



让我们共同打造气候中和的未来
Building a climate-neutral future together.

ZEB China Sino-Swiss Cooperation 中瑞零碳建筑示范项目



中华人民共和国
住房和城乡建设部



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra



intep

skat Swiss Resource Centre and
Consultancies for Development



HSLU Lucerne University
of Applied Sciences
and Arts



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Schindler – We Elevate

ZEB-Talk

Elevators for new buildings

Kurt Steiner/ Roger Beuret
NI/MOD business/ CRD
Ebikon/ Lucerne/ Switzerland
2023

迅达—
我们提升
ZEB讨论会
面向新建筑的升降机



Schindler



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1974: Joint venture with Jardine Matheson & Co. Ltd in Hong Kong.

1974: 香港怡和洋行合资企业

1980: First industrial joint venture of the People's Republic of China with a western company (pictured). China Schindler Elevator Co. is established in Beijing.

1980: 中华人民共和国与西方公司的首家合资企业。左图为北京中国迅达公司成立照片。

China Schindler, a successful history of relationship **中国迅达，一段成功的关系史**



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149
Years experience
149 年经验



1,000+
Branch offices
1000+ 分公司



69,000+
Employees
69000+ 员工



100+
Countries
100+ 国家

**CHF 11.3
billion**
revenue in 2022

113 亿瑞士法郎
2022年收益

We believe in long-term business success

我们坚信长期的商业成功



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Schindler Ahead 迅达领先

Advanced adaptive maintenance and remote services based on real-time data



Schindler PORT 迅达端口

Transit management system shaping sustainable urban development



Modular product offering 模块化产品供应

Energy efficient products for seamless and interactive passenger experience



Digital Twin 数字孪生

Reduced time to market and better equipment data quality



Building Information Modelling (BIM) 建筑信息模型

Quick and easy elevator and escalator planning



Schindler CoLab 迅达协同实验室

Building integration toolbox and API platform



BuildingMinds 思维建设

Digitalizing buildings to drive performance and sustainability



Schindler R.I.S.E 迅达R.I.S.E

Robotic precision and speed



Schindler ClimbLift 迅达爬梯

Speeding up construction processes



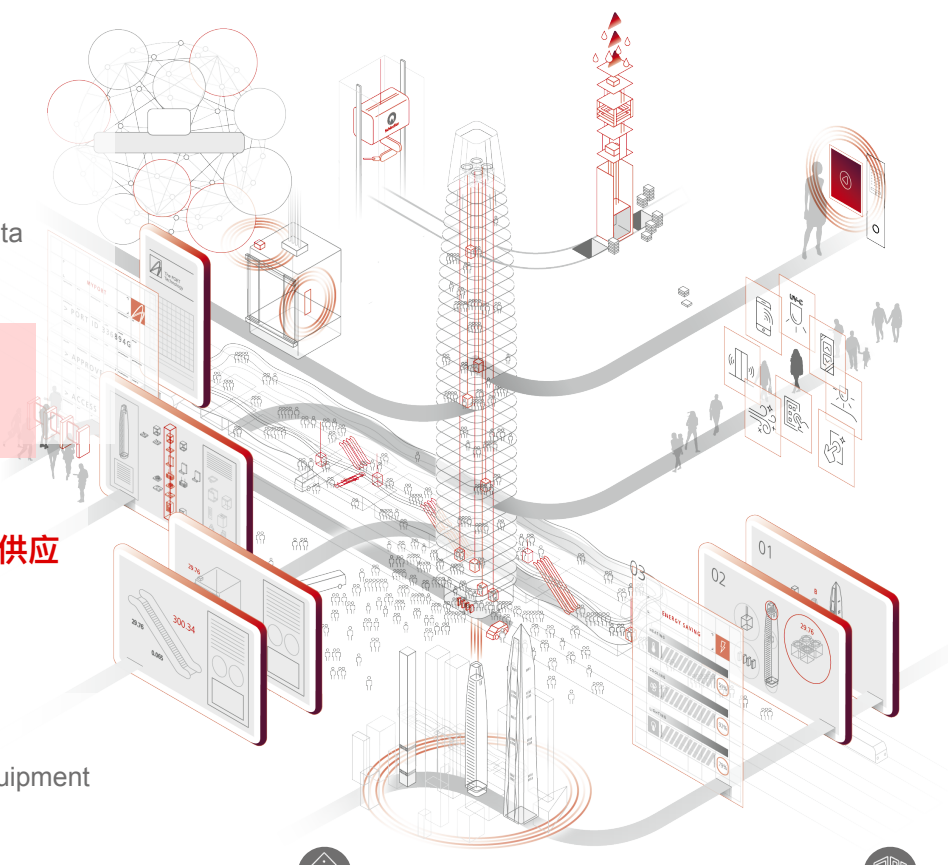
Schindler Media Network 迅达媒体网

Elevators turn into communication platforms



Schindler CleanMobility and passenger space solutions

迅达清洁移动与步行空间解决方案
Enhancing passenger comfort



Innovation and technology — Our solutions

创新与技术 — 我们的解决方案



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Our commitment 我们的承诺

Public commitment to reduce
absolute CO₂ emissions vs. 2020

与 2020 年相比减少二氧化碳绝对排放量的
公开承诺

By 2030
至2030年

-50% **-42%**

Scope 1/2 Scope 3

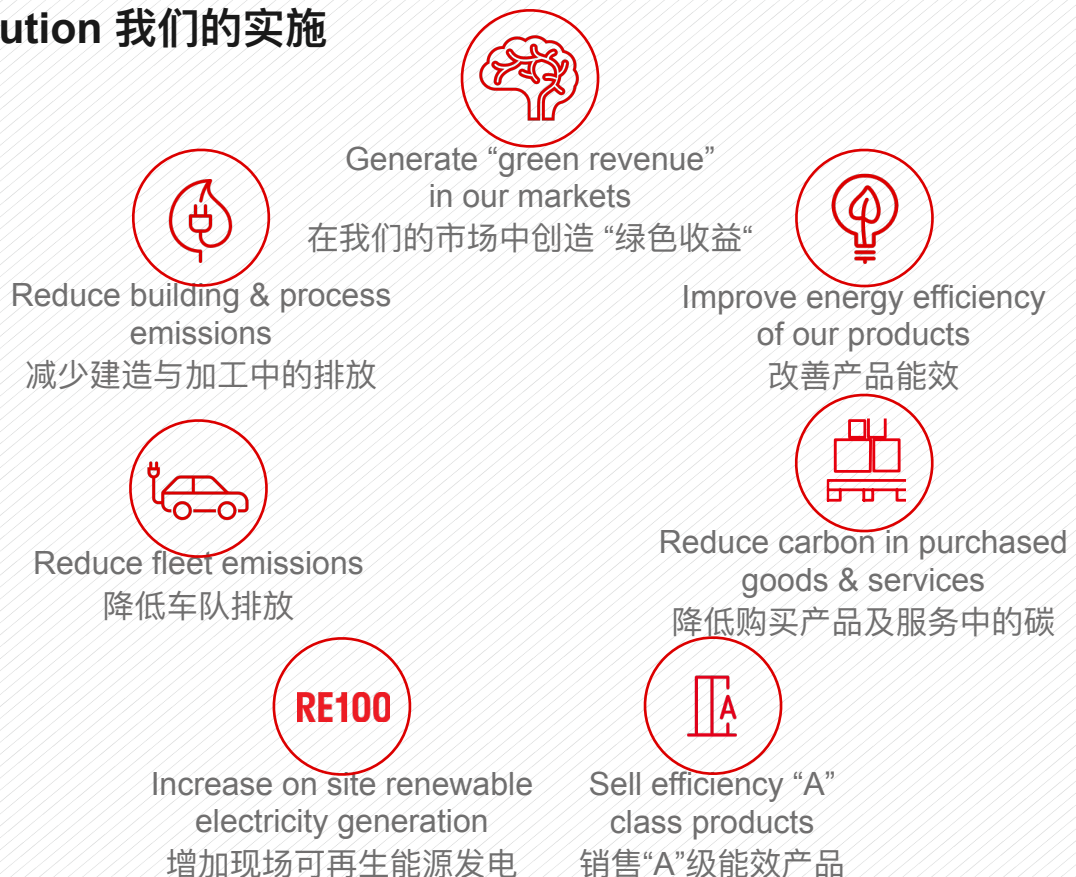
By 2040
至2040年

-90%

Scope 1/2/3

and neutralize remaining emissions
independent of the business growth
并中和与业务增长无关的剩余排放量

Our execution 我们的实施



Schindler's net-zero commitment

迅达零碳承诺



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Sources:
Scope 1&2 – Corporate Responsibility Report p. 42; Scope 3 – Reassessment Swissclimate Nov. 2021 incl. product use)

Scope 1 范围1

Direct emissions from owned or controlled sources (129 kt CO₂e)

Scope 2 范围2

Indirect emissions from generating energy purchased (54 kt CO₂e)

Scope 3 范围3

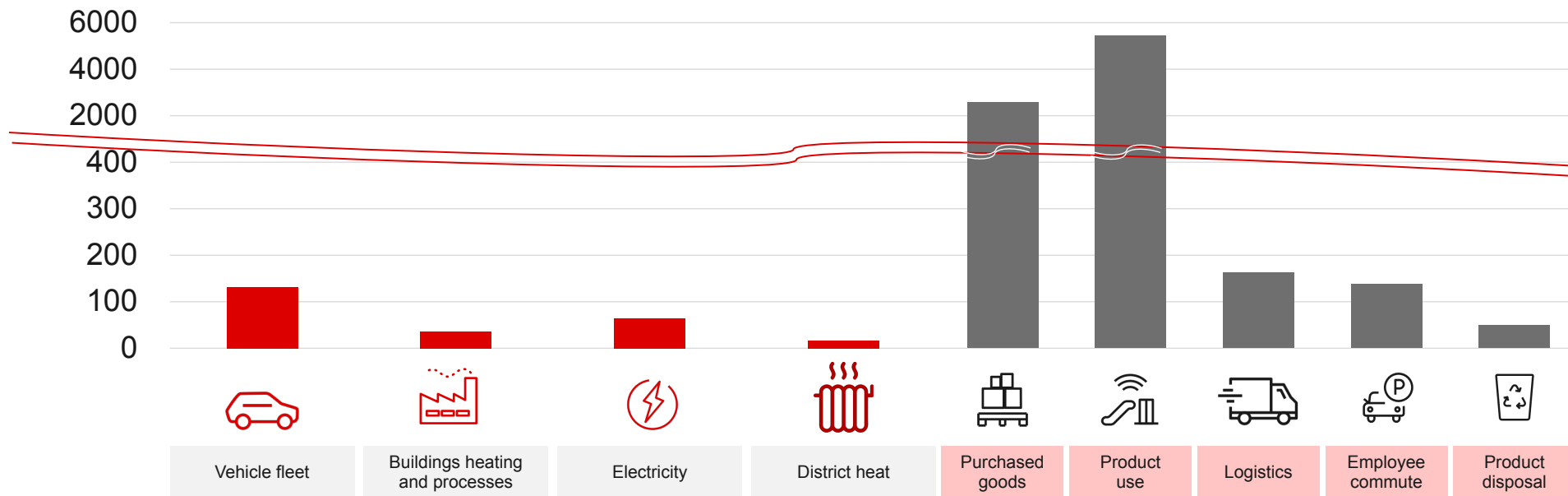
All other indirect emissions that occur in the value chain

CO₂ emissions

二氧化碳排放量

in kilotons

计量单位：千吨



Key aspects

Fleet improvement and electrification, building energy efficiency, renewable electricity

车队改善与电气化，建筑能源效率，可再生能源发电

Product design, circularity, supplier selection, new work

产品设计，循环性，挑选供应商，新工作

Schindler's carbon footprint across the value chain
Accounting for all business areas and functions

迅达在价值链中的碳足迹
全业务领域与功能核算



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- Green technology in **elevator**:
PM drive,
regenerative inverter (up to 30% energy saving),
stand mode (up to 40% energy saving),
LED lighting ECO mode,...
can reach ISO A
- Green technology in **escalator**:
aluminum steps (40% lighter, 5% improvement of overall performance),
high efficiency drive,
ECO line (up to 35% saving),
can reach ISO A+++..

升降机采用绿色技术：
电源管理驱动、再生变频器（最高节能 30%）、
站立模式（最高节能 40%）、LED 照明 ECO 模式等，可达到 ISO A

自动扶梯采用绿色技术：
铝制台阶（轻 40%，整体性能提高 5%）、高效驱动、ECO 线路（最高节能 35%），可达到 ISO A+++



Shanghai City green
Low carbon product certificate for elevator and escalator

上海城市绿化
低碳电梯产品认证



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**Shanghai five-star
Green Factory 2022 Award
for Jiading Campus**
嘉定校区荣获2022年
上海五星绿色工厂



**Solar power generating system
covering up to 80% of annual
electricity consumption**
太阳能发电系统覆盖高达80%的全年
用电量



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- Technology perfectly suited to the environment. Elevators should be Class A rated, according to ISO 25745-2.
- To assess the ecological performance of elevators throughout their life, it should be provided by Environmental Product Declarations (EPD).
- 与环境完美契合的技术。根据 ISO 25745-2 标准，升降机应达到 A 级标准。
- 为评估升降机在整个生命周期内的生态性能，应提供环境产品声明（EPD）。



Overall System 整体系统

- Compact, light weight, and durable design that optimizes material usage
- Standby mode: Many components feature an ECO or Standby mode to reduce energy consumption by up to 40%



Control 控制

- System should switch car lights and ventilation into stand-by mode
- Smart operation, down collective and selective collective controls for efficient passenger transportation



Hoistway 提升间

- Dif. Traction Media (rope, belts, etc.) have dif. characteristics and can have benefits in energy usage or lifetime.
- State of the art elevator positioning system eliminates unnecessary trips to reset the system



Car 汽车

- Ceiling lights, car indicator and landing indicators feature LED lights which last 20x longer and consume less energy than standard lights
- Door drive with stand-by mode for safety and energy conservation
- Light-weight interior materials improve operational efficiency and energy usage



Drive 驱动

- Gearless machine for smooth ride quality without requiring oil for lubrication
- Regenerative frequency converter returns energy to the grid for future use of the elevator operation
- Stable start without high peak current, quickly reaching a low energy consumption level



Elevator for new building
Technology perfectly suited to the environment

面向新建筑的升降机
与环境完美契合的技术



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Regenerative drives return energy a building's power grid to be used for the operation of the elevator.

再生式驱动装置可将建筑电网的能量回馈给电梯运行。

Benefits 好处

- Less net power usage means lower monthly utility bills for our customers
净用电量减少意味着客户每月水电费支出的降低
- Reduced heat generation means reduced cooling requirements in the elevator machine room. **Heat generation can be reduced up to 50% depending on size of equipment** 减少产热意味着减少电梯机房的制冷需求。根据设备尺寸，产热量最多可降低 50%。
- Possibility of rebates from government sponsored and local utility programs
有可能从政府赞助项目和当地公用事业项目中获得返利
- Potential to earn points toward Green Building certifications, such as LEED®, DGNB®, BREEAM®, etc. 有可能获得绿色建筑认证积分，如 LEED®、DGNB®、BREEAM® 等、

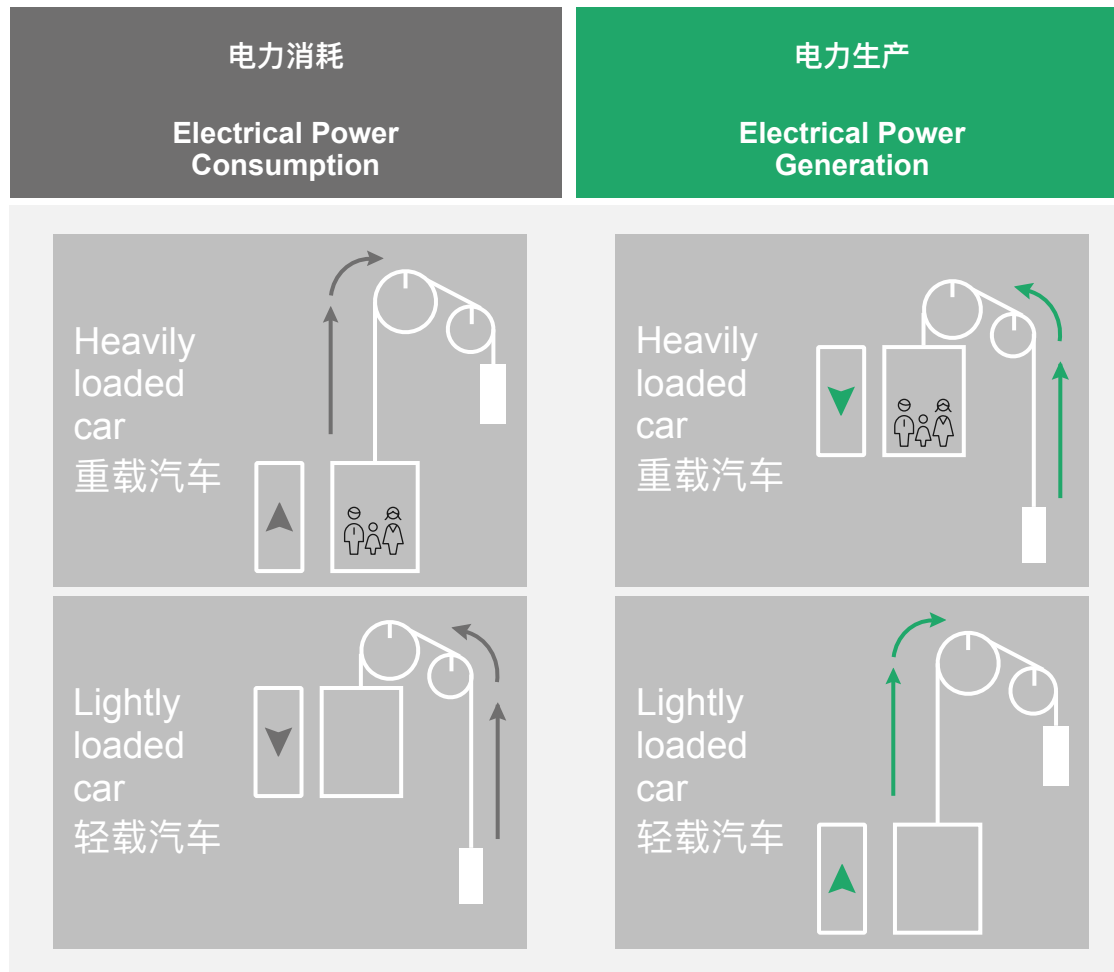


Available with 可搭配：

- Geared traction equipment 齿轮牵引设备
- Gearless traction equipment 无齿轮牵引设备

Elevator for new building

Regenerative drive - Returning energy to the grid



面向新建筑的升降机
再生驱动一向电网回馈能量

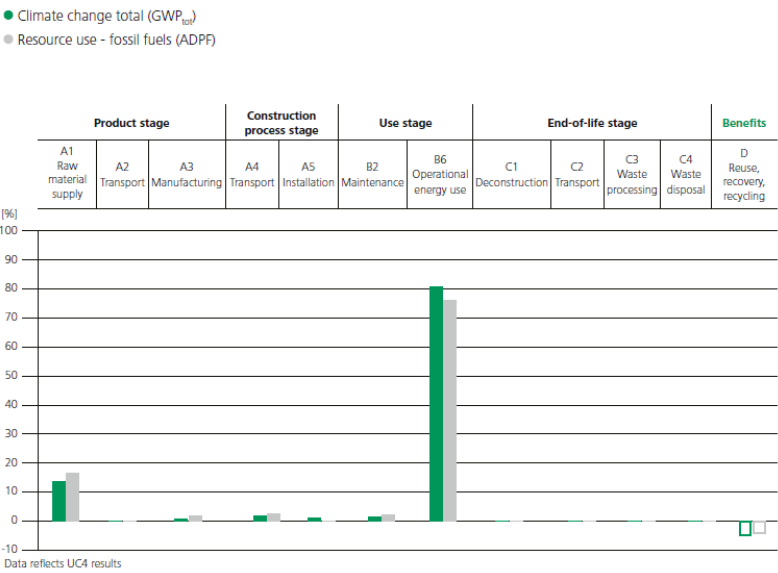


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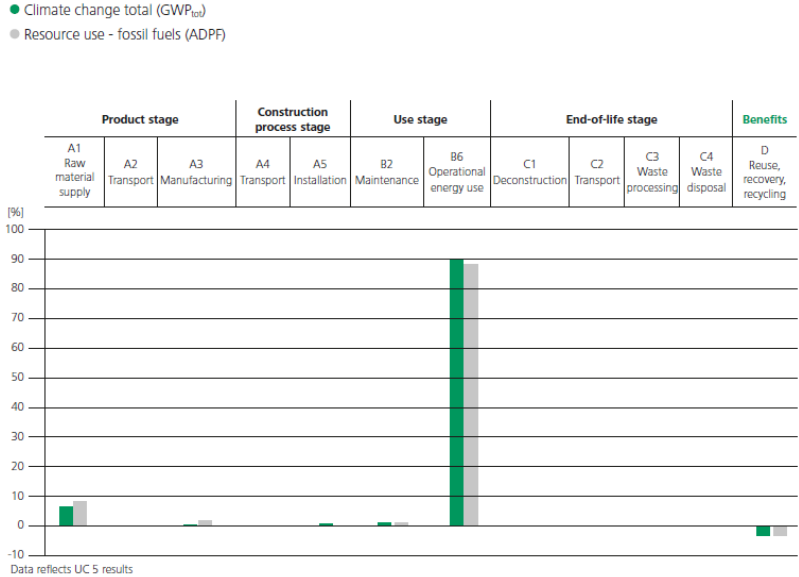
Residential
UC2 (125 trips/d)
Impact 65% from op. energy
居住区
UC2 (125 次/天)
影响 65% 来自运行能源



Commercial
UC4 (750 trips/d)
Impact 80% from op. energy
商业
UC4 (750 次/天)
影响 80% 来自运行能源



Highrise
UC5 (1500 trips/d)
Impact 90% from op. energy
高层建筑
UC5 (1500 次/天)
影响 90% 来自运行能源



Environmental Product Declaration
Impact for different applications

环境产品申明
对于不同应用的影响



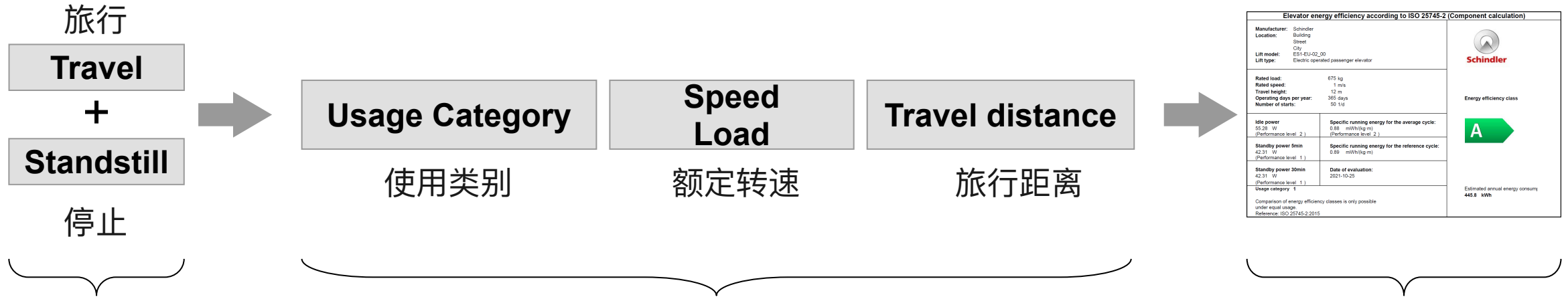
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- **ISO 25745-1:2023** > GB/T 30559.1-2014
Energy measurement and verification
能源测量与验证
- **ISO 25745-2:2015** > GB/T 30559.2-2017
Energy calculation and classification for lifts (elevators)
电梯能源计算与分类
- **ISO 25745-2:2015/Amd 1:2023** (new)
Amendment 1: Express zones
修正案1: 快速区
- **ISO 25745-3:2015** > GB/T 30559.3-2017
Energy calculation and classification of escalators and moving walks
自动扶梯与自动过道能源计算与分类
- Energy classification of elevators, escalators and moving walks to compare for same/similar application
- 对升降机、自动扶梯和自动过道进行能源分类，以便对相同/相似应用进行比较
- Calculation of estimated annual energy consumption
- 年度能耗估算计算
- Assessment of single unit only
- 仅评估单个单元
 - Useful for comparison
 - 对于对比而言有效
 - Group algorithm is not considered
 - 不考虑小组算法

Energy Efficiency – Calculation and Classification
International standards – ISO 25745 series

能效—计算与分类
国际标准 — ISO 25745 系列

Model calculation based on default scenarios and parameters 基于默认情景和参数的模型计算



Measurement 测量

(or calculation)

- Energy & Power demand

Mathematic Model 数学模型

- Customer specific data and parametrization
- Specifications influence weighting of demand in travel and standstill
- Impact on system classification

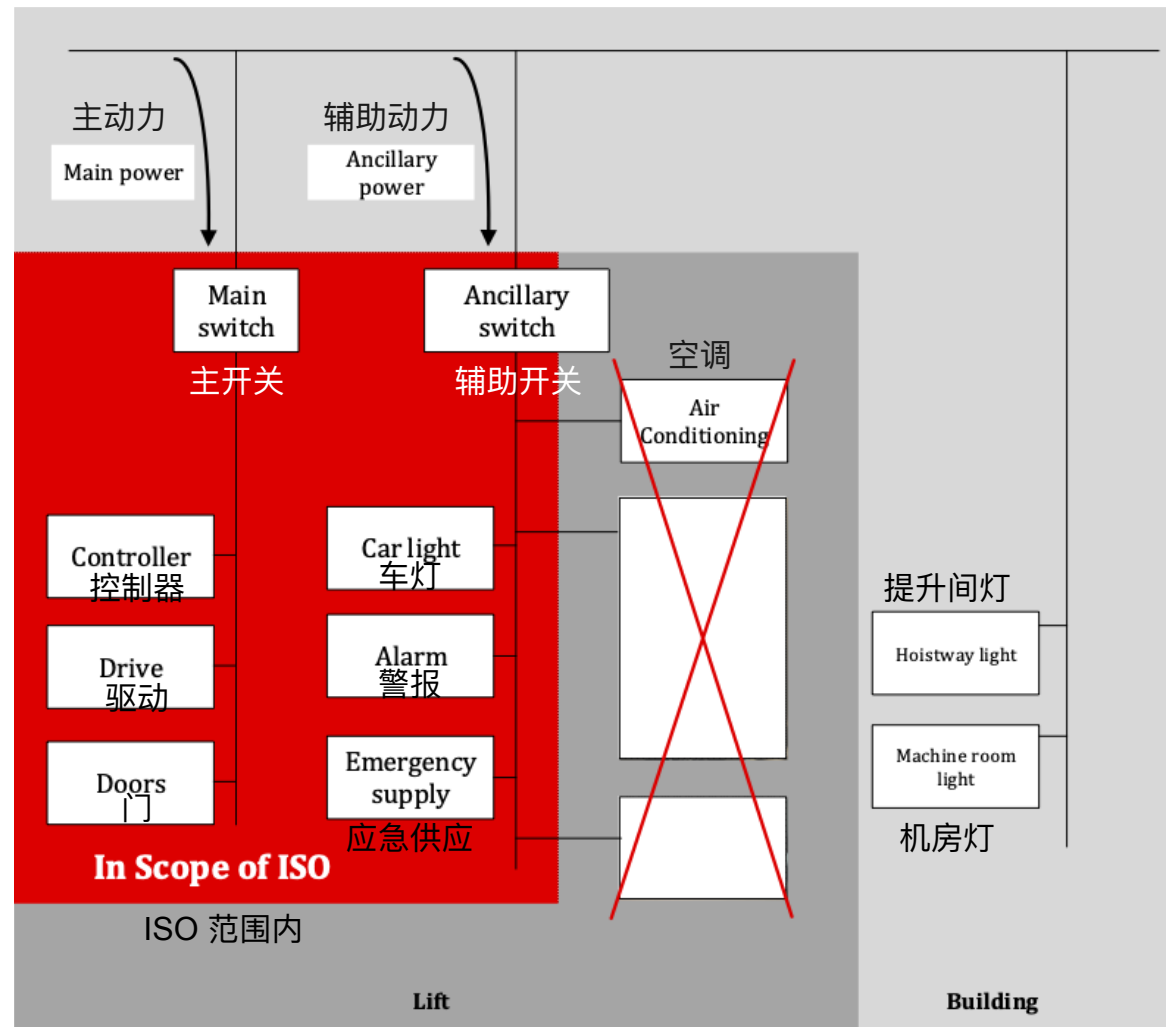
Classification 分类

- Efficiency class for individual lift installation configuration and usage
- Performance levels for Standby and Travel
- Annual Energy demand estimation

Energy Efficiency – Calculation and Classification
ISO 25745-2 - Calculation Model

能效 — 计算与分类
ISO 25745-2 -计算模型

- In Scope 范围内:
All components necessary for intended and safe use. 预定和安全使用所需的所有组件。
- Out of Scope 范围外:
Additional customer specific components like air con, CCTV, information screens, air purifier, etc. 客户定制的附加组件, 如空调、闭路电视、信息屏、空气净化器等。
 - For estimation of the annual energy consumption, they need to be individually added 为了估算年度能耗, 需要将它们分别相加
 - Their contribution may be substantial as they tend to be running all day 他们的贡献可能很大, 因为他们往往整天都在运行中



Energy Efficiency – Calculation and Classification

ISO 25745-2 - Defined Scope

能效 — 计算与分类

ISO 25745-2 - 界定范围



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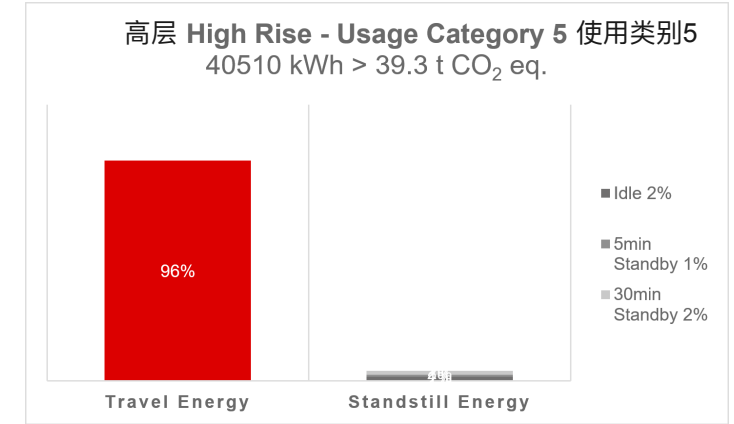
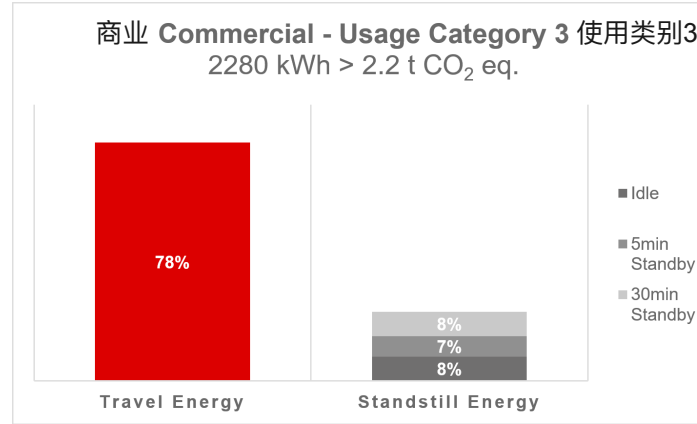
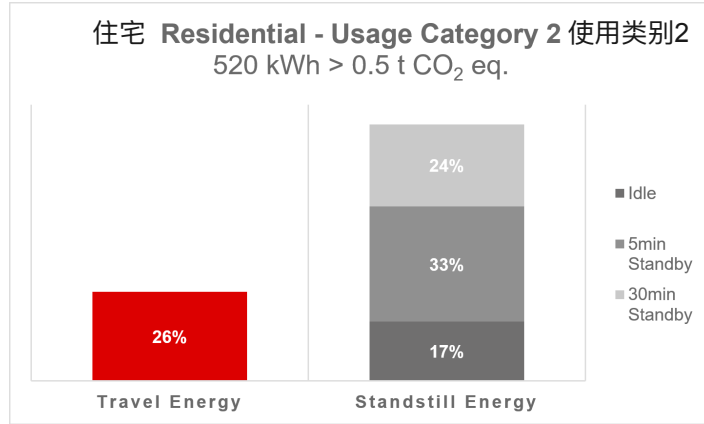
- Usage categories are used to anticipate different application and intensity of use
- 使用类别用于预测不同的应用和使用强度
- **Important重点:**
 - Comparison of energy performance is only possible within the same usage category
 - 只有在相同的使用类别中才能进行能效比较
 - Good understanding of the intended use of the elevator in the building is essential to determine the appropriate usage category for efficiency assessment and estimation of energy consumption
 - 充分了解电梯在建筑中的预期用途，对于确定效率评估和能耗估算的适当使用类别至关重要

使用类别	Usage category	1	2	3	4	5	6
使用强度/ 频率	Usage intensity/ frequency	Very low 非常低	Low 低	Medium 中	High 高	Very high 非常高	Extremely high 极其高
每天次数	Number of trips per day (n_d)	50	125	300	750	1500	2 500
典型范围	typical range	(<75)	(75 to <200)	(200 to <500)	(500 to <1 000)	(1 000 to <2 000)	(≥2 000)
典型额定 速度	Typical rated speed	0,63 m/s	1,00 m/s	1,60 m/s	2,50 m/s	5,00 m/s	5,00 m/s

Energy Efficiency – Calculation and Classification
ISO 25745-2 – Usage category

能效— 计算与分类
ISO 25745-2 —使用类别

- The application area and the applied usage category impact the energy efficiency class and the estimated energy consumption 应用领域和应用类别影响能效等级和预计能耗



- Energy optimization focus depends on application and intensity of use
- 能源优化重点取决于应用和使用强度
 - Travel is dominant > drive system efficiency and moving mass 行进至关重要 > 驱动系统效率与移动质量
 - Standstill is dominant > efficiency of permanent running components, standby/sleep modes, tuning off 停止至关重要 > 永久运行构件效率, 待机/睡眠模式, 关闭

Energy Efficiency – Calculation and Classification

Impact of the usage category - Energy optimization focus

能效 — 计算与分类

对使用类别的影响-能源优化重点

- Appropriate dimensioning of car dimension/load
 - 适合的汽车尺寸/载荷
- Weight of car interior decoration (moving mass)
 - 车内装饰的重量（移动质量）
- Which optional equipment is really needed
 - 真正需要配备哪些设备
- Installation quality impacts friction
 - 安装质量影响摩擦
- Maintenance quality impacts system losses due to deterioration over time
 - 维护质量影响因长期老化而造成的系统损耗
- Consideration of groups 机组考虑
 - Effects of lift group dispatching are not considered with ISO 25745-2
 - ISO 25745-2 未考虑电梯编组调度的影响
 - Traffic calculations for designing the group and intelligent group traffic control may bring additional savings up to 40%
 - 设计电梯组时进行交通计算和智能电梯组交通控制，可额外节省高达 40% 的费用
 - Possibility to switch off elevators in low use phase or on weekends
 - 在低使用率阶段或周末关闭电梯的可能性

Energy Efficiency – Calculation and Classification

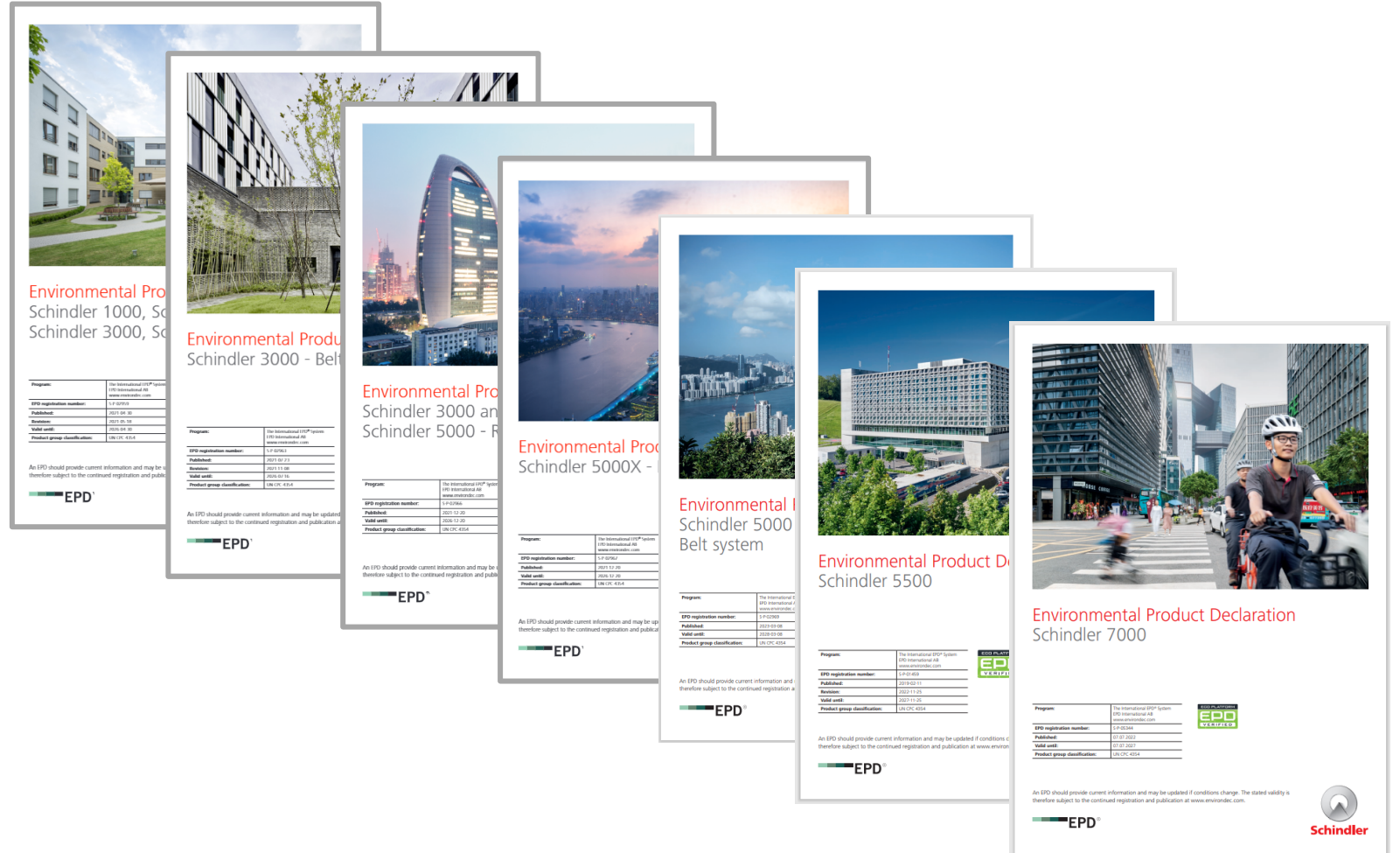
Additional considerations for optimization of energy consumption

能效 — 计算与分类
能耗优化的额外考虑



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- Provides a detailed assessment of our products from manufacturing until end of life
- 对我们的产品从生产到报废的整个过程进行详细评估
- Assessment made per product, per supply chain
- 对每个产品、每个供应链进行评估
- Calculations include the 计算包含:
 - Amount of recyclable material at the end of life 报废时可回收材料的数量
 - Energy consumed in kWh, based on a representative unit 基于一个代表性单元的能耗（千瓦时）
 - Packaging material for the unit in material weight and as a % against the total product 单位包装材料的材料重量和占总产品的百分比
 - CO2 emissions in each phase of the lifecycle 生命周期各阶段的二氧化碳排放量



Environmental Product Declarations
7 EPD's already published, several will follow

环境产品声明
已发布7份，还将发布多份



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Schindler's contribution to HKGBC BEAM Plus
Providing sustainable solutions for your project

We Elevate



Schindler's contribution to LEED
Corporate sustainability

We Elevate



Schindler's contribution to DGNB
Providing sustainable solutions for your project



We Elevate



Schindler's contribution to BREEAM
Corporate sustainability

We Elevate



Singapore BCA Green Mark
Certified Schindler products support your sustainability goals



We Elevate



Schindler

Green Building Partnerships - Current marketing material
Flyers for BEAM Plus, LEED, DGNB, BREEAM, and Green Mark

绿色建筑伙伴关系 - 现有营销材料
BEAM Plus, LEED, DGNB,
BREEAM, and Green Mark宣传册



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Clean escalator technology



Energy Efficiency 能源效率

- Smart power management with new drive system, in combination with three ECO operating modes 新型驱动系统与三种 ECO 运行模式相结合，实现智能电源管理
- Schindler 9300 with extended lifespan, reduced CO2 footprint, and ISO energy rating of A+++ 迅达 9300 延长了使用寿命，减少了二氧化碳排放量，ISO 能源评级为 A+++
- Schindler ECOLINE power management packages with options for stop-and-go operation, stand-by speed for substantial additional energy savings, up to 36% over other operating modes 迅达 ECOLINE 动力管理包，可选择停机运行、待机速度，可节省大量能源，与其他运行模式相比，最高可节省 36% 的能源



Sustainable Materials 可持续材料

- We place particular emphasis on using environmentally friendly materials in the manufacture of our escalators. Once an escalator reaches the end of its service life, about 90% of these metals can be recycled.我们在制造自动扶梯时特别注重使用环保材料。一旦自动扶梯的使用寿命结束，其中约 90% 的金属可以回收利用。
- Schindler's aluminum steps are the lightest in the industry. Using aluminum steps results in a total weight reduction of 40% relative to steel steps, and an improvement of 5% in total escalator efficiency. Aluminum steps have a longer lifetime than steel steps and a lower CO2 footprint. They also have a superior safety record, 2 times above the less economical sheet metal compound steps. 迅达的铝制台阶是业内最轻的。与钢制台阶相比，铝制梯级的总重量减轻了 40%，自动扶梯的总效率提高了 5%。与钢制台阶相比，铝制台阶的使用寿命更长，二氧化碳排放量更低。铝制台阶的安全性能也非常出色，是经济性较差的金属板复合台阶的 2 倍。
- Schindler offers attractive LED design options for balustrade, skirt, comb, step and truss lighting. Using LED lights reduces power consumption by up to 80% relative to conventional light sources. LED lights have up to 20x times longer reducing waste generation 迅达为栏杆、裙板、梳子、台阶和桁架照明提供了极具吸引力的 LED 设计选项。与传统光源相比，使用 LED 灯可减少高达 80% 的能耗。LED 灯的使用寿命是传统光源的 20 倍，可减少废弃物的产生

Potential ZEB-talk for Escalators?

ZEB讨论会自动扶梯专题的可能性?



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Digital Services 数字化服务

Digitalization increases the capacity for remote maintenance and enables Schindler to reduce the on-site visits and replace it with remote service activities, such as Performance Callback, e-inspections and Health Checks.



**Fewer callbacks= less downtime
+ smaller carbon footprint**

更少召回=更少停机时间+更小碳足迹

Remote maintenance activities with our digitally connected units **reduces the need for callbacks by up to 37%**. Fewer journeys to site equates to lower service-related carbon emissions.



Right parts at the right time

对的时间完成对的部分

Actionable insight from digitally-connected units ensures service technicians arrive with the right parts for the job. This prevents unnecessary warehouse trips, reduces waste, and **minimizes the environmental** impact of the spares supply chain.



**More electric vehicles =
fewer emissions**

更多电车=更少排放

By moving to **electric cars** and **e-bikes** we are reducing emissions from the service fleet without compromising on the quality of our service.



**Protecting the environment,
one email at a time**

保护环境，每次使用电子邮件

Switching to **electronic communications** for digital field documentation and invoicing allows us to save up to 250 metric tons of paper annually.

Energy-efficient Buildings with Schindler Repair solutions

采用迅达维修解决方案的节能建筑

We make existing buildings more energy-efficient via innovative low-carbon service solutions.

Our Repair solutions like LED lighting or Shaft Ventilation optimize the energy consumption of elevators, reduce the heat loss and CO₂ emissions of the building.

Potential ZEB-Talk for Sustainable Service?
Sustainable solutions for existing buildings

ZEB 讨论会可持续服务专题的可能性?
既有建筑可持续解决方案

Digital Services as the
enabler for a Sustainable
Service
数字服务是可持续服务的推动力





让我们共同打造气候中和的未来
Building a climate-neutral future together.

现代化 Modernization			
RePair	ReStore	ReNew	RePlace
			
RePair	ReStore	ReNew	RePlace
Continuous repair to guarantee high uptime and quality of service	Controller + inverter + fixtures Recommended: After more than 15 years or 2,000,000 trips	Controller + inverter + fixtures + machine Recommended: After more than 25 years or 3,500,000 trips	Full system replacement Recommended: After 30 years
Lifetime extensions	Lifetime extensions	Lifetime extensions	Lifetime extensions
Energy Savings	Energy Savings	Energy Savings	Energy Savings
Sustainable Maintenance	Sustainable Maintenance	Sustainable Maintenance	Sustainable Maintenance
Design Impact	Design Impact	Design Impact	Design Impact
Price	Price	Price	Price
Embedded CO2	Embedded CO2	Embedded CO2	Embedded CO2

Potential ZEB-Talk for modernization?
To be ready for the future

ZEB讨论会现代化专题的可能性?
面向未来



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THANK YOU

感谢您的关注



中华人民共和国
住房和城乡建设部



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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skat Swiss Resource Centre and
Consultancies for Development



HSLU Lucerne University
of Applied Sciences
and Arts

