arch, Certified Passive House Designer
Trainer & Building Certifier
camille.sifferlen@passiv.de

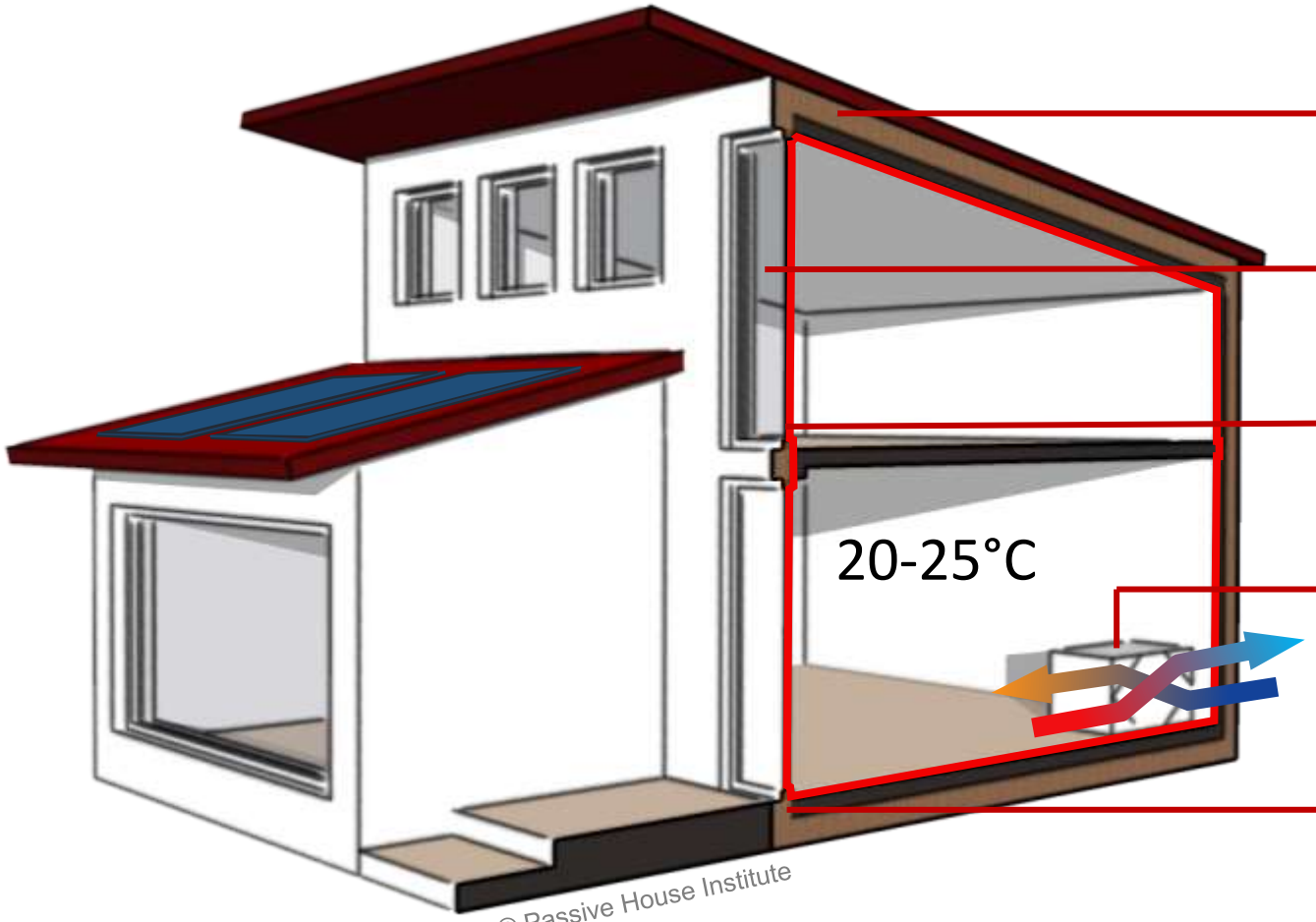
Passive House Institute - Darmstadt, Germany

Passive House added value

- Energy efficiency
- Health & Comfort
- Future-proof

Passive House Star Garment Innovation Center, Sri Lanka
© Ganidu Balasuraya

5 Passive House Principles



Continuous insulation

Reduces heat losses/gains*

Passive House windows + shading

Enjoy/avoid* free solar gains

Continuous airtightness

Prevents droughts + moisture problems

Ventilation unit

With heat/humidity recovery*
Provides fresh air 24/7!

No thermal bridges

Limit weak points

* Climate dependent

65 000+ Passive House units worldwide


Qingdao Passive House Technology & Experience Center
ID 4674 © Qingao Sino-German Ecopark


V. Senger School, Frankfurt | ID 1955 © Mara Monetti Fotografie


Can Tanca Passive House Premium, Ibiza
ID 5253 © Terravita Construye


Star Garment Innovation Center, Sri Lanka © Ganidu Balasuraya


Cornell Tech, New York | ID 5202 © Handel Architects

Passive House **international building criteria**

Heating demand
≤ 15 kWh/(m²a)

OR
Heating load < 10W/m²

Cooling demand
Climate dependent
(up to ~ 70kWh/m²a)

OR
Cooling load < 10W/m²

Primary Energy demand
≤ 120 kWh/(m²a)

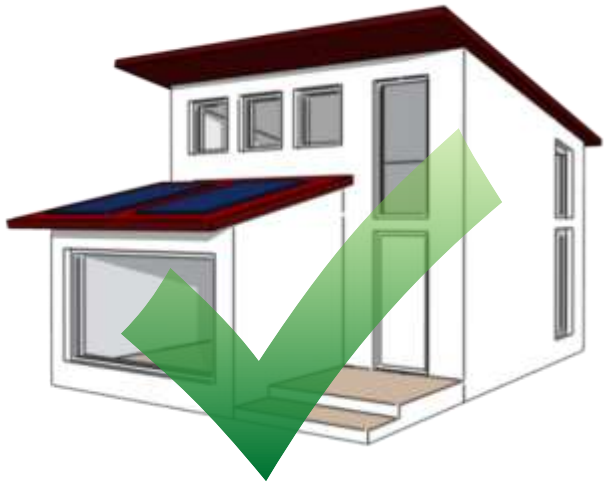
Airtightness
$n_{50} \leq 0.6\ h^{-1}$

Up to

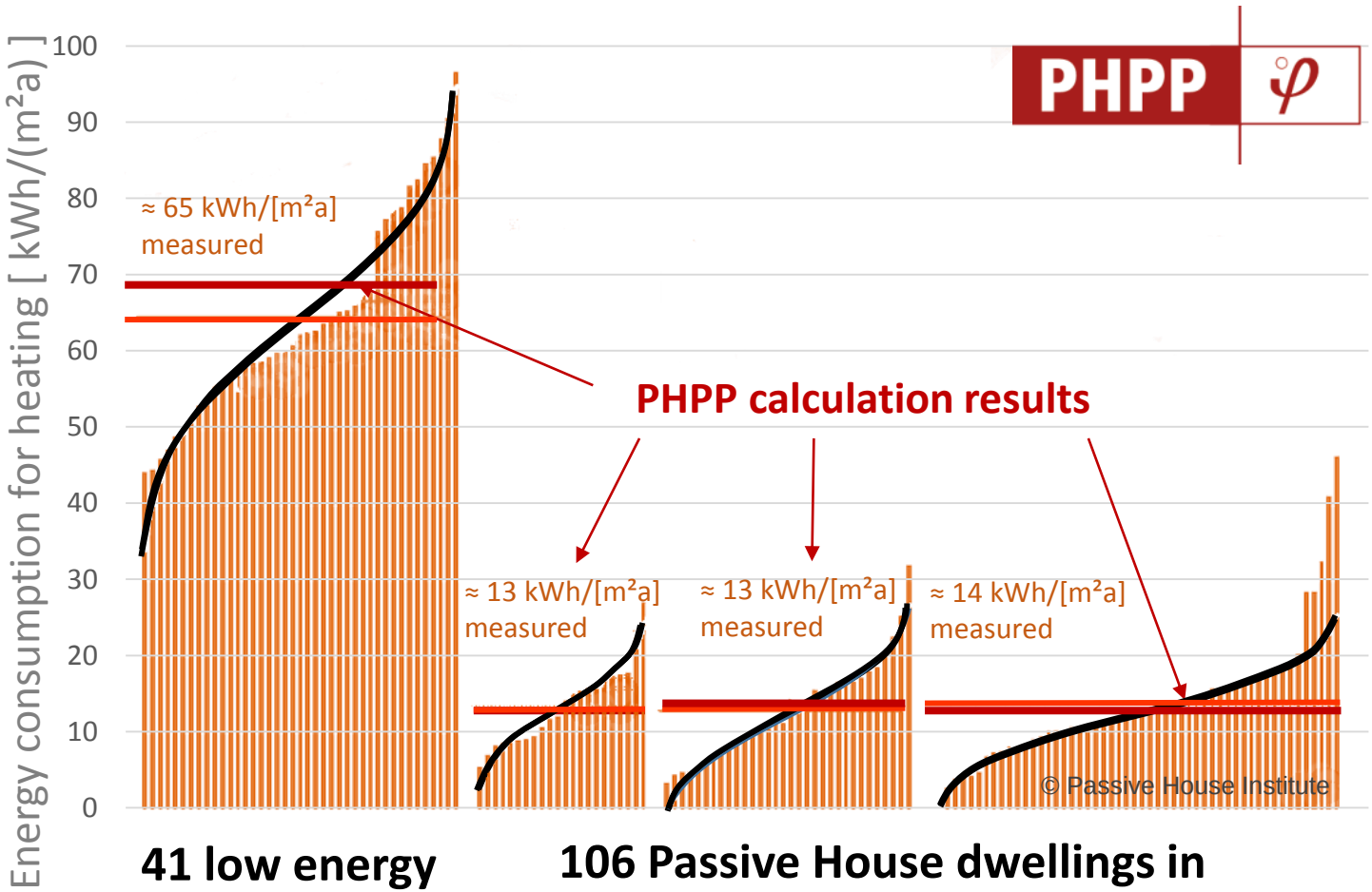
- 90% heating

- 80% cooling

/ existing buildings



No detected performance gap!

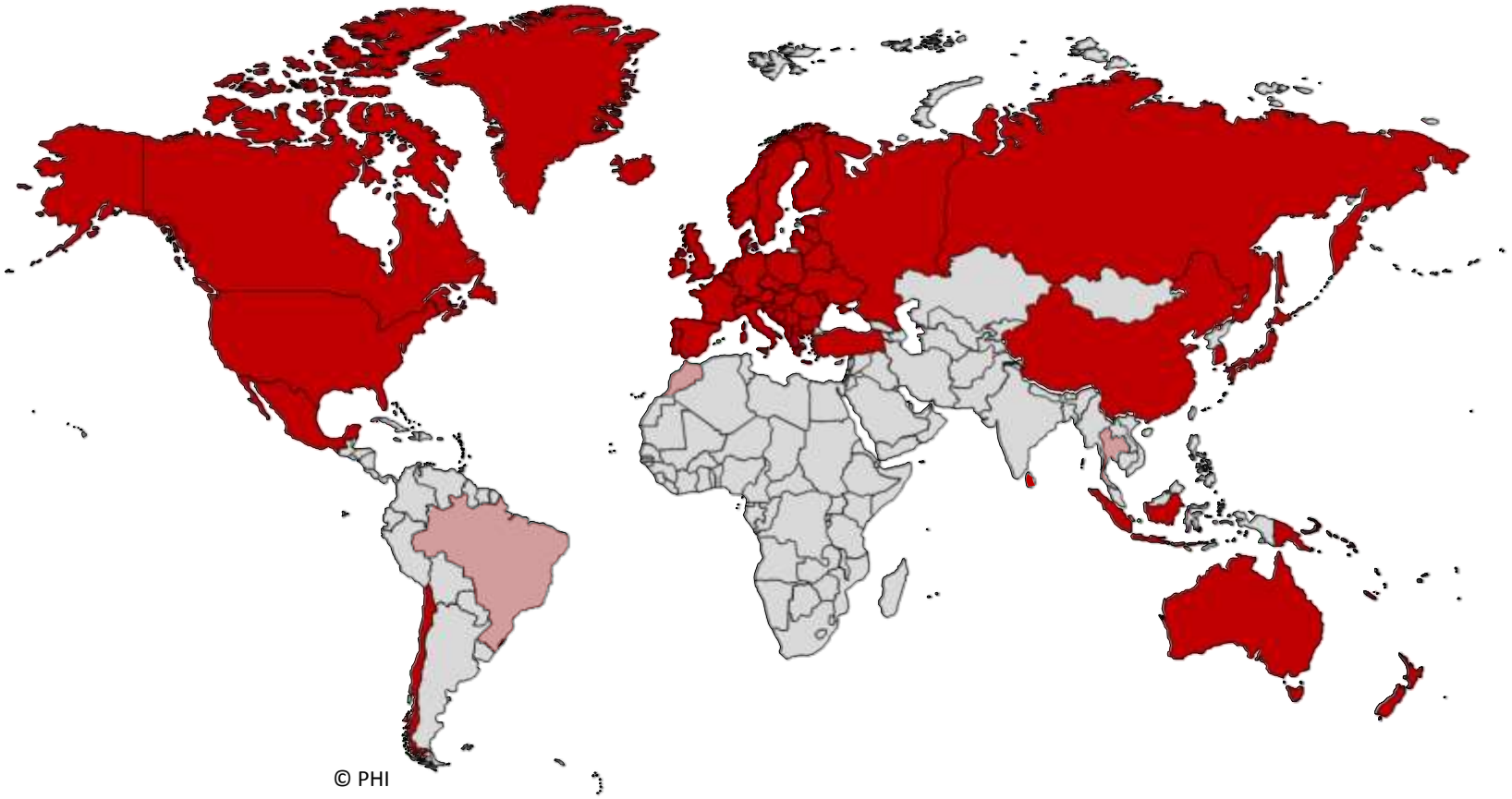


41 low energy dwellings in Niederhausen

106 Passive House dwellings in Wiesbaden | Hanover | Stuttgart

Worldwide development

Think global, act local!



3500+ members in 56 countries

22 international affiliates organisations

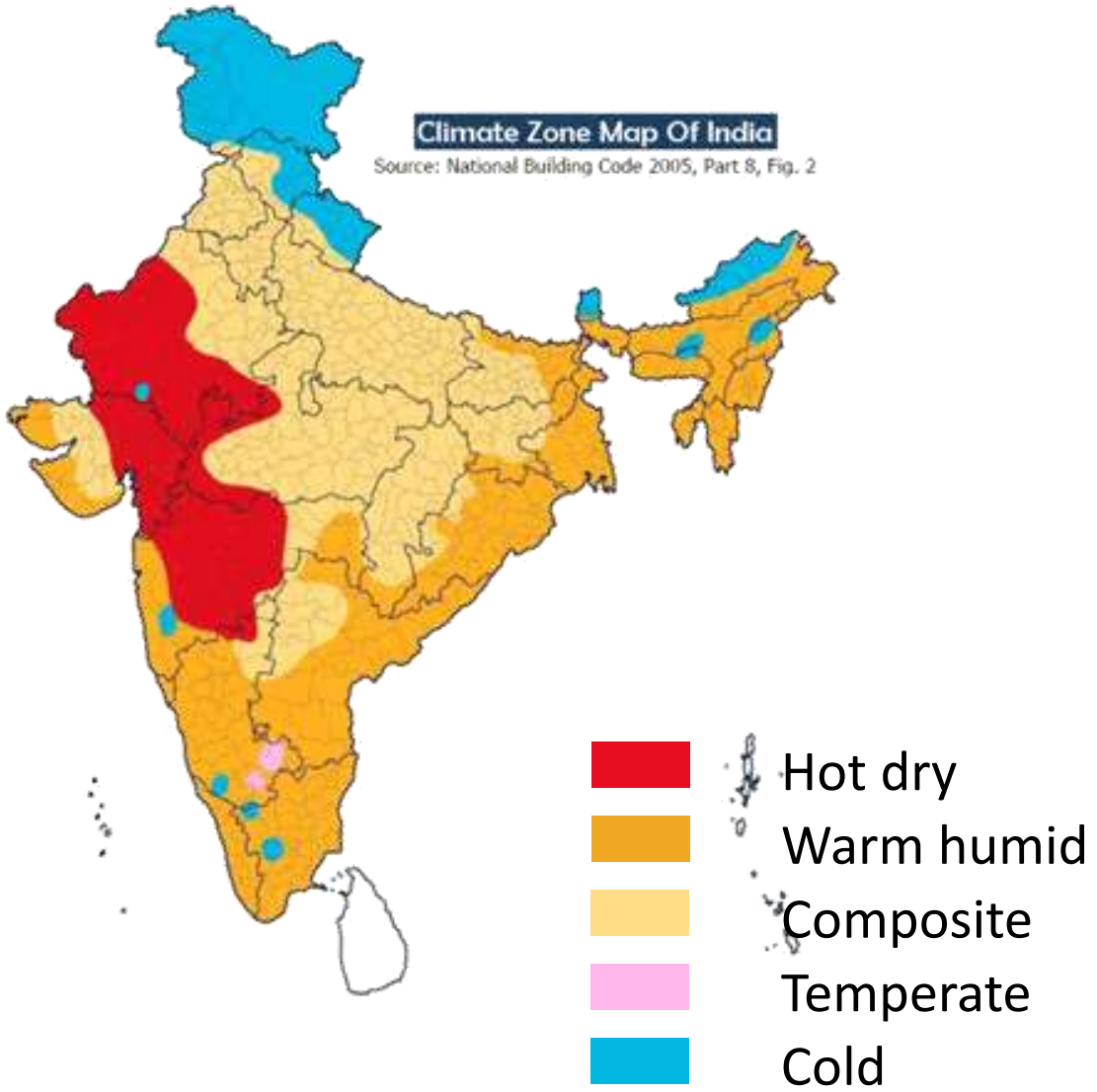
Common challenges

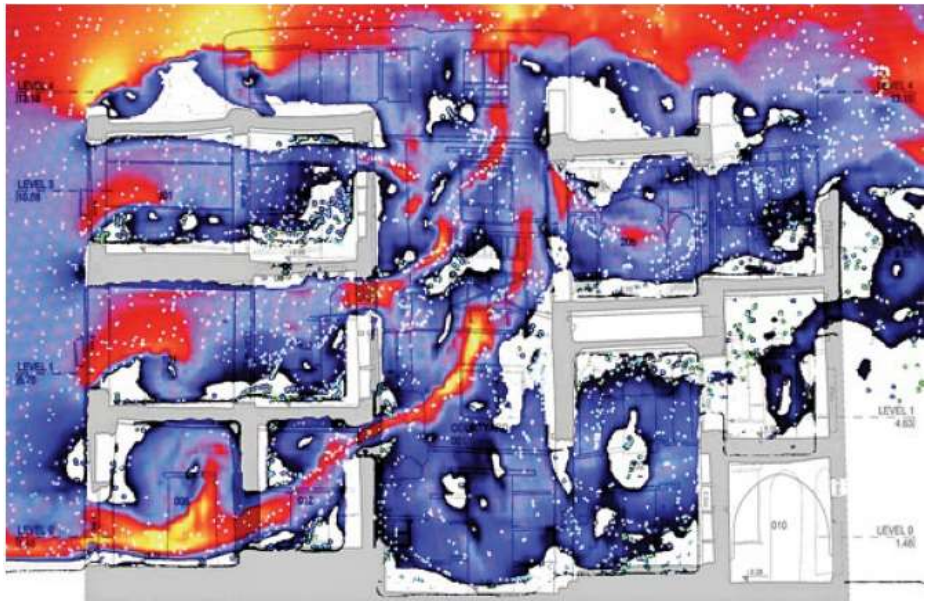
Different solutions for different contexts

- Climates
- Cultures
- Construction types

Emerging economies

- Required knowledge & components
- Quick mass training & building
- Lack of awareness
- Affordability





A/ Keep the building open, foster free air circulation. But,

Indoor temperature up to 40 °C

Indoor humidity up to 25 g/kg

OR B/ Separate the interior from the exterior

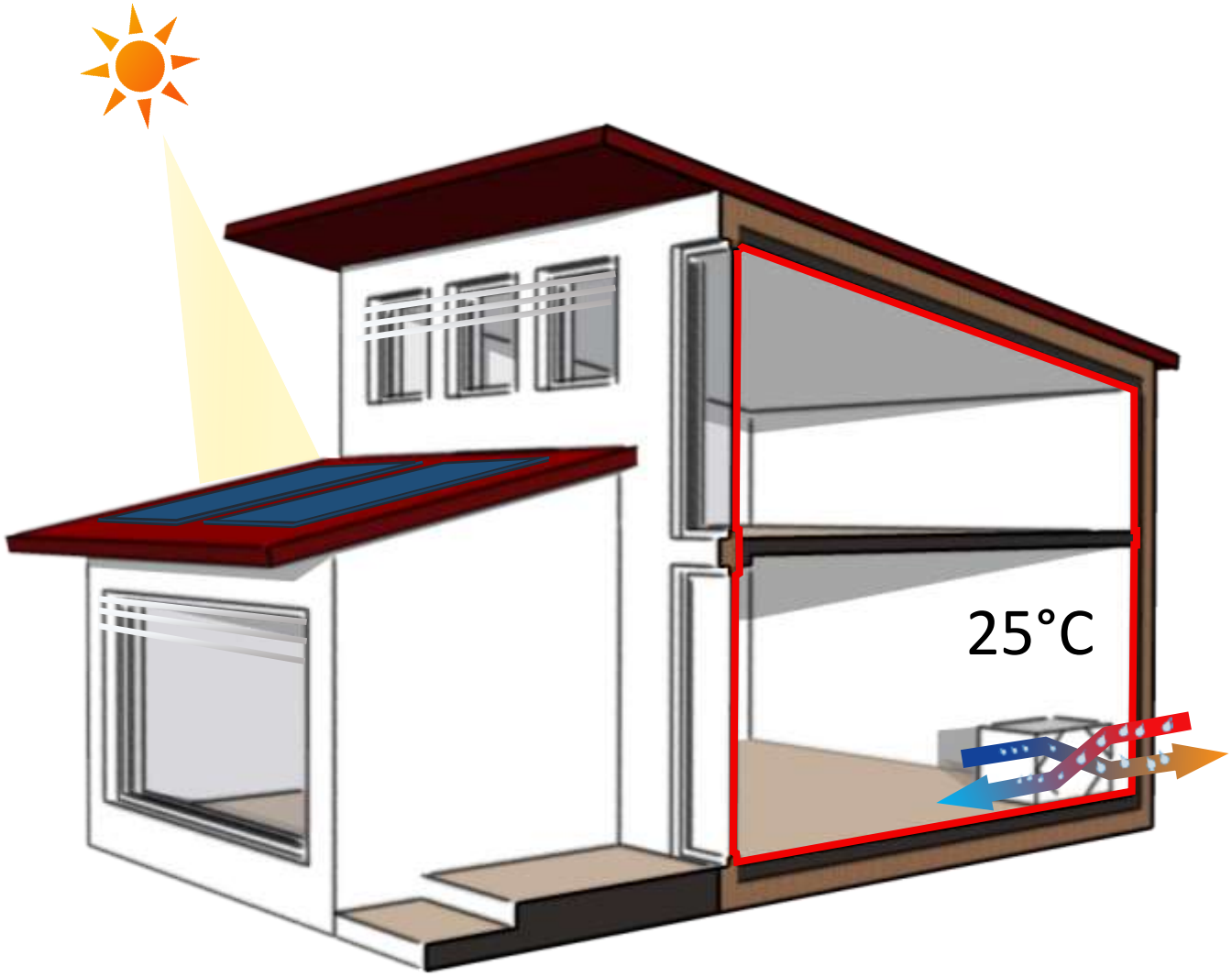
Indoor temperatures	20-25°C
Indoor humidity up to	12 g/kg

Low energy demand
No cooling peak power problem


First Passive House building in Dubai | ID 5065 © MBRSC/Dubai

OR B/ Separate the interior from the exterior

1. Limit internal & external heat loads
2. Use passive cooling strategies
3. If not enough, active cooling



Mexico – Projects overview

DEEVi 1

At the request of: GOPA

Tool to measure energy efficiency and course materials for the Sisevive

For the Building Component of the Sustainable Energy in Mexico Program from GIZ

DEEVi 2

Update of the tool and course materials

With technical assistance and review from: Building Component of the Sustainable Energy in Mexico Program from GIZ, executed by: GOPA

For the Committee for the Maintenance and Update of the Sisevive-Ecocasa (CMAS):

IDG 2

Update of the global performance index for the Sisevive-Ecocasa Program

For the NAMA Facility Project: Implementation of the NAMA for new housing in Mexico from GIZ

2011 **Supported NAMA for Sustainable Housing in Mexico**

Technical design: study of energy efficiency, additional costs and CO2 mitigation

For the Mexican-German NAMA program from GIZ

Authors: Thomson Reuters Point Carbon, IzN Friedrichsdorf, Passivhaus Institut, GOPA Consultants, Pespectives.

Reviewed by: CONAVI, SEMARNAT, Mesa Transversal, GIZ

2013 **Supported NAMA for Existing Housing in Mexico**

2015 Authors: Passivhaus Institut, IzN Friedrichsdorf, GOPA Consultants

Review and supervision: CONAVI, Infonavit, GIZ

2016 **LAIF Component from the Ecocasa Program**

Technical support for the construction of up to 800 Passive Houses in different climates in Mexico.

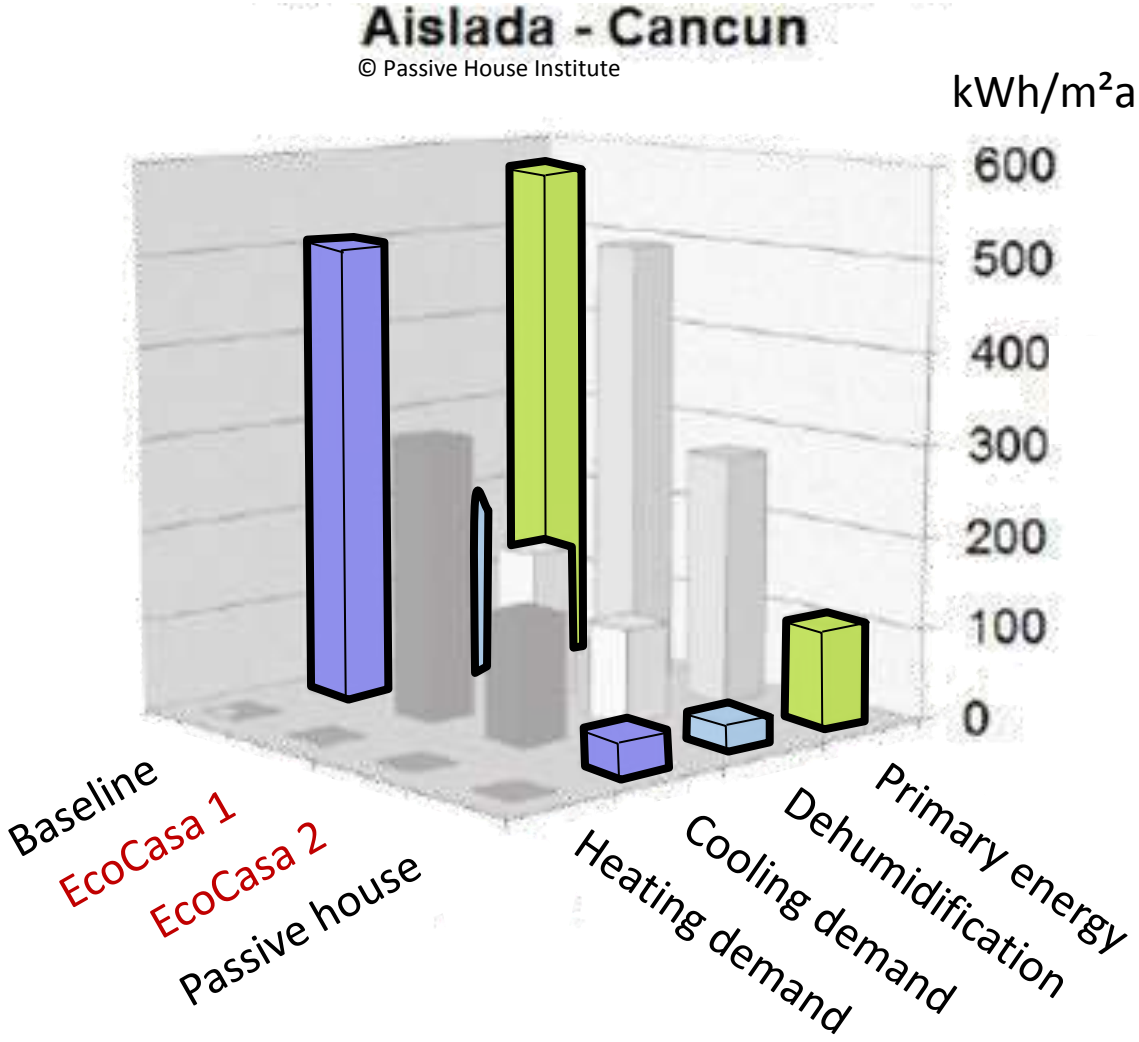
In consortium with: GOPA

On behalf of: SHF

2017

Projects of the Passive House Institute in Mexico.

Mexico – NAMA study



© Campos 2012

LOCK-IN effects!

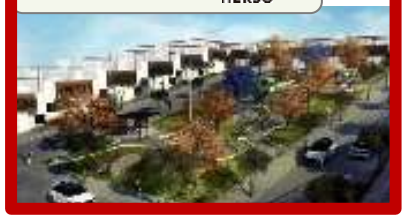
Mexico - LAIF Component

Passive house pilot projects

$n_{50} = 0.58h^{-1}$

Nogales DEREX

Morelia HERSO



Guadalajara GIG

Monterrey SADASI

Veracruz

© Elaborado GOPA / PHI

Componente LAIF

SHCP | SHF | KFW | with funding by the European Union | GOPA WORLDWIDE CONSULTANTS | Passive House Institute

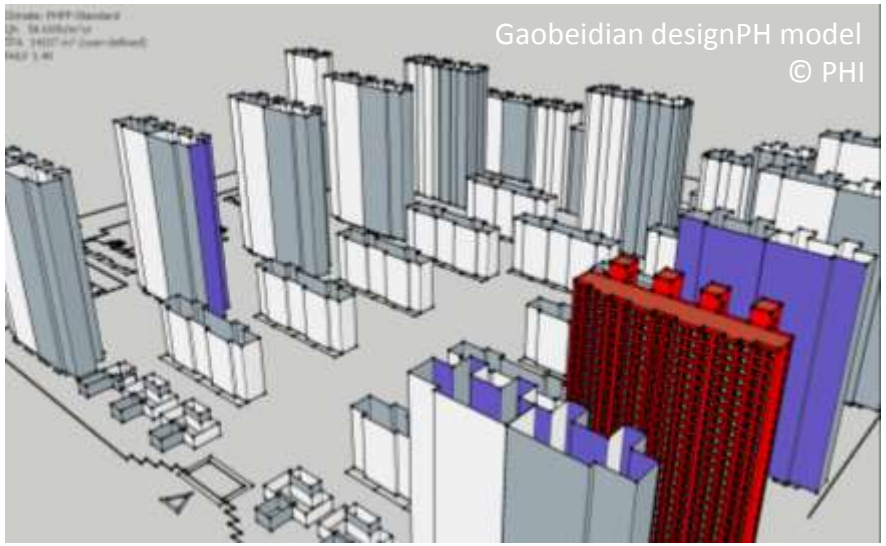
China – Monitoring and Study

Office building| ID 4489 © Schöberl & Pöll GmbH

ID 4674 © RoA - RONGEN TRIBUS VALLENTIN GmbH & CABR Beijing

China – Increased Interest!

23 INTERNATIONAL PASSIVE HOUSE CONFERENCE 2019
国际被动房大会2019


Gaobeidian designPH model
© PHI

75+ local Passive house components
Local designers, building certifiers*

Gaobeidian buidling site © Kuang

Canada – Implementation strategies

Vancouver City

- Cost-effectiveness study
- FREE Passive Design Toolkit
- Regulation updates & incentives
- Zero Emissions Building Plan

Province of British Columbia

- BC Energy Step Code
- Best Practices Guide
  for local governments

© BC Energy Step Code


Prefabricated Passive Houses for indigenous communities © Britco

Way forward for India

1. How?

- Studies in the context of India
- Pilot projects & monitoring

2. Scale up

- Incentives & regulations
- Local professionals & components

Collaboration of all parties involved!

- Local & international experts
- Construction industry / practitioners

Passive House Institute

Energy-efficiency. Comfort. Health.
Future-proof money and time investment.

Thank you for your attention!

LAIF project: First Passive House prototypes, Morelia, Mexico
© Passive House Institute