KNX テクニカル ワークショップ

2014年2月24日
インターテックリサーチ株式会社
KNX Partner No.44768

ＫＮＸテクニカルワークショップ

１．Advantages of KNX, Facts and Figures 2013.12, and KNX City （英文）

２．KNXのご紹介

３．ETSデモ（英文）

４．KNX will improve your business opportunities（英文）

５．How to Develop a KNX Device（英文）

Advantages of KNX, Facts and Figures 2013.12 and KNX City

KNX Association International

www.knx.org

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

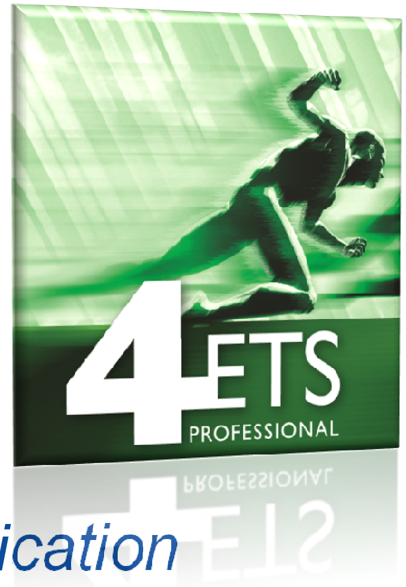
KNX = High Product Quality

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 customized Apps

KNX – Advantage No. 5

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

KNX – Advantage No. 6

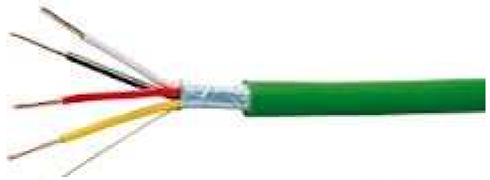
Fit for use in all kinds of buildings!

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

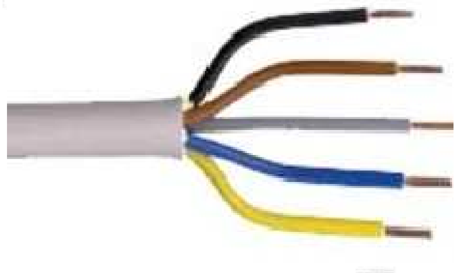
KNX – Advantage No. 7

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

2. *Easy 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

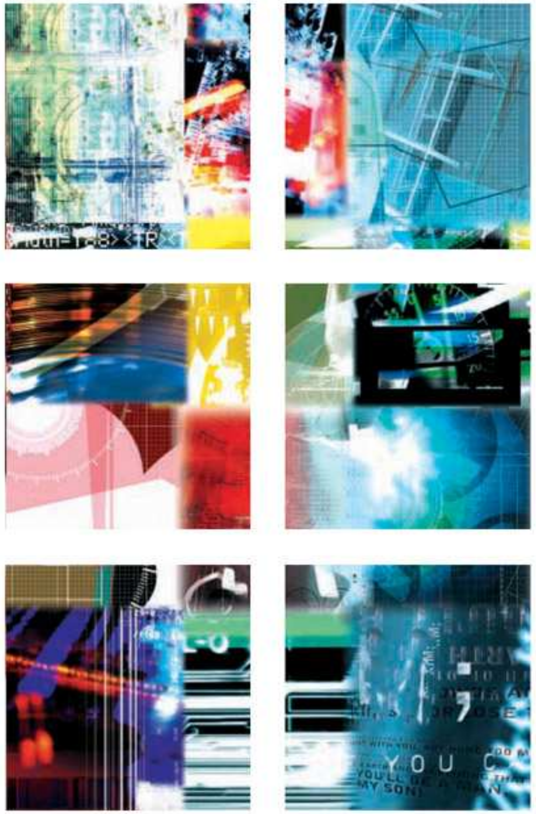
   B. Interfacing with DALI

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

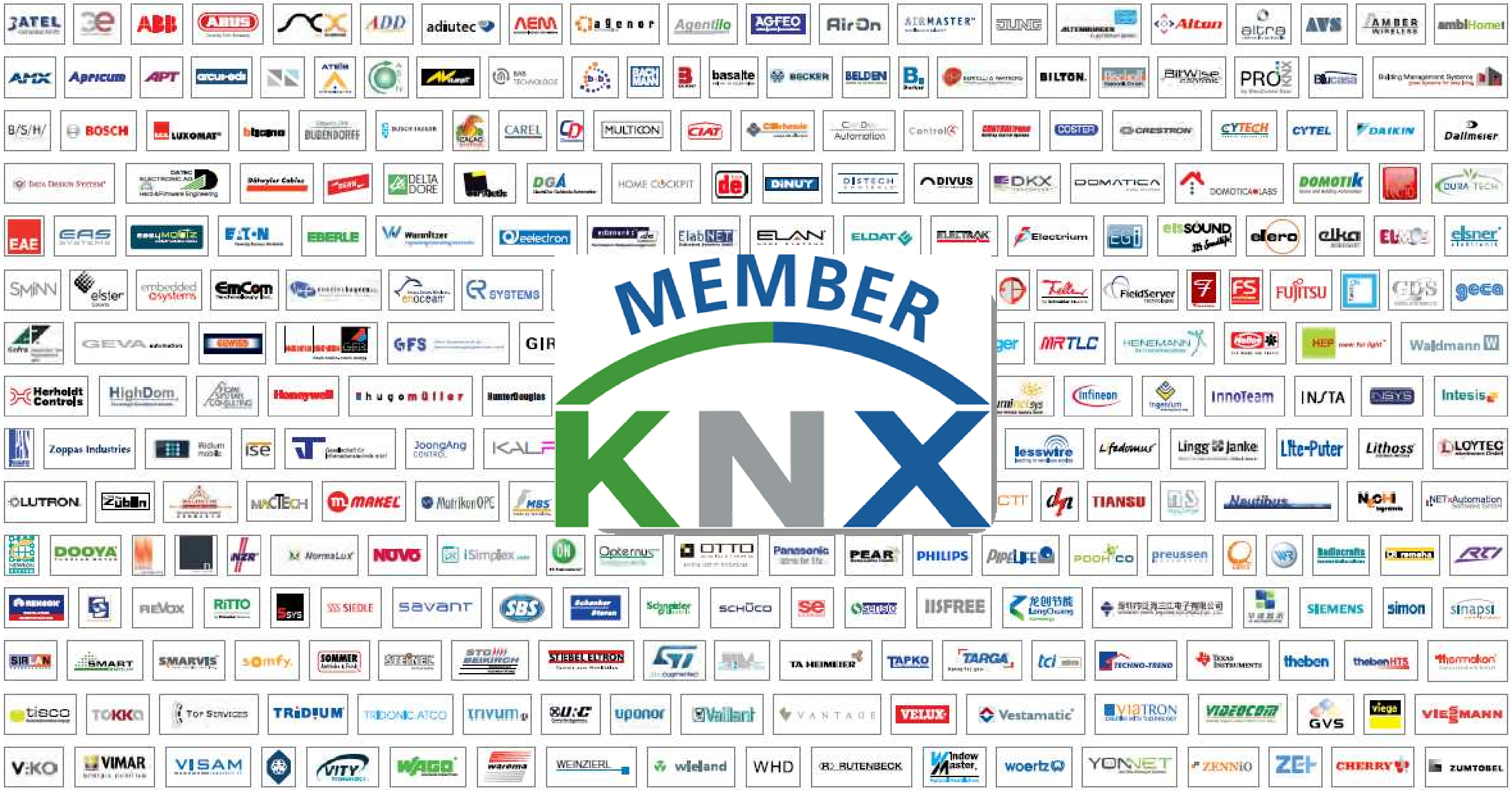
2. KNX is completely FREE of additional royalty fees: No IPR royalties to be paid for KNX standard features used in KNX certified products to other KNX members



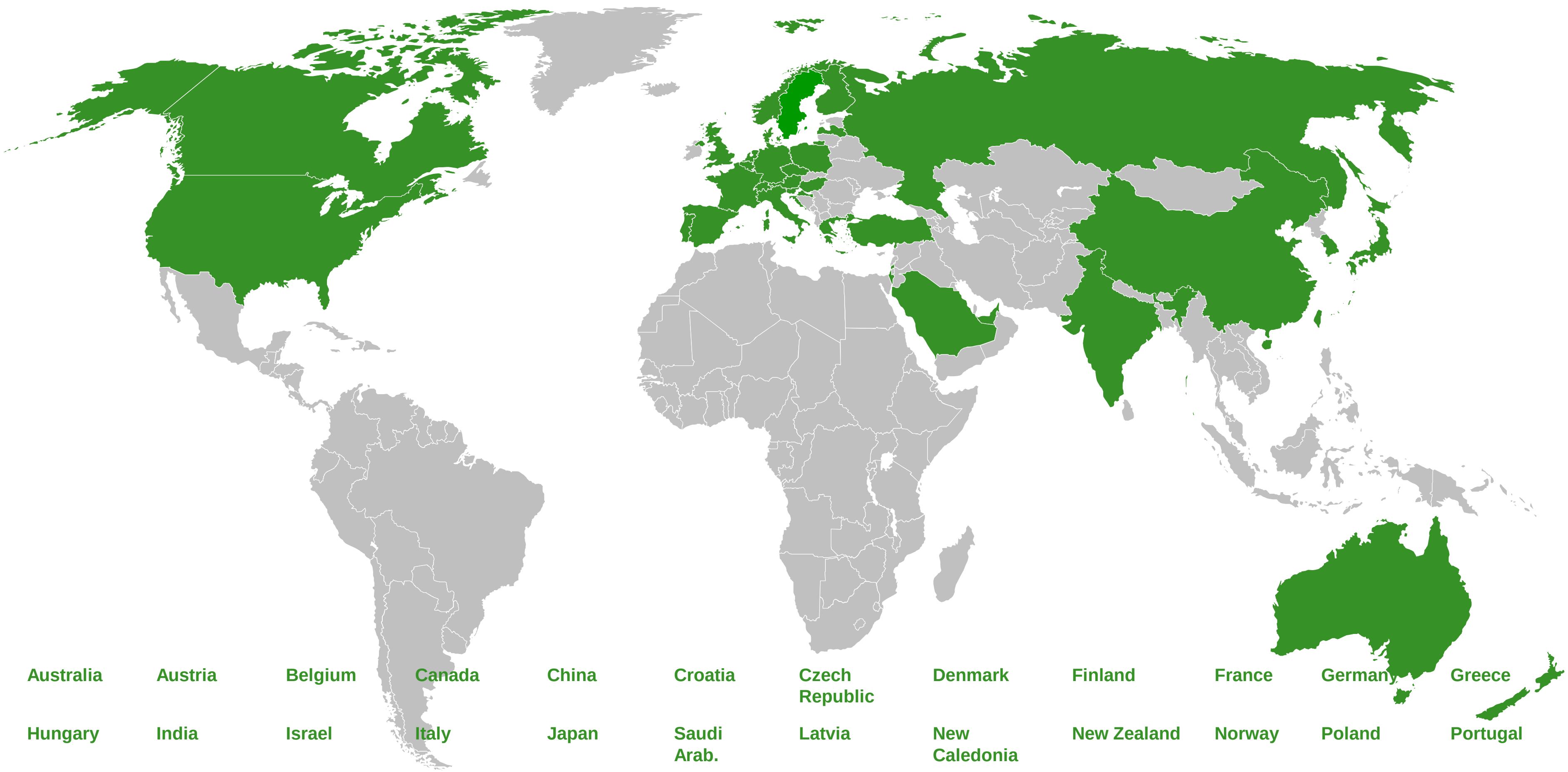
Facts and Figures 2013.12

www.knx.org

332 Members in 37 countries

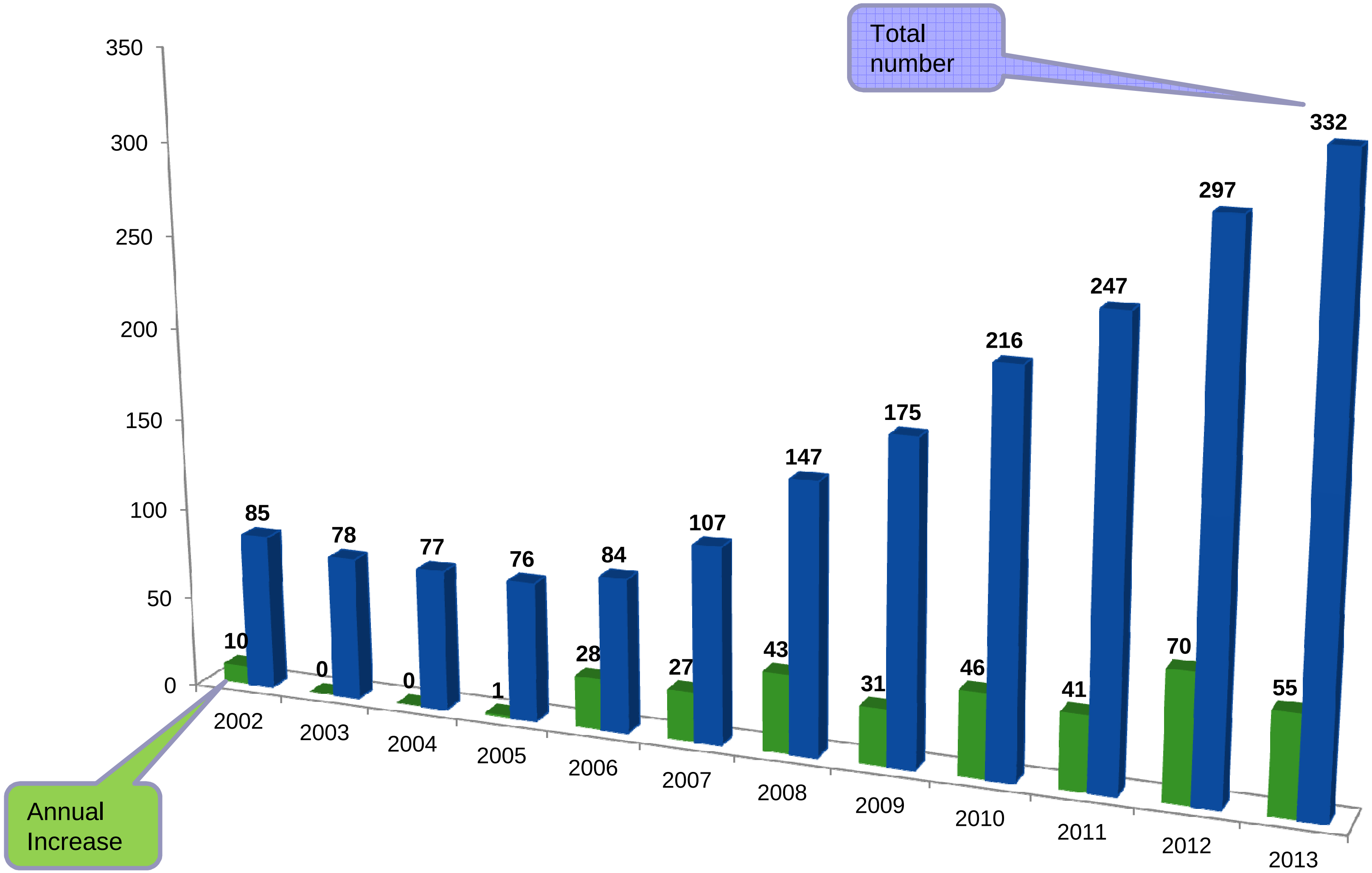


332 Members in 37 countries



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
85
78
77
76
84
107
147
175
216
247
297
332
10
0
0
1
28
27
43
31
46
41
70
55

More than 7000 certified KNX Devices





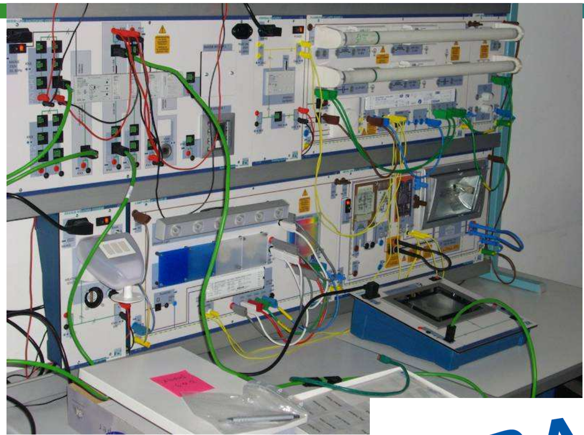




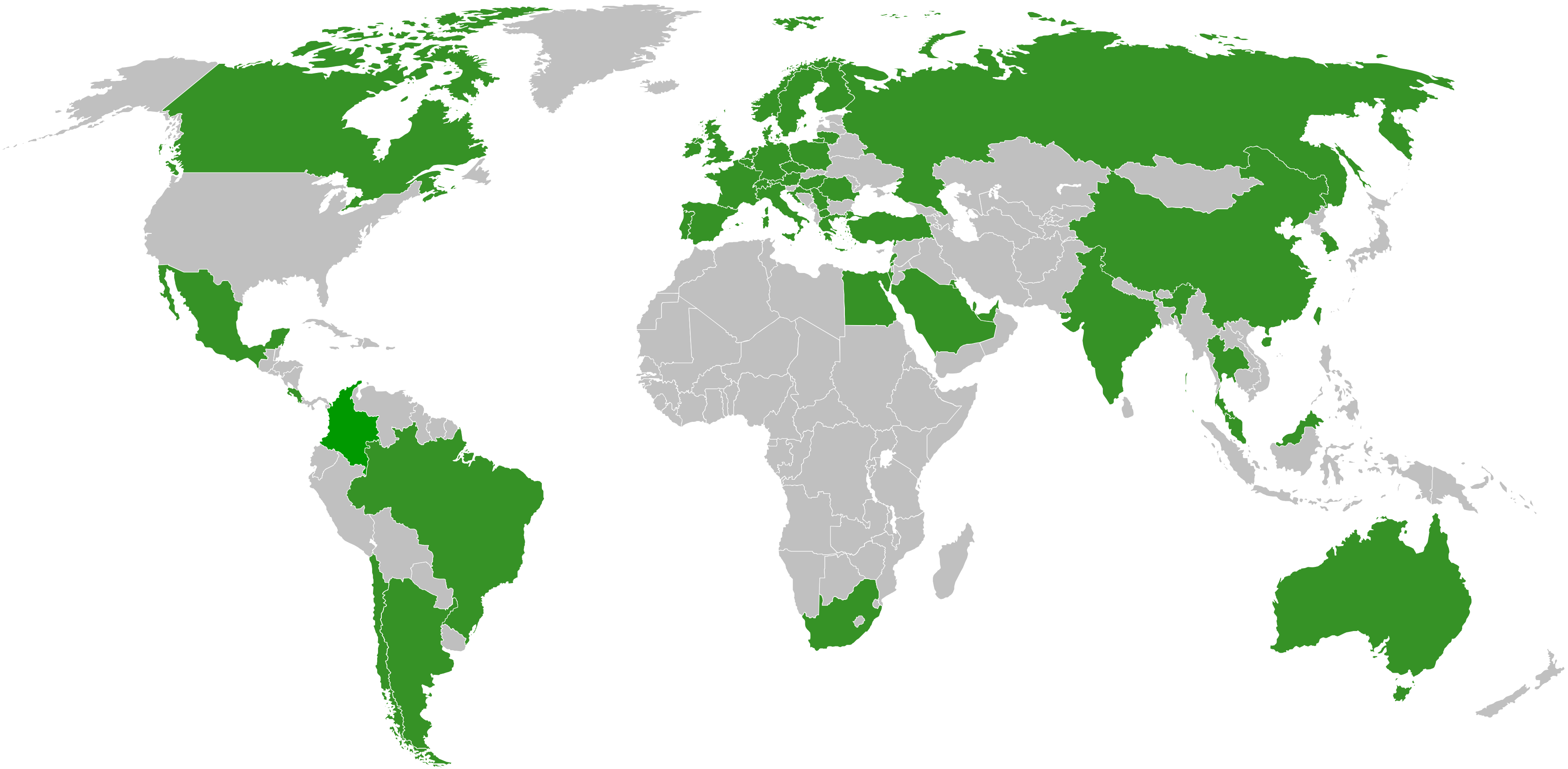




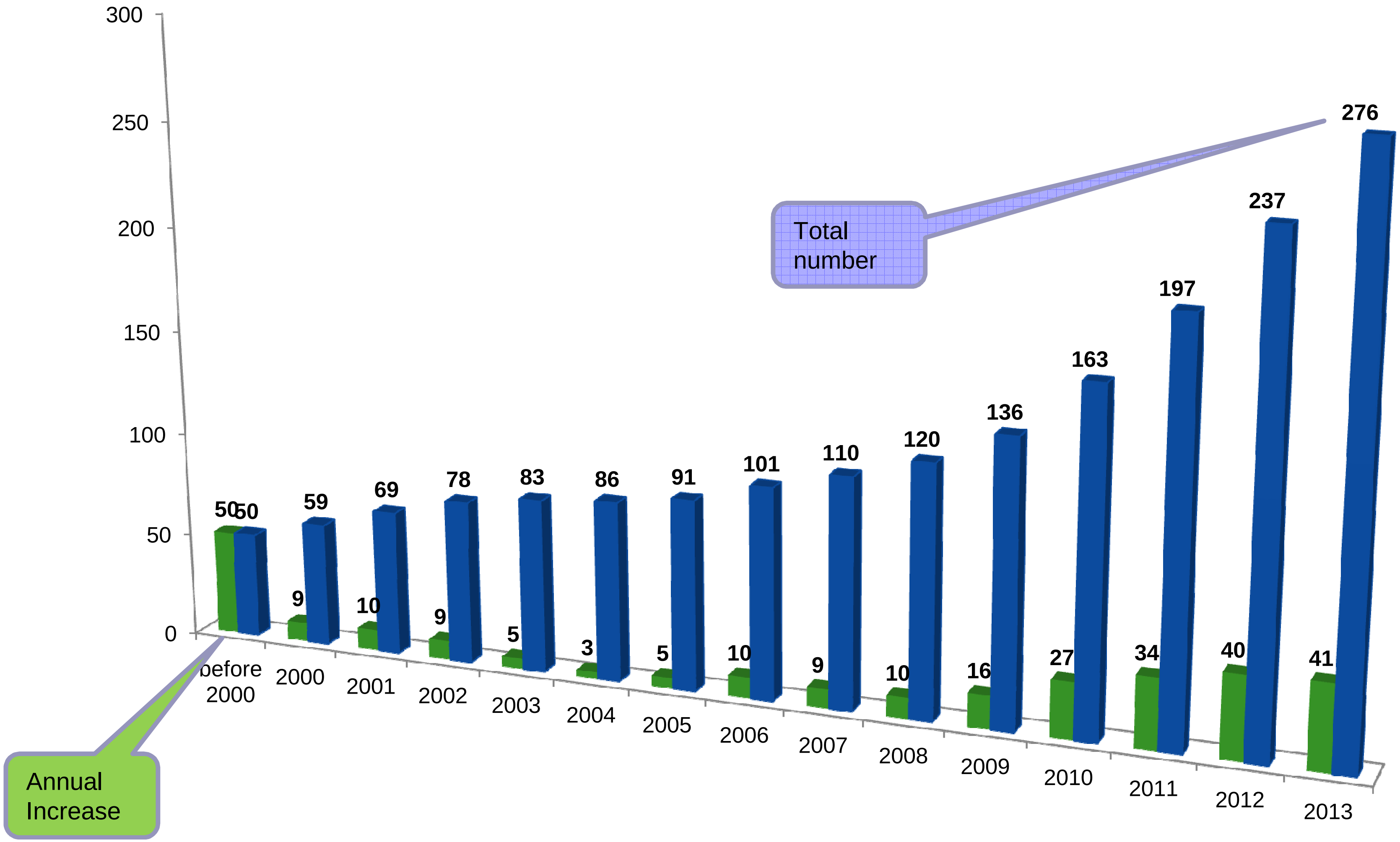
276 Training Centres in 51 countries



276 Training Centres in 51 countries



KNX Training Centres



40090 Partners in 125 countries

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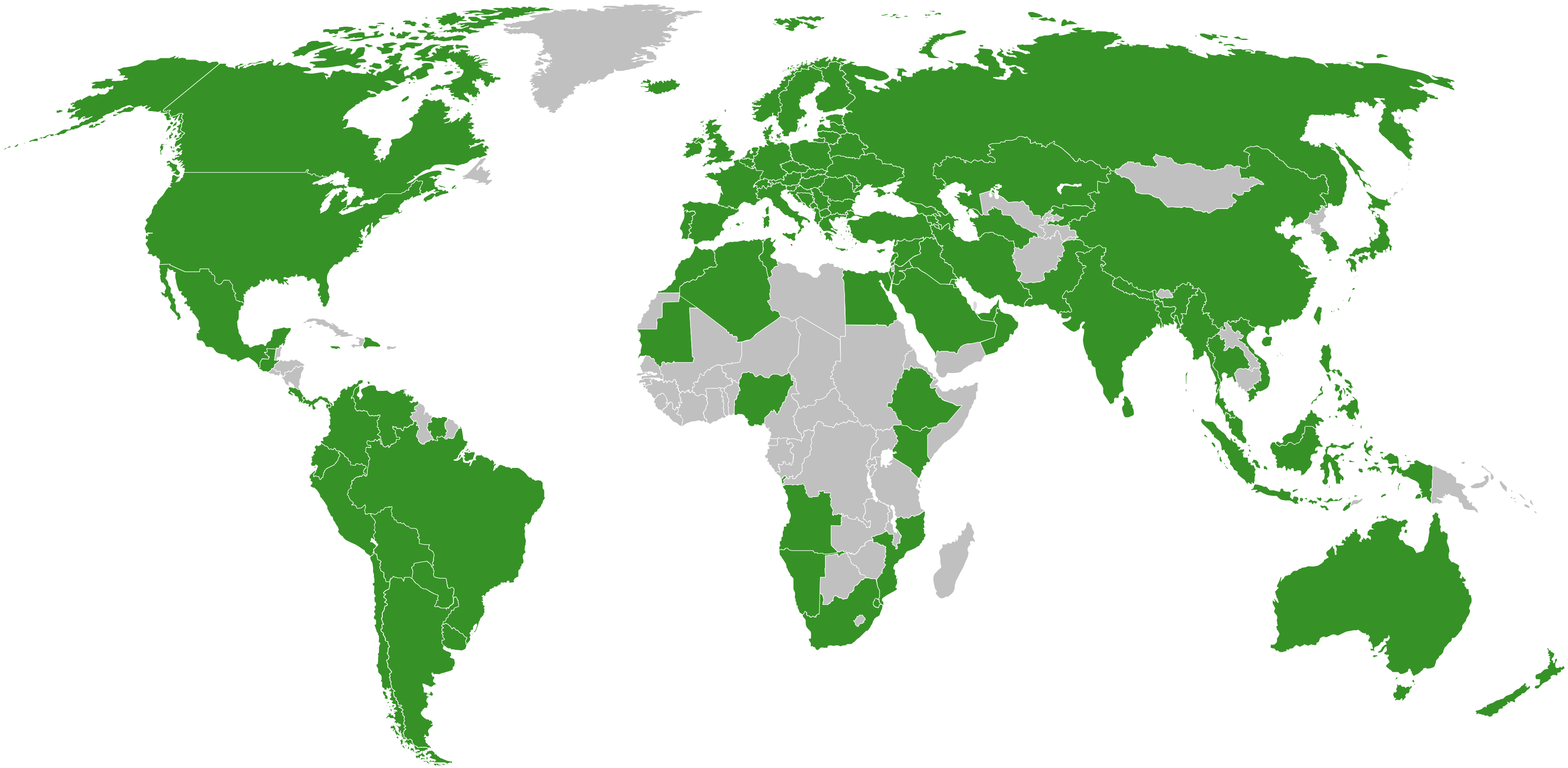

KNX Partners

98 Scientific Partners in 28 countries

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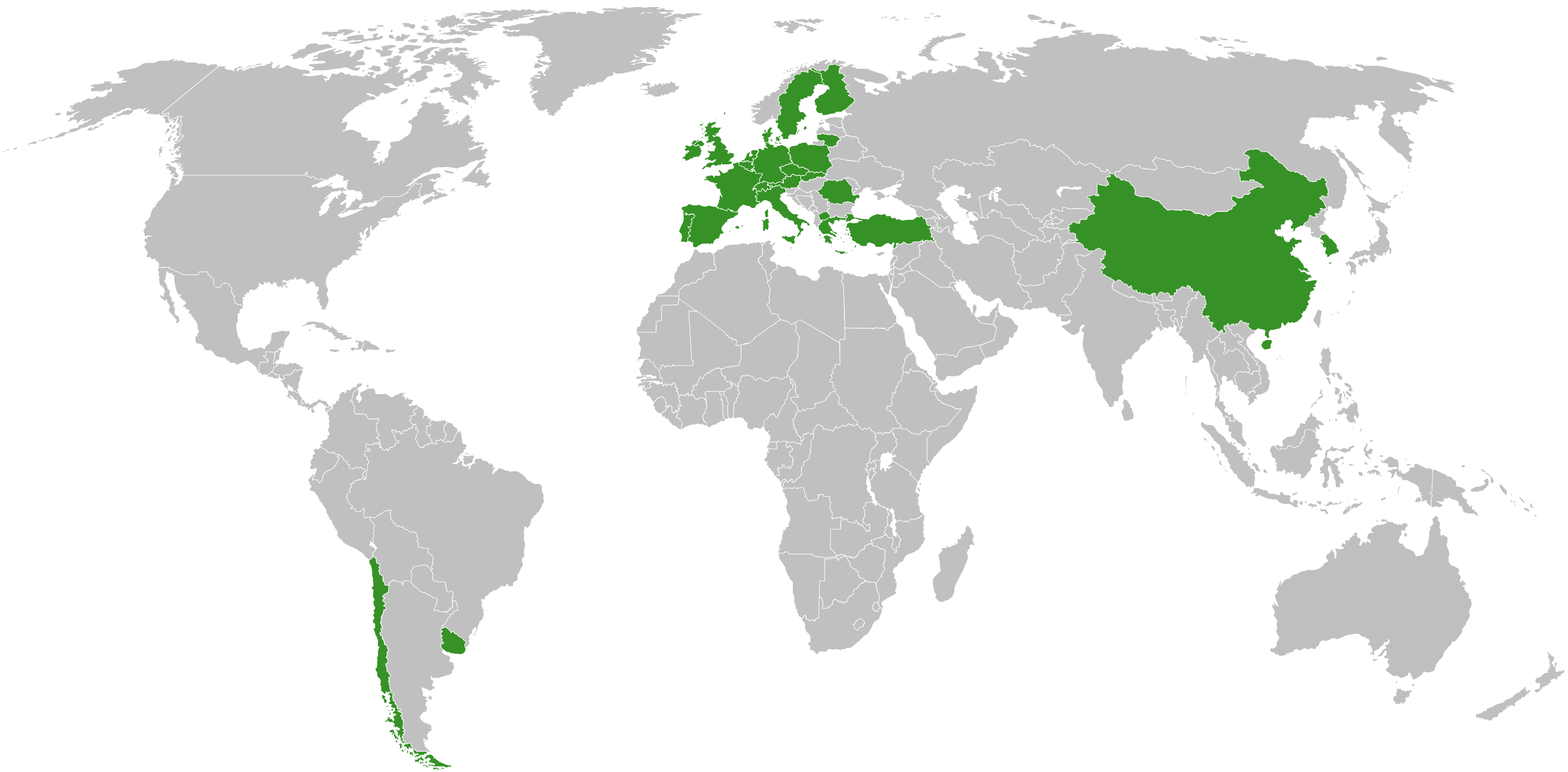
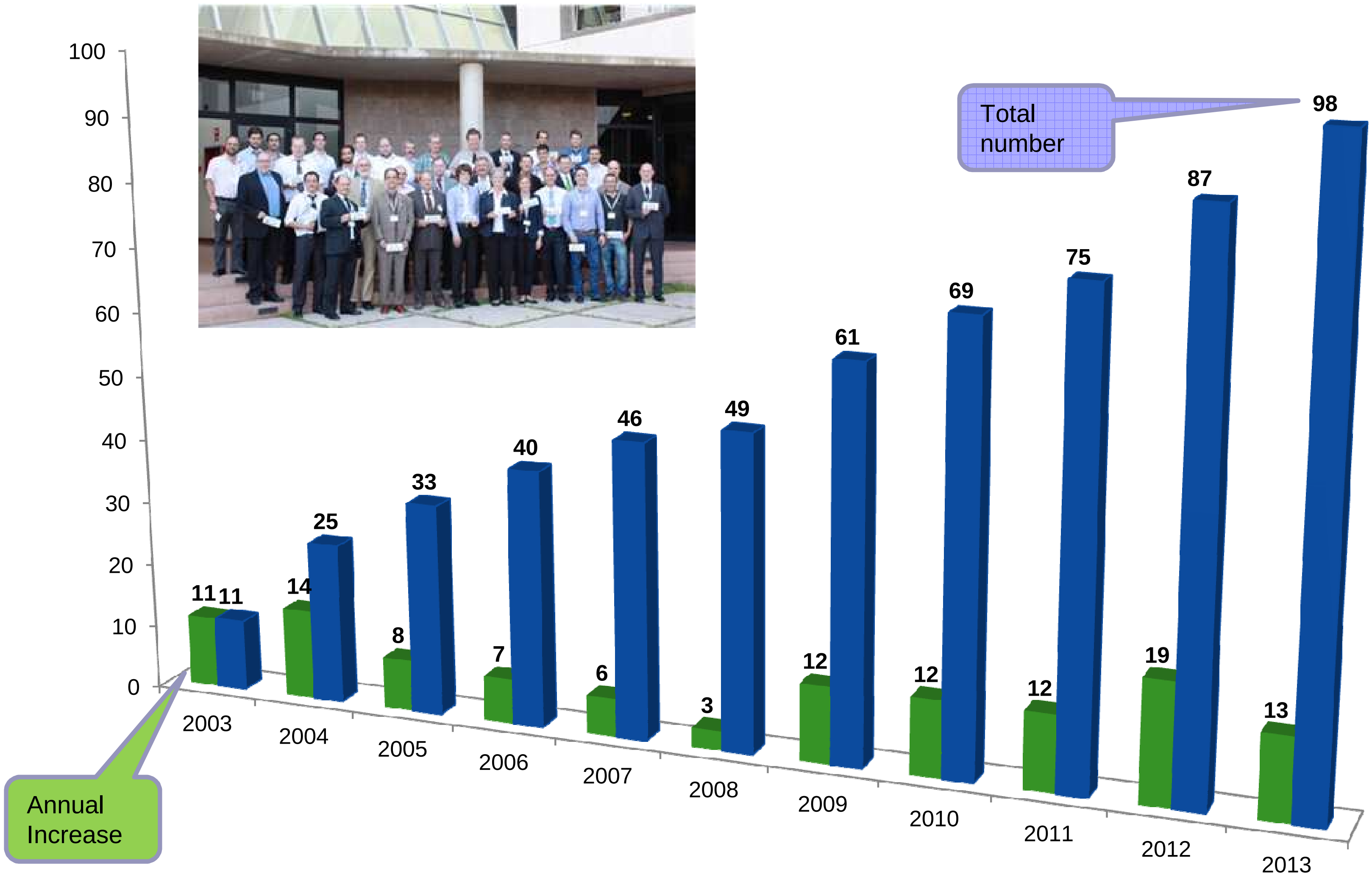


KNX Scientific Partners



13 Userclubs in 12 countries

Austria

Belgium

CIS and Baltic

Croatia

Denmark

Germany

Hong Kong

India

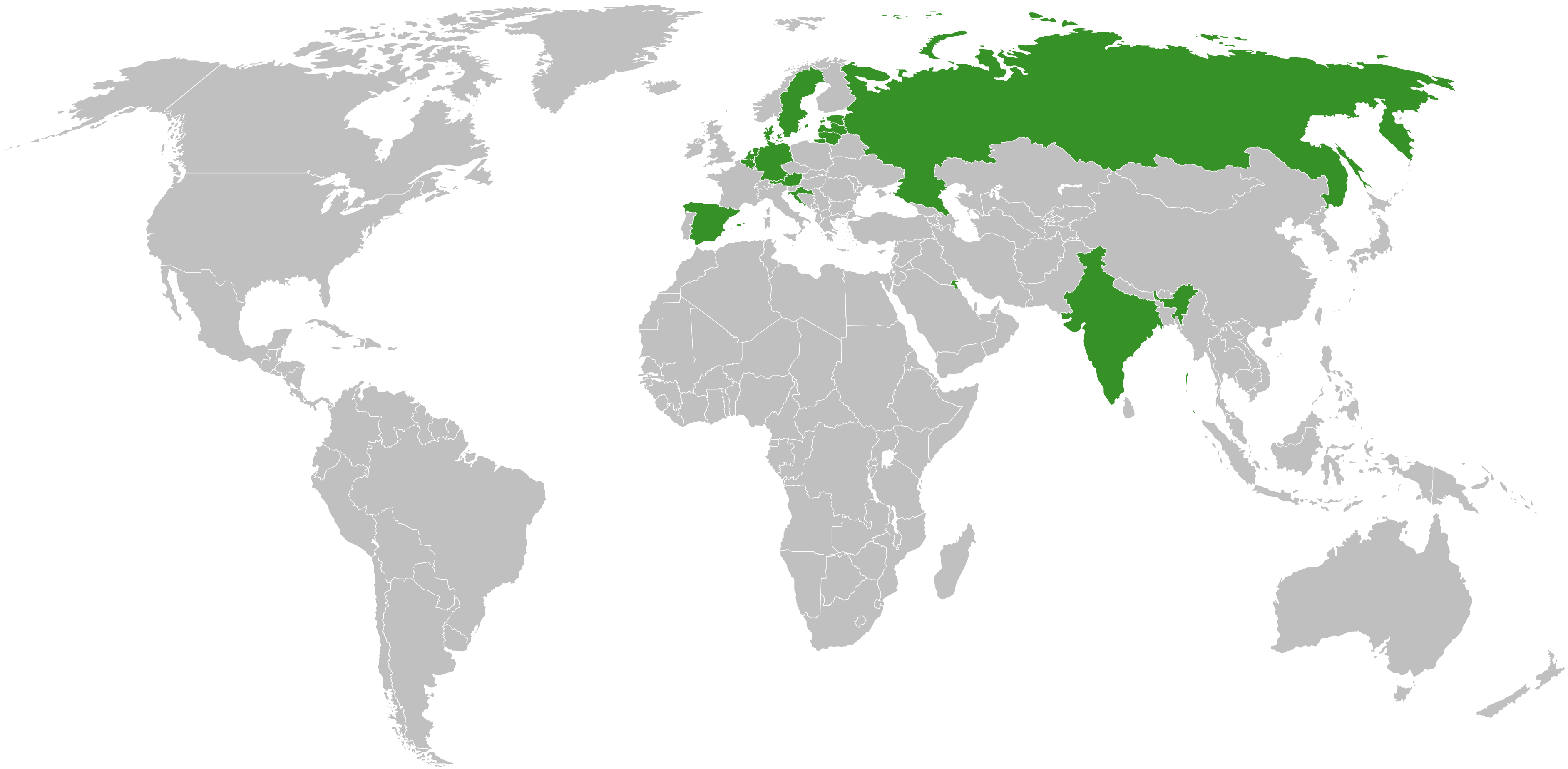
Kuwait

Spain

Sweden

The Netherlands

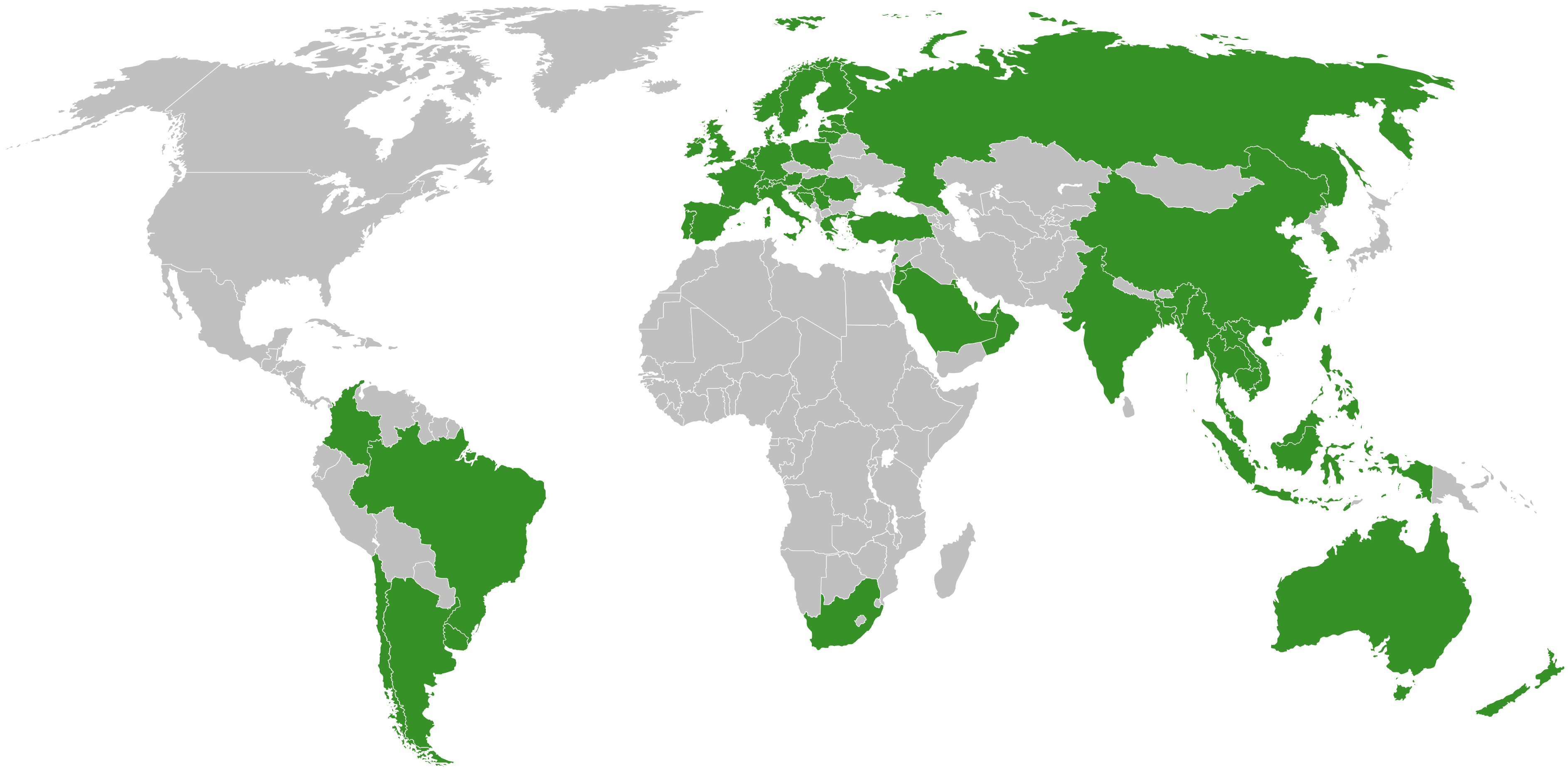
13 Userclubs in 12 countries



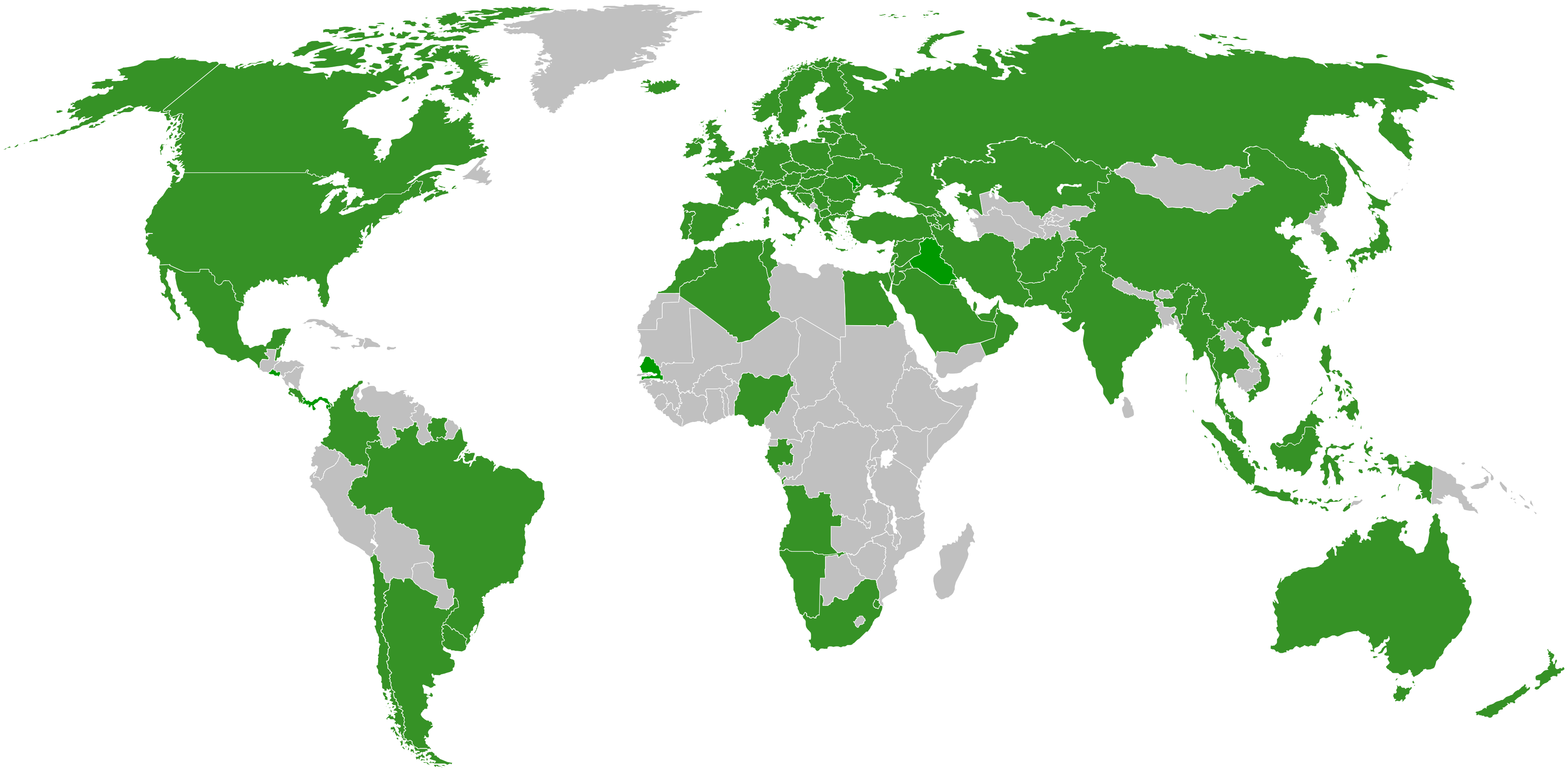
7 Associated Partners

Local represenation of KNX: 40 KNX National Groups

40 KNX National Groups



ETS Sold in more than 120 countries



KNX Facts & Figures December 2013

- **332 KNX Members in 37 countries**
- **7000 certified product groups**
- **40090 KNX Partners in 125 countries**
- **275 Training Centers in 51 countries**
- **98 Scientific Partners in 28 countries**
- **13 Userclubs in 12 countries**
- **7 Associated partners**
- **40 National Groups**
- **ETS sold in more than 120 countries**

Join the worldwide KNX community

PARTNER KNX

ASSOCIATED KNX

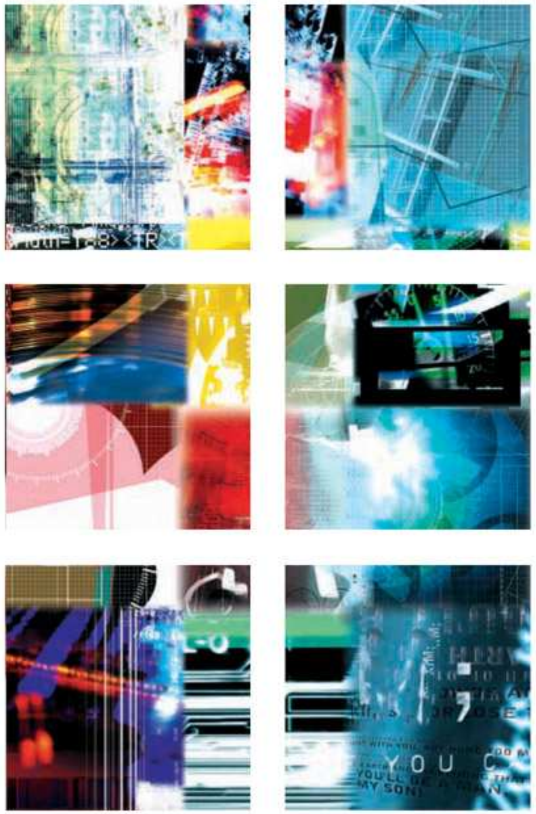
USERCLUB KNX

MEMBER KNX

NATIONAL KNX

SCIENTIFIC KNX

TRAINING KNX



www.knx.org

KNX city

New business opportunities

From the KNX building to the KNX city

- Buildings are responsible worldwide for…

  …40% of the consumption of final energy

  …21% of the production of greenhouse gases

  …an increasing demand for energy

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)*

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

Energy efficiency in Guarda Polytechnic Institute

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

Nerocubo Hotel in Italy

Improved energy balance in insurance company (Prague)

From the KNX building to the KNX city

- Cities are worldwide responsible for…
  - ...two third of the total energy consumption
  - … 60% of the total water consumption
  - … 70% of the production of greenhouse gases

- More than 50% of the world population live already today in metropolitan areas
  - ➔ Until 2050 it will be up to 70% of the world population

KNX has its focus in the building…

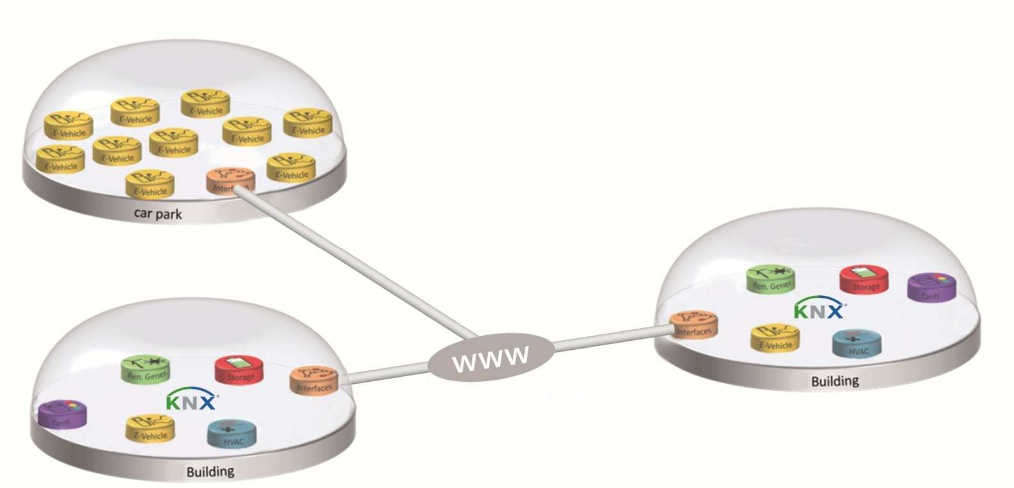
… but considers Smart Grid and city issues

- 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. decentralized 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**

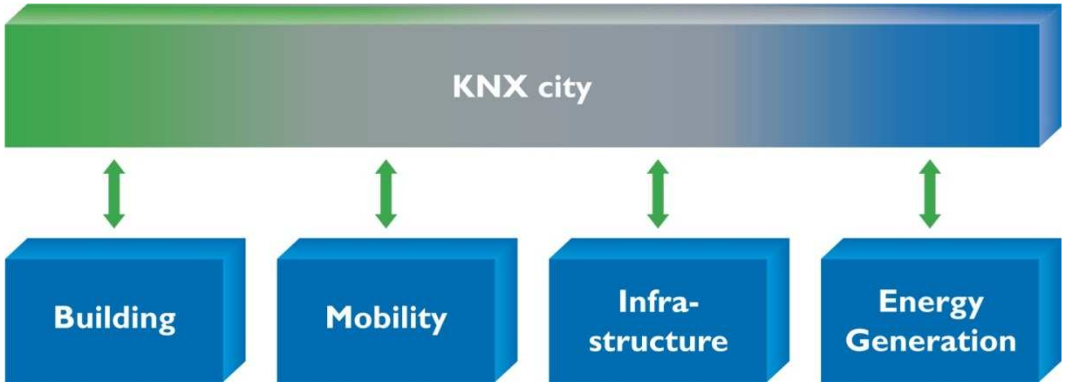
KNX city distributed facilities

- 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.



From the building to the KNX city

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

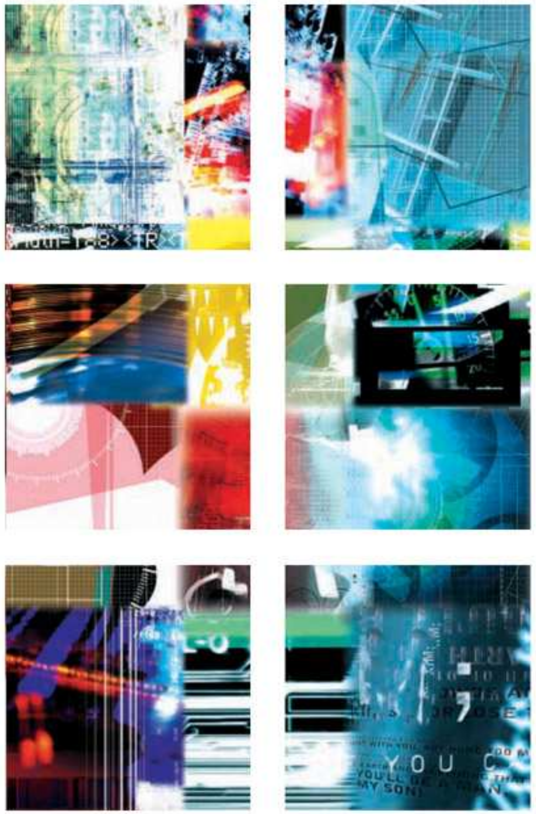


KNX city

KNX city - Taiwan

KNX city - China

KNX



www.knx.org

KNXのご紹介

インターテックリサーチ株式会社
KNX Partner No.44768

１．KNXとは
２．KNXの特徴
３．KNX協会の特徴
４．KNXの用途
５．KNXの仕様
６．KNXの開発ツール
７．KNXの適用事例
８．KNXのアジアにおけるプレゼンス
９．KNXに関する補足

１． KNXとは

- KNXは、過去十数年欧州で培われてきた、設備系オープンネットワーク標準のEIB（European Installation Bus）、ホームオートメーション標準のEHS（European Home System)、およびフランスで生まれたHVACネットワーク標準のBatiBUSが集大成されたもの
- 1999年5月、上記の３つの標準の策定機関が合併し、ベルギーに本拠を置く営利団体KNX協会が発足
- 2002年にKNX仕様として公開
- KNXは、ホームオートメーション／ビルオートメーション用の、ネットワーク層とアプリケーション層にまたがる規格
- EIB のプロトコルスタックを基本として、物理層、構成モード、アプリケーション層などに BatiBUS や EHS からの機能拡張が施されている

１．KNXとは

現在では以下の通り、世界各国の標準に認定されているとともに、国際標準にもなっている：

- CENELEC：2003年、KNXの通信プロトコルとツイストペア（TP）及びPLCの伝送メディアが欧州標準EN 50090に認定される
- ANSI/ASHRAE：2005年、KNXとBAC netのmappingが米国標準ANSI/ASHRAE 135に認定される
- CEN：2006年、KNXのビルオートメーション制御システムが欧州標準EN 13321-1に、KNXnet/IPプロトコルがEN13321-2 に認定される
- ISO/IEC：2006年、KNX Protocol&mediaが国際標準ISO/IEC 14543-3に認定される
- 中国国家標準化管理委員会：2007年7月、KNXを中国の国家標準GB/Z 20965に認定。更に2013年4月、GB/T 20965-2013に昇格させた

２．KNXの特徴

- 種々の伝送メディアで利用可能
- 幅広い用途
- 幅広い適用範囲
- 新築ばかりでなく既築家屋・ビルの自動化
- 簡易インストールモードとシステムインストールモード
- ETS：KNXデバイスの開発者、認証機関、実際に設置するインストーラーが同じツールを利用
- ゲートウェイデバイス経由で、他のビルオートメーションシステムやマルチメディア・ネットワークなどと接続実績
- 現在15カ国対応のETS(日本語にも対応予定）
- KNX は特定のハードウェアプラットフォームに依存した設計になっていないので、8ビットのマイクロコントローラやパーソナルコンピュータで実装可能

３．KNX協会の特徴

- EIBAEIBの策定機関）、EHSA（EHSの策定機関）、およびBCI（BatiBUS Club International）が1995年5月合併して出来上がった
- ベルギーに本拠を置き、世界各国にあるKNX national groupsを通じて、KNXを普及させ、協会員のメンバシップ費、KNX技術及びKNXソフトウェアツールのライセンス費、およびKNX製品の登録／認定費用から収入を得る営利企業である
- KNXテストラボ（現在6か国10社）で認定され、KNXのロゴが付いたすべての製品間での相互運用性およびシステムの互換性が保証されている
- ISO9001を取得したメーカーのみにしか、KNXロゴのついた製品提供を許可しない
- KNX協会のメンバは実装のためのリソースもロイヤリティ•フリーで利用できる

３．KNX協会の特徴

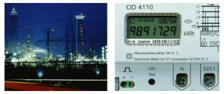
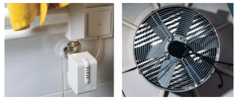
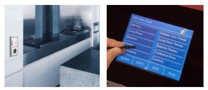
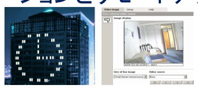
KNX関連組織は驚異的なスピードで全世界に広まっている：

- 平成24年7月調査時点でKNX協会のメンバは、31カ国、260社（日本ではダイキンとパナソニックの2社）となっていたが、平成25年8月時点では、34カ国、318社（日本では、ダイキン、パナソニックと富士通ジェネラルの3社、米国メンバもTexas Instruments社など11社）に増えている
- 平成24年7月調査時点でKNX協会のトレーニングセンターの数は43か国222施設となっていたが、平成25年8月時点では、49カ国、261施設に増えている
- 平成24年7月調査時点でKNX協会のパートナーは、112カ国、29612人となっていたが、平成25年8月時点では、121カ国、37806人に増えている
- 技術系大学などのサイエンティフィックパートナーは、60拠点から27カ国96拠点に増えている
- 平成24年7月調査時点でKNX National Groupの数は25だったが、平成25年8月時点では、36に増えている

４． KNXの用途

一般家屋用途	説明
照明の制御	● 室内や庭の照明の中央制御 ● 照明シナリオの選択や、個々の照明の調光
ブラインド／シャッター制御	● 風雨や日差しに覆う自他ブラインド／シャッターの上げ下ろし ● 日程計画に沿ったブラインド／シャッター制御
空調制御	● 部屋の用途や住人に応じた空調の最適制御
AV制御	● 家中のどこからでもAV制御 ● 各部屋でのAV制御
利用状況の見える化	● 壁掛けの表示板に家中のすべてのシステムの利用状況を表示 ● オーディオシステムや監視カメラの統合・見える化
セキュリティ・安全	● 窓や扉の開閉・破損・不法侵入者、煙探知時のレポート ● 玄関のカメラ監視 ● 家中の電気を点灯して不法侵入者を阻止 ● タイマーでブラインドや照明を制御し在宅しているように見せかけ

4． KNXの用途

商業ビル用途	説明	
エネルギー管理 	・ピーク需要監視／負荷分散 ・メータリング／ネットワーク監視	・データロギング ・見える化
照明設備制御 	・On/Off、調光制御 ・自動照明、定常照明、タイマー制御	・採光シーン ・DALIゲートウェイ
ブラインド／シャッター制御 	・グループごとのOn/Off集中制御 ・プリセット位置への設定 ・日差し追従	・自動プログラム、風雨からの保護 ・安全モード、SMIゲートウェイ
空調制御 	・個別部屋制御、中央自動制御 ・タイマーによる制御	・フロアヒーティング ・安全プログラム　その他
セキュリティ・安全 	・不法侵入 ・煙探知 ・出入り口監視	・予防技術 ・障害監視
利用状況の見える化 	・タッチパネル／表示パネル ・スイッチ／プッシュボタン制御	・IRリモート制御／PCでの見える化 ・Webサーバ、WAP、PDA
オートメーションとリモートアクセス 	・論理機能 ・時間指定機能 ・システムの監視・監督	・インターネットアクセス ・遠隔制御、リモートプログラミング

５． KNXの仕様

KNXは国際標準・欧州標準なので、ISO/IECやCENELECから入手可能。

KNX協会ではKNXハンドブック（CD）として、€1,000で販売

2013年12月公開されたVersion2.1の構成は以下の通り：

- Volume 1: Primer (*not complete)
- Volume 2: Cookbook
- Volume 3: System Specifications
- Volume 4: Hardware Requirements
- Volume 5: Certification Manual
- Volume 6: Profiles
- Volume 7: Application Descriptions
- Volume 8: Conformance Testing
- Volume 9: Basic and System Components
- Volume 10: Specific Standards

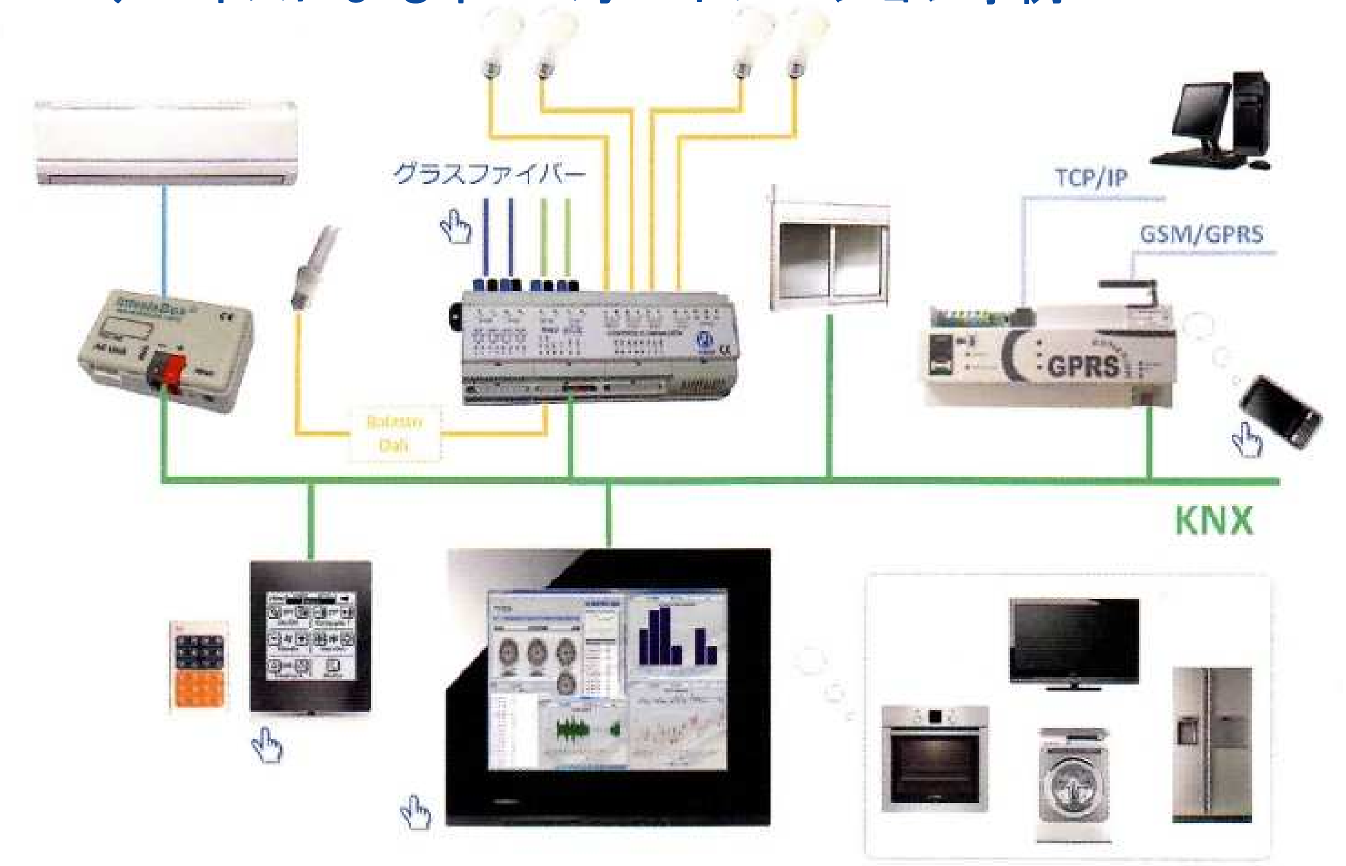
６． KNXの開発ツール

KNX協会で開発・提供しているツール

	• ETSは、KNXの前身の設備系オープンネットワーク標準であるEIB（European Installation Bus）のころから使われてきたツールで、ETSを使うことにより、ホームオートメーション／ビルオートメーション設計・開発を容易に行うことができる。 • KNX準拠の製品データベースをインポートすることで、それらを部品として、ホーム／ビルの回路設計ができる。 • ETSが作動するPC上で回路設計した内容（各KNXデバイスの動作を規定するプログラム）をKNXデバイスにダウンロードできる。 • KNXシステムに不具合がある場合に、KNXバスに流れる電文をモニタして、不具合の診断にも利用できる
	• KNXネットワークにアクセスするDCOMベースのバスアクセスシステムを設計するC++/VB開発者向けツール。 • Falconドライバー・ライブラリを提供。
	• KNX製品インストーラーや製品開発者向けの、KNXデバイスやKNXベースのホームオートメーション／ビルオートメーションシステムの振る舞いの分析テストツール。 • KNXデバイス認証機関でも使用される。 • トラブルシューティングやモニタリングにも利用できる。

７． KNXの適用事例

KNXデバイスによるホームオートメーション事例



7．KNXの適用事例

KNXデバイスによるビルオートメーション事例

８．KNXのアジアにおけるプレゼンス

- 2003年、韓国のAjou Universityでは、KNXベースのホームオートメーションシステムと韓国のJung製品を使ったホームオートメーションの実証試験を実施
- 2003年、ロシアにKNX National Group Russiaを設立され、KNX標準の普及に尽力してきた結果、2007年時点でモスクワにKNXトレーニングセンターも2箇所できた
- 2006年5月28-30、北京にて第2回Euro – China Workshop 2006が開催され、KNXベースのEN50090欧州標準とビルオートメーションシステムについて議論された
- 2007年5月、KNXベースの製品開発に関する強い要望により、KNXの設計＆試験ツールであるETSの中国語版ETS3.0eがリリースされた
- 2007年6月、KNXシベリアが開設された
- 2007年、韓国Hanyang UniversityのUbiquitous Network System Laboratoryでは、ホームオートメーションの研究でKNXを採用。下位の通信プロトコルには802.15.4あるいはZigBeeを用いた実験を検討中

８．KNXのアジアにおけるプレゼンス

- 2007年11月、KNXが中国のホーム／ビルオートメーションの国家標準化指導性技術書（GB/Z 20965）に認定され、KNX協会に所属する中国の企業が出てきた
- 2008年7月、KNXチャイナが設立される
- 2008年9月、ABB i-bus® KNX intelligent installation systemを採用したシンガポールのビル2棟が2008年のKNX awardにノミネートされた
- 2009年4月、150番目のKNX協会メンバとしてダイキン工業が参加
- 2010年、Joong Ang Control Co., Ltd.が韓国で最初のKNXメンバとして登録された
- 2010年、ABBがインド国内企業にKNX技術を広めるため、KNXトレーニングセンター開設。ABBは2004年からインド国内でKNX関連プロジェクトを手がけており、2010年までに120以上のプロジェクトでKNXが採用された
- 韓国の2009 World Standards Day Ceremonyで、KNX標準を採用したSiemens Ltd. Seoulに外資系企業としては初めてPresident's Award for national standardizationが授与された

８．KNXのアジアにおけるプレゼンス

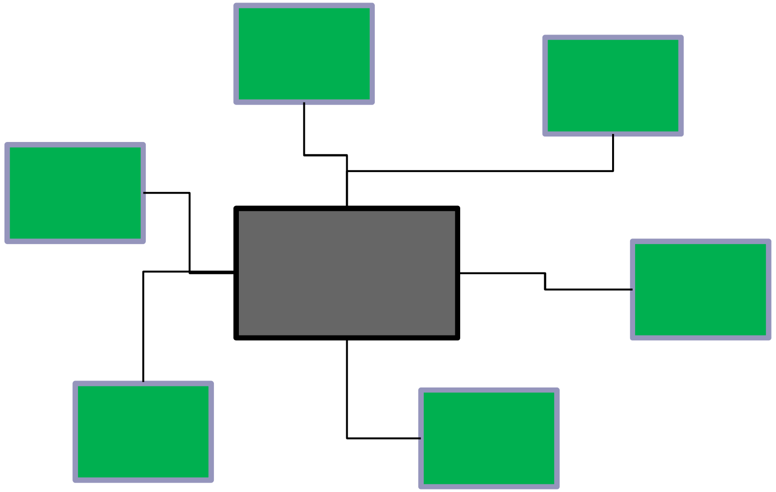
- KNXを採用したモスクワのインテリジェントビル：Moscow International Business Centerに対してKNX Award が授与された
- KNXを採用したインドの空港ビル：Delhi International Airportに対してKNX Award 2010が授与された
- KNXを採用しホームオートメーションを実現したソウル市内のマンション群18棟に対してKNX Award 2010が授与された
- 2011年1月、ソウルで第1回Korean Forum of KNX Technology and Application for Home and Building Controlが開催された
- 2011年6月、シンガポールで第1回Singapore Forum of KNX Technology and Application for Home and Building Controlが開催された
- 2011年11月、北京にて、KNXチャイナとSAC（中国国家標準化管理委員会）協賛で第1回KNX Forumが開催された
- 2011年、4年間中東でKNXの普及に携わってきたArmiti Trading L.L.C.がドバイで2番目のKNXトレーニングセンターに認定された
- 2011年、パナソニックがKNX協会のメンバとなった
- 2011年11月、台湾で初めてTaiwanese Forum of KNX Technology and Application for Home and Building Controlが開催された

８．KNXのアジアにおけるプレゼンス

- 2011年11月、台湾で初めてTaiwanese Forum of KNX Technology and Application for Home and Building Controlが開催された
- 2012年2月、韓国にKNX National Groupが設立された
- シンガポールでもKNX National Groupの 立ち上げが行われた
- 2012年4月25日、インドにアジアで3番目のKNX National Groupが設立された
- 台湾でのKNX National Group 立ち上げが行われた
- 富士通ジェネラルが300番目のKNXメンバとなった
- 2012年8月28日、シンガポールで2回目のSingapore Forum of KNX Technology and Applicationが開催された
- 2013年2月26日、テュフラインランドの協賛により、横浜市のテュフラインランド テクノ ロジーセンターにて第1回KNXフォーラム in Japanが開催された
- 2013年10月24日、横浜ベイホテル東急にて、日本KNX協会（KNX National Group Japan）設立に向けた「Kick-off meeting」が開催された
- 本日、日本KNX協会発足

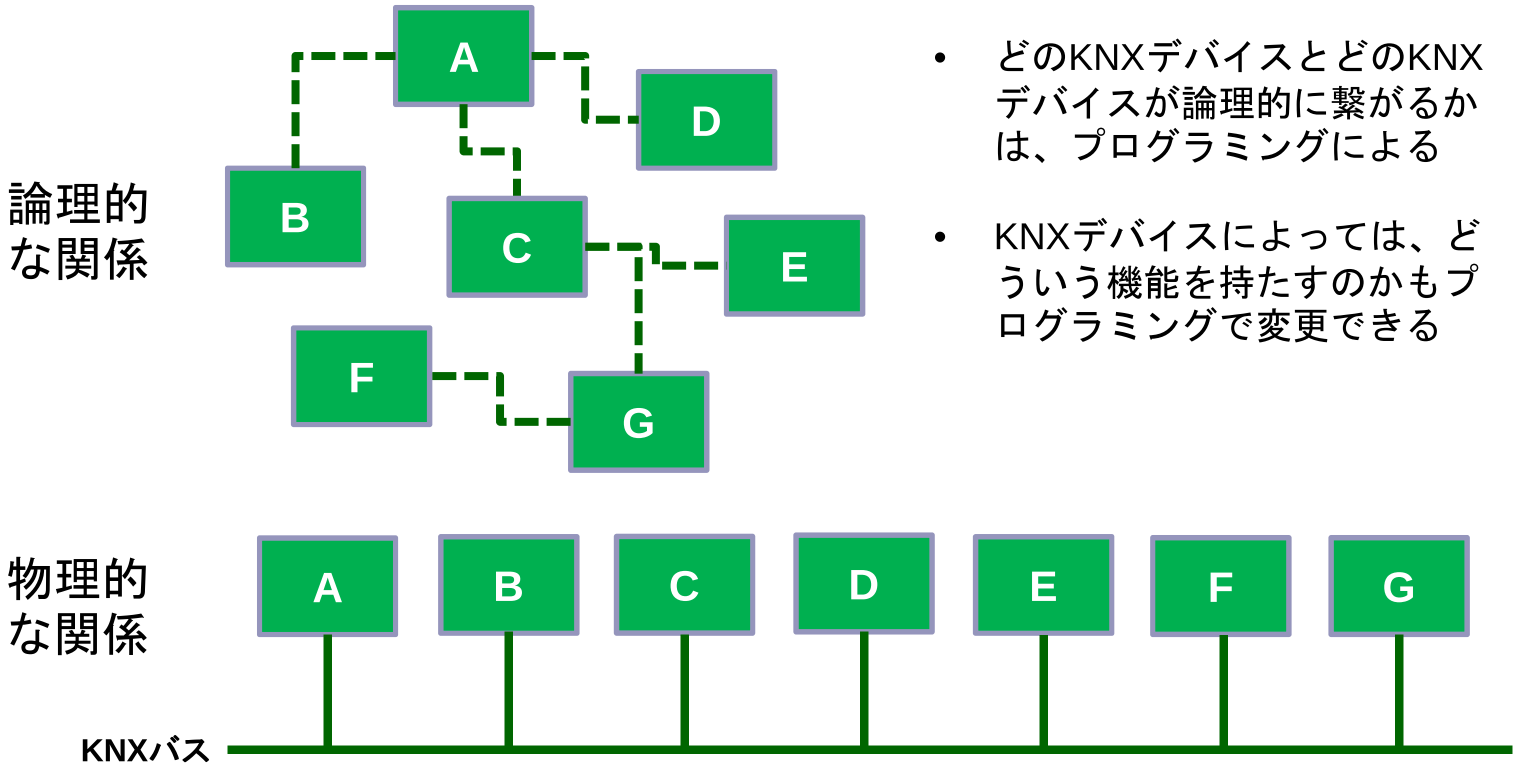
９．KNXの仕組みに関する補足

従来のBEMS／HEMS：中央集中管理



９．KNXの仕組みに関する補足

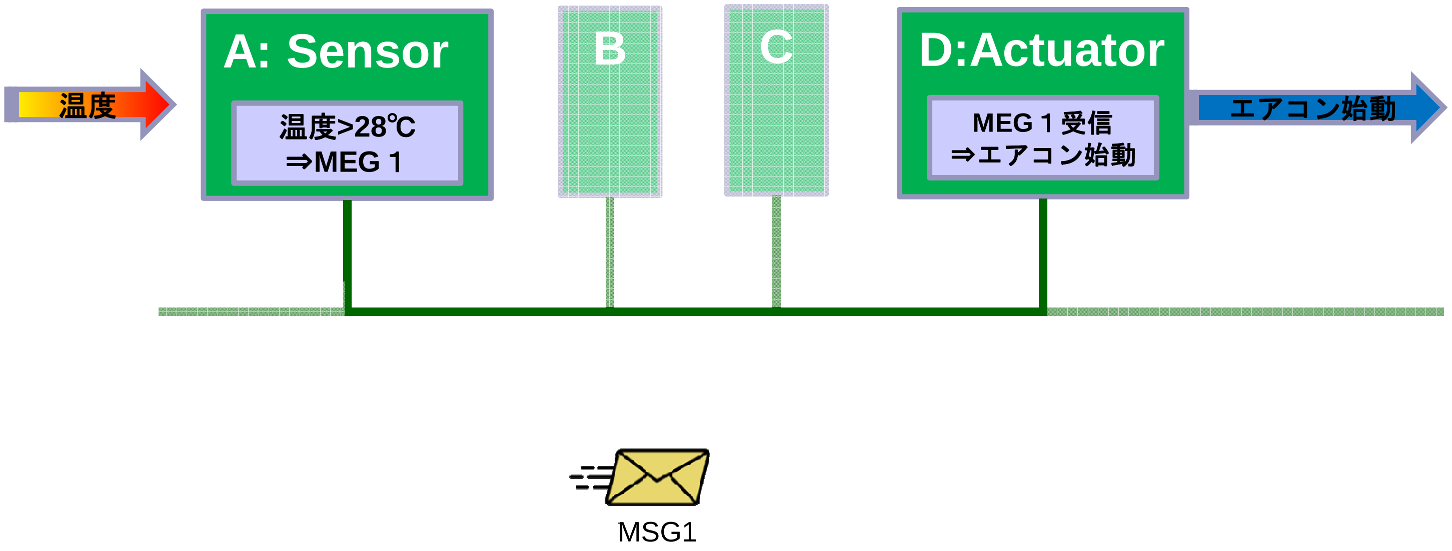
KNXでは、デバイスごとにインテリジェンスを持つ分散型



- どのKNXデバイスとどのKNXデバイスが論理的に繋がるかは、プログラミングによる
- KNXデバイスによっては、どういう機能を持たすのかもプログラミングで変更できる

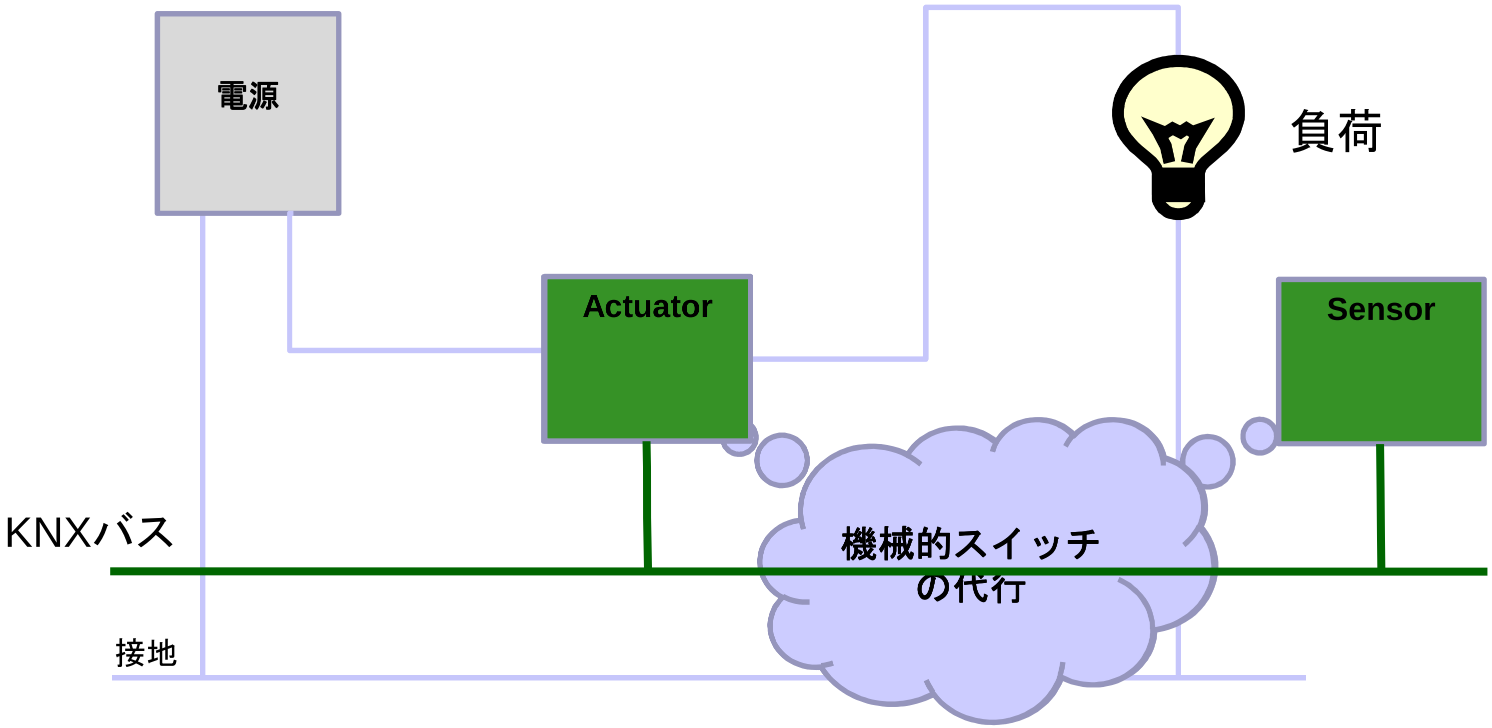
９． KNXの仕組みに関する補足

KNXの基本構成と動作



９． KNXの仕組みに関する補足

機械的スイッチをKNXデバイスに置き換える



ETS4 Demonstration

1. Introduction and System Requirements
2. ETS4 screens
3. Importing KNX product databases
4. KNX Project – Creation
5. KNX Board example
6. A real KNX Project

KNX Association International

www.knx.org

1. Introduction and System requirements

The PC software tool ETS for:

- **Engineering,**
- **Configuration and**
- **Diagnostics**

of all KNX certified products.

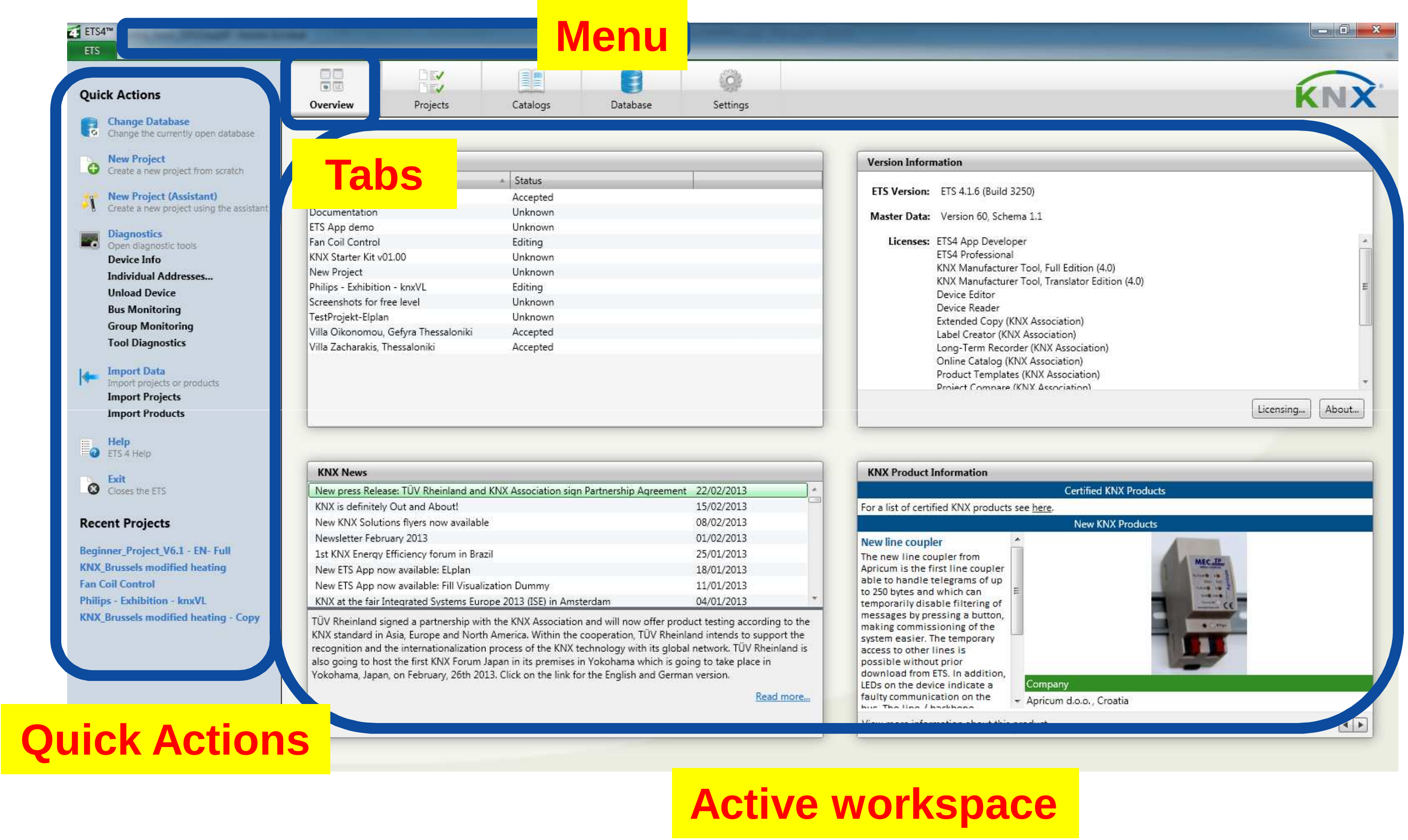
Manufacturer independent = System integrator may combine products of different manufacturers to one installation.

1. Introduction and System requirements

Operating systems (32/64 bit) officially supported :

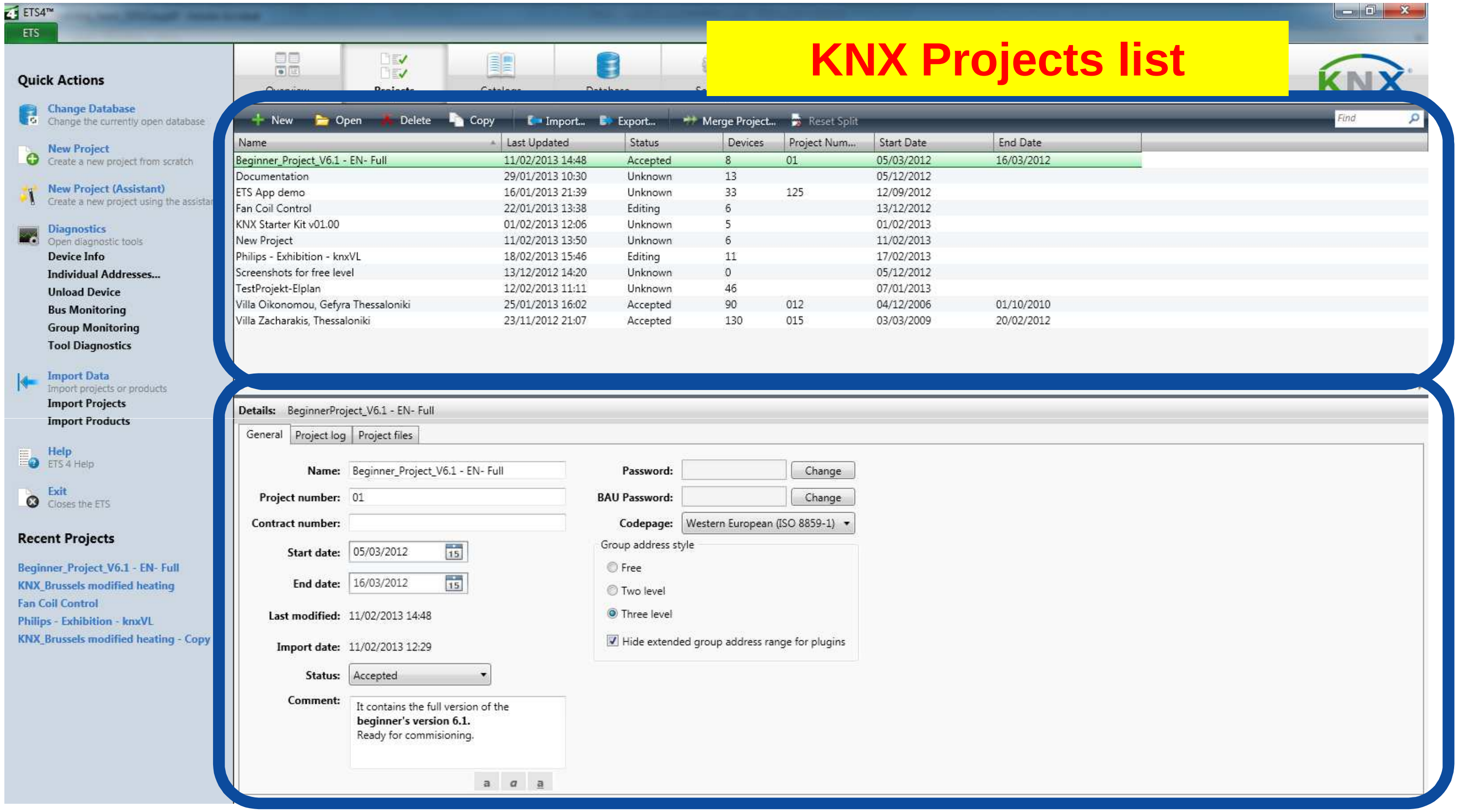
1. MS Windows XP
2. MS Windows Vista
3. MS Windows 7
4. MS Windows Server 2003/2008
5. MS Windows 8

2. ETS4 screens ：
Initial ETS4 screen and its elements



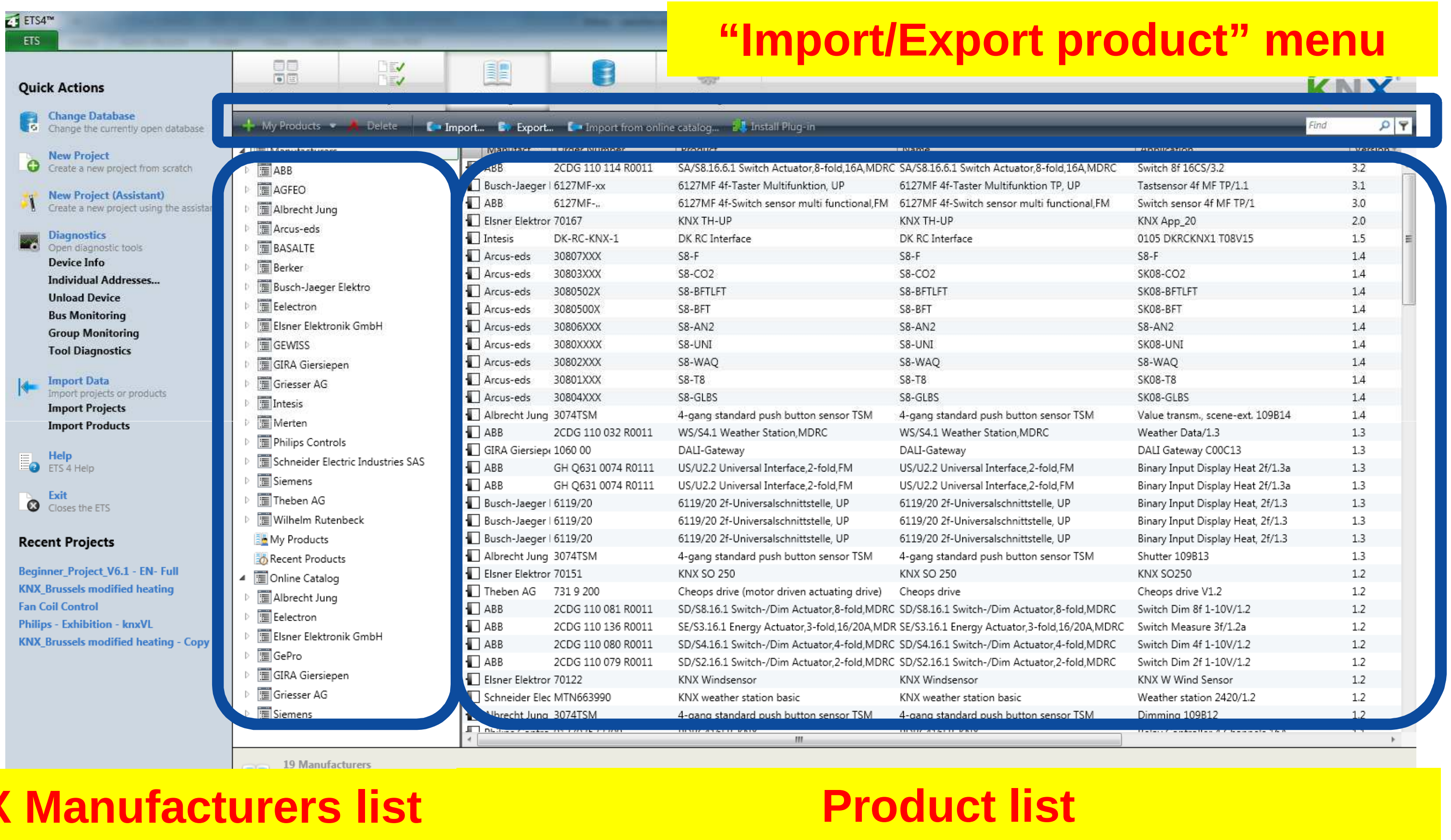
2. ETS4 screens :
Dashboard tabs – "Overview"

2. ETS4 screens :
Dashboard tabs – “Projects”

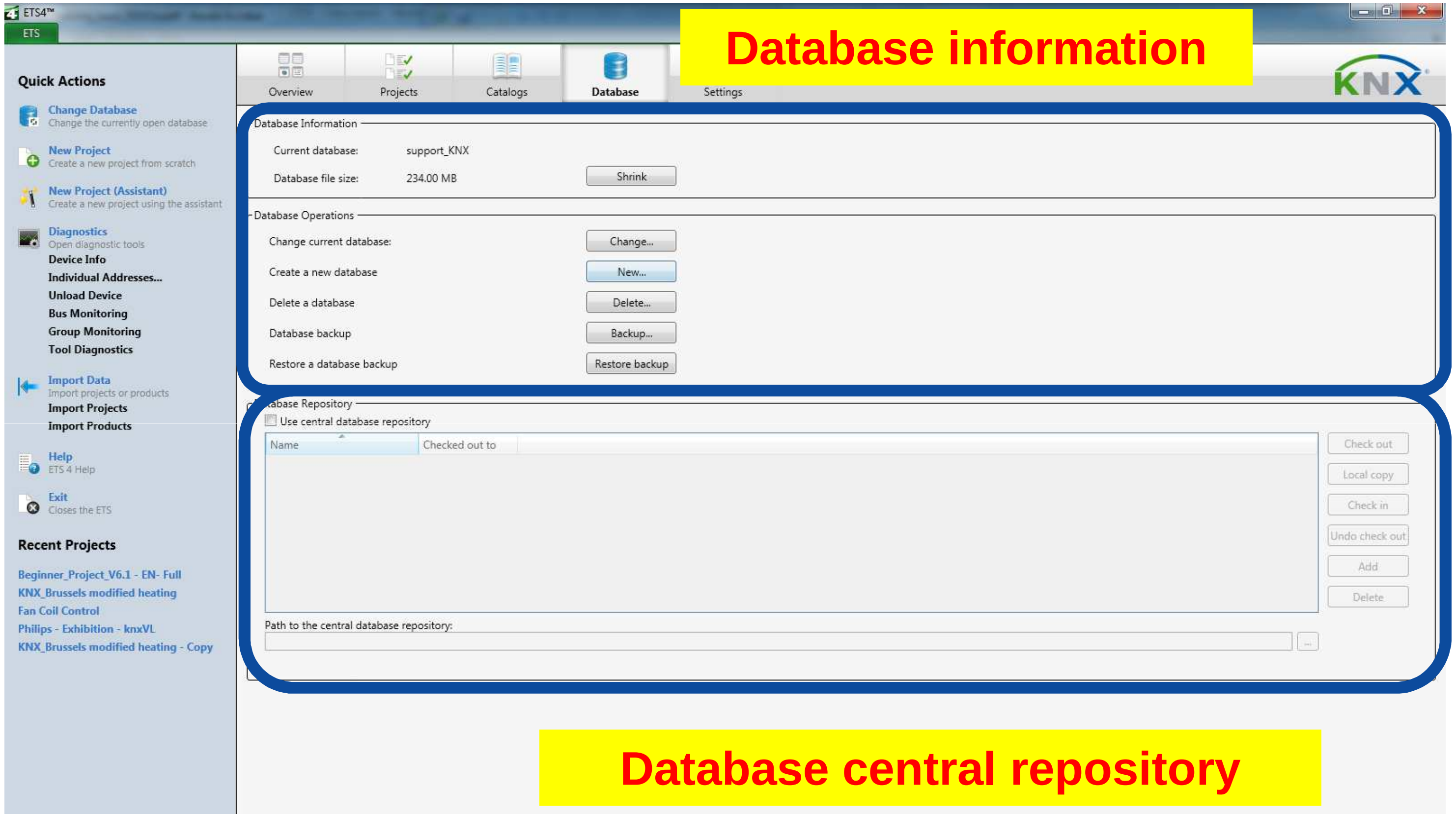


Selected project information

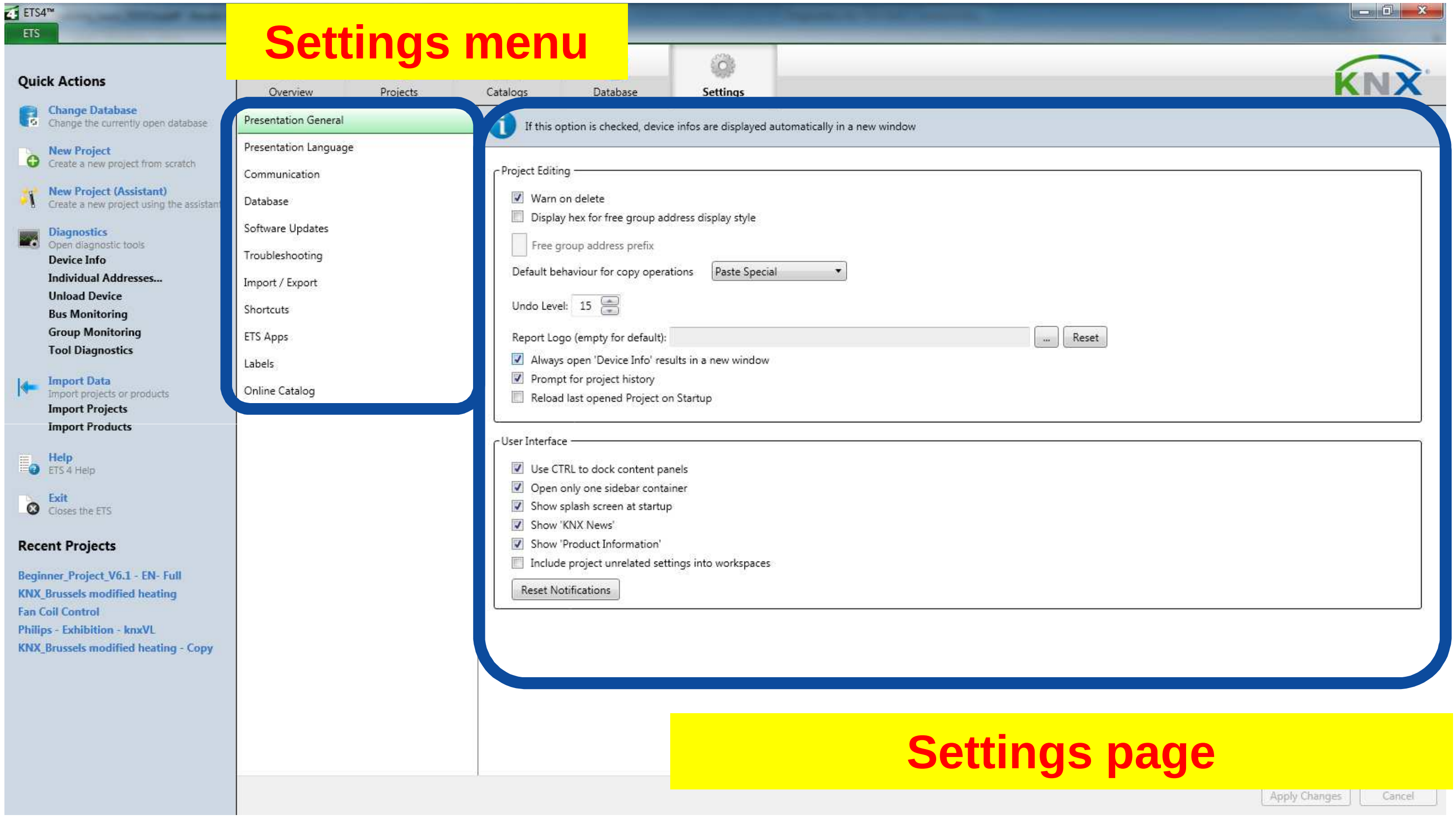
2. ETS4 screens :
Dashboard tabs – “Catalogs”



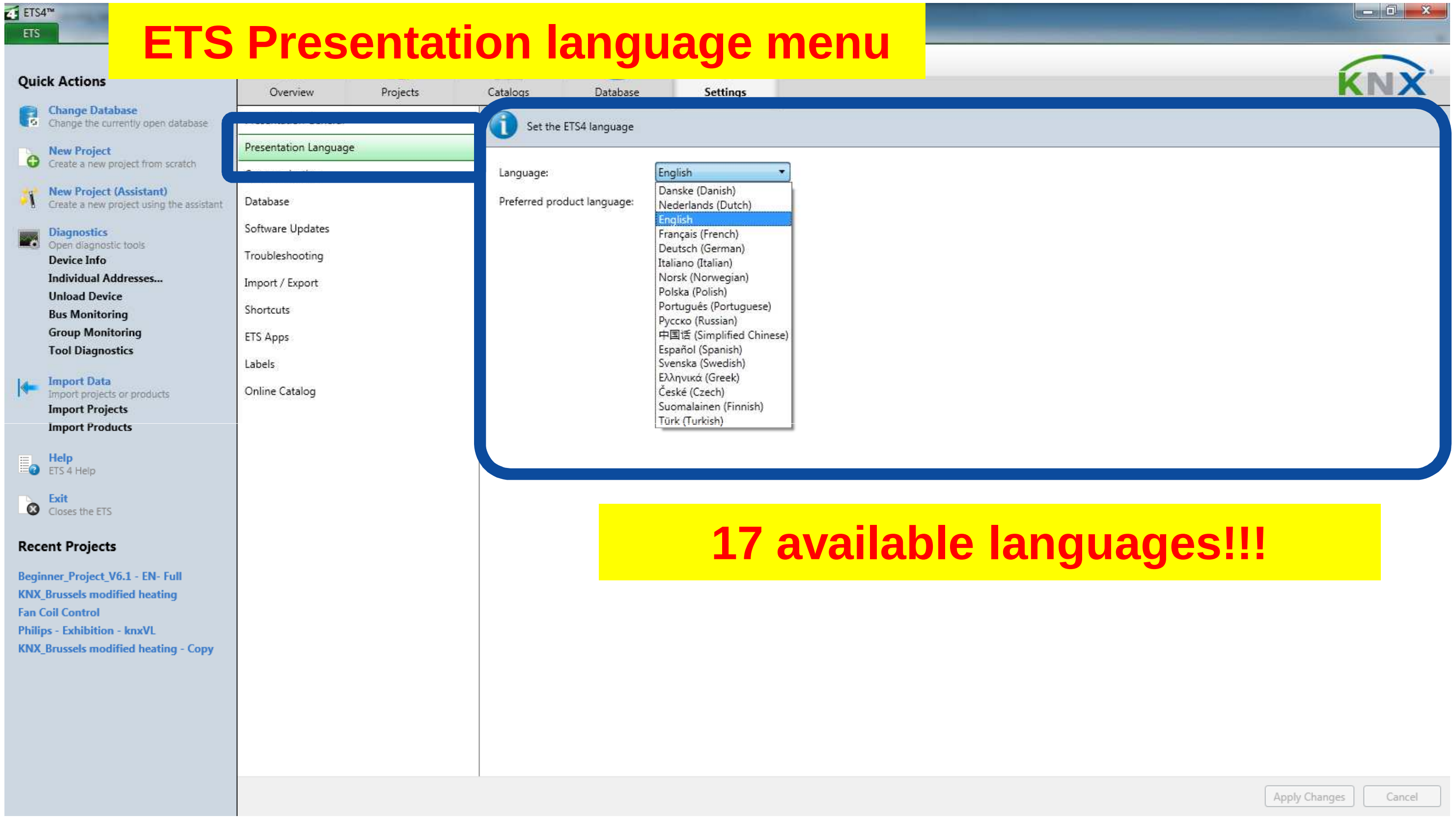
2. ETS4 screens : Dashboard tabs – “Database”



2. ETS4 screens :
Dashboard tabs – “Settings”

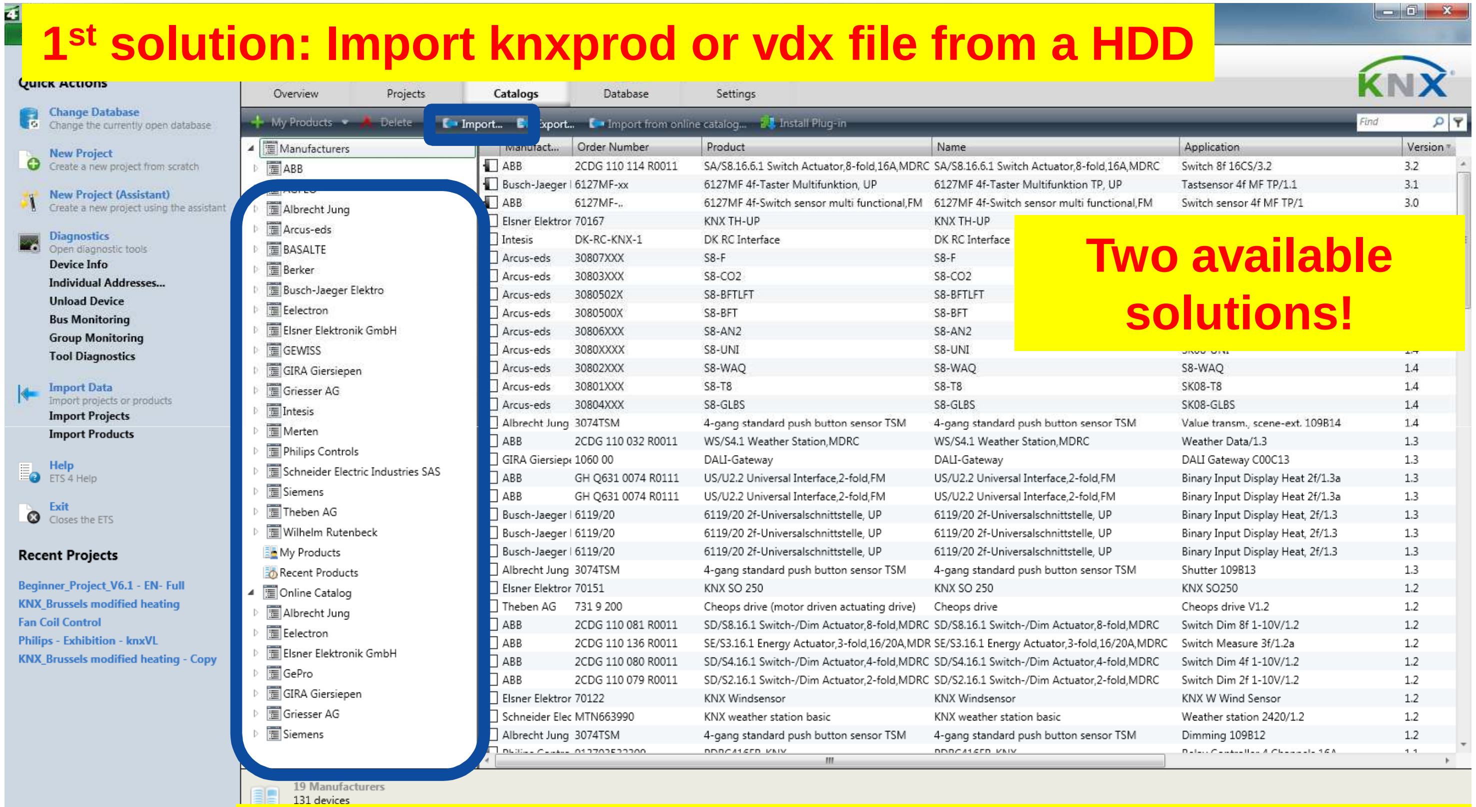


2. ETS4 screens ：
Dashboard tabs – "Settings"—"Presentation Language"



3. Importing KNX product databases

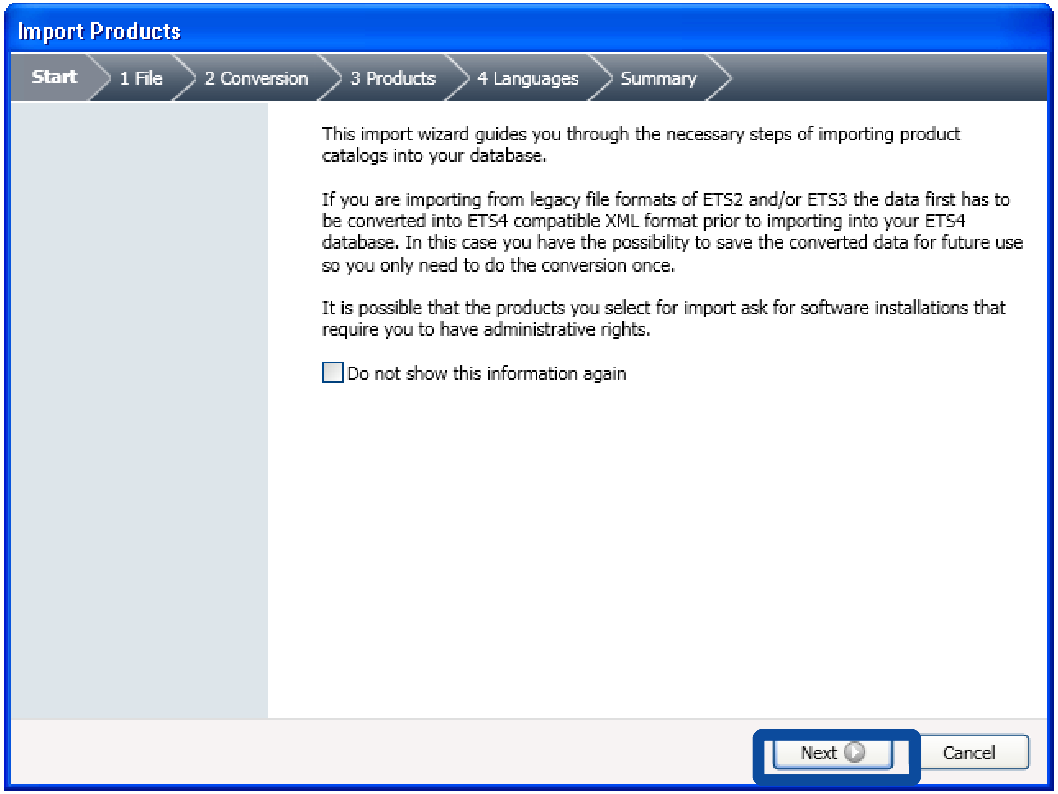
1st solution: Import knxprod or vdx file from a HDD



Two available solutions!

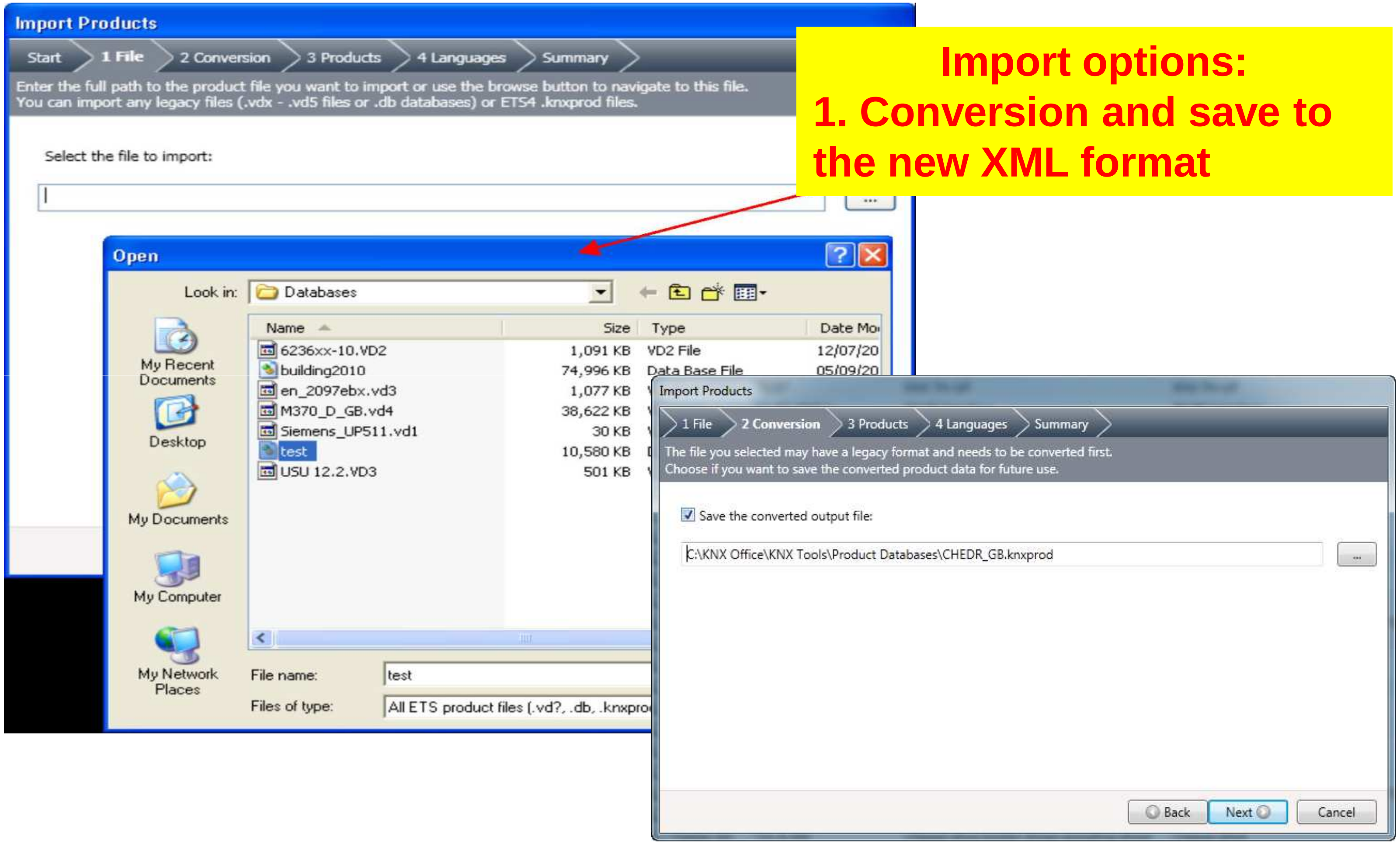
2nd solution: Direct import from the Online Catalog

3. Importing KNX product databases
– Solution 1 step1



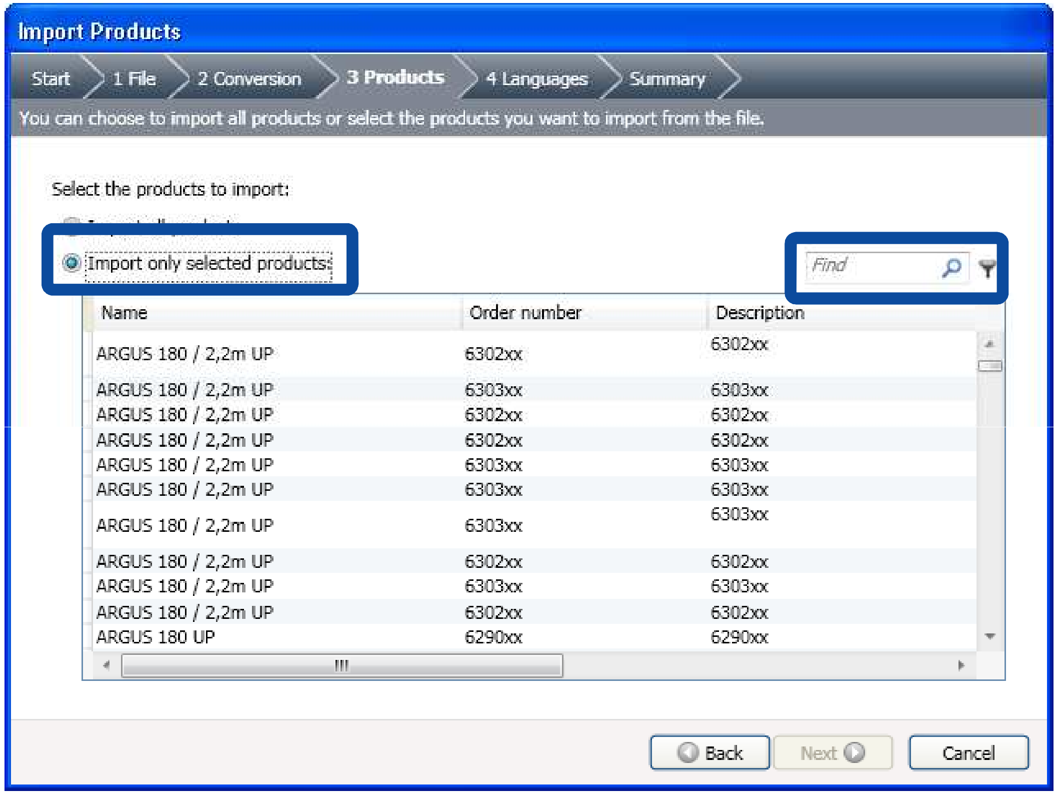
Import wizard

3. Importing KNX product databases – Solution 1 step2



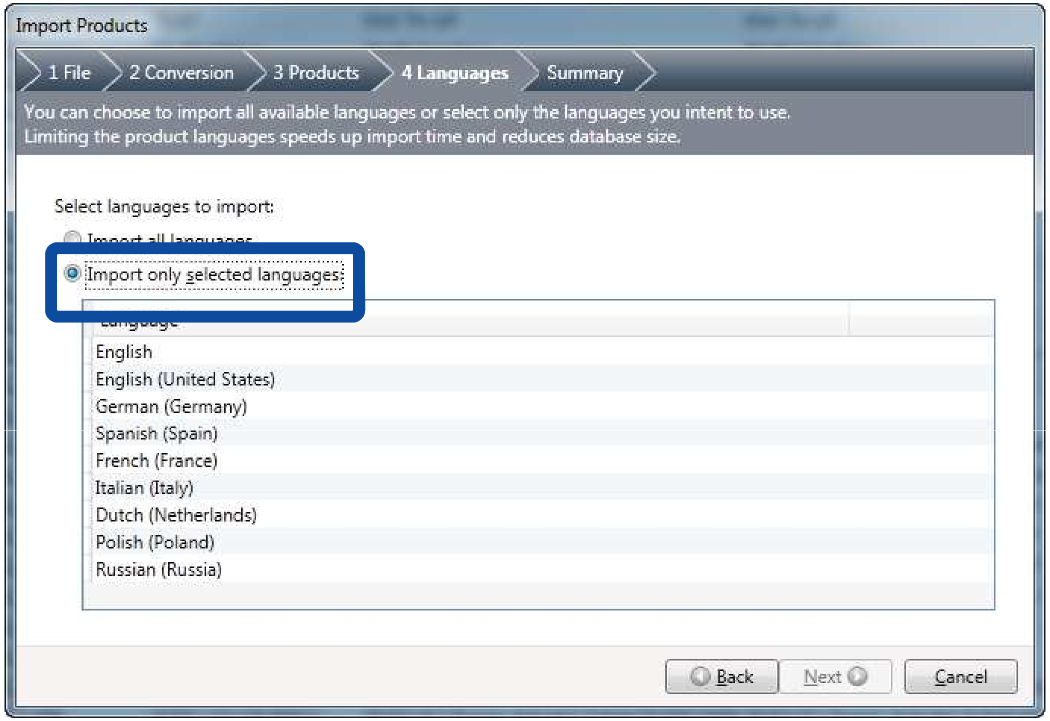
Import options:
1. Conversion and save to the new XML format

3. Importing KNX product databases
– Solution 1 step3



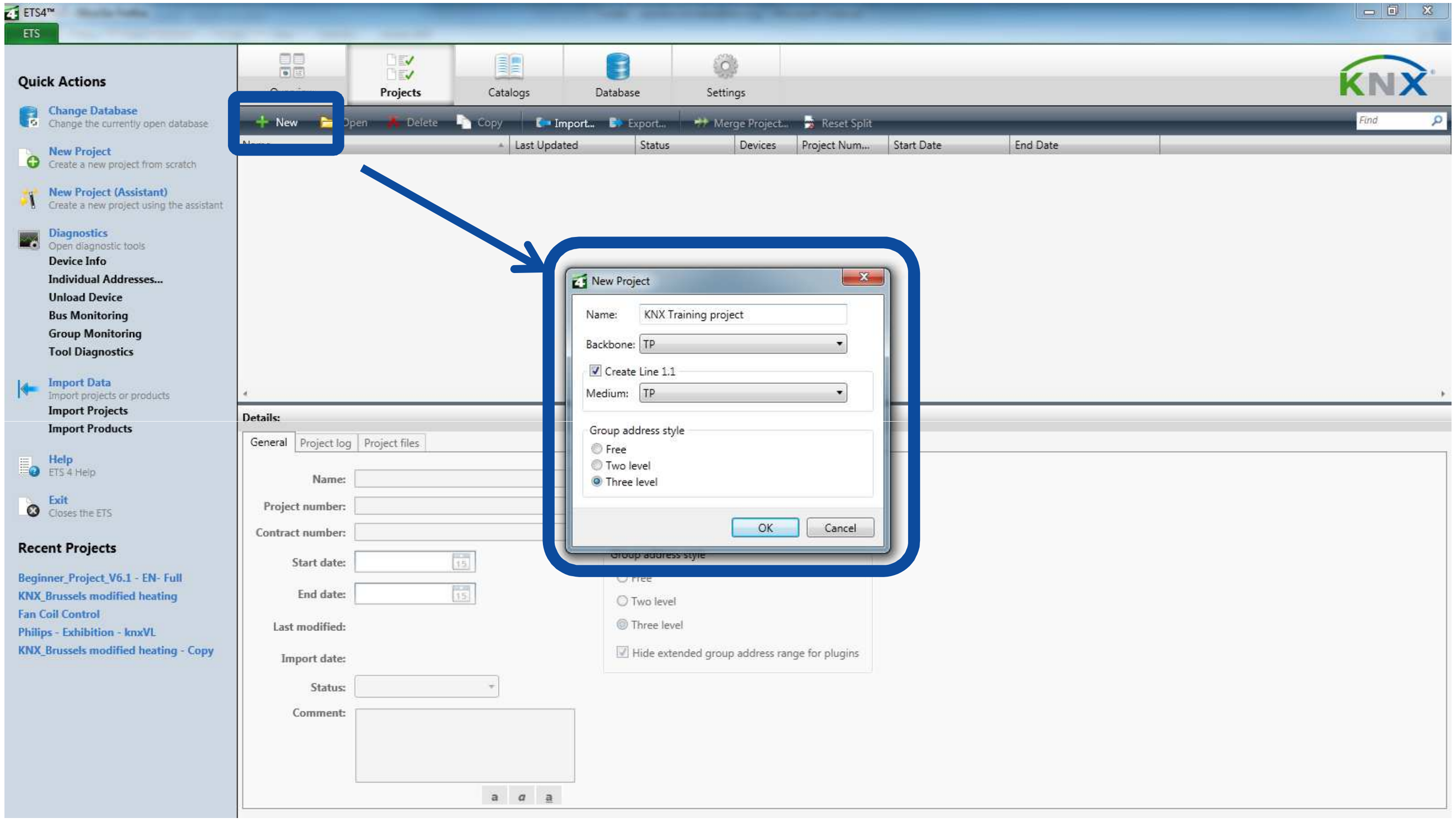
Import options:
2. Selective import of products

3. Importing KNX product databases – Solution 1 step4



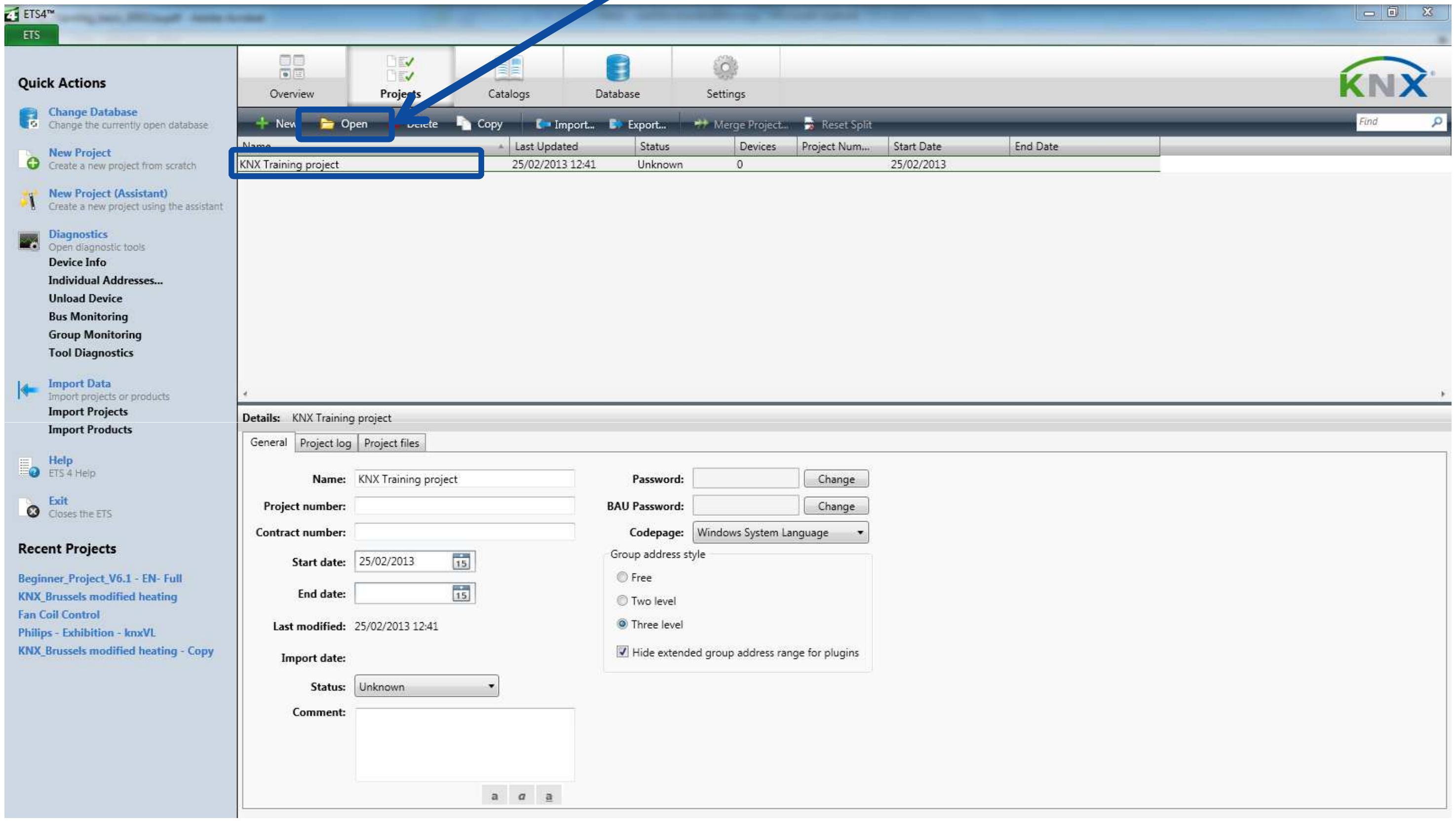
Import options:
3. Selective import of product languages

4. KNX Project - View



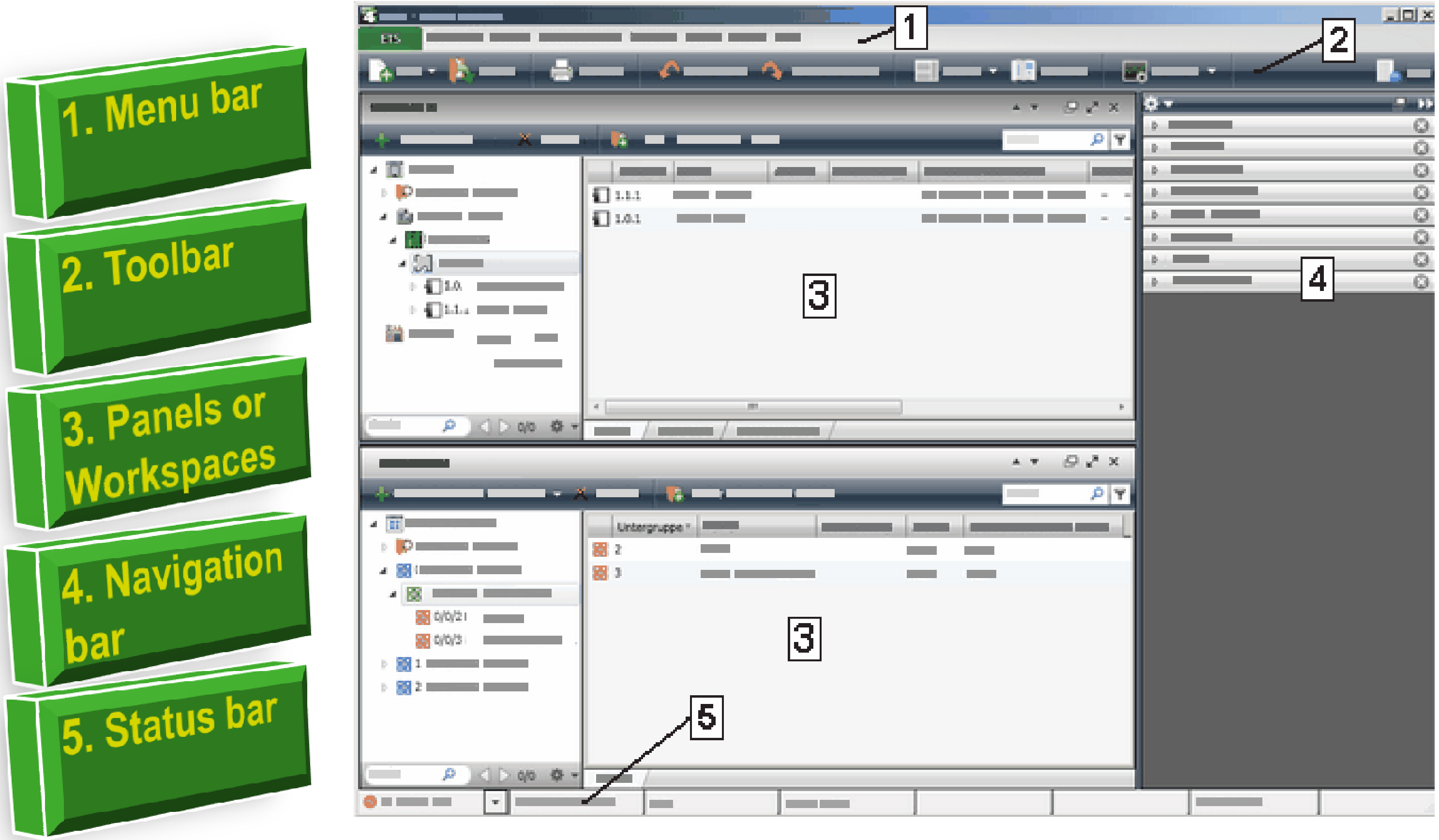
Enter desired name, select the line type & the GA style…

4. KNX Project - View
– Opening



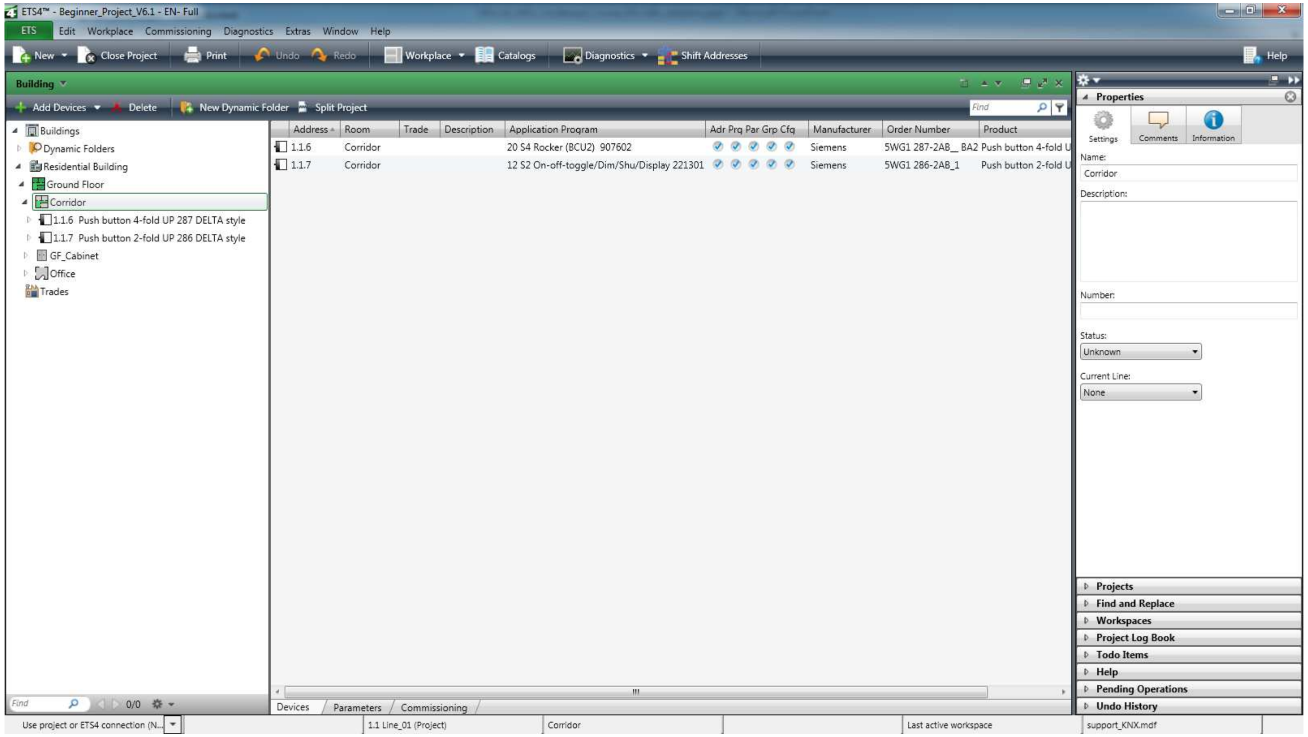
Select the project and either 1.double click OR 2.press the "Open" button

4. KNX Project - View
– Project elements



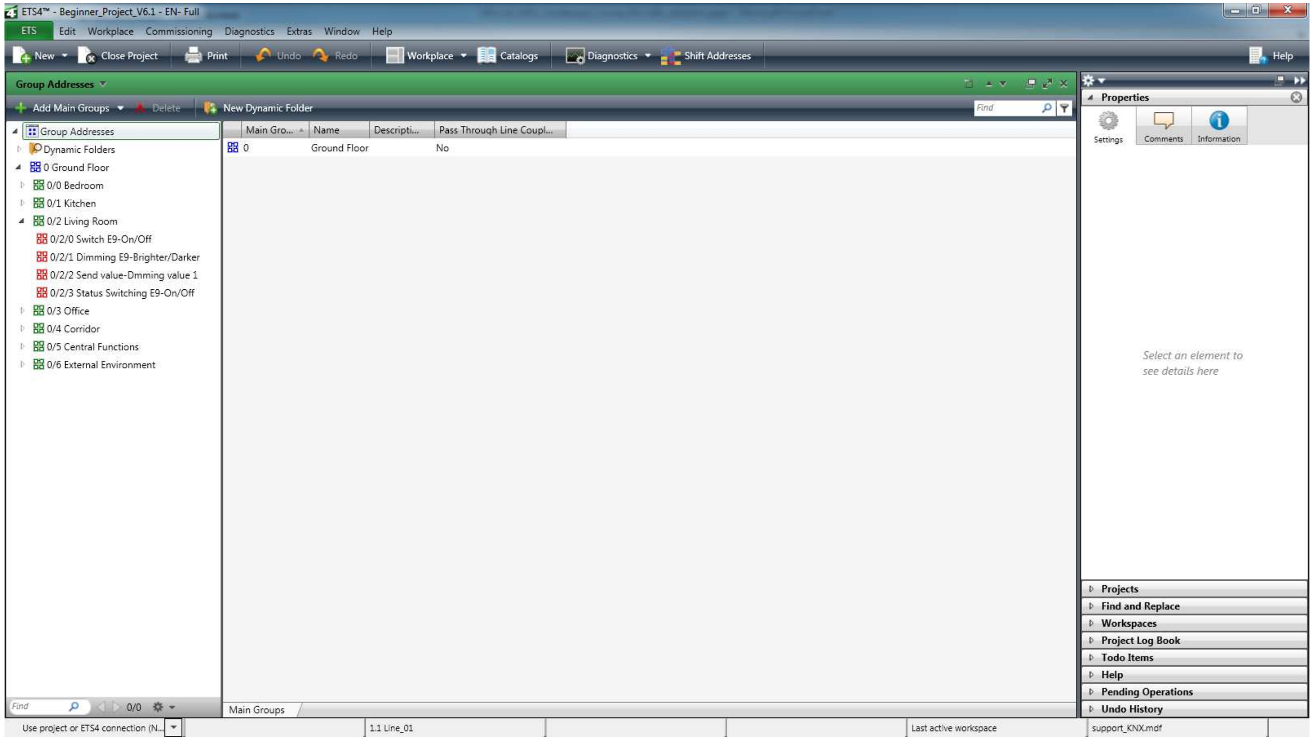
4. KNX Project - View
– Building pane

- 1. Building
- 2. Group Addresses
- 3. Topology
- 4. Project Root
- 5. Devices
- 6. Favorites
- … ETS Apps



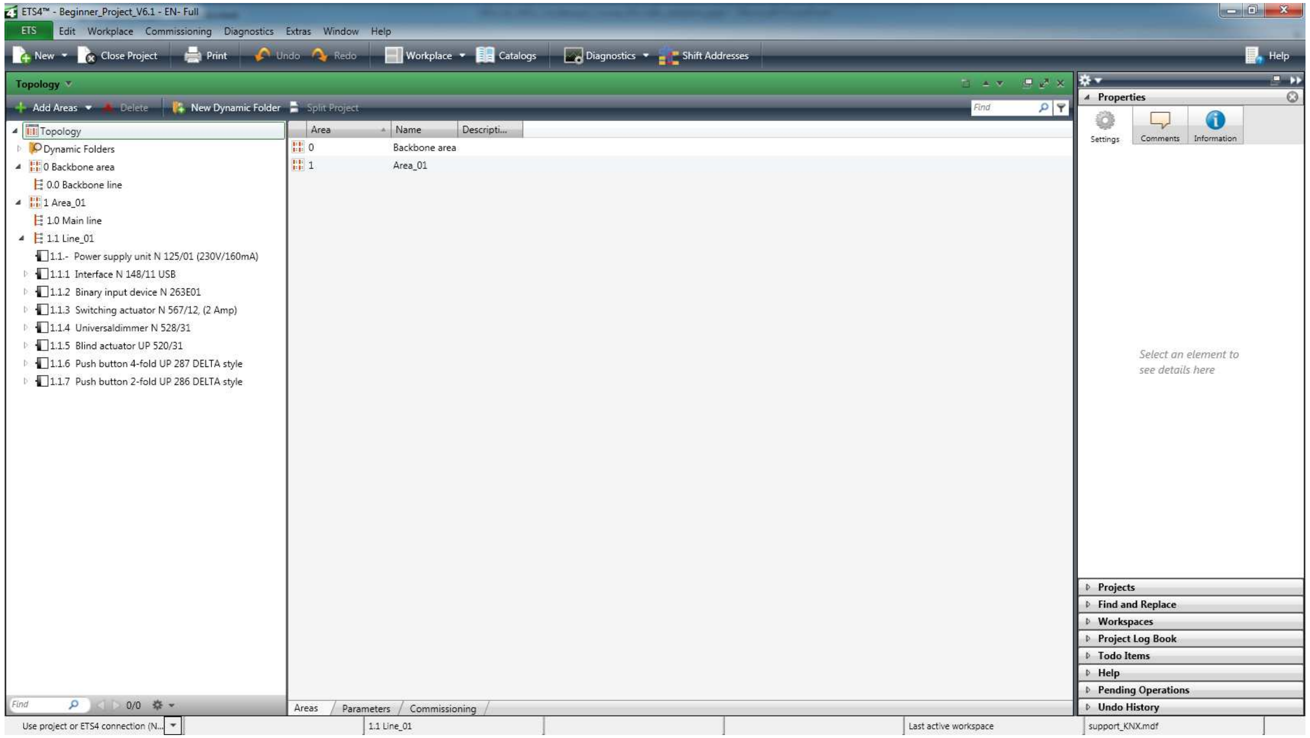
Representation of the actual building structure in ETS

4. KNX Project - View
– Group Addresses pane



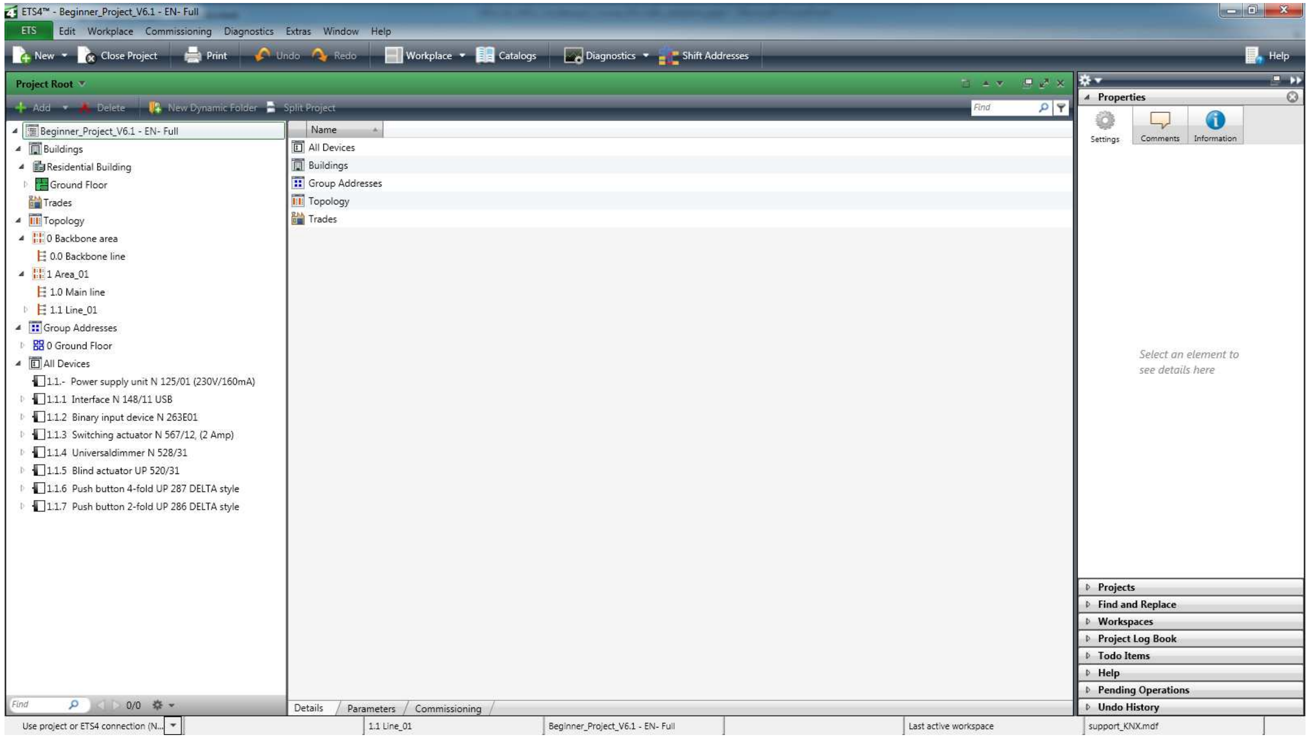
Representation of the actual circuits & functions in ETS

4. KNX Project - View
– Topology pane



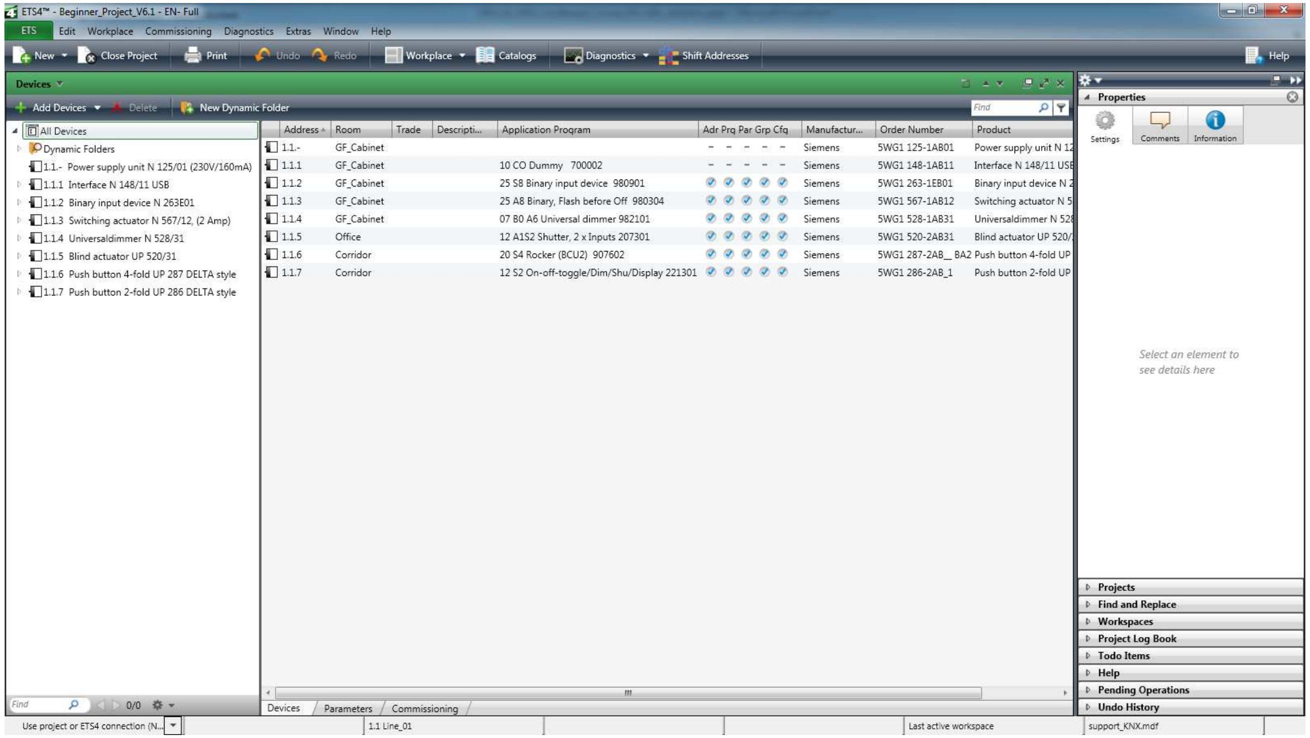
Representation of the actual bus structure and the assignment of Individual Addresses to the devices

4. KNX Project - View
– Project Root pane



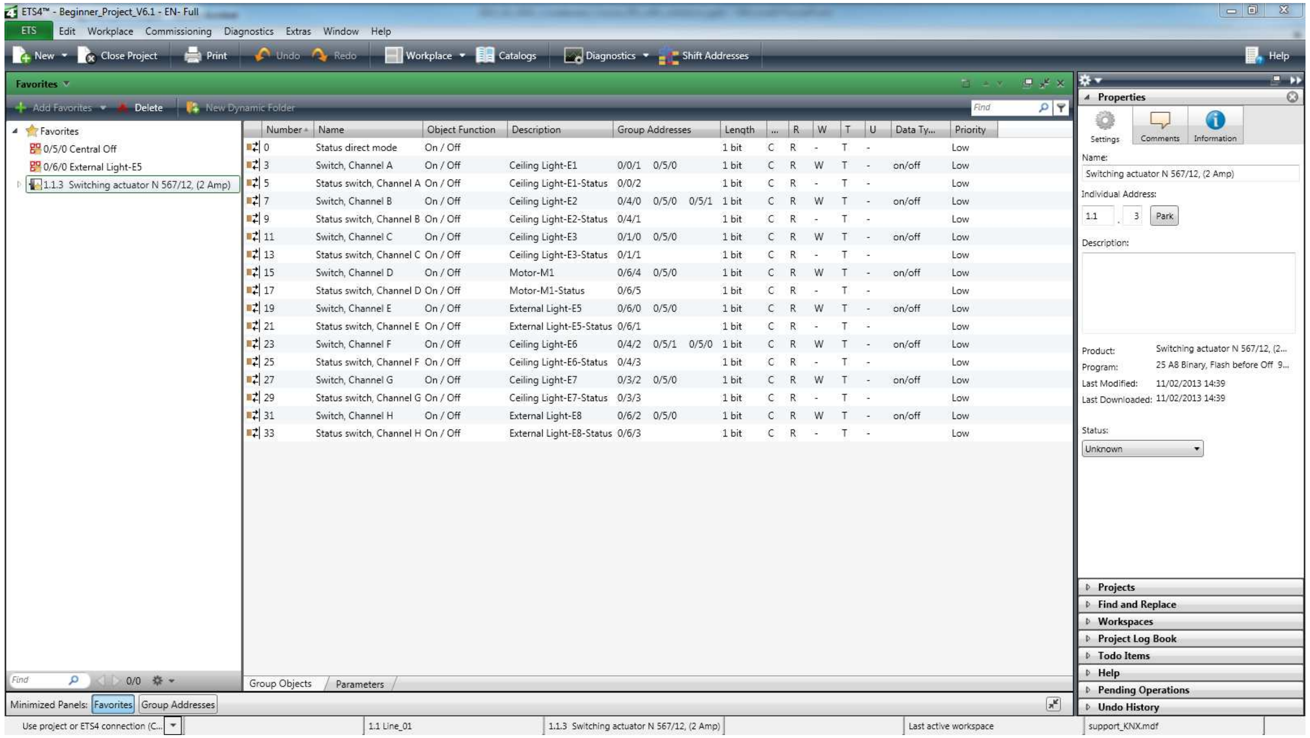
All the elements of ETS in one window. For quick overview.

4. KNX Project - View
– Devices pane



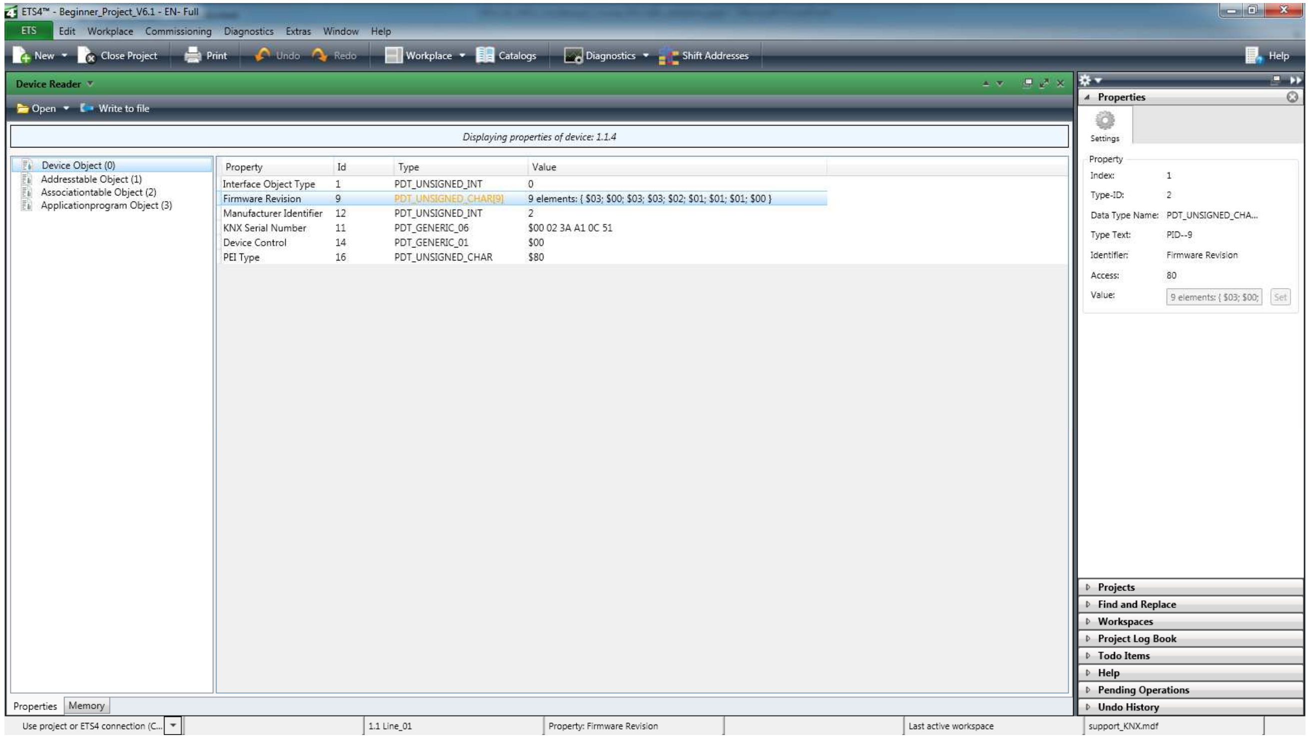
List of all the devices of a KNX project

4. KNX Project – View
– Favorites pane



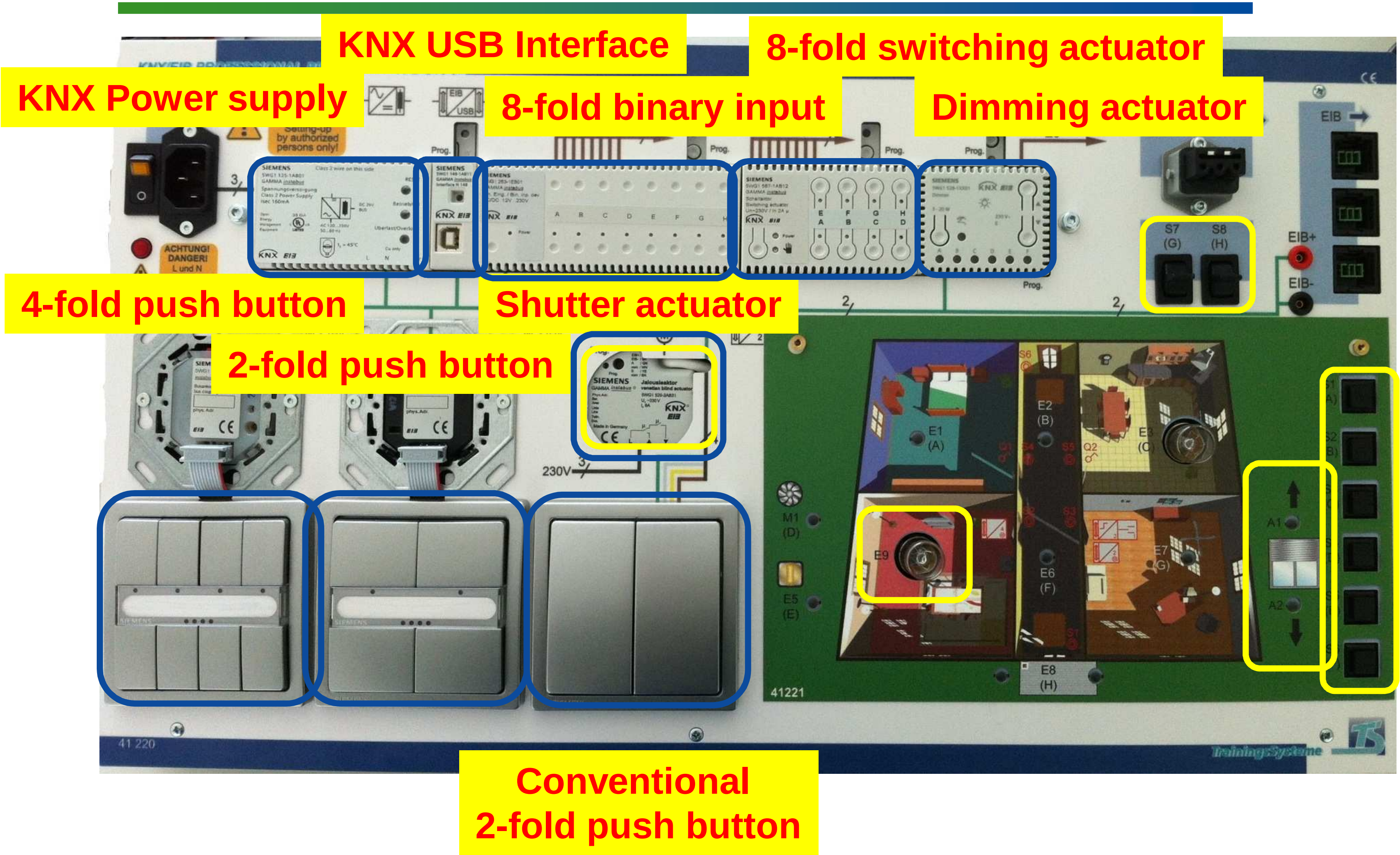
Combine any elements from any of the other panels according to your needs

4. KNX Project – View
– ETS Apps pane



Extra functionality can be added in the existing ETS interface

KNX Programming board



6. A real KNX Project

Request from a customer:

I want to be able to switch 'On' and 'Off' individually the lighting circuits in the bedroom (E1) and in the corridor (E2), by using the up position of a rocker to switch 'On' and the down position of the same rocker to switch 'Off'. Actually, I would like this on the 4-fold push button.

6. A real KNX Project
How to realize it:

- ***Use the lighting circuits: E1, E2 = Switching Actuator device channels: A,B (resp.)***
- ***Use the 2 left rockers of the 4-fold push button device on the left***
- ***Link the Group Objects with the Group Addresses of the corresponding lighting circuits***

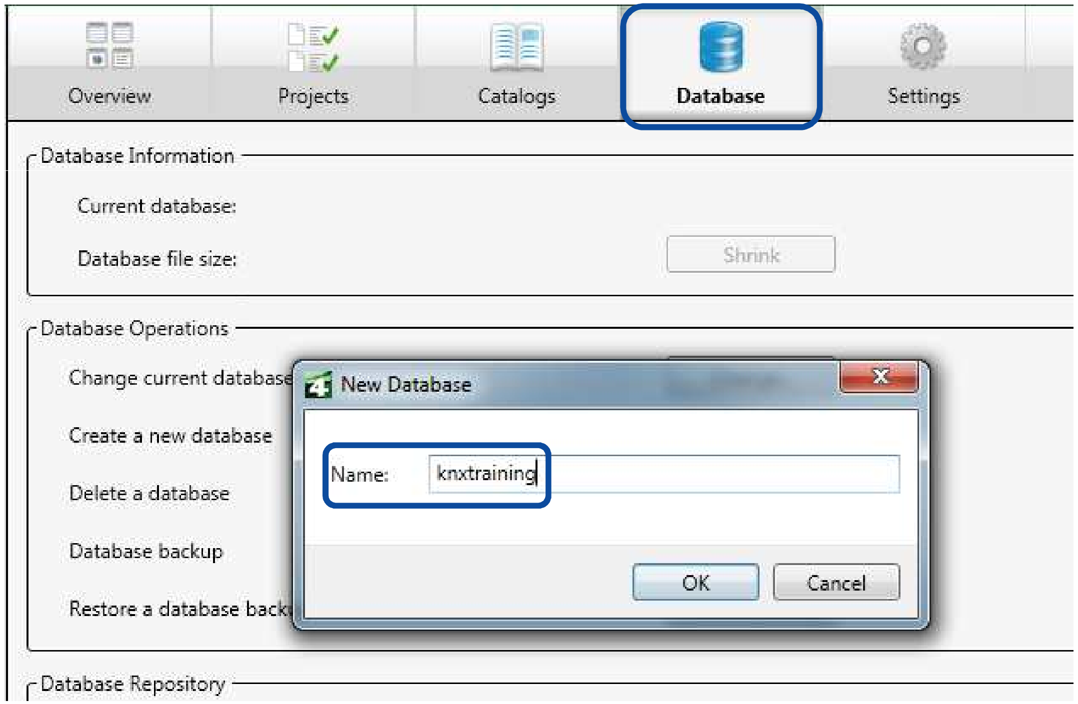
KNX Product Selection:

- Switching Actuator: Siemens Switching actuator N567/12
- 4-fold Push Button: Siemens Push Button 4-fold UP 287 DELTA

6. A real KNX Project

Step 1 – Open ETS4 and create a new database

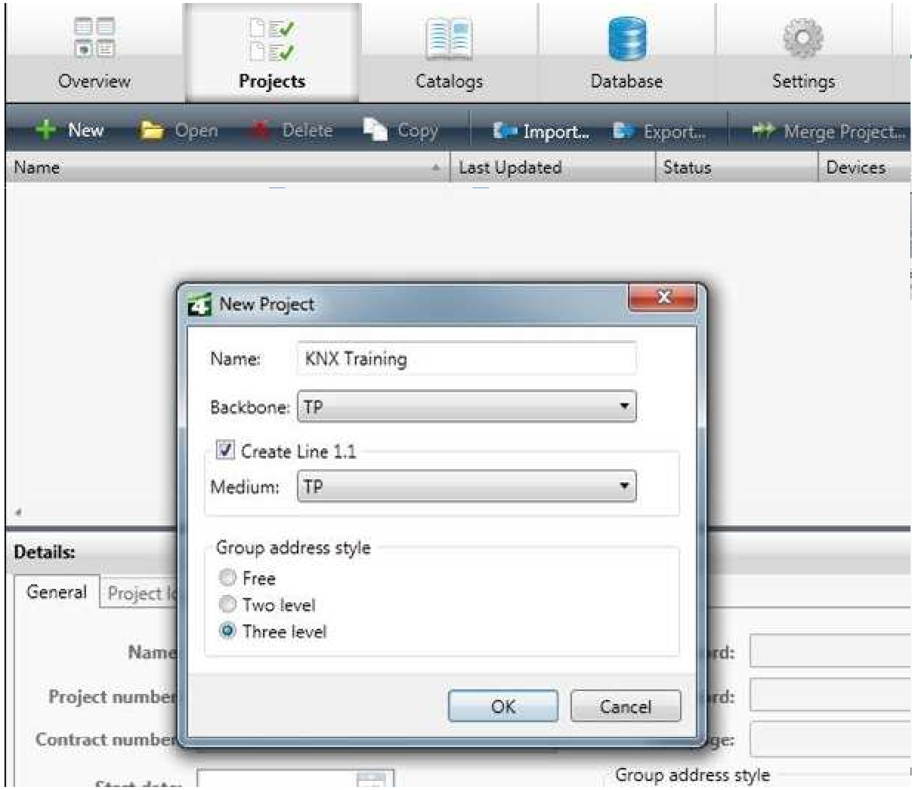
Create a new database in ETS4 and name it "knxtraining"



6. A real KNX Project

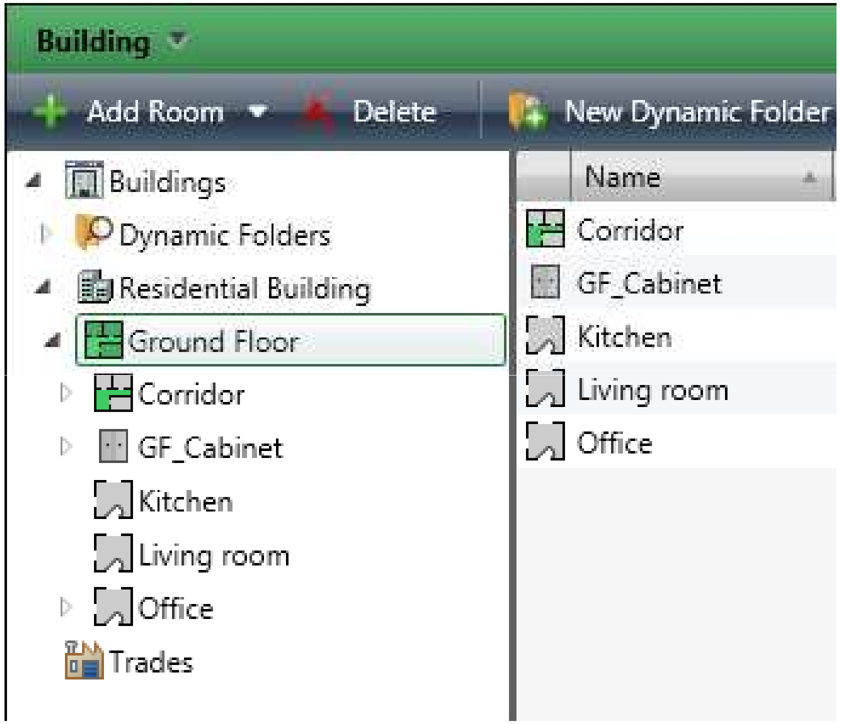
Step 2 – Create a new project in ETS4

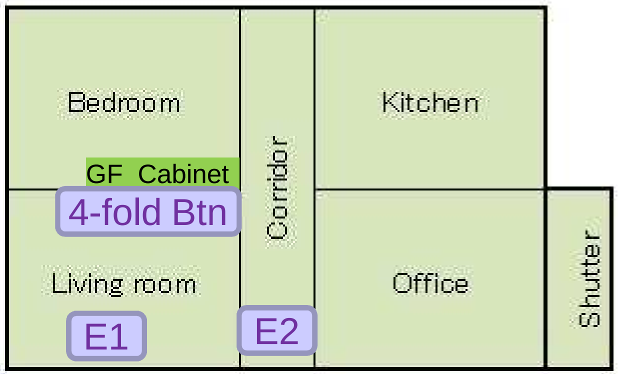
Create a new project in ETS4 and name it “KNX Training”



3. A real KNX Project

Step 3 – Define the building structure





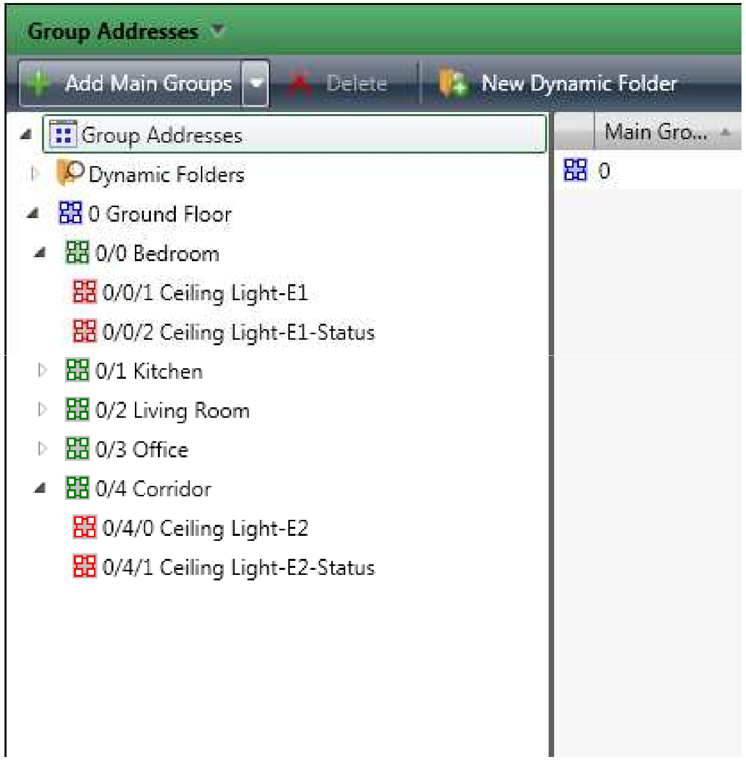
Create the building structure of the residential house of the panel of your programming board.

From Building pane:

1) **Add Building – Residential Building**
2) **Add Building parts – Ground Floor**
3) **Add Room - Corridor, GF_Cabinet, Kitchen, Living Room, Office**

6. A real KNX Project

Step 4 – Define the Group Addresses



Create the Group Addresses that represent the actual circuits of the residential house of the panel of your programming board.

From Group Addresses pane:

1) **Add main Group – Ground Floor**
2) **Add Middle Group – Bedroom, Kitchen, Living Room, Office, Corridor, Central Function, External Environment**
3) **Add GA in Bedroom –**
   Ceiling Light-E1 ⇒ GA 0/0/1
   Ceiling Light-E1-Status ⇒ GA 0/0/2
4) **Add GA in Corridor –**
   Ceiling Light-E2 ⇒ GA 0/4/0
   Ceiling Light-E2-Status ⇒ GA 0/4/1

Group Addresses are assigned to the actual circuits.

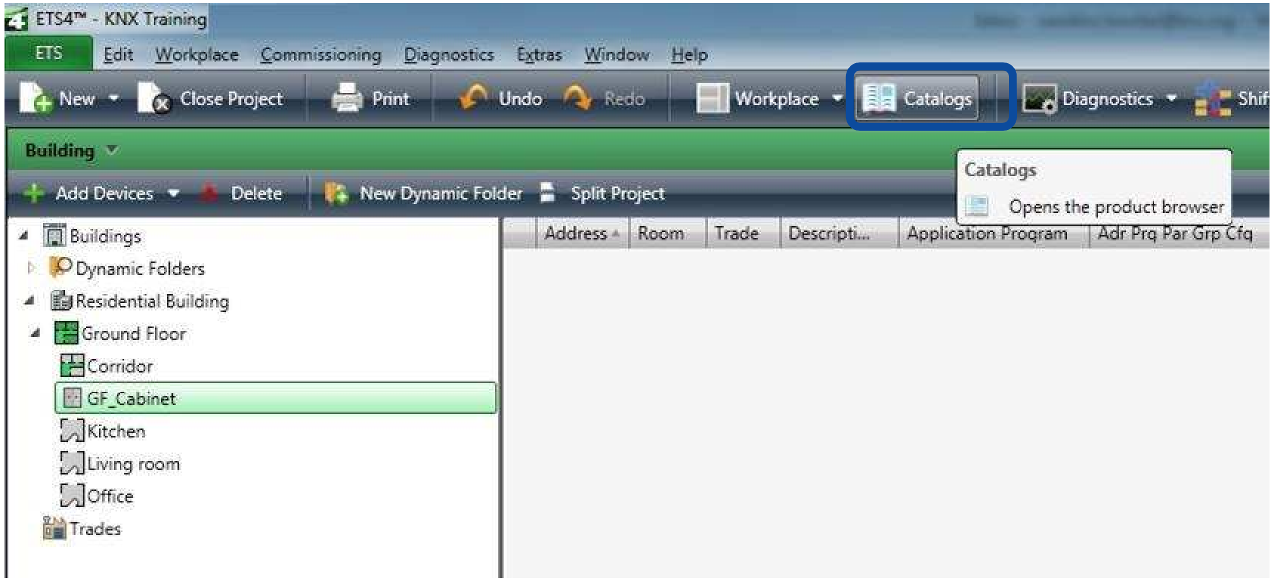
6. A real KNX Project

Step 5 – Insert the devices to your project

Insert the devices in the right room of your project, according to the residential house panel of your programming board.

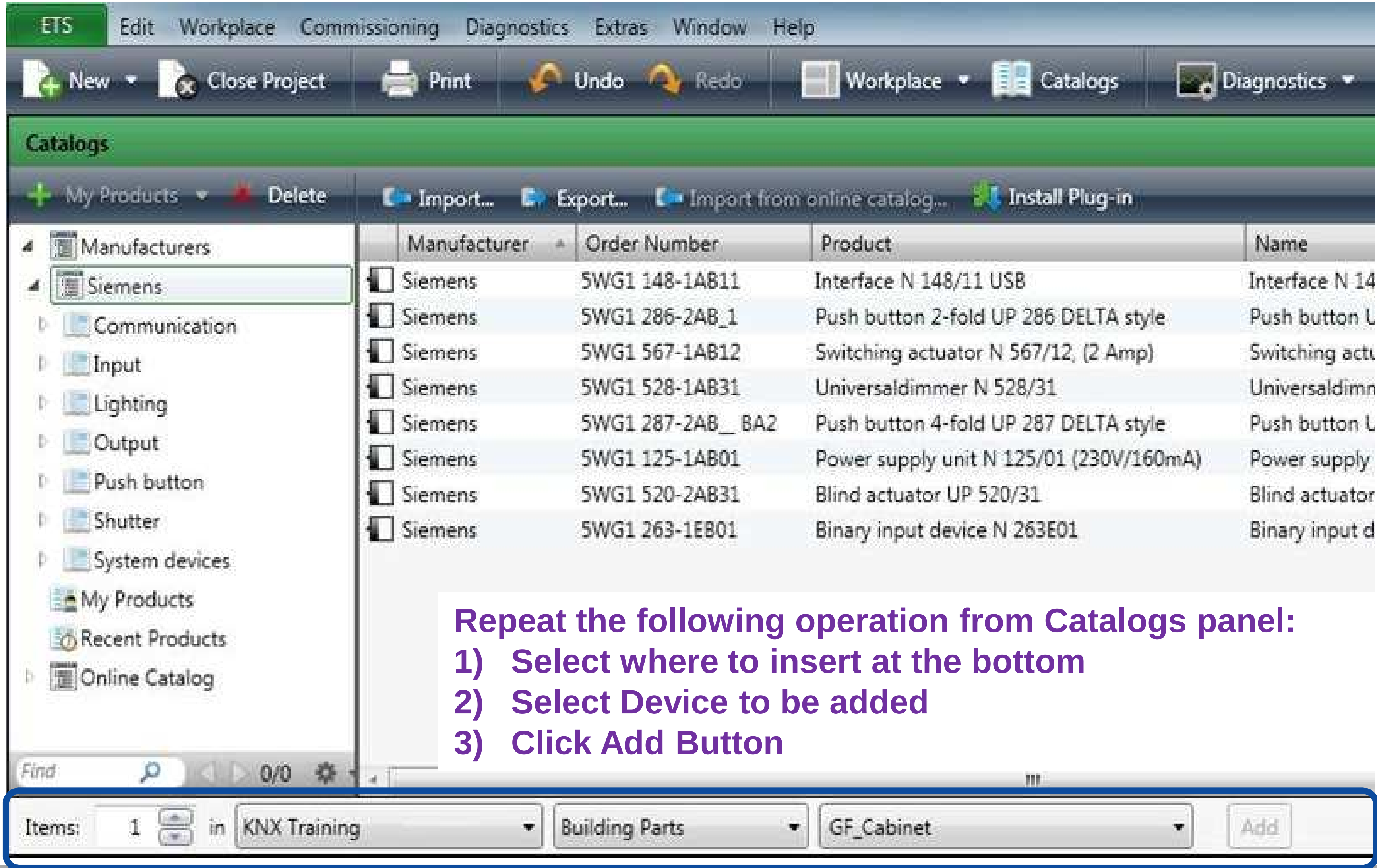
Find the devices in the “Catalogs” panel

Hint: Start firstly from the cabinet devices



6. A real KNX Project

Step 5 – Insert the devices to your project

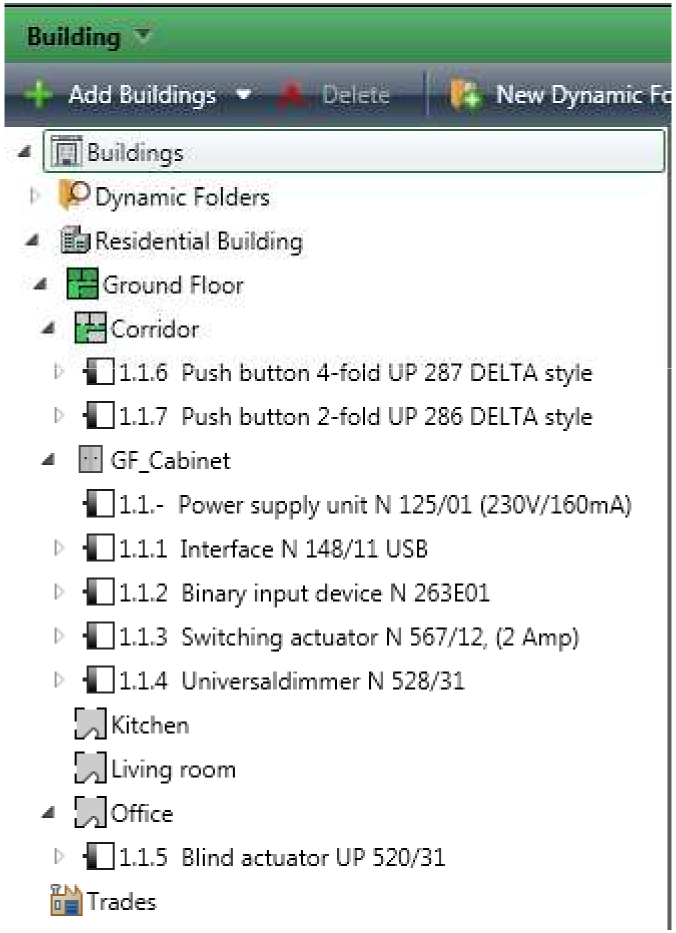


Repeat the following operation from Catalogs panel:

1) **Select where to insert at the bottom**
2) **Select Device to be added**
3) **Click Add Button**

6. A real KNX Project

Step 5 – Insert the devices to your project



The result after the insertion of the devices shall look like this:

GF_Cabinet:
1) Interface N148(USB) ⇒ IA 1.1.1
2) Binary Input device ⇒ IA 1.1.2
3) Switching Actuator ⇒ IA 1.1.3
4) Universal Dimmer ⇒ IA 1.1.4

Office:
5) Blind Actuator ⇒ IA 1.1.5

Corridor:
6) Push Button 4-fold ⇒ IA 1.1.6
7) Push Button 2-fold ⇒ IA 1.1.7

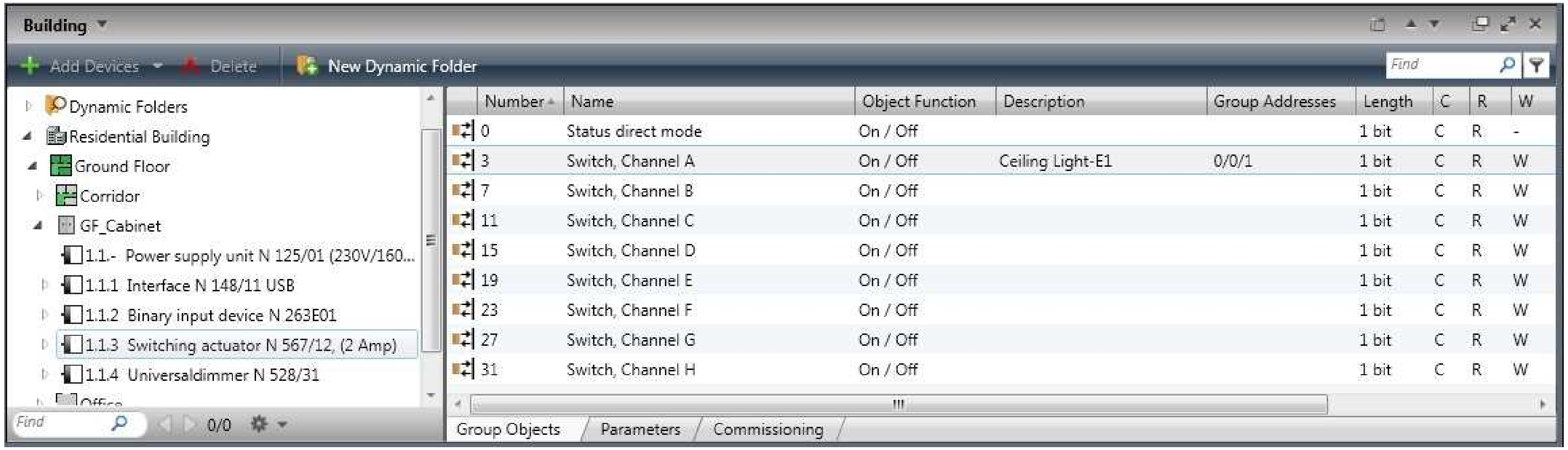
Individual Addresses are assigned

6. A real KNX Project

Step 6 – Link the switching actuator channels

Link ‘Switch, Channel A’ Group Object with ‘0/0/1 – Ceiling Light-E1’ Group Address.

1) Select Switching actuator Channel A on/off in the Devices pane
2) Select Ceiling Light-E1 in Group Address pane
3) Drug those selected by 1) into the blank pane selected by 2)

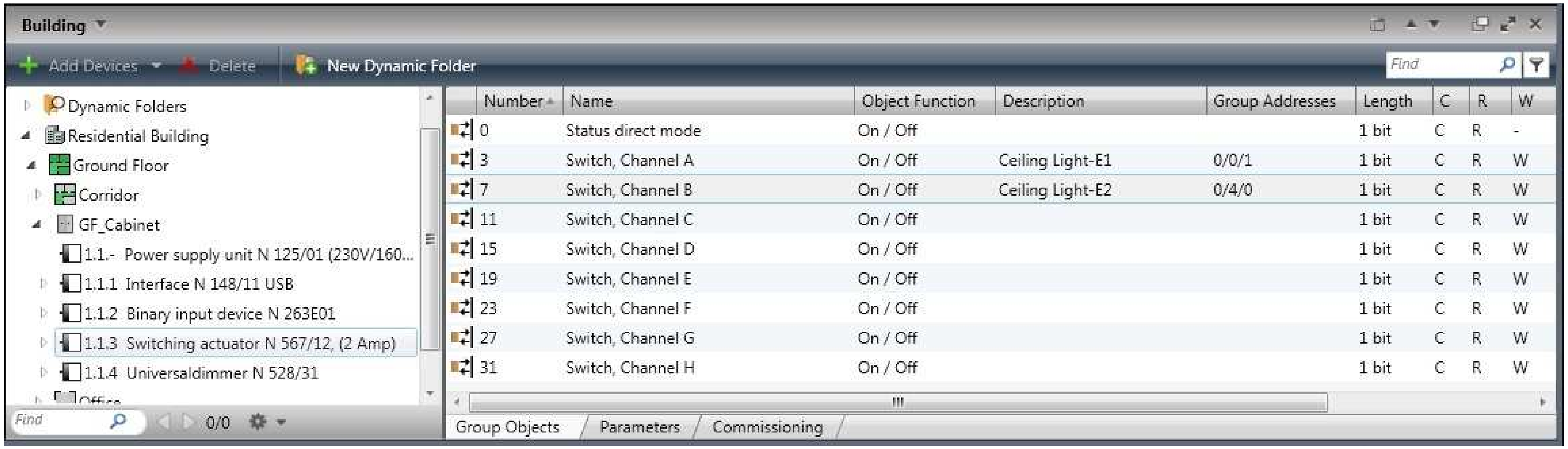


6. A real KNX Project

Step 6 – Link the switching actuator channels

Link ‘Switch, Channel B’ Group Object with ‘0/4/0 – Ceiling Light-E2’ Group Address.

1) Select Switching actuator Channel B on/off in the Devices pane
2) Select Ceiling Light-E2 in Group Address pane
3) Drug those selected by 1) into the blank pane selected by 2)

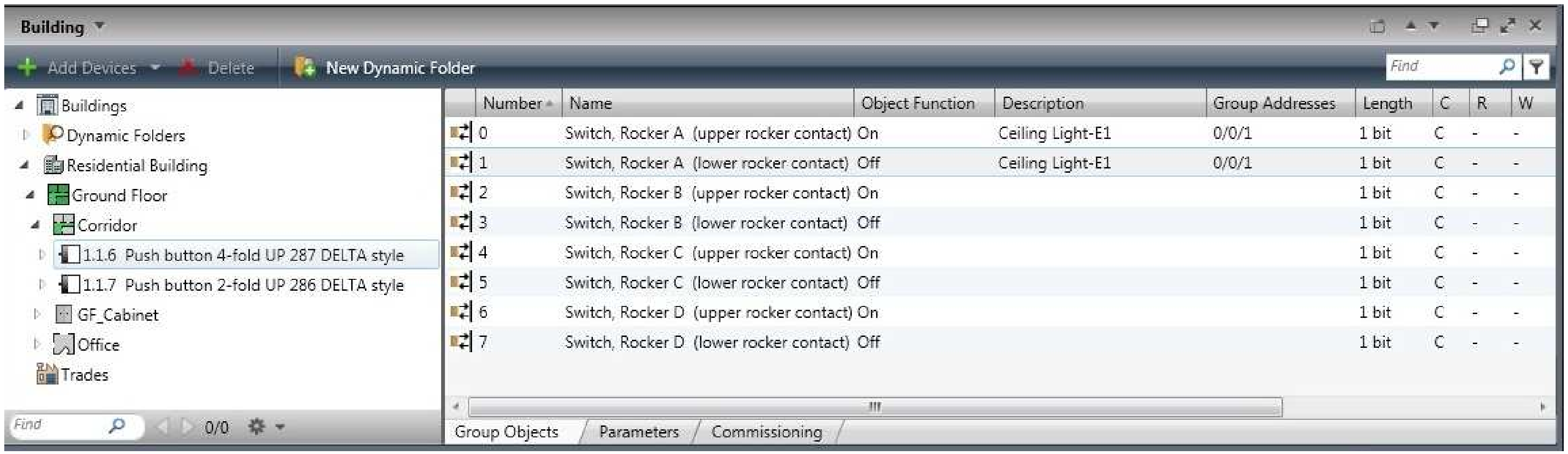


Number	Name	Object Function	Description	Group Addresses	Length	C	R	W
0	Status direct mode	On / Off			1 bit	C	R	-
3	Switch, Channel A	On / Off	Ceiling Light-E1	0/0/1	1 bit	C	R	W
7	Switch, Channel B	On / Off	Ceiling Light-E2	0/4/0	1 bit	C	R	W
11	Switch, Channel C	On / Off			1 bit	C	R	W
15	Switch, Channel D	On / Off			1 bit	C	R	W
19	Switch, Channel E	On / Off			1 bit	C	R	W
23	Switch, Channel F	On / Off			1 bit	C	R	W
27	Switch, Channel G	On / Off			1 bit	C	R	W
31	Switch, Channel H	On / Off			1 bit	C	R	W

6. A real KNX Project
Step 7 – Link the push button rockers

Select Group Objects ‘Switch, Rocker A (upper and lower rocker contact)’ and link them with ‘0/0/1 – Ceiling Light-E1’ Group Address.

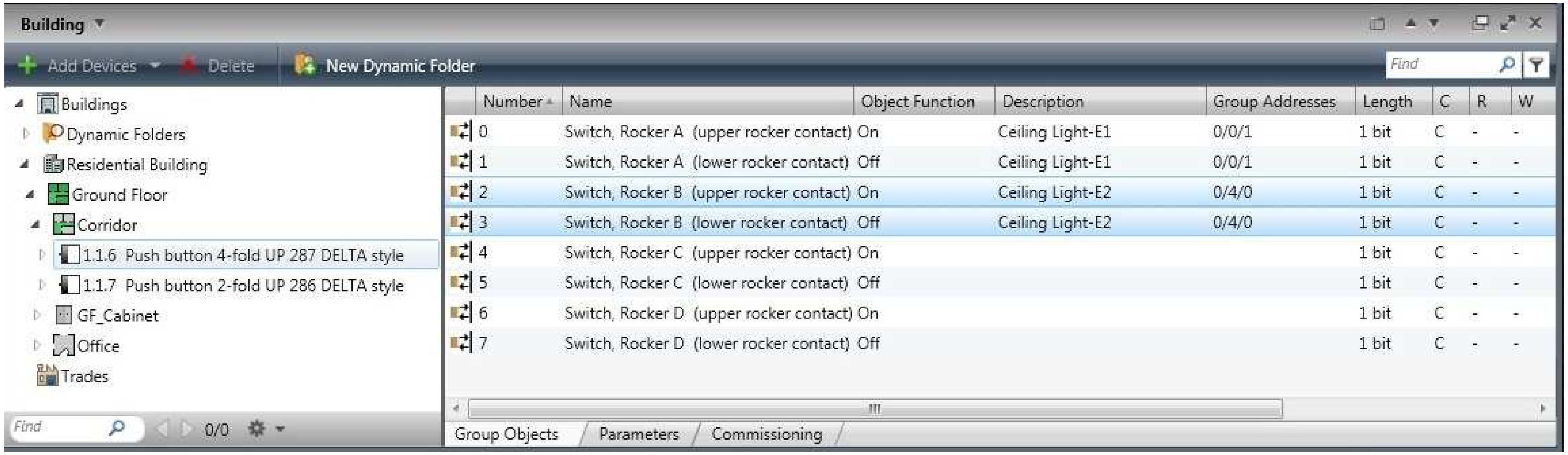
1) Select Switching Push Button 4-fold’s Switch Rocker A on and Swicth Rocker A off (two elements) in the Devices pane
2) Select Ceiling Light-E1 in Group Address pane
3) Drug those selected by 1) into the blank pane selected by 2)



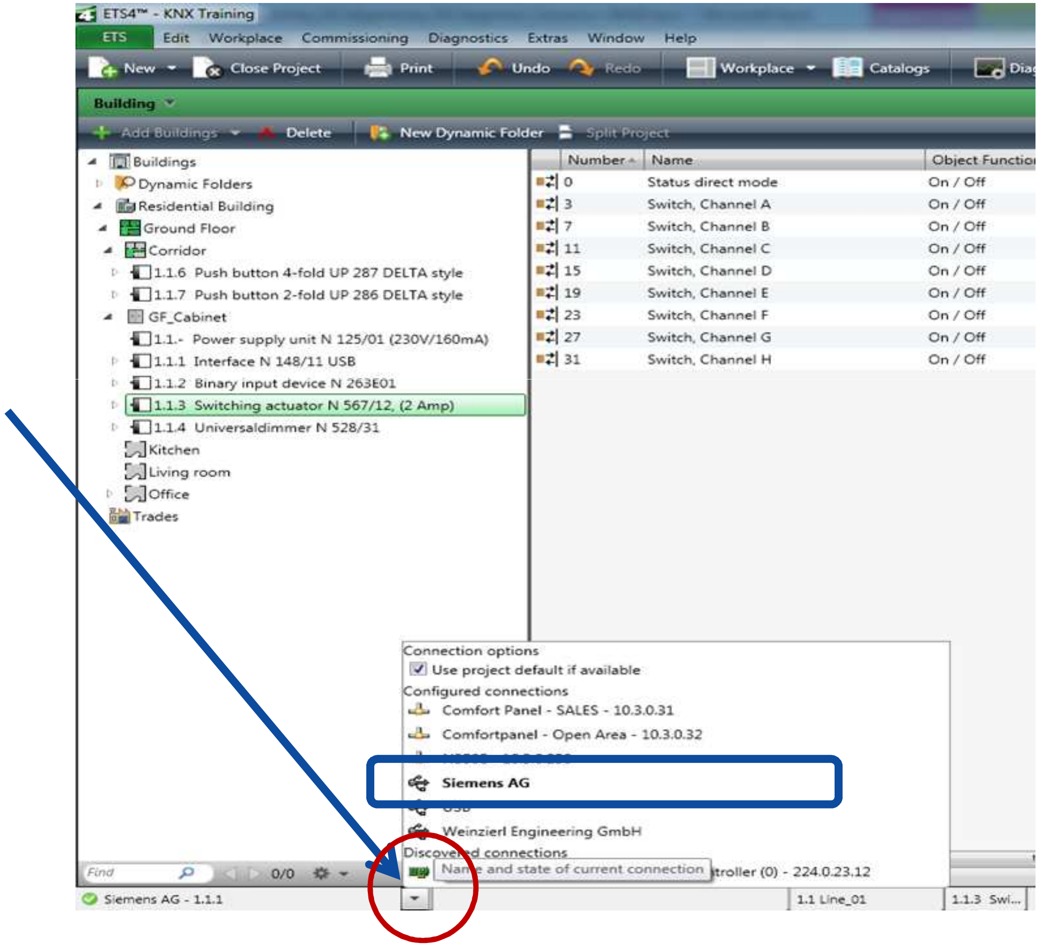
6. A real KNX Project
Step 7 – Link the push button rockers

Select Group Objects 'Switch, Rocker B (upper and lower rocker contact)' and link them with '0/4/0 – Ceiling Light-E2' Group Address.

1) Select Switching Push Button 4-fold's Switch Rocker B on and Swicth Rocker B off (two elements) in the Devices pane
2) Select Ceiling Light-E2 in Group Address pane
3) Drug those selected by 1) into the blank pane selected by 2)



6. A real KNX Project
Step 8 – Download the Individual Addresses and the Application Program

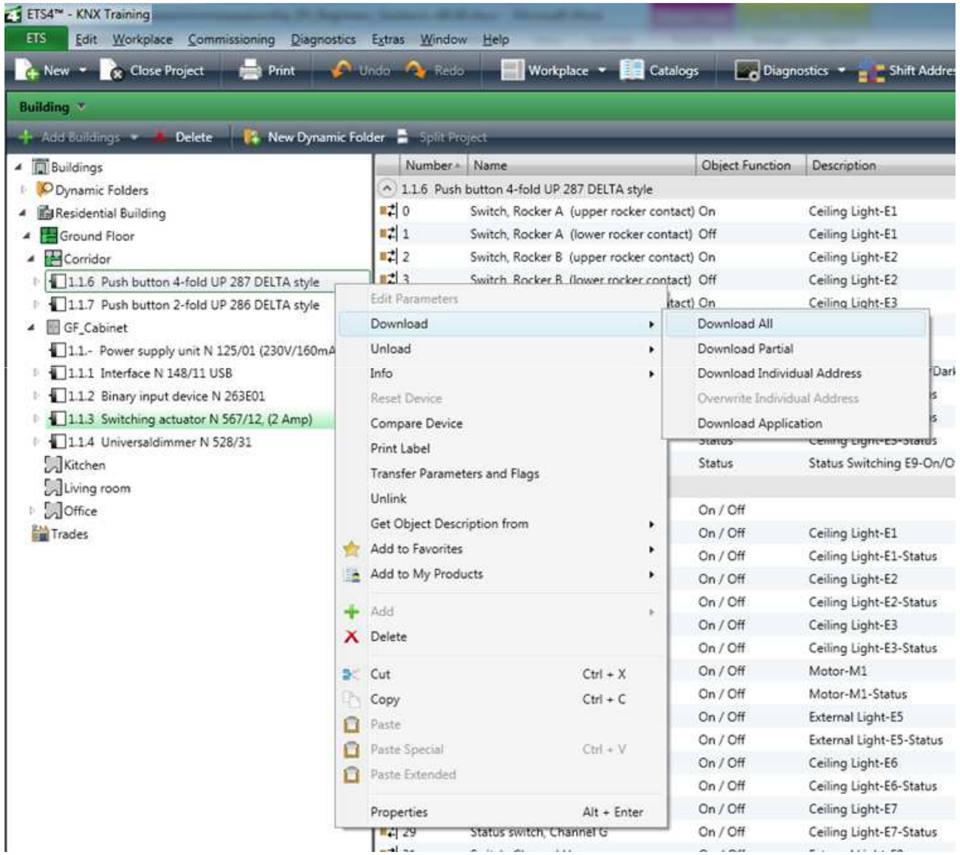


Select the right interface to your programming board.

Hint: In our case is a KNX USB interface, called "Siemens AG"

Make sure that the correct IA assigned for USB interface (1.1.1 in this example) has set to Siemens AG from ETS-Settings-Siemens AG screen.

6. A real KNX Project
Step 8 – Download the Individual Addresses and the Application Program

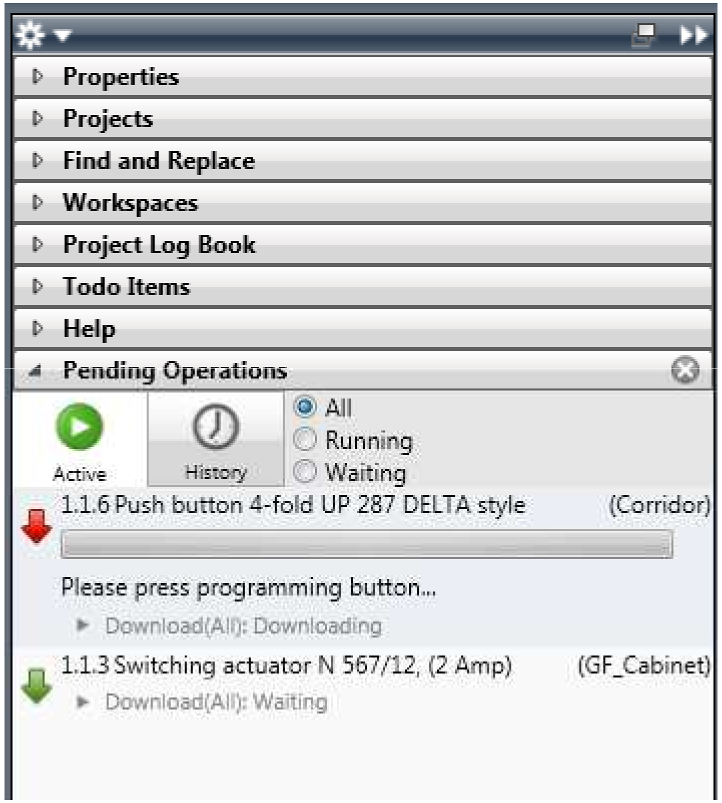


Select the devices that you linked (the 4-fold push button and the 8-fold switching actuator) and download the relevant data.

From Devices, Topology or Group Address pane

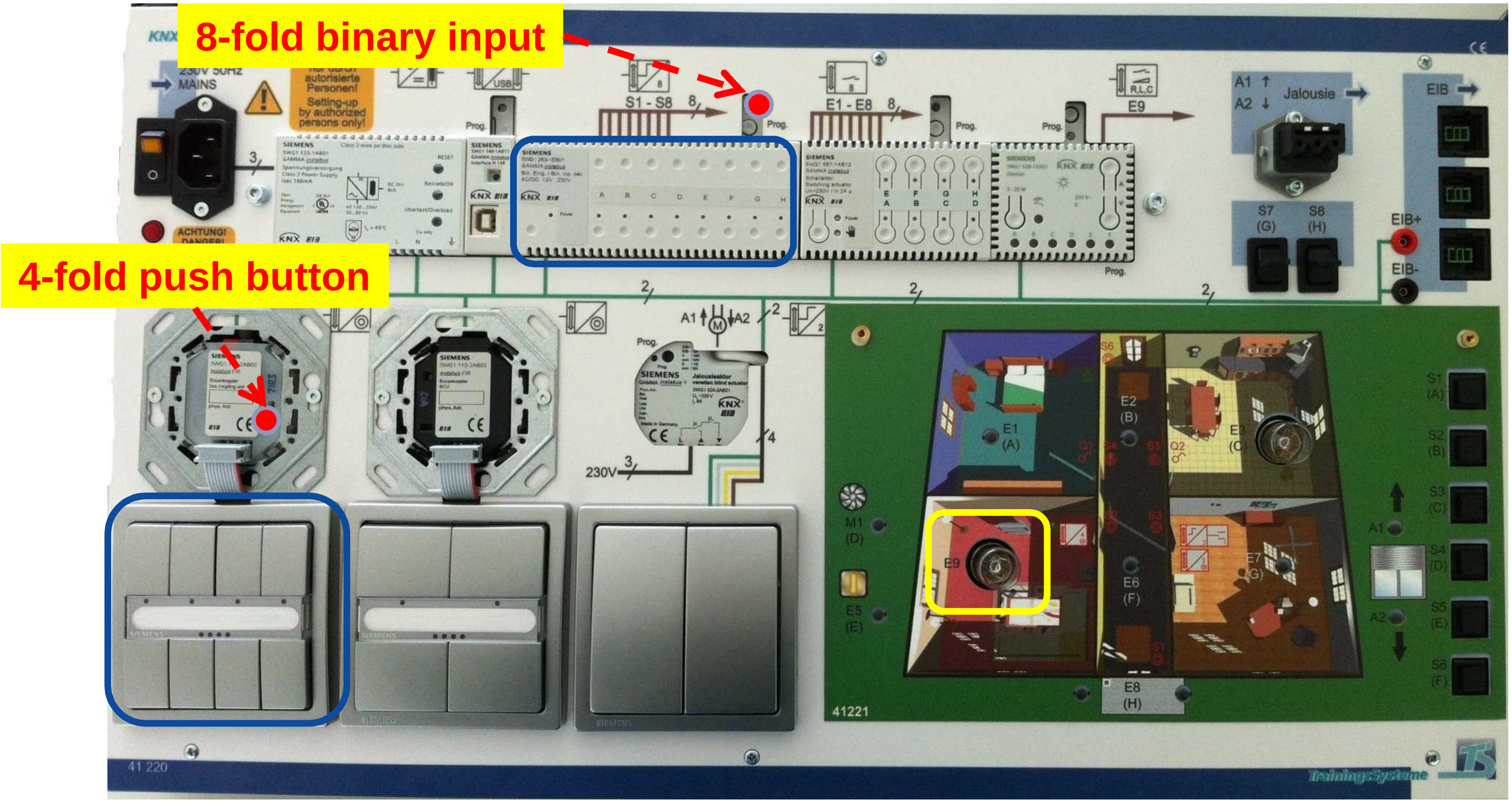
1) **Select the device to download the relevant data**
2) **Right Click → Download → Download All**

6. A real KNX Project
Step 8 – Download the Individual Addresses and the Application Program

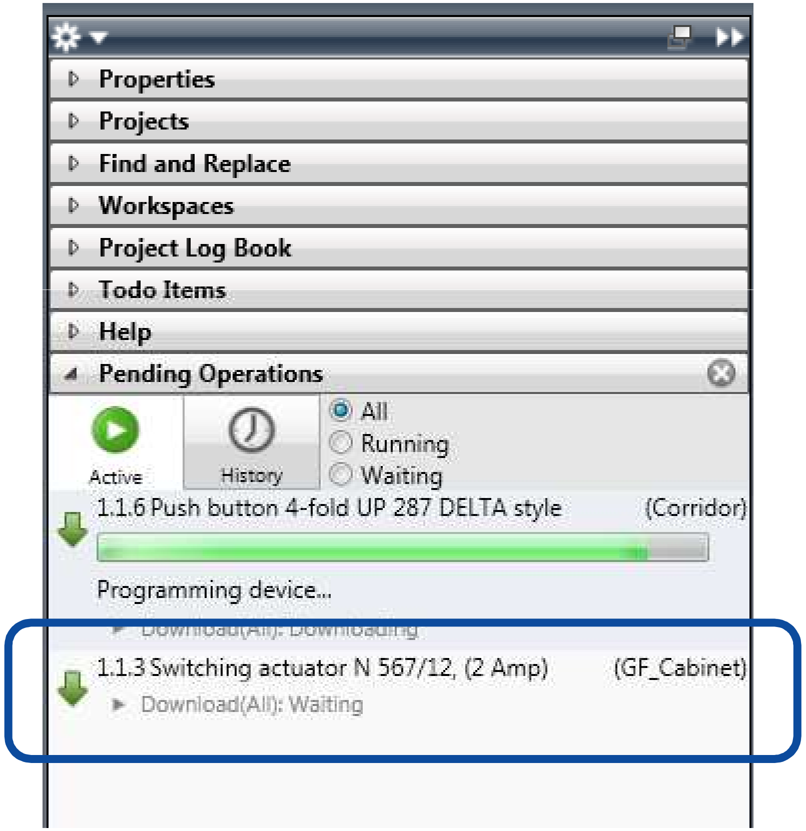


Press the programming button (● in the next page) of the corresponding device.

6. A real KNX Project
Step 8 – Download the Individual Addresses and the Application Program



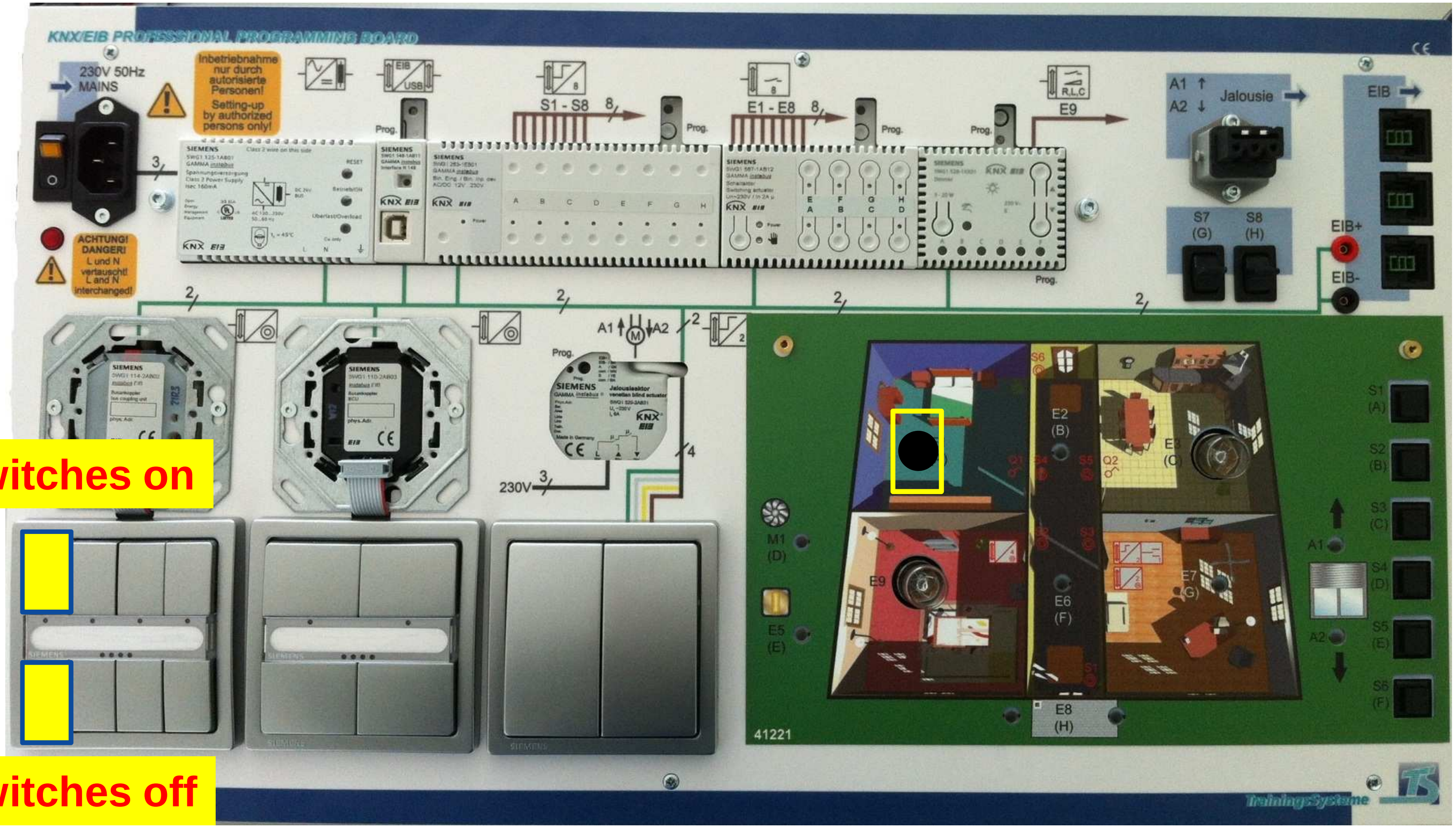
6. A real KNX Project
Step 8 – Download the Individual Addresses and the Application Program



The Individual Address and the Application Program are being downloaded to the device. Perform the same action for the device in queue.

6. A real KNX Project

Step 9 – Check the result

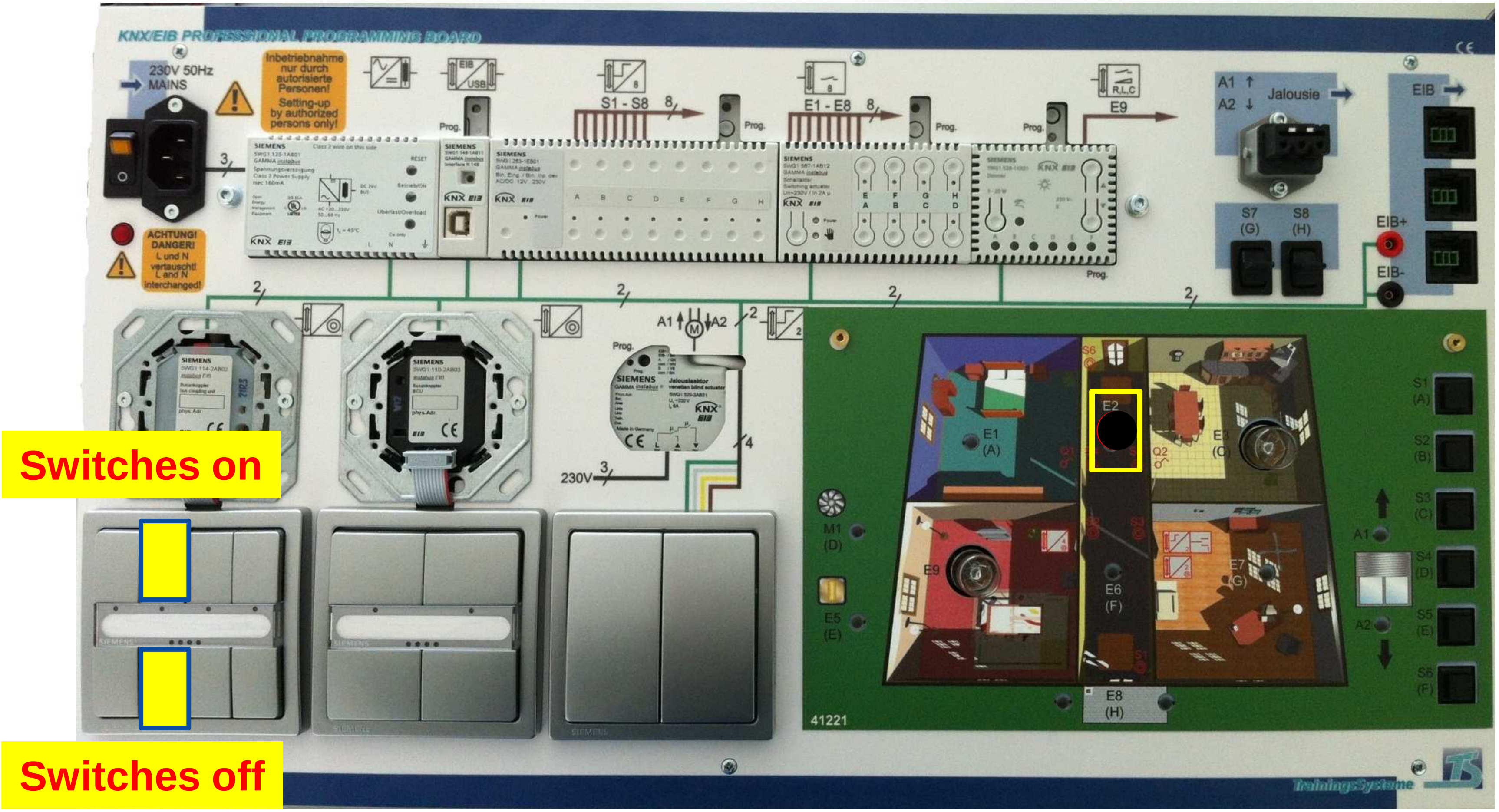


Switches on

Switches off

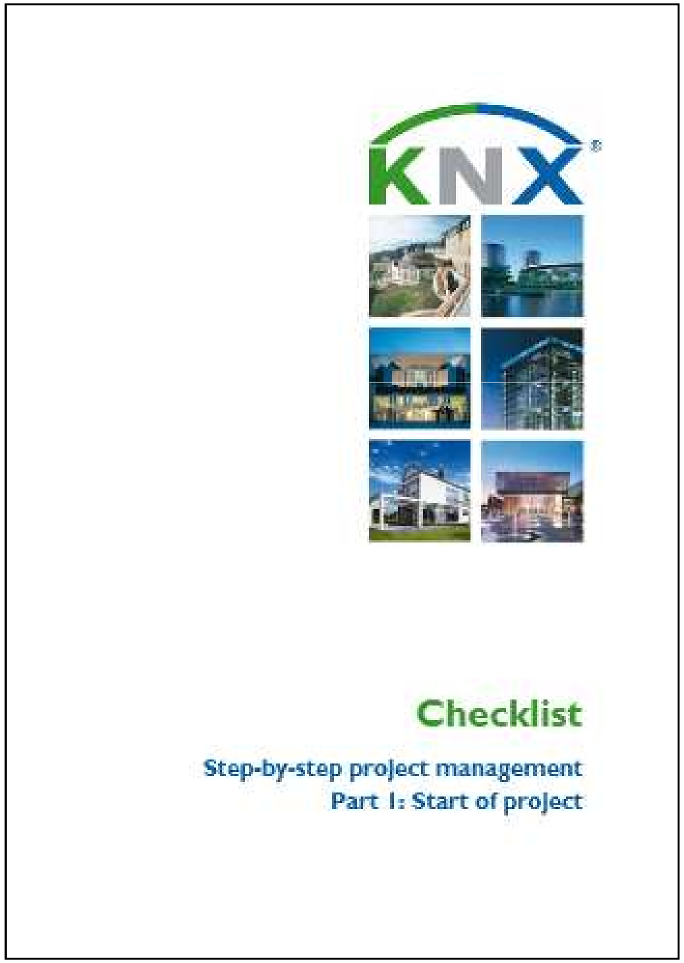
6. A real KNX Project

Step 9 – Check the result



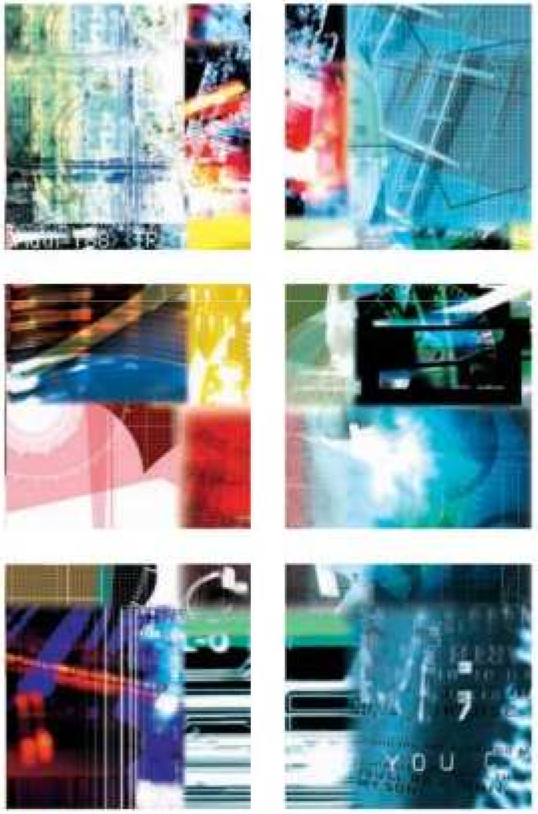
6. A real KNX Project

Step 10 – As an installer. create and give proper documentation to the customer



- Up-to-date electrical plans
- Description of the functions
- Give a short (or long) emonstration to the customer.

KNX®



www.knx.org

KNX will improve your business opportunities

- **Advantages of the KNX Technology**
- **Advantages of Being a KNX Member**
- **Advantages of an Open Standard**

KNX Association International

www.knx.org

Advantages of the KNX Technology

1. International Standard, therefore future proof

- **CENELEC**
  KNX became EN50090
- **CEN**
  KNX became EN13321-1/2
- **ISO/IEC**
  KNX became ISO/IEC14543-3
- **SAC**
  KNX became GB/Z20965
- **ANSI/ASHRAE**
  KNX became US ANSI/ASHRAE standard 135

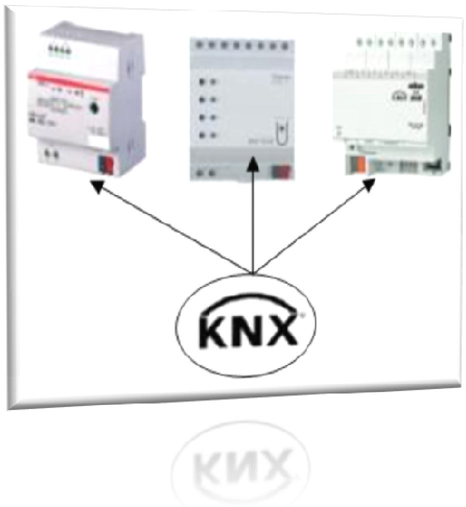
International Standard, therefore future proof

Product certification guarantees Interoperability & Interworking

KNX stands for high product quality

2. Product certification guarantees Interoperability and Interworking

Different products of
different manufacturers can be used in
different applications



KNX logo ensures
Interoperability & Interworking

- KNX is the only HBES standard running global certification schemes for products, training centers and even for persons.
- Product compliance is checked at neutral laboratories.

International Standard, therefore future proof

Product certification guarantees Interoperability & Interworking

KNX stands for high product quality

3. KNX stands for high product quality

- KNX Association requires a high level of production and quality control during all stages of the product life.
- All manufacturers have to show compliance to ISO 9001.

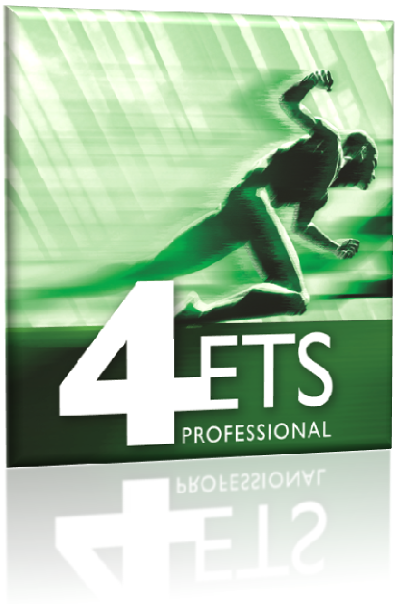
International Organization for Standardization

International Standard, therefore future proof

Product certification guarantees Interoperability & Interworking

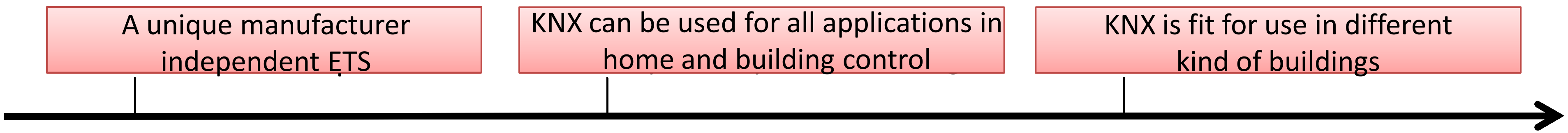
KNX stands for high product quality

4. A unique manufacturer independent ETS

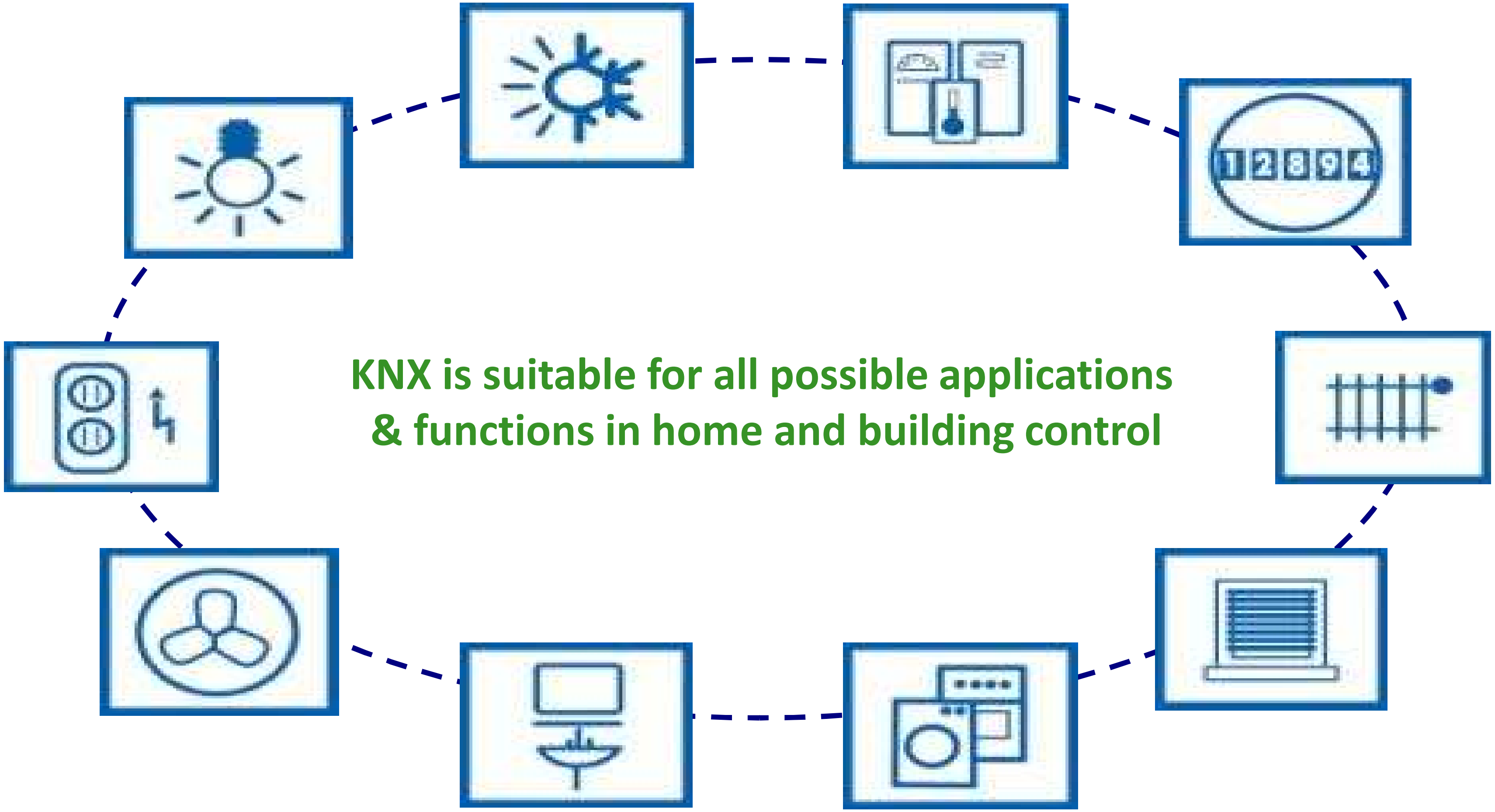


- The PC software tool ETS allows the planning, engineering and configuration of all KNX certified products.

- The tool is moreover manufacturer independent: the system integrator is able to combine products of different manufacturers to one installation.



5. KNX can be used for all applications in home and building control



A unique manufacturer independent ETS

KNX can be used for all applications in home and building control

KNX is fit for use in different kind of buildings

6. KNX is fit for use in different kind of buildings

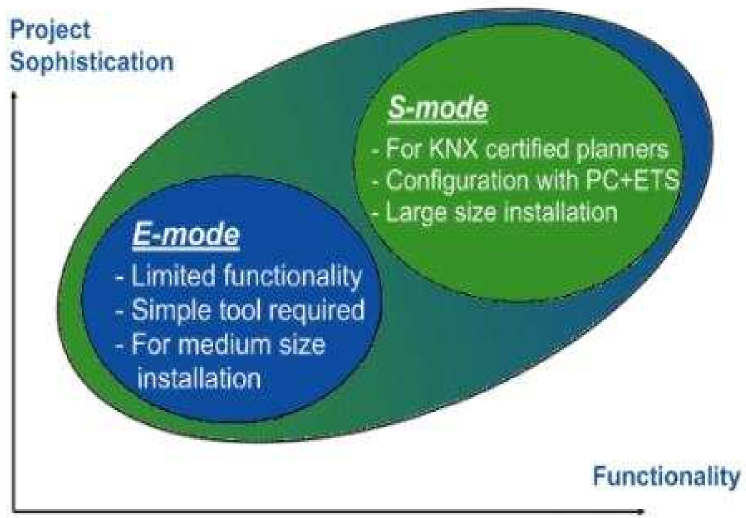
- New and existing buildings
- Small size houses & large buildings
- Easy to extend and adapted to new needs.

A unique manufacturer independent ETS

KNX can be used for all applications in home and building control

KNX is fit for use in different kind of buildings

7. KNX supports different Configuration Modes



- **E-mode: configuration by controller.**
- **S-mode: configuration by PC.**

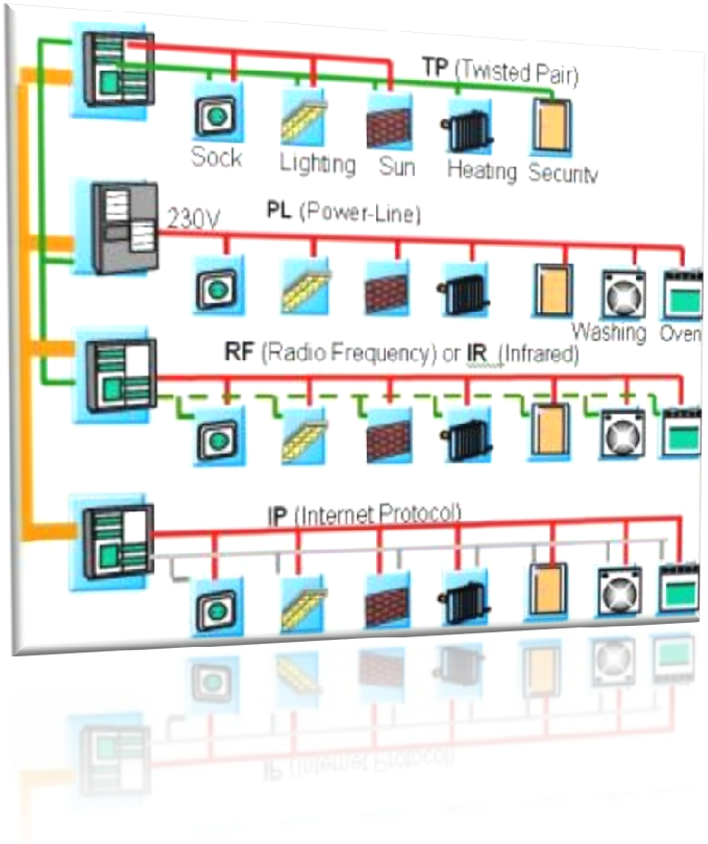
KNX supports different Configuration Modes

KNX supports several Communication Media

KNX can be coupled to other systems

8. KNX supports several Communication Media

- Twisted Pair (TP)
- Power Line (PL)
- Radio Frequency (RF)
- IP/Ethernet



KNX supports different Configuration Modes

KNX supports several Communication Media

KNX can be coupled to other systems

9. KNX can be coupled to other systems

- **KNX has developed sophisticated gate-ways to help and complete other sys-tems.**
- **Proofs of KNX collaboration are:**

  ✓**Mapping with BACnet.**

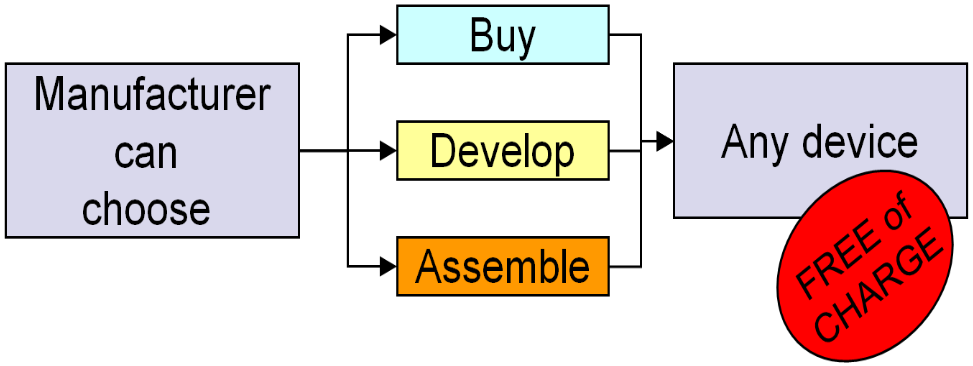
  ✓**Possibility to interface with DALI.**

KNX supports different Configuration Modes

KNX supports several Communication Media

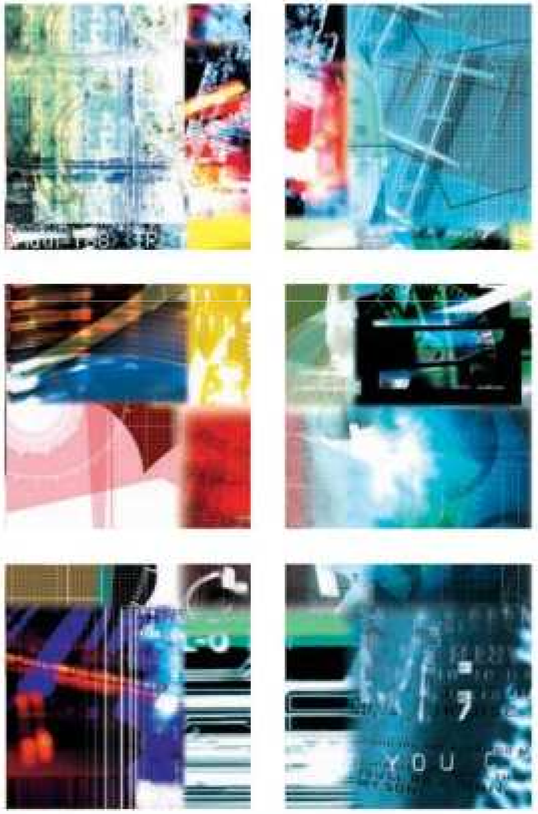
KNX can be coupled to other systems

10. KNX is independent from any hard- or software technology



- Manufacturers can develop own microprocessor platform or they can also recourse to provider of KNX system components.

- KNX is completely FREE of additional royalty fees.

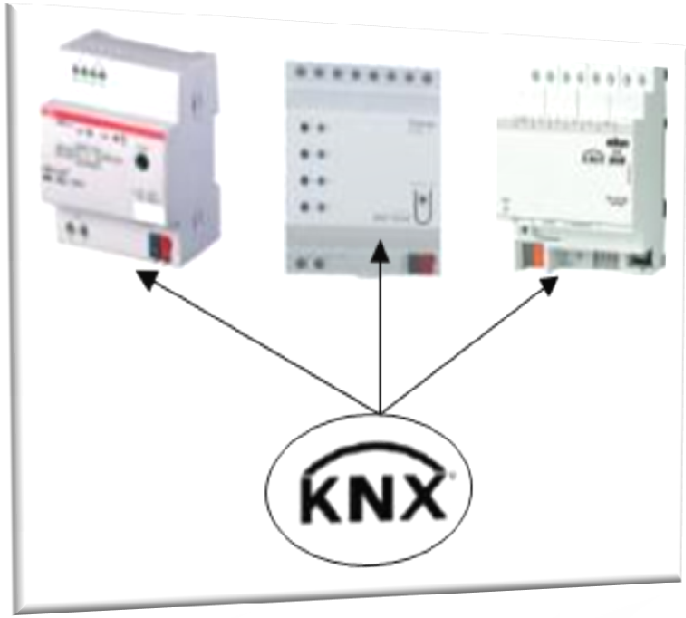


www.knx.org

Advantages of Being a KNX Member

1. Use KNX logo on your products

- As a sign of quality, only KNX Members are able to use the KNX logo on their KNX certified devices and on their KNX-related promotional material. Let your KNX devices and company be part of the worldwide network of providers of KNX certified products.



2. Boost your Company Internationally

- **Benefit from the impact of publications in the KNX Journal, read by more than 80,000 people in 100 countries: free presentation of any new KNX member to the KNX community and free promotion of your latest KNX products.**


KNX
JOURNAL
Market Study Smart Home
KNX Video Contest
KNX Award 2012
KNX IP Secure
ETS Apps Development
2
2012
The worldwide STANDARD for home and building control
www.knx.org


DOMOTIK
EAE


New KNX Products

3. Access to the KNX Know-How

- **The KNX technology will be at your fingertips in the form of the latest version of the KNX Specifications. The KNX Standard will guide you through all topics related to KNX development, including system features, profiles, certification rules, application descriptions, testing requirements…**

4. KNX Team at your Service

- As a KNX Member, the Brussels KNX team is at your service for support related to KNX administrative, certification, testing, marketing and tools licensing issues.
- the KNX working groups, you can exchange views with other involved KNX members on KNX related matters.

5. Exclusive access to KNX Tools

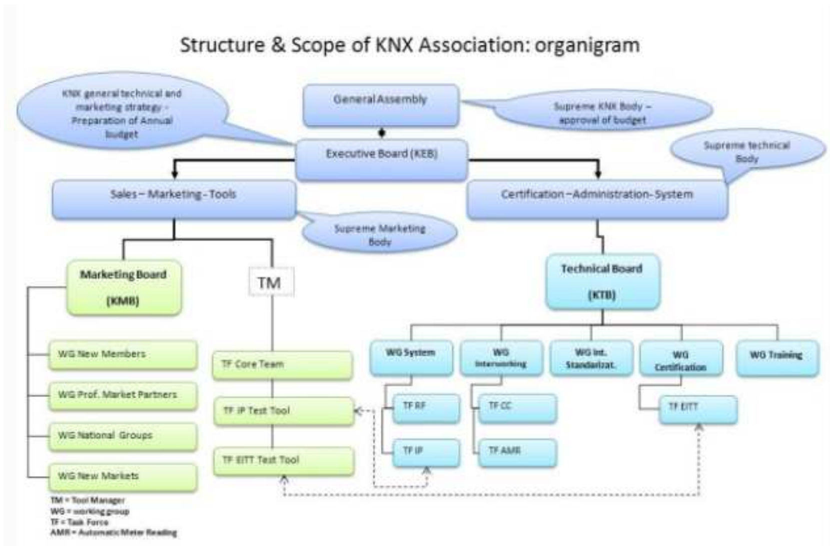
- As a KNX member, only you have access to the specialized KNX tools such as the Manufacturer tool for creation of KNX ETS product database entries and EITT, the uniform KNX conformity test tool.

6. Extend your Worldwide Visibility

- Your company name will appear on the International KNX website, translated into more than 18 languages and also constituting the communication platform for the KNX country organizations (“KNX national groups”) in the individual countries (so far more than 20).

7. Influence the KNX decision-making process

- **You can participate in the KNX Working Groups and KNX Task Forces, the driving forces in KNX marketing and communication, as well as technical aspects. You have the opportunity to influence the future of KNX by participating in official KNX decisions during the KNX annual general meeting (AG).**



8. Open up new markets through you involvement in KNX

- Participate in KNX events organized in several countries or get involved in local KNX National Groups.

9. Enhance your campaigns with free KNX PR Material

- **Common promotional material such as KNX brochures, giveaways… is available from KNX to support you when creating more awareness for KNX with new customers.**

10. Stay informed on latest evolutions in International Standardization

- **KNX has partnerships with many international standardization organizations, with the purpose of further enshrining KNX in international standards : in view of this privileged position, KNX will be able to keep you posted on latest evolutions in standardization of new home and building control related standards.**

Advantages of an Open Standard

www.knx.org

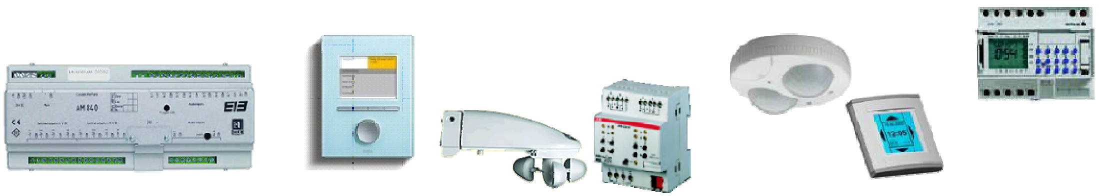
Interworking: general

- **Real interworking of devices of different manufacturers requires**
  - standardisation of
    - Protocol
    - Useful data: size and contents!
  - Proven compliance through third party certification

- **History KNX Interworking**
  - EIB Association: EIB Interworking standards – data formats for common functions
  - Renamed to KNX DPT – Data Types during convergence process
  - Publically available as EN 50090-3-3

KNX Interworking: advantages (1)

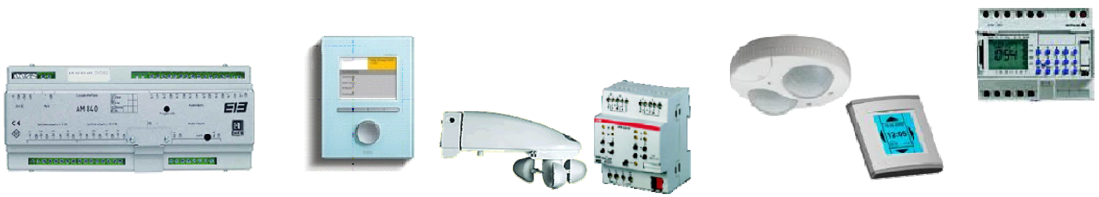
- **The advantages of KNX only truly become visible in a multi-vendor and cross-discipline environment**
  - E.g. “All off” button of Manuf A switches the lights off, controlled by switching actuators of Manuf B, C, D, …
- **Enormous benefit to end users**
  - Product line A is defective but Manuf A has discontinued product line ➔ Find replacement at Manuf B
- **Interworking attracts manufacturers of niche products**
  - One single manufacturer is unable to offer all possible KNX solutions, from lighting to HVAC to Load management, etc.
  - Boosts OEM market: what Manuf A does not produce himself, he can easily find at another KNX manufacturer

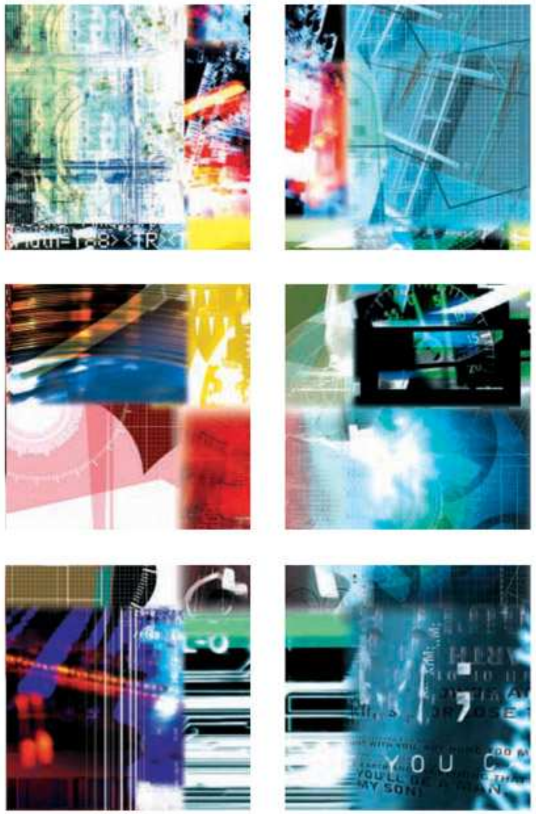



KNX Interworking: advantages (2)

- **Thanks to interworking, a common market infrastructure can be established**
  - Common configuration tool
  - Common training schemes

- **Gateways between KNX and proprietary systems are easier to develop**
  - proprietary coding can be easily mapped to common KNX data formats as described in the KNX standard
  - Easy coupling of KNX to e.g. BACnet and DALI





www.knx.org

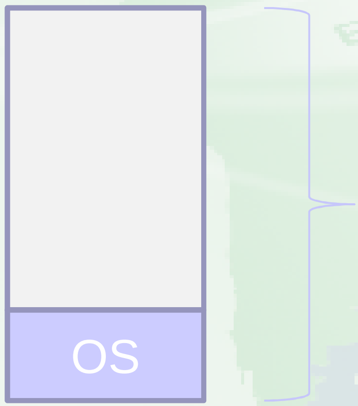
How to Develop KNX Device

KNX Association International

KNX MANUFACTURING

HW

- KNX is HW independent. Use your own hardware design, your own microcontroller, etc.
- But, the HW in charge of the bus connection must be a TP-UART (analog-digital conversion).
- The HW is NOT certified. It has to be compliant with the electrical rules of each country where the product is intended to be sold.
- The OS (Operative System) must be a **KNX certified stack**.
    - Purchase a KNX stack, or
    - Develop and to be certified your own one.
- The device, ex-factory, is “incomplete”.

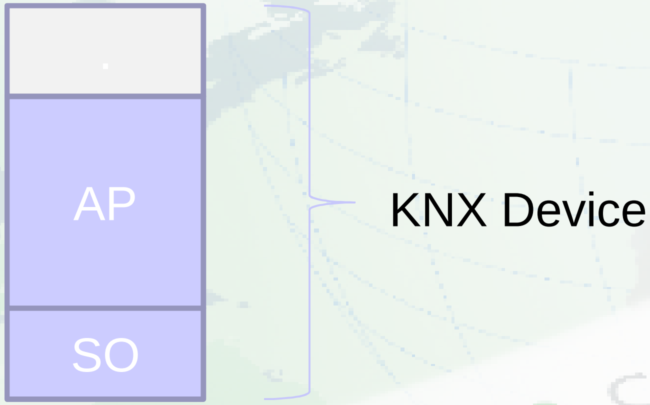


KNX Device

KNX MANUFACTURING

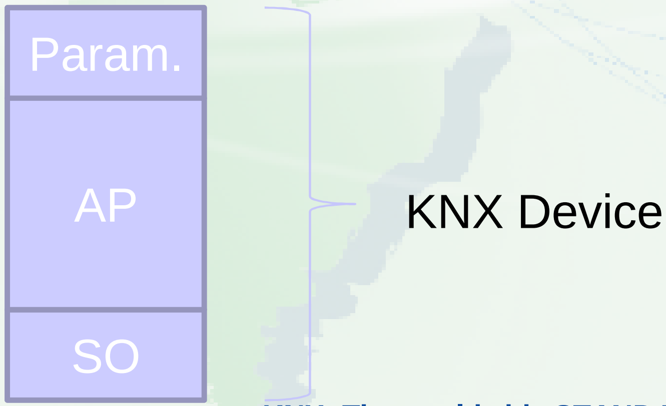
HW

- The device needs the application program (developed by the manufacturer) also certified.



The AP is the “soul” of the device. One HW can run different AP, meaning that the device does different things (shutters, lights…)

- The system integrator configure the device according to the project.



KNX MANUFACTURING

HW

- HW Design: