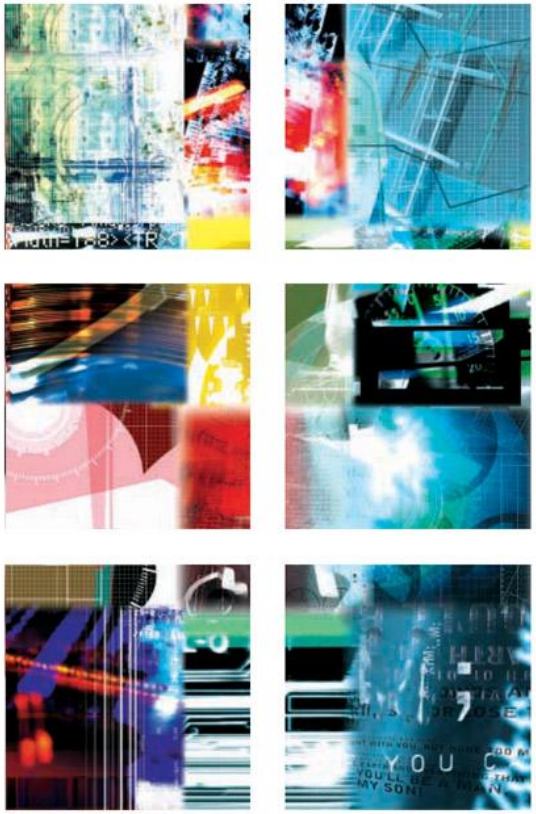


www.knx.org

KNX

The worldwide STANDARD for home and building control

KNX Association
Vassilios Lourdas
System Engineer
vassilios.lourdas@knx.org

KNX is the Standard

- CENELEC

EN 50090 – the only European Standard for Home and Building Electronic Systems (HBES) based on KNX.

- CEN

EN 13321-1 – the European Standard for Building Automation based on KNX.

- ISO/IEC

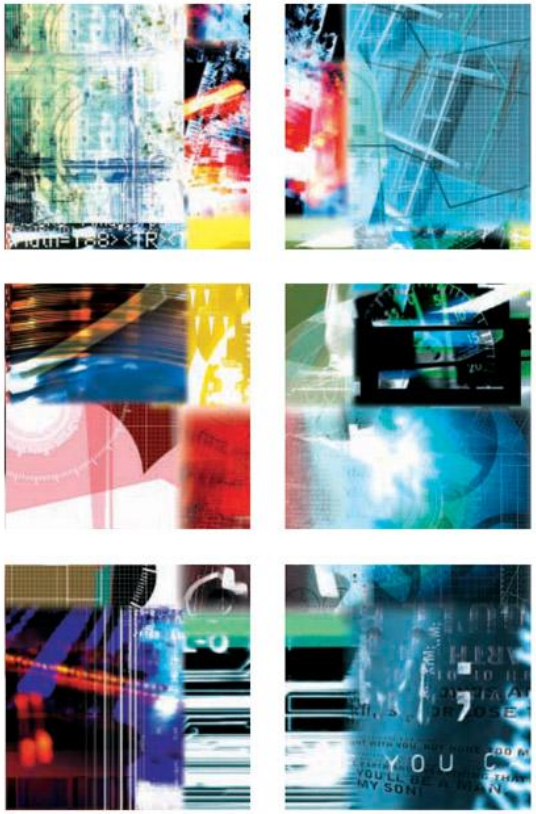
ISO/IEC 14543-3 – the World`s only Standard for Home Electronic Systems (HES) based on KNX.

- GB/T

GB/T 20965 – Chinese Standard for Home and Building Control based on KNX

- US Standard (ANSI/ASHRAE 135)

KNX: The worldwide STANDARD for home and building control!



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Advantages of KNX

KNX – Advantage No. 1

KNX is a standard here to stay!

- CENELEC

2003: KNX became **EN50090**

- CEN

2005: KNX became **EN13321-1/2**

- ISO/IEC

2006: KNX became **ISO/IEC14543-3**

- SAC (P.R. China)

2013: KNX became **GB/T 20965**

- ANSI/ASHRAE

KNX referenced in **US ANSI/ASHRAE** standard **135**

KNX – Advantage No. 2

Guaranteed Interoperability through neutral certification

1. KNX is the only home and building control standard running global certification schemes for
   A. Products
   B. Training Centers
   C. Persons

2. Product compliance is checked at neutral third party test laboratories

KNX Logo guarantees interoperability between products of different manufacturers and applications

KNX – Advantage No. 3

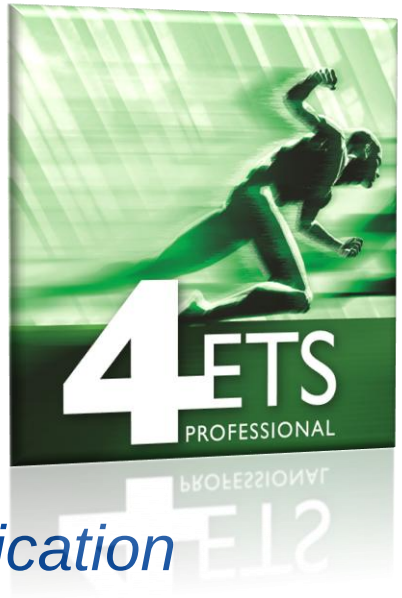
KNX = High Product Quality

1. KNX Association requires *high level production and quality control* during all stages of the product's life

2. All manufacturers have to show compliance to *ISO 9001* = prerequisite for product certification

KNX – Advantage No. 4

One Tool – the Engineering Tool Software ETS™!



1. One PC software tool for
   A. Design
   B. Configuration
   C. Diagnostics

   of KNX all certified products
2. Tool is *manufacturer, devices and application* independent – integrator can combine products of different manufacturers and applications in one installation
3. Tool is extendable with customised Apps

KNX – Advantage No. 5

Fit for use in ALL applications in home and building control!

KNX – Advantage No. 6

Fit for use in all kinds of buildings!

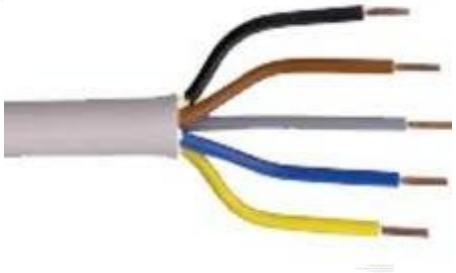
1. New or existing Buildings
2. One family houses or large size buildings
3. Easy extendible/adaptable to new needs

KNX – Advantage No. 7

Support for different transmission media

1. *Twisted Pair*

2. *Power Line*



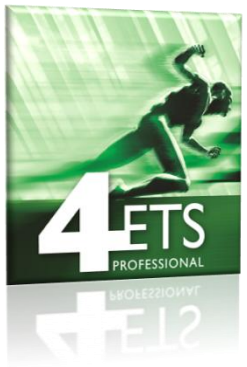
3. Radio Frequency

4. *Ethernet/WIFI*

KNX – Advantage No. 8

Support for different configuration Modes

1. *S-Mode*
   - A. Configuration with computer (ETS)
   - B. Prior basic course training recommended
   - C. Any size of installation



2. *E-Mode*
   - A. Configuration without PC
   - B. No prior training necessary
   - C. Small or medium size installations

KNX – Advantage No. 9

Easy coupling to other systems

1. KNX members offer large variety of gateways to couple to other systems

2. Examples

   A. Mapping to BACnet

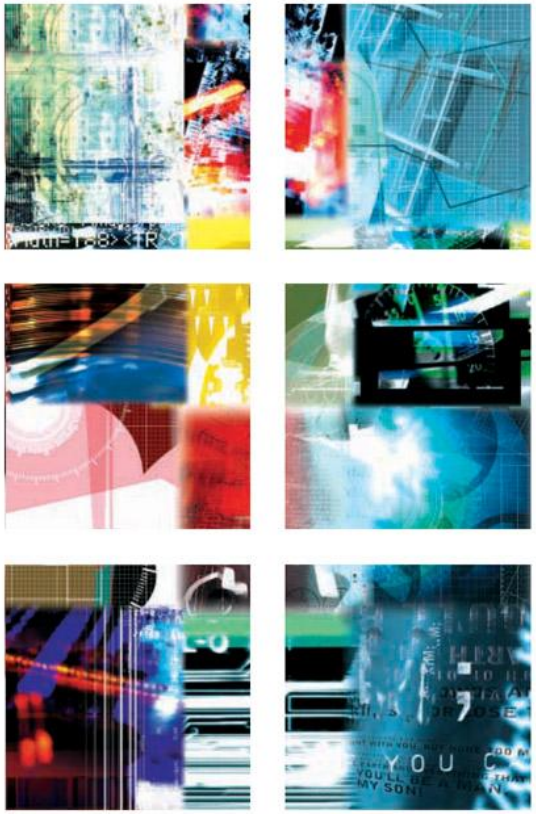
   B. Interfacing with DALI

KNX – Advantage No. 10

KNX is independent from any hard- or software technology

1. KNX manufacturers can develop own protocol solution
    1. From scratch
    2. On basis of existing certified system components from other KNX members

2. KNX is completely FREE of additional royalty fees: No IPR royalties to be paid for KNX standard features used in KNX certified produ to other KNX members



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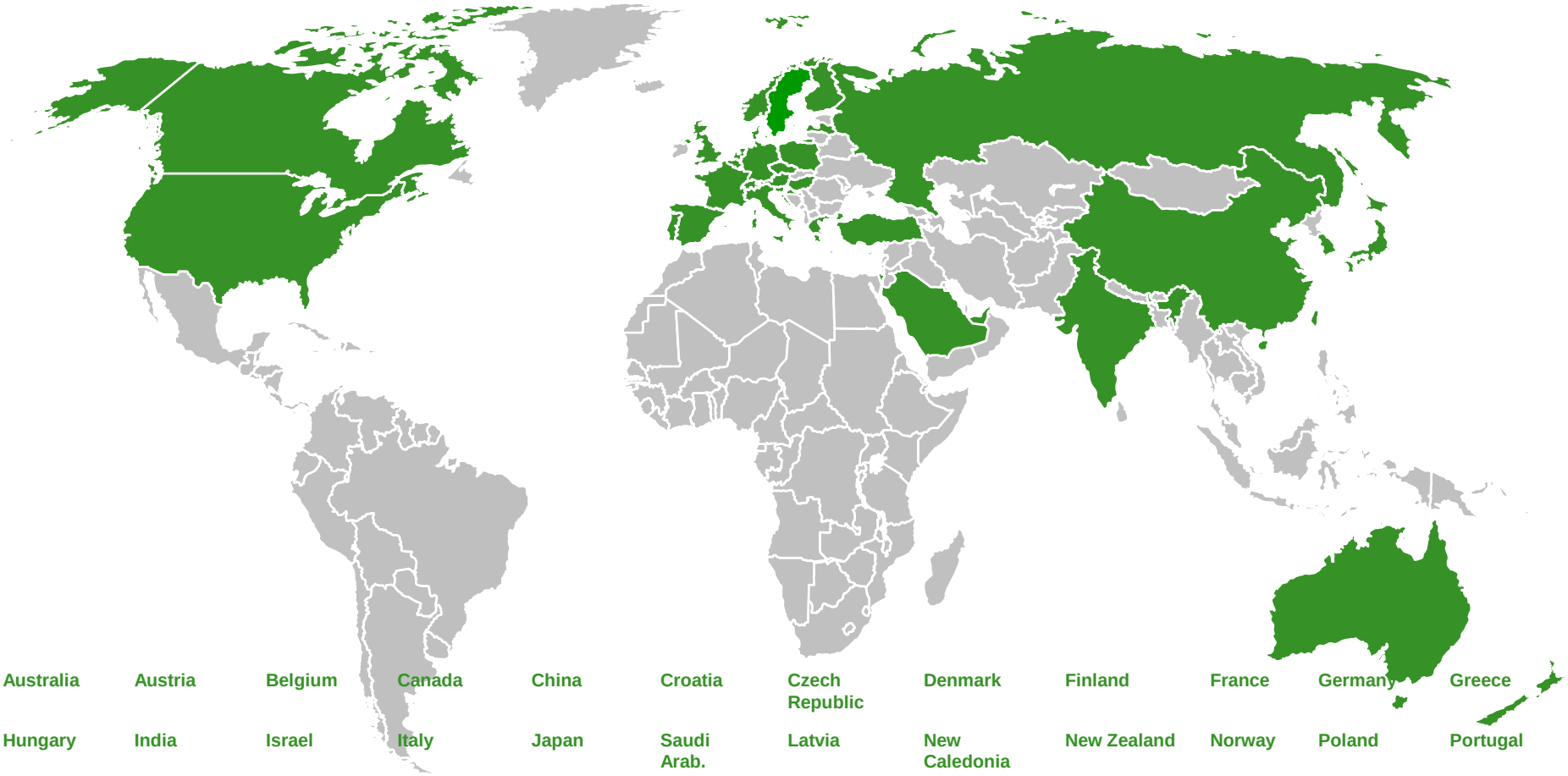
KNX Facts and Figures

May 2014

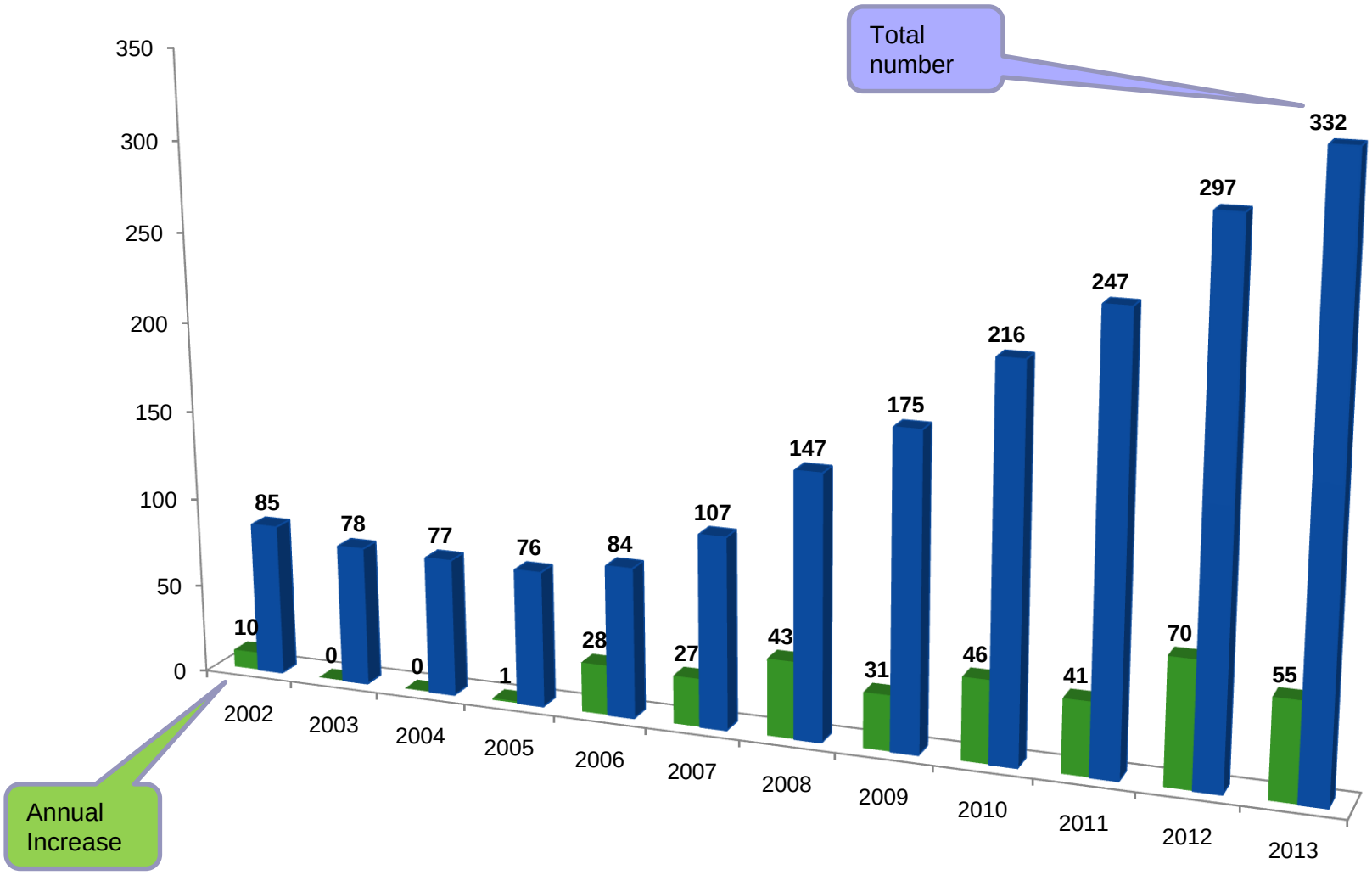
348 Members in 37 countries

348 Members in 37 countries



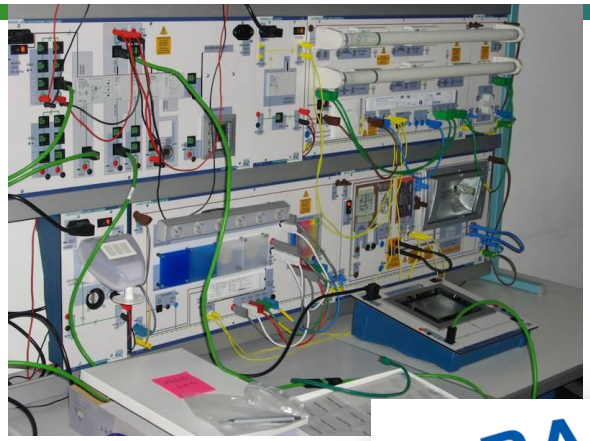
Australia	Austria	Belgium	Canada	China	Croatia	Czech Republic	Denmark	Finland	France	Germany	Greece
Hungary	India	Israel	Italy	Japan	Saudi Arab.	Latvia	New Caledonia	New Zealand	Norway	Poland	Portugal
Russia	Singapore	Slovenia	S-Korea	Spain	Sweden	Switzerland	Taiwan	Netherlands	Turkey	UAE	UK
USA											

KNX Members

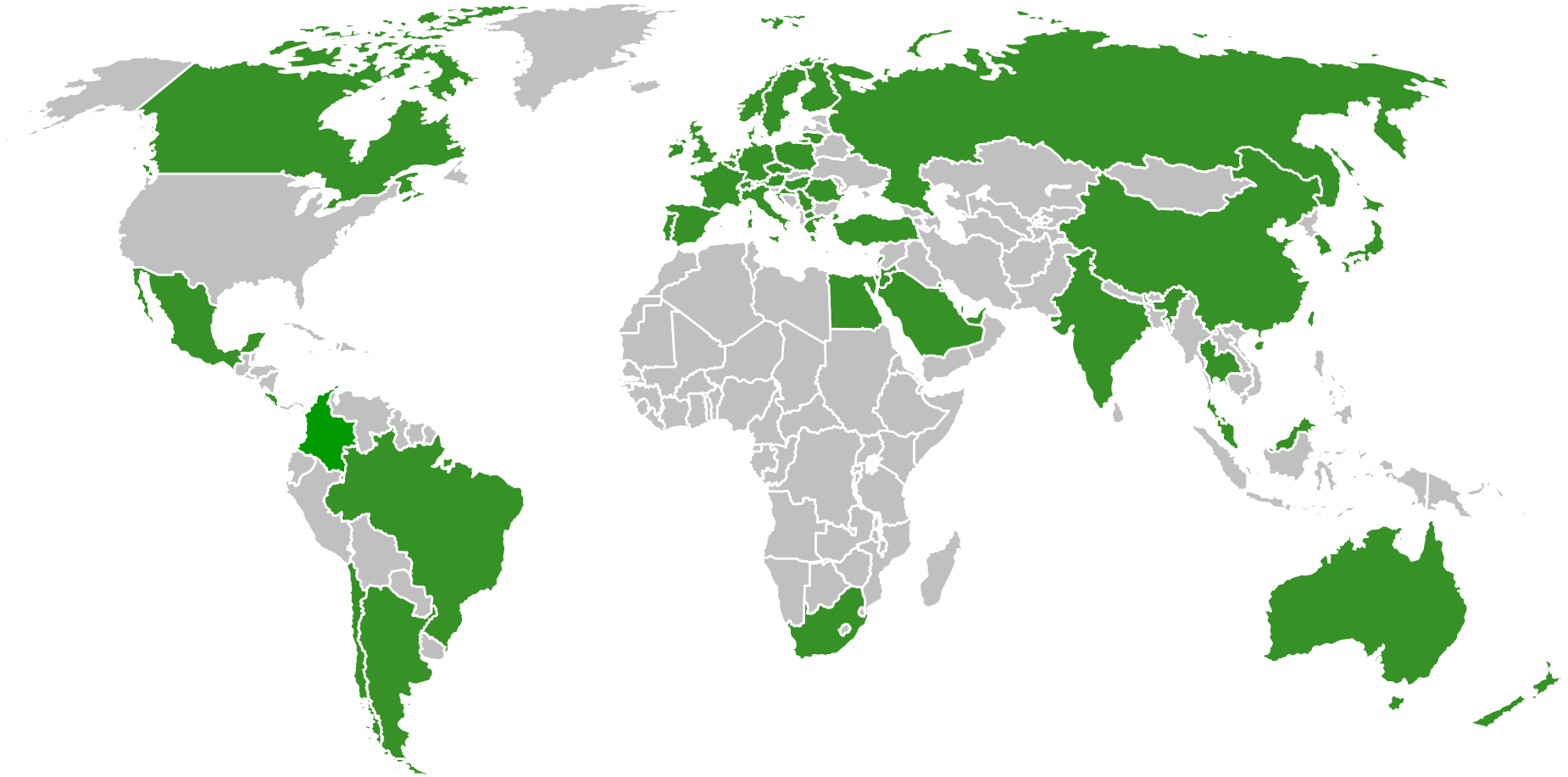

Total number
Annual Increase
350
300
250
200
150
100
50
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
10
85
0
78
0
77
1
76
28
84
27
107
43
147
31
175
46
216
41
247
70
297
55
332

More than 7000 certified KNX Devices

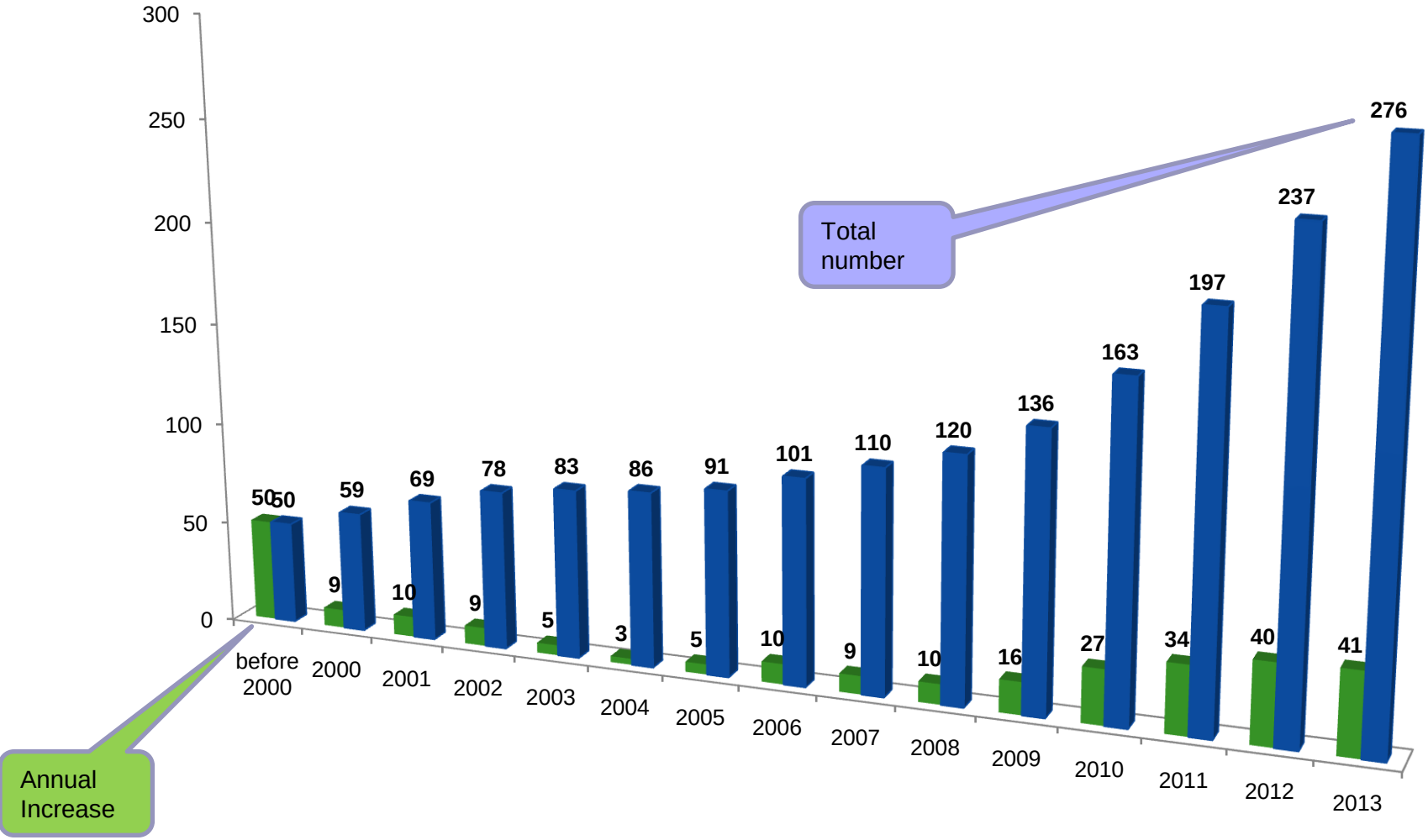
291 Training Centres in 54 countries



291 Training Centres in 54 countries

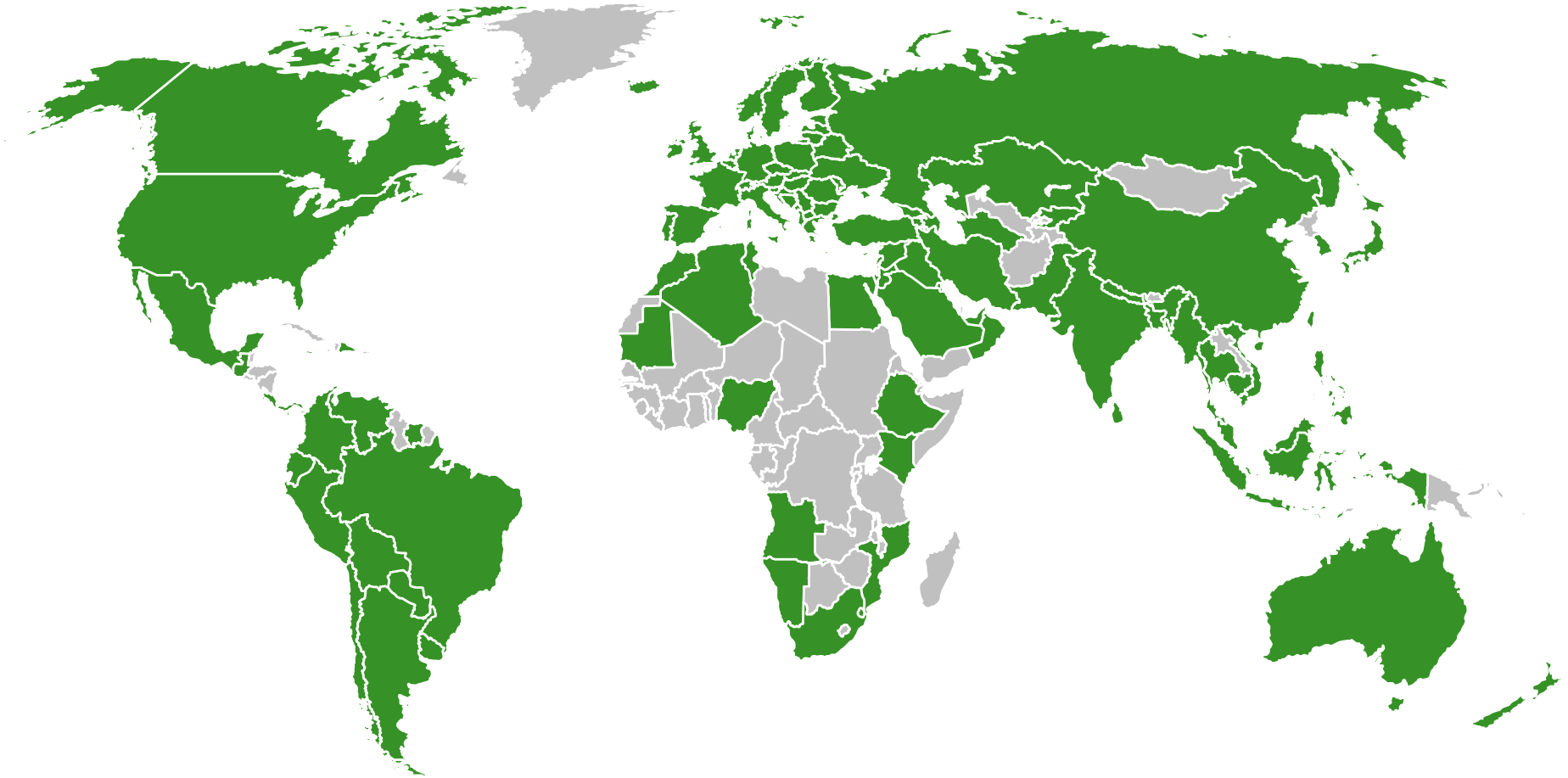


KNX Training Centres



42296 Partners in 127 countries

42296 Partners in 127 countries

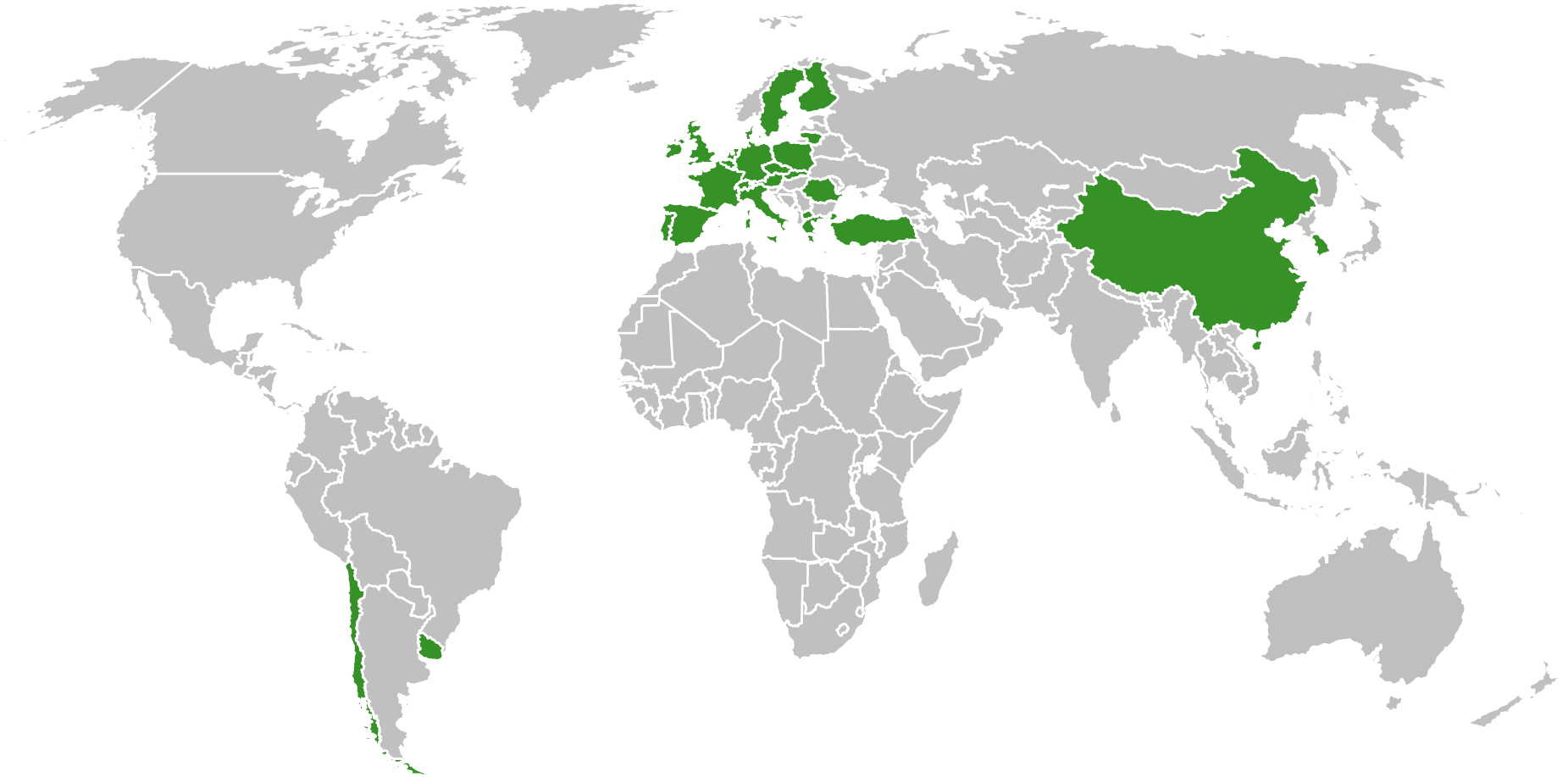


KNX Partners

102 Scientific Partners in 28 countries

SCIENTIFIC KNX

102 Scientific Partners in 28 countries



KNX Scientific Partners

16 Userclubs in 15 countries

Austria

Belgium

Germany

Greece

Hong Kong

Hungary

India

Kuwait

Malaysia

Norway

Poland

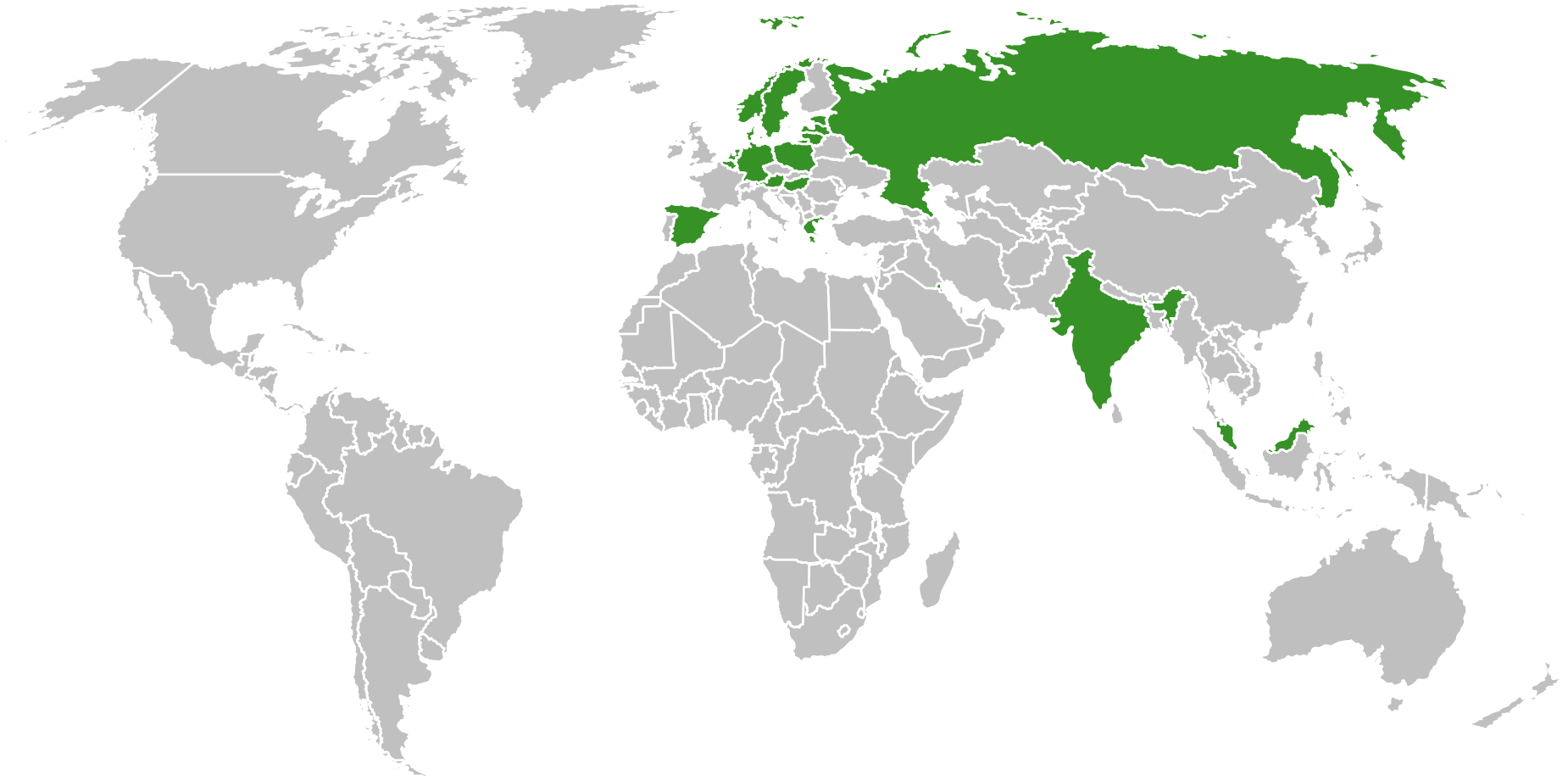
Russia, CIS and Baltics

Spain

Sweden

The Netherlands

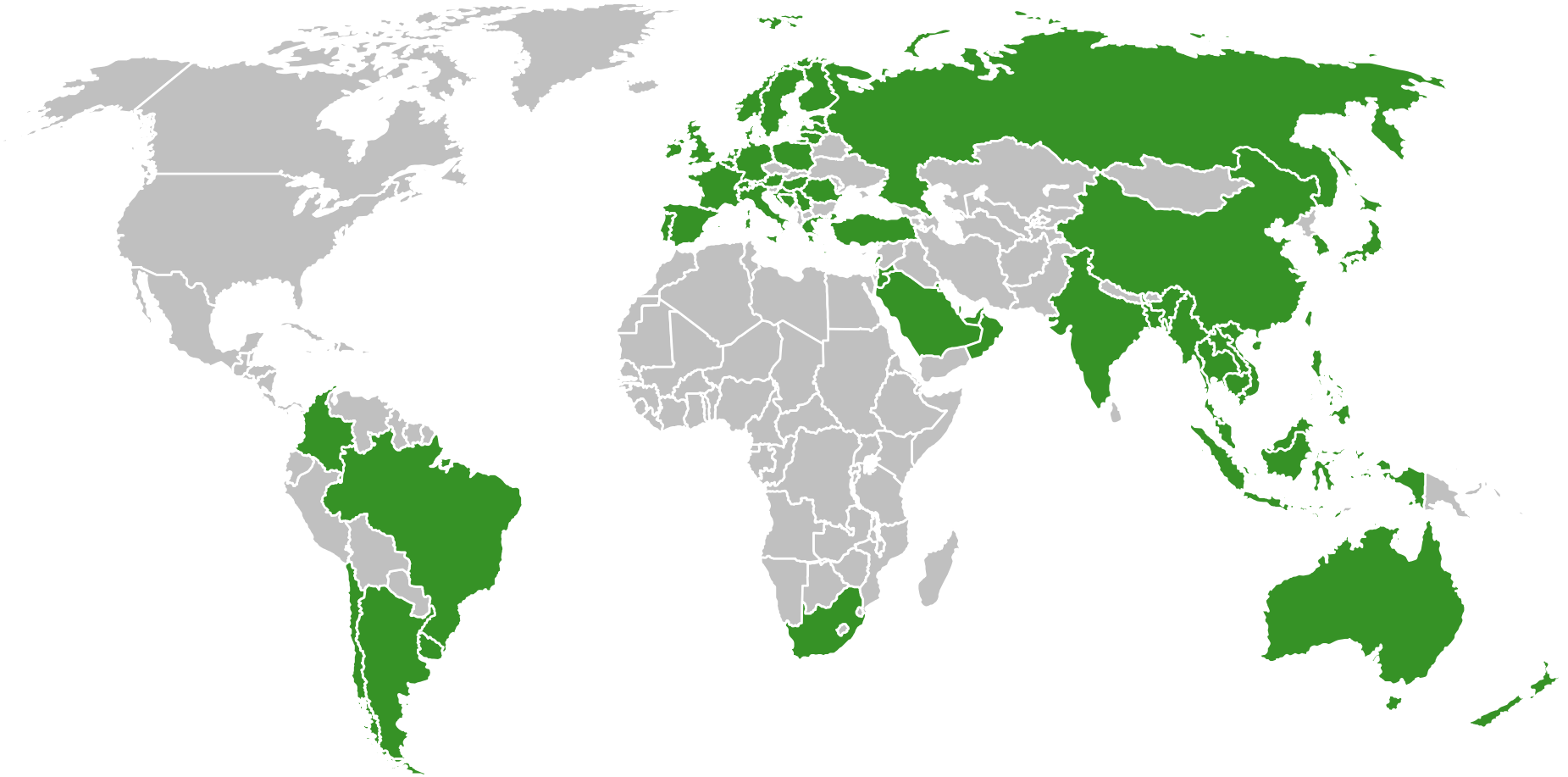
16 Userclubs in 15 countries



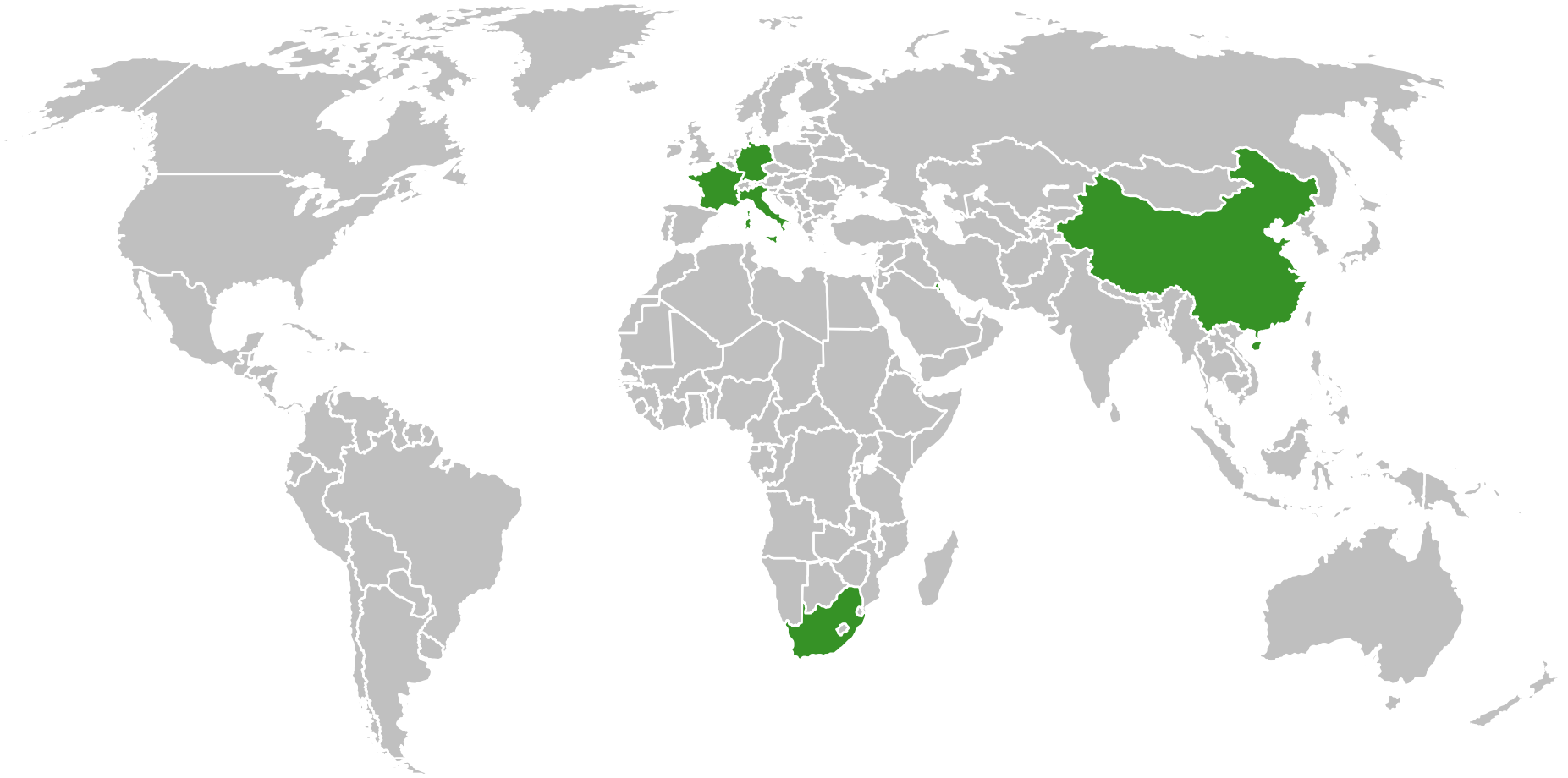
7 Associated Partners

Local represenation of KNX: 41 KNX National Groups

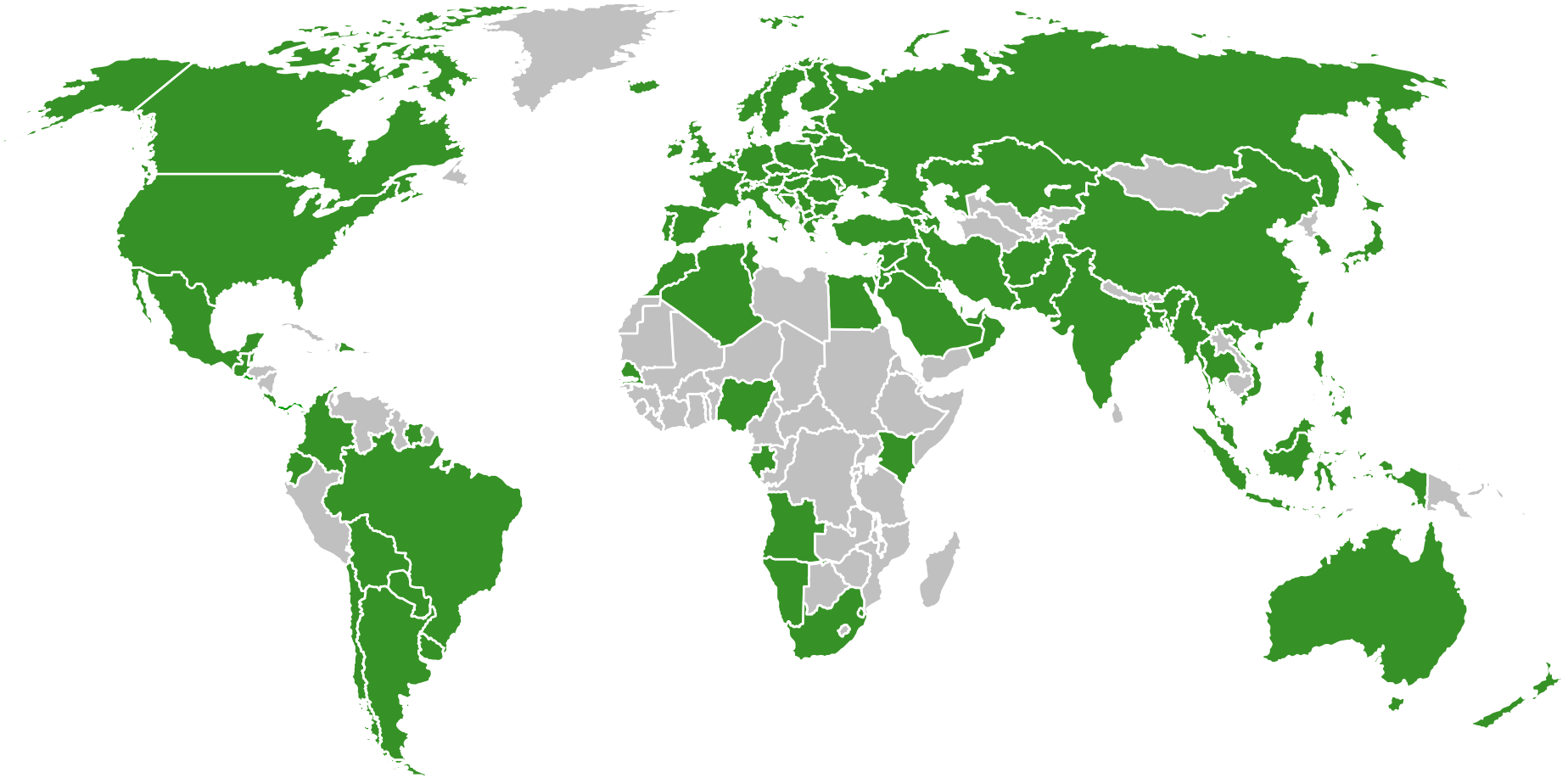
41 KNX National Groups



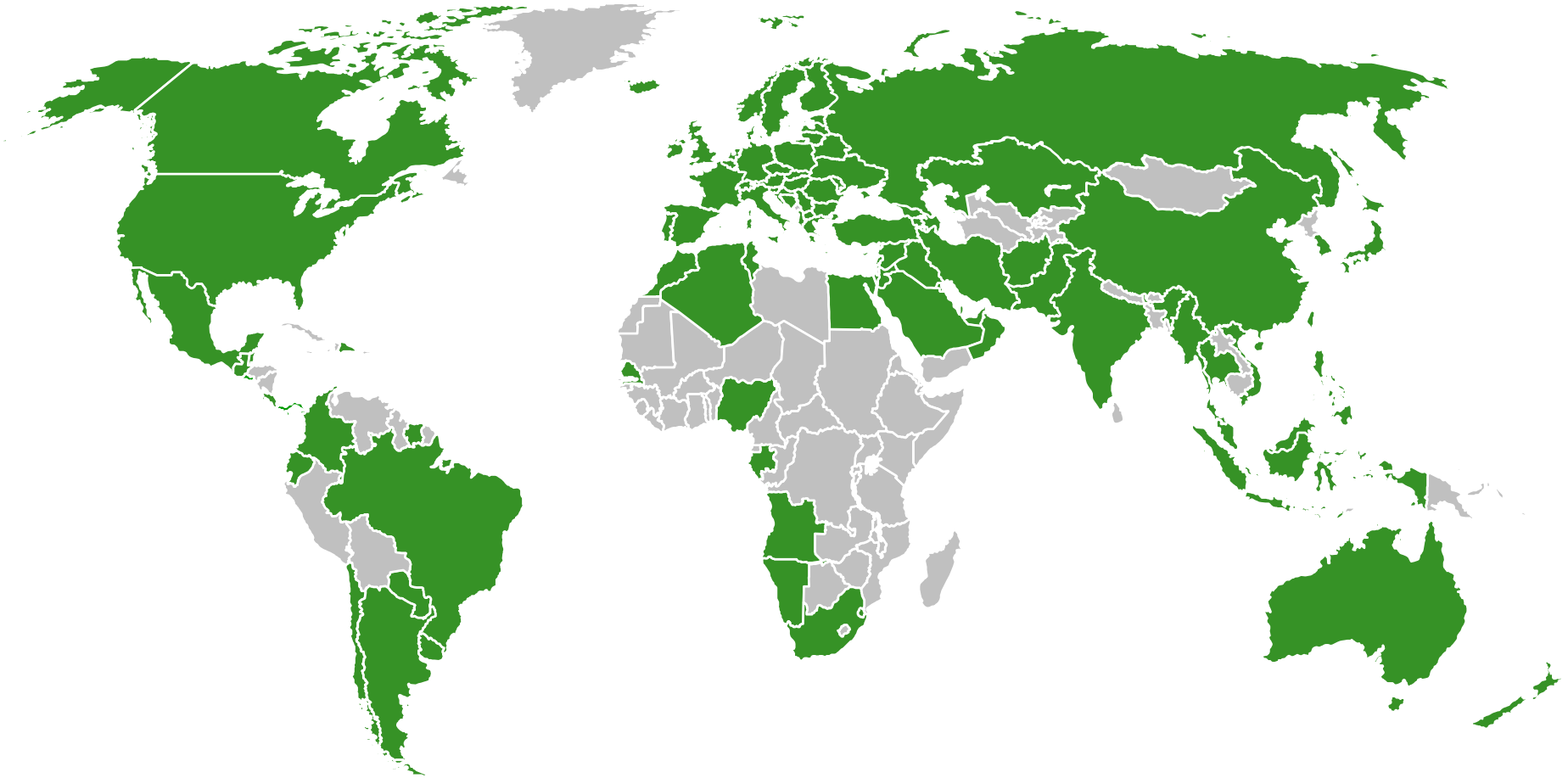
11 Test labs in 5 countries



ETS Sold in more than 120 countries



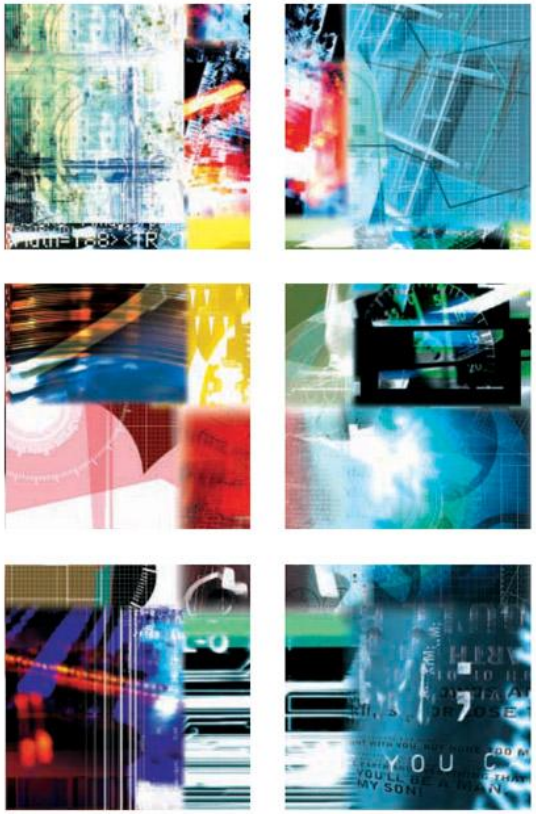
KNX Projects in more than 120 countries



KNX Facts & Figures May 2014

- 348 KNX Members in 37 countries
- 7000 certified product groups
- 42296 KNX Partners in 127 countries
- 291 Training Centers in 54 countries
- 102 Scientific Partners in 28 countries
- 16 Userclubs in 15 countries
- 7 Associated partners
- 41 National Groups
- 11 Test labs in 5 countries
- ETS sold in more than 120 countries

Join the worldwide KNX community



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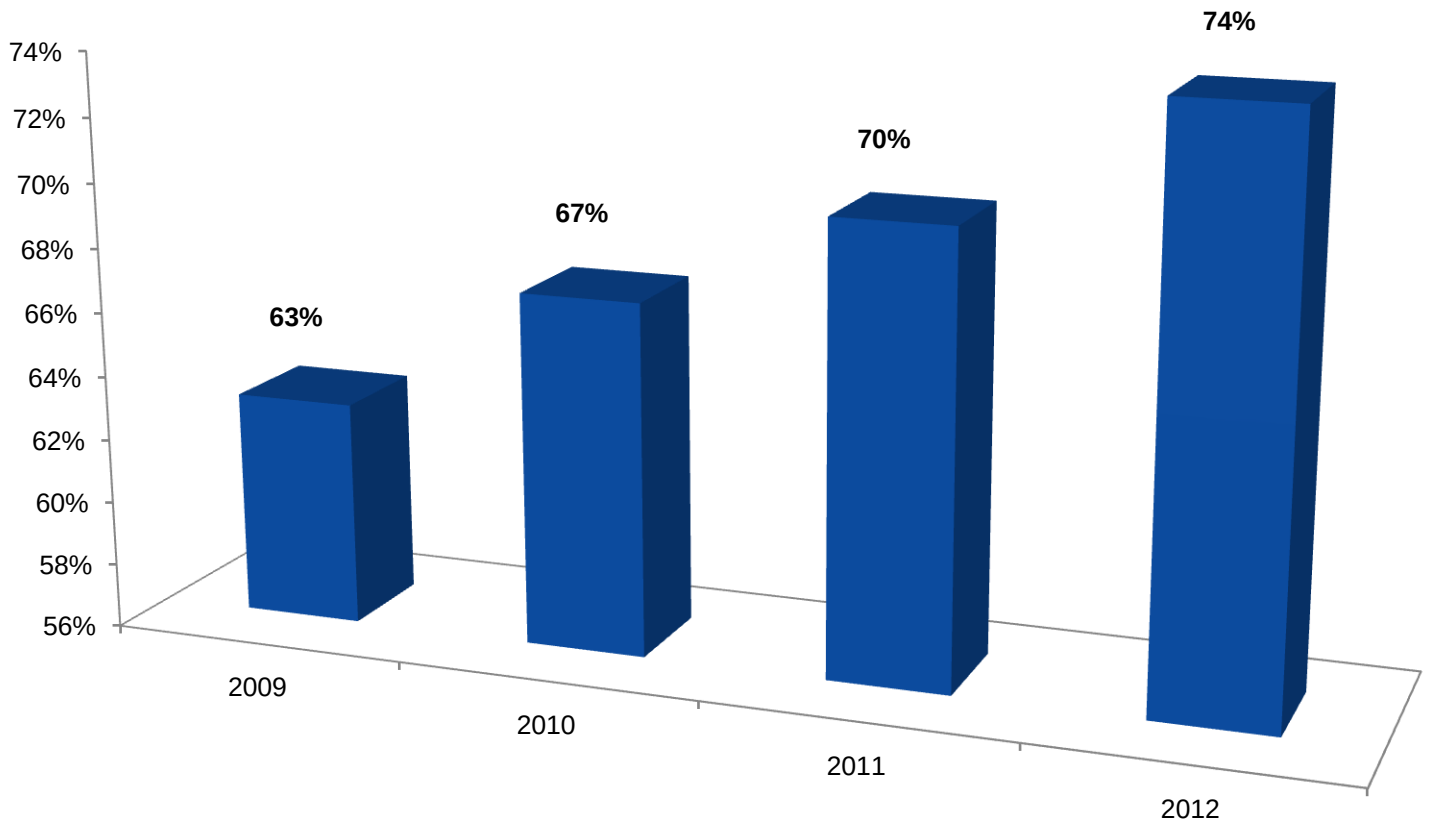
BSRIA

European Smart Home Market Study

European Smart Home Market Study

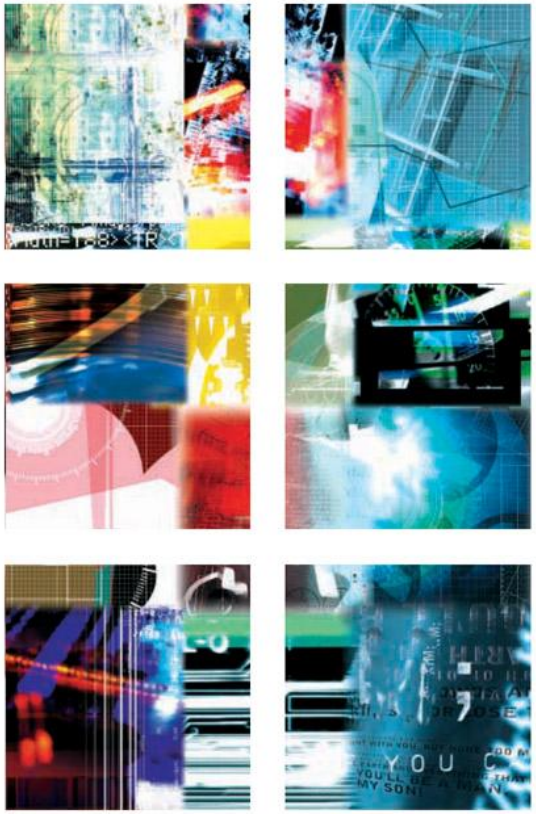
Share of KNX in the total smart home market value



European Smart Home Market Study

"In 2011 the share of KNX-based solutions exceeded 70% of the total market value. In the last three years, the KNX share has been adding three percentage points on average, suggesting the growing importance of KNX"

("BSRIA - Smart home market: impressive growth; new opportunities", June 20, 2012)



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KNX city - Introduction

city

Challenges in cities – 5 Facts

Fact 1: Cities consume and pollute

- *Consumption of **two third of worldwide energy***
- *Consumption of **60% of worldwide water consumption***
- *Responsible for **70% of worldwide of greenhouse gases***

Challenges in cities – 5 Facts

- **Fact 2: 50% of worldwide population lives in cities**

Forecast for 2050: Expected raise to 70%

Challenges in cities – 5 Facts

- **Fact 3: Raising demand for houses and buildings**

…40% of the consumption of final energy

…21% of the production of greenhouse gases

→ Continuously increasing demand for energy

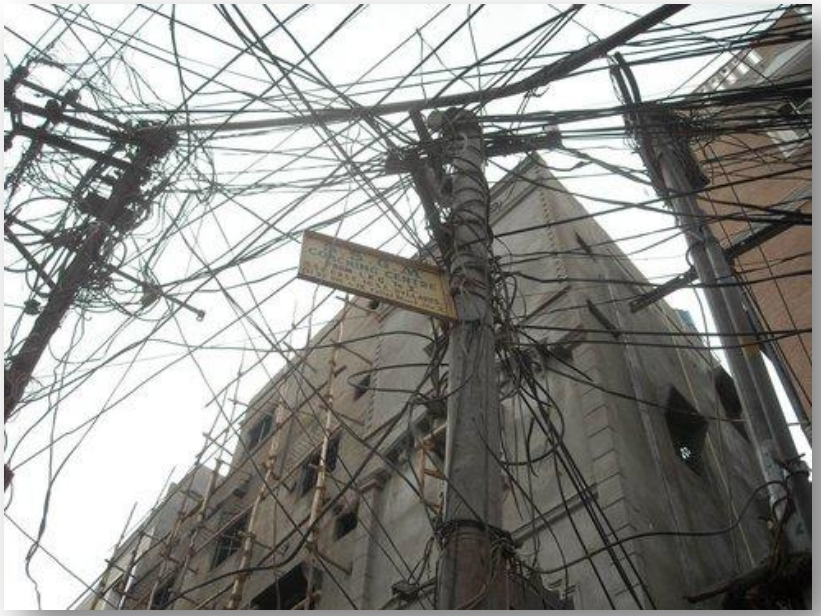
Challenges in cities – 5 Facts

Fact 4: The demand for mobility increases

- *Urban traffic accounts for **10% of global greenhouse gases***
- *The number of cars will **double by 2030***

Challenges in cities – 5 Facts

- **Fact 5: Power supply can't be secured at this rate**



Cities' demand will exceed current supply

KNX has its focus in the building…

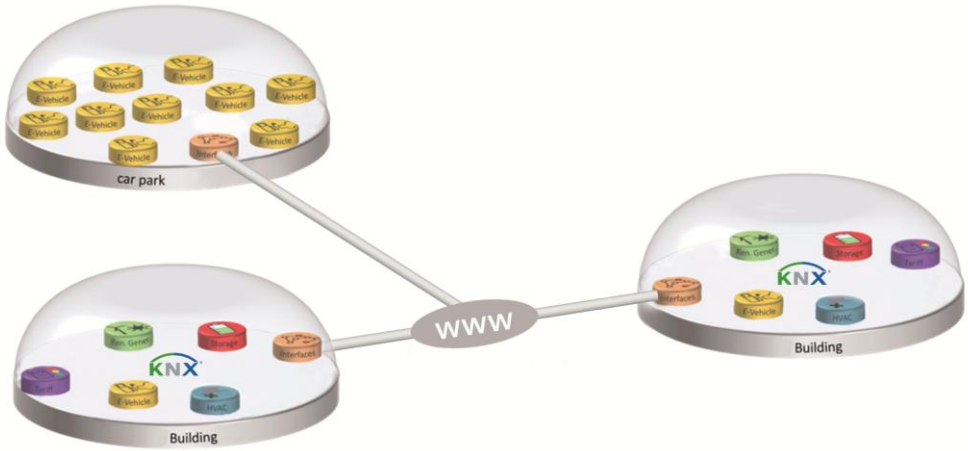
… but considers Smart Grid and city issues

- A “Single solution” doesn’t meet city sustainability objectives
- Smart cities require buildings that interact with the city
- Different fields need to interact. Examples:
  - “Mobility” effects “buildings”, e.g. charging of electric vehicles
  - „Energy generation“ affects buildings, e.g. decentralised generation on roofs of “buildings”.
  - The building affects the “City”, e.g. by feeding in surplus energy into the grid.

➔ **KNX city sets a new focus with existing KNX technologies in the buildings**

KNX city distributed facilities

- KNX offers communication by twisted pair, IP and radio frequency
- Buildings can be connected to each other over distances by IP as if they were one building
  - Distributed facilities
  - Energy management over distances
  - Balancing of generation and consumption of different buildings.



Positive Trends: Building

Energy efficiency is on the rise

"Energy management in buildings is the first and easiest way to create an energy efficient city"

Challenges for buildings:

- Energy efficiency in the city is not only to save final energy but to balance the grid.
- The energy management of buildings requires the interaction between the Building and Infrastructure

Energy Efficiency in the KNX Buildings

Energy Savings with KNX in the buildings:

- up to **40 %** with KNX shading control
- up to **50 %** with KNX individual room control
- up to **60 %** with KNX lighting control
- up to **60 %** with KNX ventilation control

Electricity for the City of Salzburg *(Austria)*

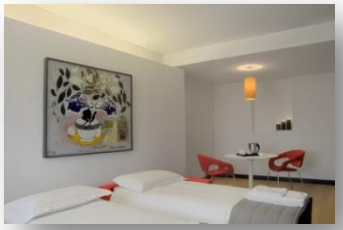
The largest building in the Middle East

Oundle School, Peterborough *(Great Britain)*

Energy efficiency in Guarda Polytechnic Institute

A family home in low energy standard in Innsbruck *(Austria)*

A new bioclimatic office building in Huesca *(Spain)*



Nerocubo Hotel in Italy

Improved energy balance in insurance company (Prague)

Positive Trends: Mobility

Demand for green mobility increases

"Green Mobility, especially Electro-mobility, avoids harmful emissions"

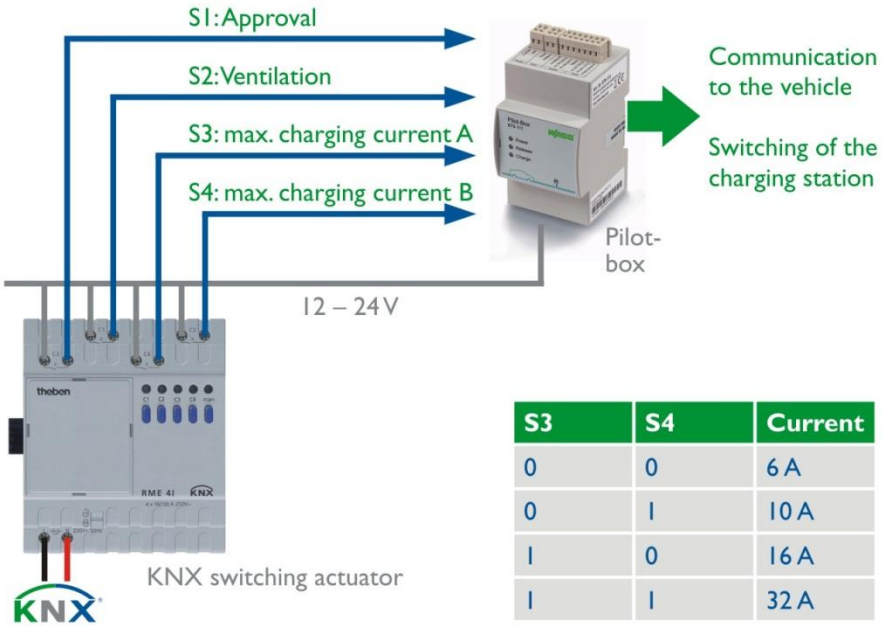
Challenges for the mobility:

- Emissions will be only avoided by charging eCars in cities electricity from **renewable energies**
- The charging of eCars requires the interaction between the Building and Mobility.

KNX city application: Mobility

Connectivity of Electromobility to KNX

- KNX can charge electric eCars intelligently
  - Variation of the charging current and thereby the power
  - Demand Side Management with eCars
  - Predominant charging of eCars with generated energy from renewable energies such as the own photovoltaic system



S3	S4	Current
0	0	6 A
0	1	10 A
1	0	16 A
1	1	32 A

Positive Trends: Infrastructure

Smart Grids provide intelligent city solutions

"Smart grids enable a comprehensive interoperable energy management"

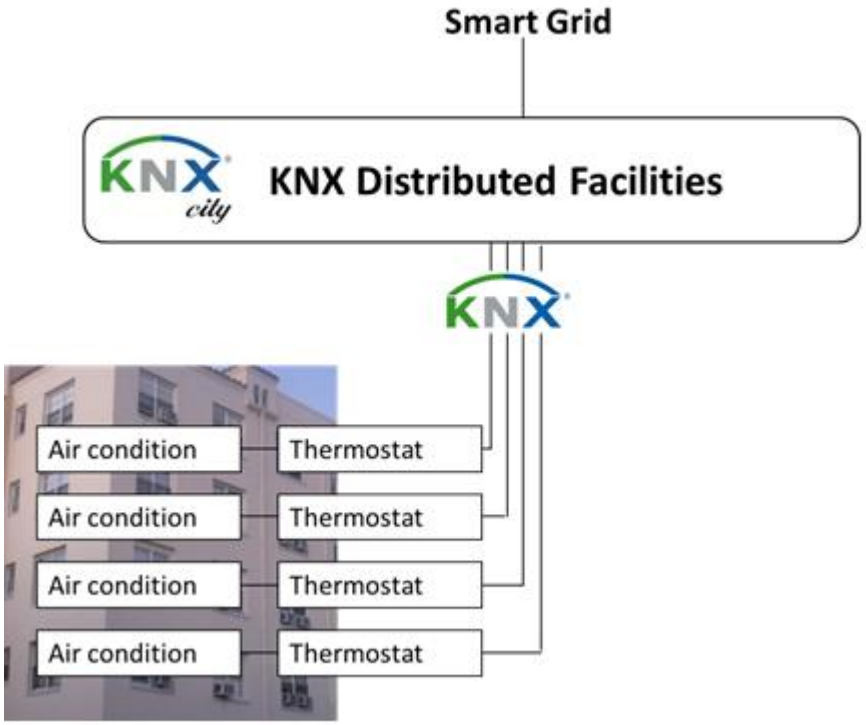
Challenges for the infrastructure:

An infrastructures requires the interaction between the Building, Mobility and Energy Generation based on the ***smart grid.***

KNX city application: Infrastructure

City air conditioning control

- **KNX city Solution: AC – Control via Distributed Facilities**



- ***Reducing of AC performance for a short period***
- ***This has no negative effect on the well-being of the user***
- ***Considerable energy savings for the grid***

Positive Trends: Energy generation

Renewable Energies are set by the world

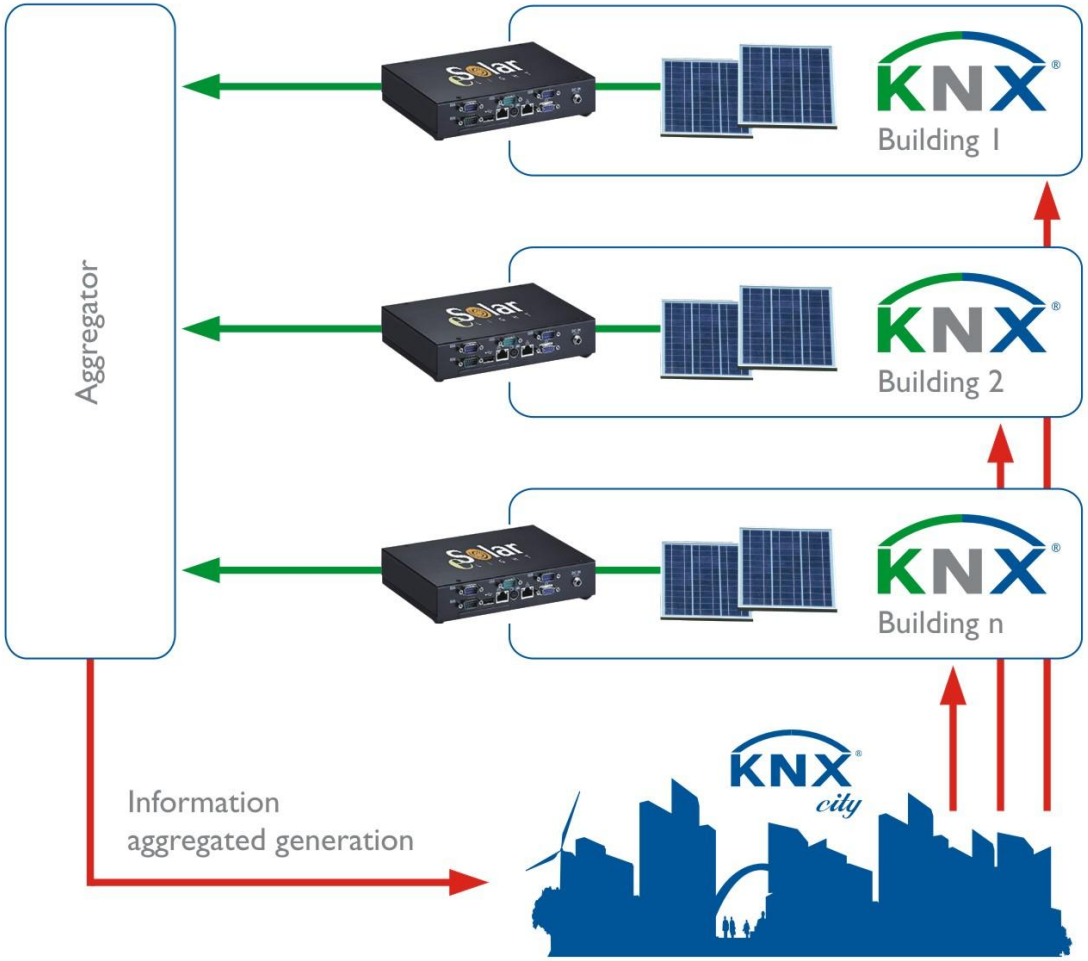
"Renewable energy provides benefits for our climate and our health”

Challenges for Renewable Energies:

- The volatile renewable energy power generation is the major challenge
- The decentralised arrangement of renewable energies requires the interaction between Buildings and Energy Generation

KNX city application: Energy Generation

City energy generation management



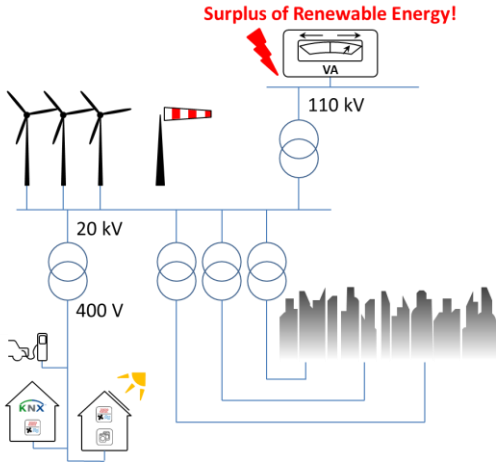
KNX city Energy management

What KNX can do for the Smart Grid and the city

Surplus of renewable energies

- KNX starts loads for consuming the surplus of energy
- Automatically or manually
- Tariff controlled by utility

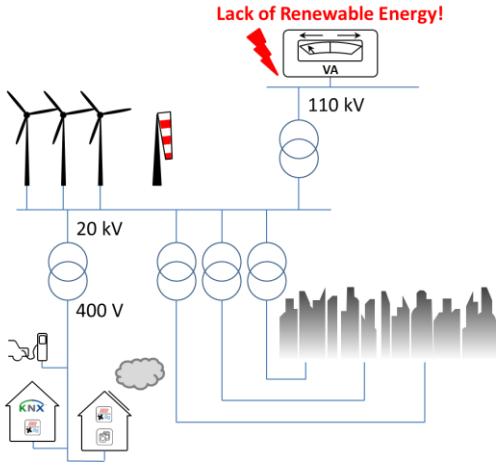
➔ **KNX helps to buffer renewable energies**



Lack of renewable energies

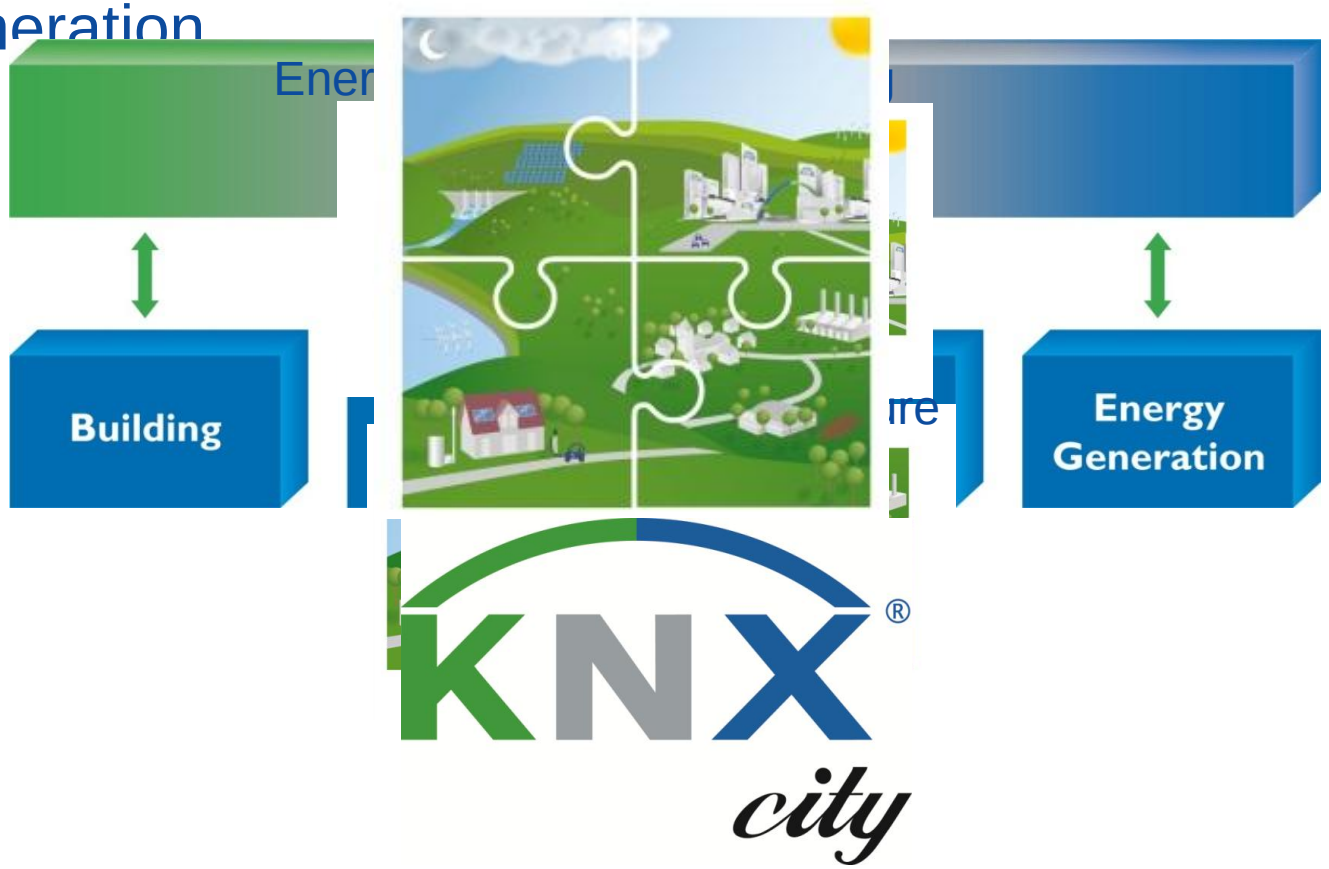
- KNX stops loads for reducing the total city load for a short time

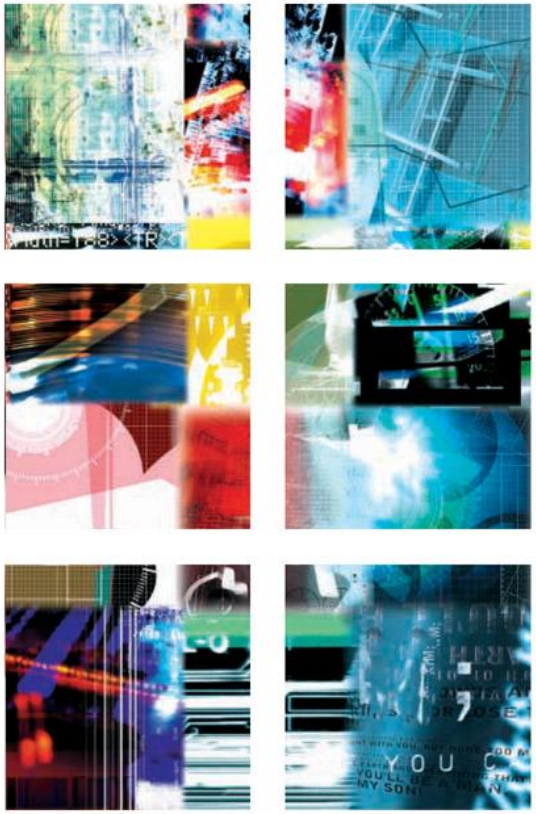
➔ **KNX helps to cope with the lack of renewable energies**



From the building to the KNX city

KNX city offers solutions in the interaction of buildings, mobility, infrastructure and energy generation





www.knx.org

Thank you very much for your attention

KNX Association
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System Engineer
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