

Ang Ye, 04.11.2021

ADVANCED BUILDING ENERGY EFFICIENCY AND ITS APPLICATION

WE'RE **MAKING** THE ENERGY TRANSITION HAPPEN

➤ **CENTRE OF EXPERTISE**
for energy efficiency, renewable energy sources and system integration

➤ **INTERMEDIARY**
between politics, industry, science and society

➤ **PLATFORM**
for dialogue with stakeholders from various industries and fields

➤ **PARTNER AND INITIATOR**
of federal government for its energy and climate policy strategy

➤ **ENABLER**
of the energy transition in concrete projects domestically and abroad

OUR KEY AREAS

STRATEGY AND
ADVICE

STUDIES AND
ANALYSES

PROJECT
DEVELOPMENT

MARKET
DEVELOPMENT

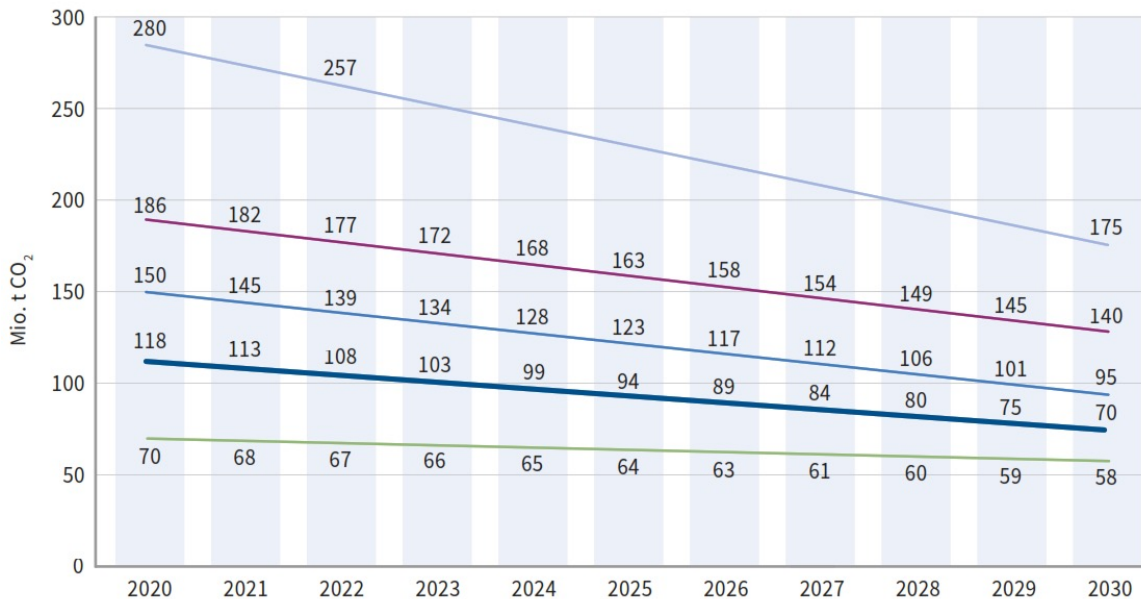
NETWORKS

COMMUNICATION



BUILDING ENERGY EFFICIENCY IN GERMANY

GERMANY'S SECTOR TARGETS AND ANNUAL EMISSION LEVELS 2020 - 2030

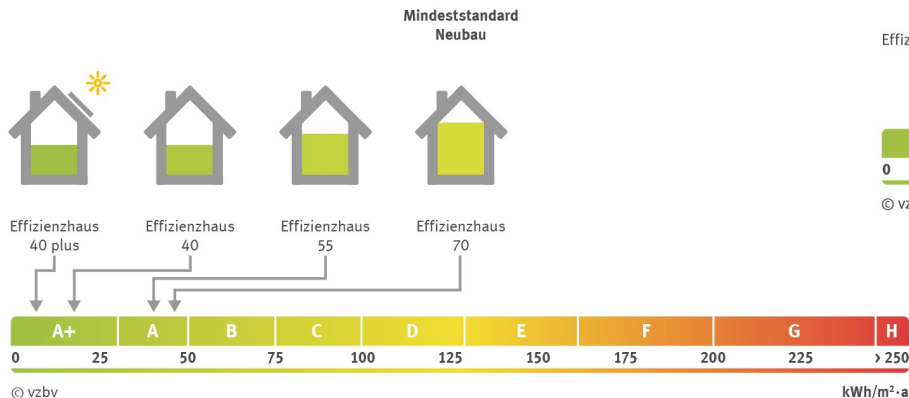


Source: BMU 2020

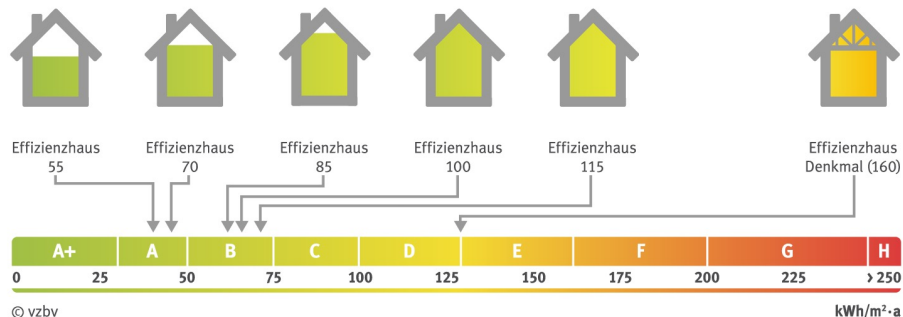
- Building
- Transport
- Energy
- Industry
- Agriculture

IMPORTANT INSTRUMENT: KFW SUBSIDIES FOR BUILDING SECTOR IN GERMANY

New Building



Retrofit



DATABASE OF ENERGY EFFICIENCY EXPERTS

➤ Energy-efficiency experts with **certified qualifications** in the area of energy-efficient building and refurbishment are included in the database.
dena conducts **random checks of the work performed** by the experts included in the database in order to ensure consistent quality.

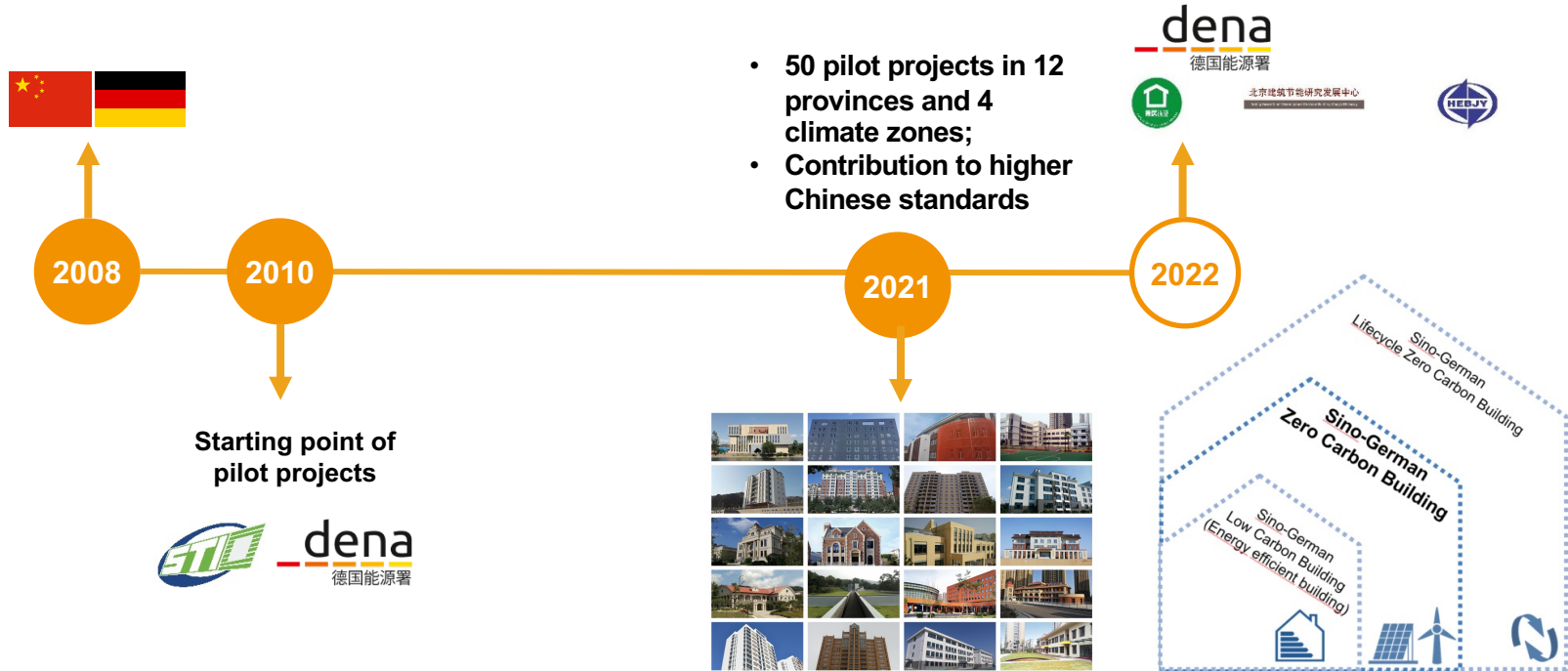
➤ dena manages the Database of Energy Experts on behalf of KfW.





WORKING WITH CHINA

OVER 10 YEARS APPROACH



DENA QUALITY ASSURANCE

Design Phase

- design seminars
- coaching
- design control + improvement



Construction Phase

- demo building + training
- site control
- final acceptance
- **low carbon building certificate**



Operation

- monitoring 1 year
- proof of monitoring data
- **low carbon operation certificate**

EXAMPLE: HIGRISE RESIDENTIAL JINAN 28#



- GFA/TFA: 18036 m²/ 15703 m²,
- Primary Energy Demand: 107,57kWh/ (m²a)
- CO₂ Emission: 41,26kg/ (m²/a)
- Heating, cooling, DHW by heat pump, no renewable energy



中德合作高效建筑—被动式低能耗建筑质量标识 **dena**
Sino-German Energy Efficient Buildings: Certificate 德国能源署

颁发日期: 2020年11月04日 建筑名称: 济南28#高层住宅项目
Issued at: 04.11.2020 Project name: Building 28#, Apartment, Jnan. 能源需求技术标识
Energy demand

建筑信息
Building

主要建筑功能 Type of building	住宅 Residential Building
地址 Address	山东省济南高新区凤凰路7号融创公馆高层住宅项目 Northwest Side of the City of Jinan High Tech Zone, Jnan City, Shandong Province
开发单位 Developer	山东泉源置业有限公司 Shandong Quanyuan Real Estate Development Co., Ltd.
建造年份 Year of construction	2018年-2020年
建筑面积 / 使用面积 Gross Area and Usable Area	18036 m ² / 15703 m ²
容积率系数 Surface-volume ratio	0.88

能效数据
Energy performance

能效等级 Energy class	A	中国绿色建筑能效标准 Sino-German Energy Efficiency Standard
终端能源需求 Final energy demand	41.37 kWh/m ² a	德国能源需求技术标识 DEE Standard
一次能源需求总量 Primary energy demand	107.57 kWh/m ² a	德国能源需求技术标识 DEE Standard
二氧化碳排放量 CO ₂ emissions	41.26 kg/m ² a	德国能源需求技术标识 DEE Standard

日期: 04.11.2020 负责人签字: 盖章
Date: 04.11.2020 Signatory / Stamp

证书编号: CH-DE-EP-28-1-2020
中德合作高效建筑质量标识 (CERTIFIED) 德国能源署 (dena)

中德合作高效建筑—被动式低能耗建筑质量标识 **dena**
Sino-German Energy Efficient Buildings: Certificate 德国能源署

颁发日期: 2020年11月04日 建筑名称: 济南28#高层住宅项目
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综合能效评价
Overall evaluation of energy efficiency

热需求 / Space heating demand: 16.27 kWh/m²a

热负荷 / Space heating load: 0.44 W/m²

冷需求 / Space cooling demand: 24.70 kWh/m²a

冷负荷 / Space cooling load: 15.61 W/m²

一次能源需求总量 / Primary energy demand: 107.57 kWh/m²a

围护结构
Building envelope

传热系数 U-value 2010/2013	围护结构 Building envelope	一次能源需求数据 Primary energy demand [kWh/(m ² a)]
屋顶 / 顶板隔热 Upper envelope	0.11	制热需求 Space heating
外墙 External wall	0.14	制冷需求 Space cooling
门窗 / 门 Window/door assembly	0.82/1.4	新风与除湿需求 Ventilation/Dehumidification
地板 / 底层地面 Floor assembly/ground	0.14	生活热水制备需求 Domestic hot water
气密性 (Air-tightness g/h·m ³)	总计 Total	生活用电量 Residential electricity
	0.10	总计 Total

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围护结构
Building envelope

面积 Area [m ²]	传热系数 U-value [W/m ² K]	保温层厚度 Thickness [mm]	材料 Material
屋顶 / 顶板隔热 Roof/ceiling assembly	0.11	0.11	挤塑聚苯板 XPS λ=0.028(W/mK)
外墙 External wall	0.14	0.14	挤塑聚苯板 XPS λ=0.031(W/mK)
窗墙 Window	0.82	0.82	铝包木窗, 三层中空玻璃, 隔热气 铝包木窗, 三层中空玻璃, 隔热气 Aluminum-Clad wood frame, Triple insulated glazing, Thermally insulated window frame U-value 0.154+0.154+0.154 W/m ² K
门 Door	1.4	1.4	钢木复合 Steel-wood composite
地板 Ground floor	0.14	0.14	挤塑聚苯板 XPS λ=0.028(W/mK)
空调 Air-conditioning	4	12	空调板 Refrigerated Plate λ=0.040(W/mK)

设备工程
Building services

设备 Equipment	能源类型 Energy carrier
采暖设备 Heating	新风空调一体机 Integral device of heat pump and ventilation 网络环网冷、热/电/能 Environmental energy / Electricity
制冷设备 Cooling	新风空调一体机 Integral device of heat pump and ventilation 网络环网冷、热/电/能 Environmental energy / Electricity
生活热水制备 Domestic hot water	电热水器 Electric water heater 电/能 Electricity
新风系统 Ventilation	① 已安装新风系统, with ventilation system 新风与除湿 power demand 0.40 kWh/m ² a ② 新风系统运行, with hot recovery, 新风与除湿 power demand 0.75 kWh/m ² a ③ summer 78.9% 电, winter 68.4% ④ 新风系统运行, with hot recovery power demand 0.75 kWh/m ² a
太阳能设备 Solar system	① 未安装太阳能板, solar collectors area ② 有安装太阳能板, for domestic hot water production ③ 有 / 太阳能板, for auxiliary heating ④ 有 / 太阳能板, for power area

FURTHER DEVELOPMENT

Sino-German Low Carbon Building

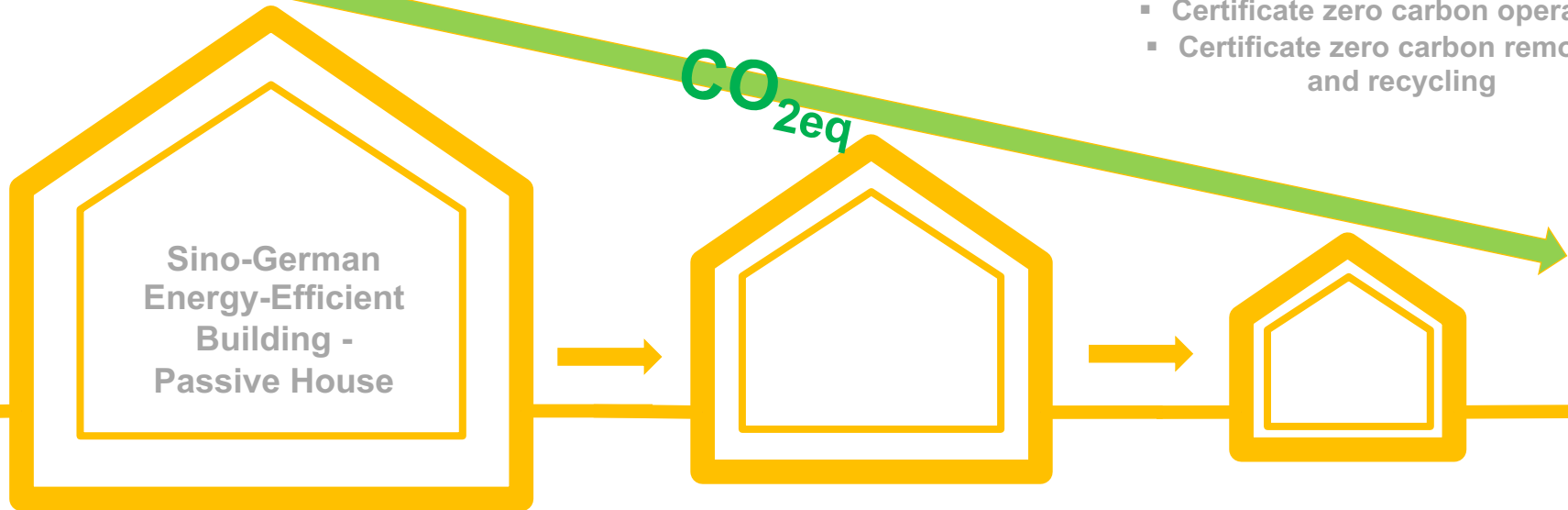
- **Certificate low carbon building in design and construction**
 - **Certificate operation**

Sino-German Zero Carbon Building

- **Certificate zero carbon building in design and construction**
- **Certificate zero carbon operation**

Sino-German Lifecycle Zero Carbon Building

- **Certificate design, material and construction**
- **Certificate zero carbon building in design and construction**
- **Certificate zero carbon operation**
- **Certificate zero carbon removal and recycling**



**THANK YOU FOR
YOUR ATTENTION.**

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