



# Modernizing our Future

MAX WONG, KONE ELEVATOR (HK) LTD



# Who we are

- KONE is a global leader in the elevator and escalator industry. Our job is to make the best of the world's cities, buildings and public spaces.
  - KONE provides elevators, escalators, automatic doors, turnstiles, monitoring and access control systems
  - services covering the entire lifetime of a building, from the design phase to maintenance, repairs and modernization solutions
- Founded in Finland in 1910
- Over 52,000 employees
- Over 1.1 million equipment in KONE maintenance
- Listed on the NASDAQ Helsinki since 1967



## An innovation leader

- Over 3,000 patents related to the elevator and escalator industry
- Cooperation with customers, key partners, leading universities and research facilities
- In 2016, Forbes has ranked KONE among the most innovative companies in the world (#56)

## Jeddah Tower

JEDDAH, SAUDI ARABIA

Standing at over one kilometer upon its completion in 2020, Jeddah Tower will be the world's tallest building

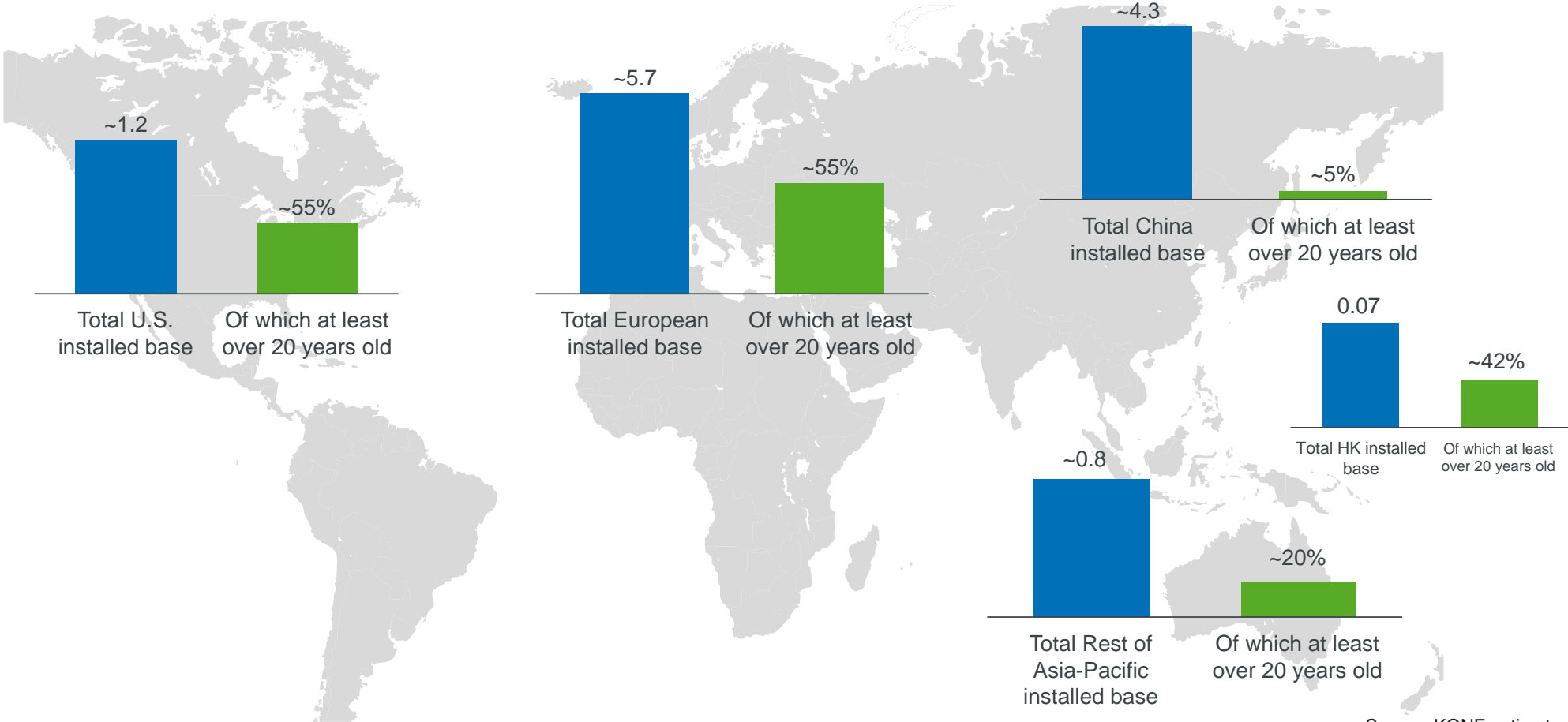
Using KONE UltraRope™ technology. The world's fastest double deck elevators travelling over 10 m/s.

In total, KONE will deliver 58 elevators and 8 escalators for the Jeddah Tower project.



# Modernization – huge demand


Over 40% of the E&E in operation in the Hong Kong is over 20 years old



Source: KONE estimates

KONE Corporation



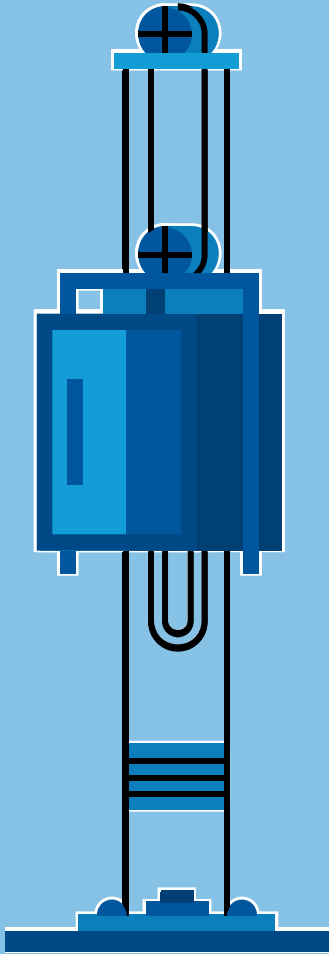
A male technician wearing a blue hard hat, safety glasses, a high-visibility yellow vest, and white gloves is holding a smartphone and talking to a woman. They are standing in an elevator shaft with yellow safety barriers. The woman is wearing a grey sweater and blue jeans, and has a grey bag slung over her shoulder. In the background, there is a wall with a framed document titled "KONE Elevator Modernization Information".

Just like any machinery, elevators & escalators need modernizing at some point during their lifespan. Modernization is an investment that pays off in increased safety, improved reliability and style, and lower energy costs.

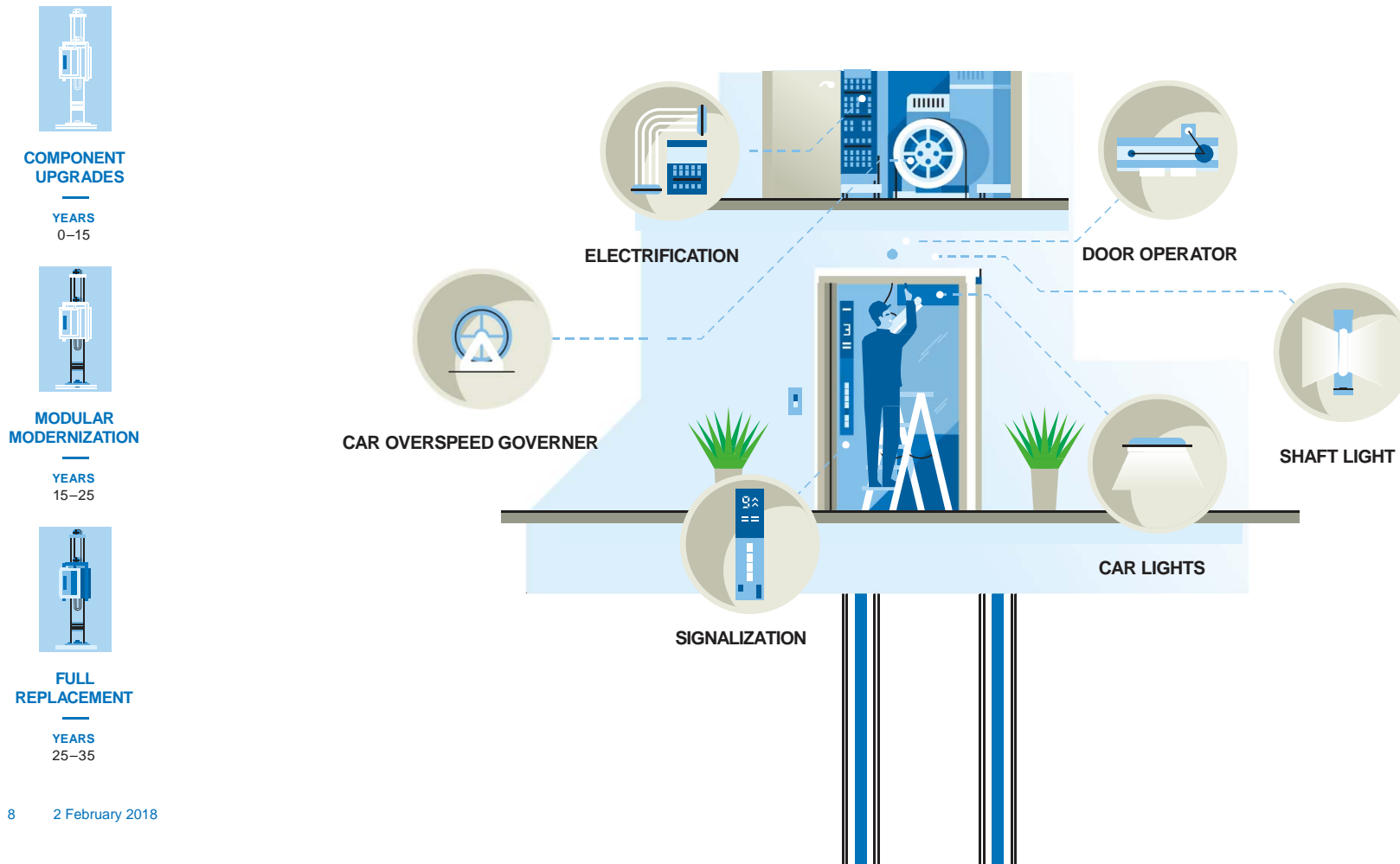
Capital  
replacement  
cycle



YEARS  
15-25



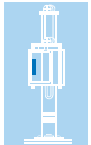
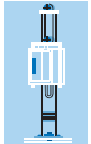

# Component upgrades

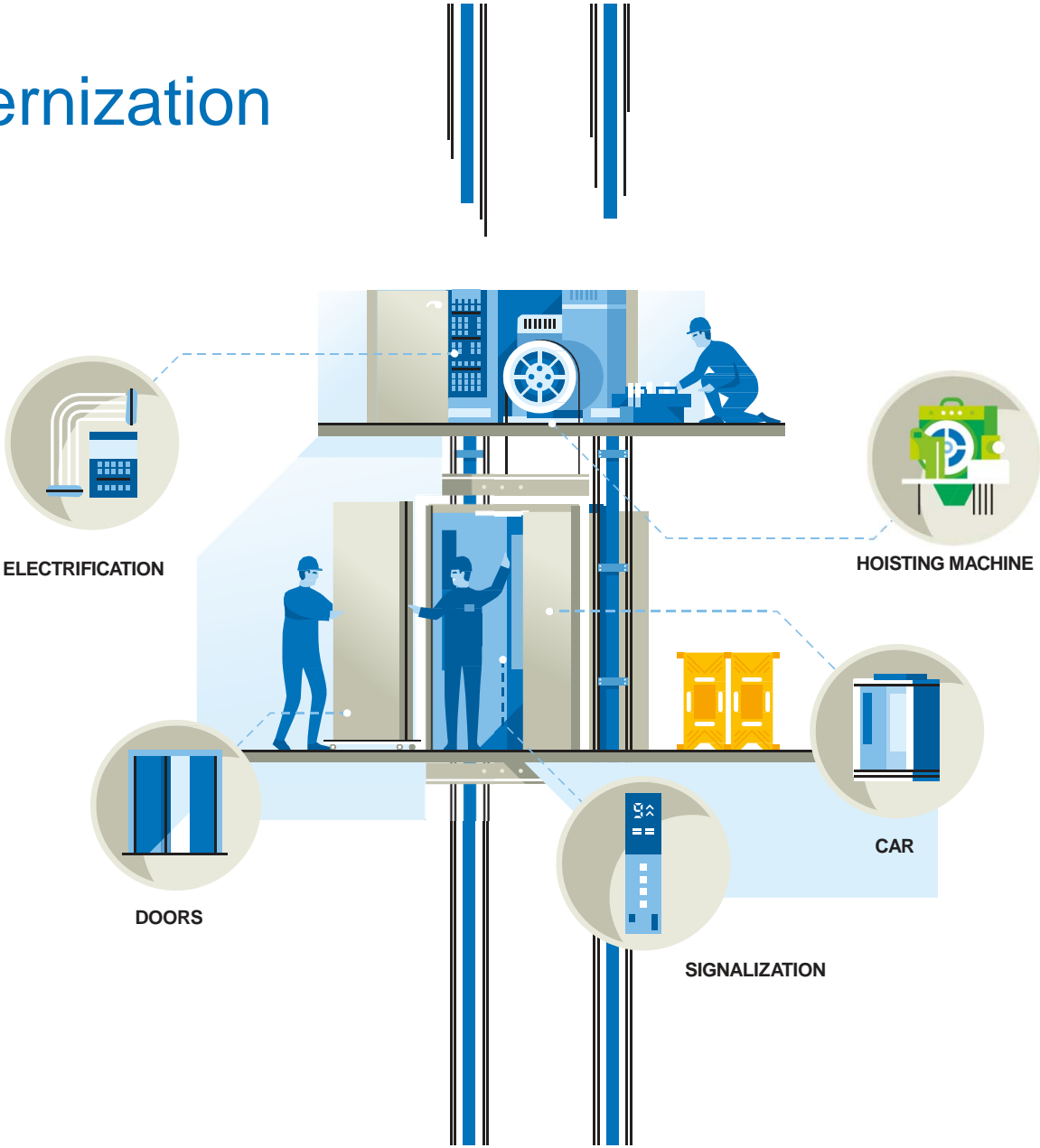




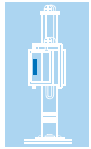
# Modular modernization



-   
**COMPONENT UPGRADES**  
—  
YEARS  
0–15
-   
**MODULAR MODERNIZATION**  
—  
YEARS  
15–25
-   
**FULL REPLACEMENT**  
—  
YEARS  
25–35

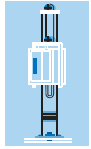


# Full replacement



COMPONENT UPGRADES

YEARS  
0-15



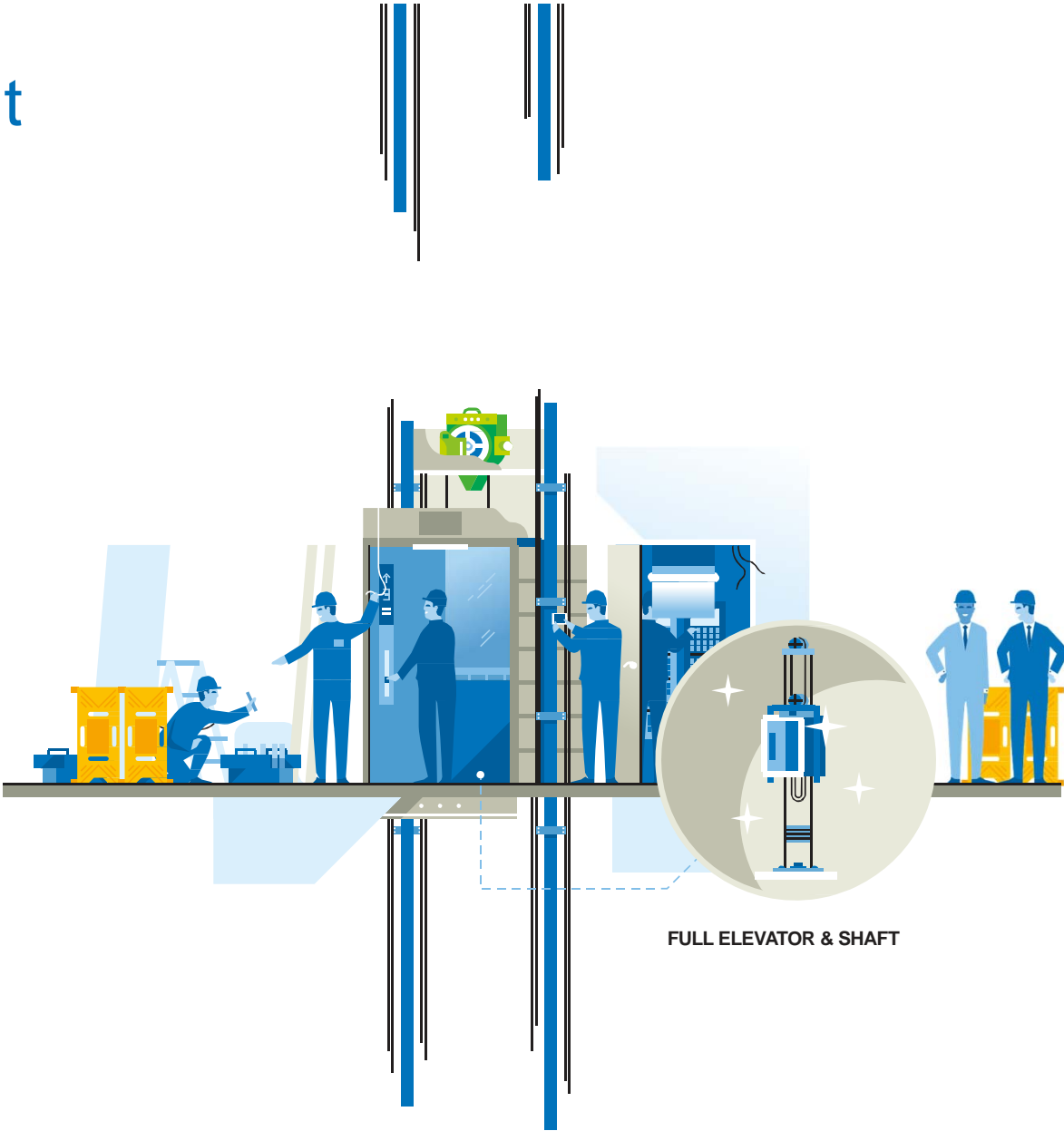
MODULAR MODERNIZATION

YEARS  
15-25



FULL REPLACEMENT

YEARS  
25-35



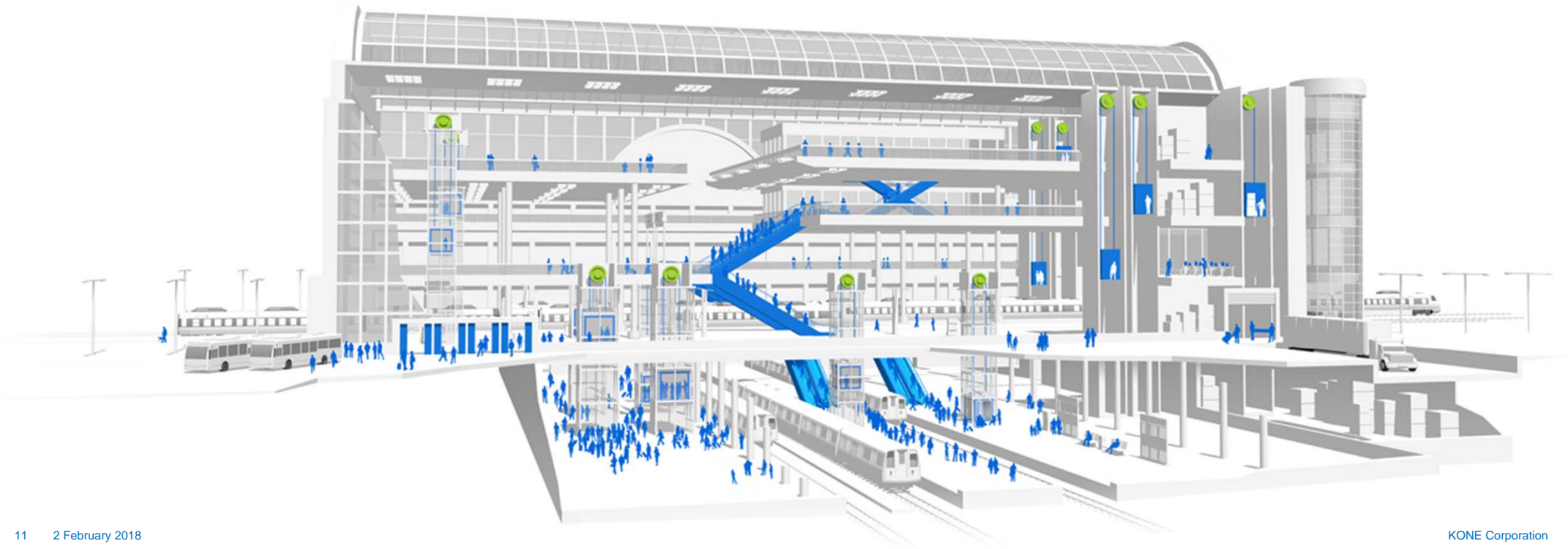
FULL ELEVATOR & SHAFT

# Modernizing an escalator

STAY OPEN DURING MODERNIZATION



KONE developed **EcoMod™** solution so you can stay open during modernization and optimize maintenance for the lifetime of the installation.





# When is KONE EcoMod™ the right solution for you?



## When working in hard-to access-sites

- With modular installation parts are delivered just on time to site



## When you want to retain existing architecture

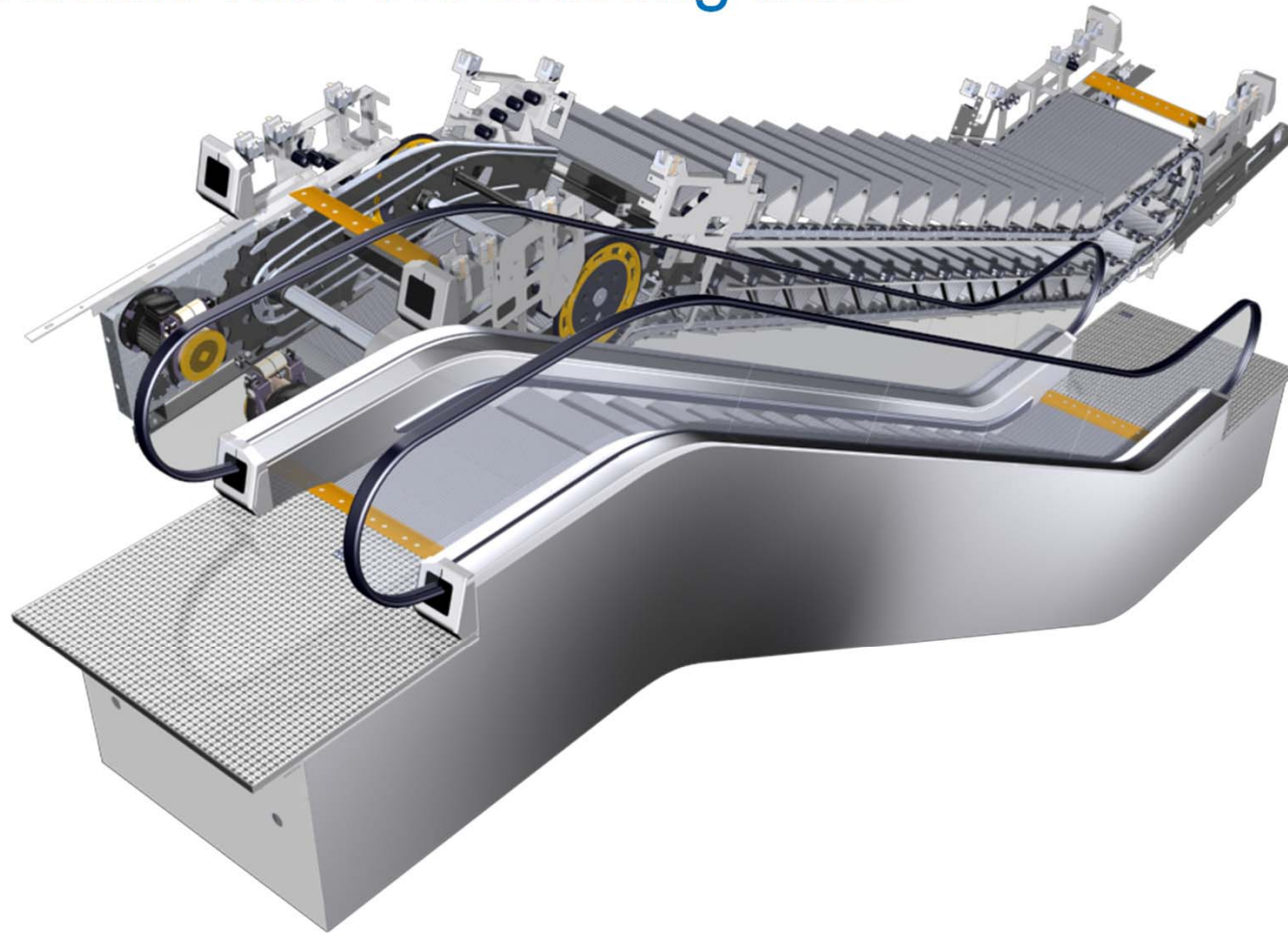
- With EcoMod there is no need to demolish floors, walls, roofs, and building facades.
- Less noise, less dust and less refinishing work required.



## When you need non-stop People Flow

- You can stay open for business during project

# EcoMod™ installs with the existing truss



# Transportation systems in building

## CIBSE Guide D

- Traffic planning and selection of equipment
  - Calculation
  - Simulation

## Inputs

- Building information (e.g. floor, height, space)
- Population (e.g. floor area, layout)
- Traffic pattern (e.g. hotel, office, residential)

## Results

- Technical requirements (e.g. quantity, speed, capacity)
- Performance (e.g. RTT, Interval, 5MHC)





## KONE Elevator Performance Analyzer (EPA)

A tool which measures the number of people entering and leaving an elevator at all floors served.



# Minimum disturbance to building operations

Components:

**Hardware** (3D sensor and data recorder)

**Analysis Software**

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- Quick installation
- Self learning of building floor levels
- Various elevator parameters measured
- Data stored for later analysis in PC



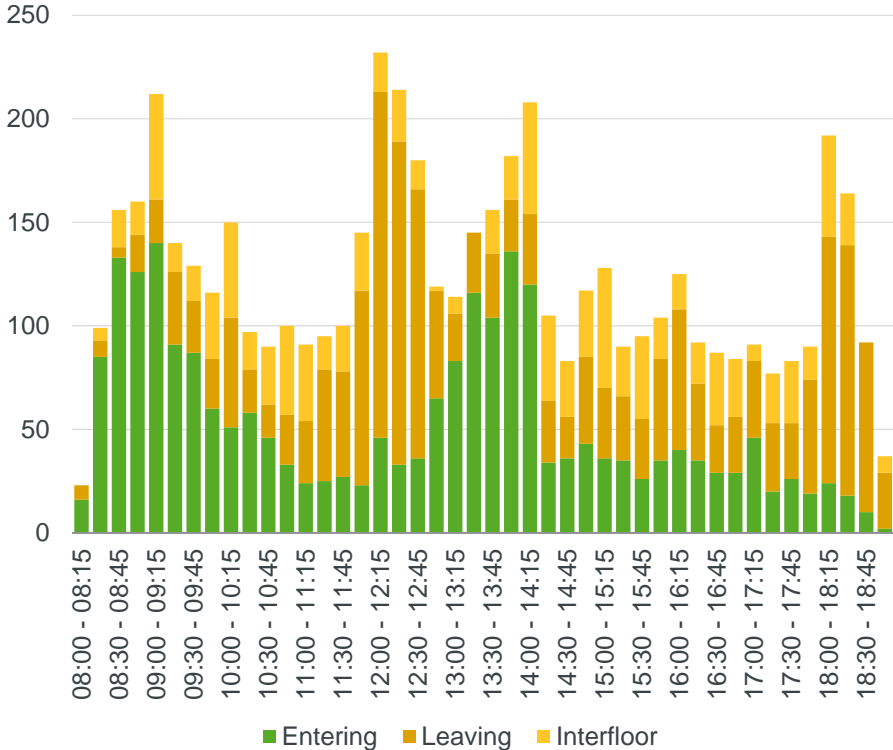




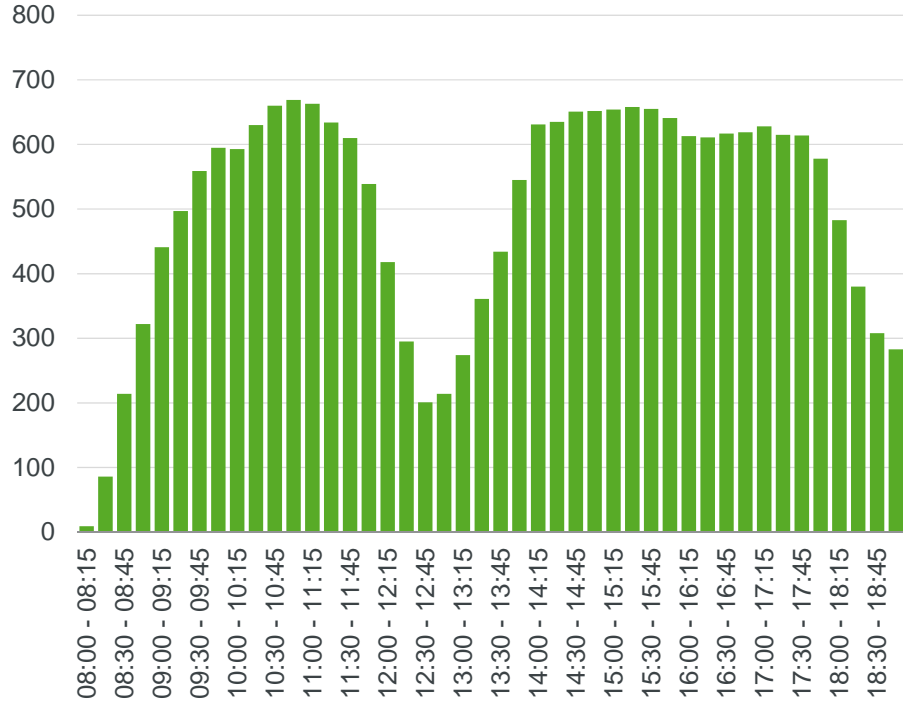
# Reports - Daily profile and accrued number of people



People Flow Profile



People Inside the Building



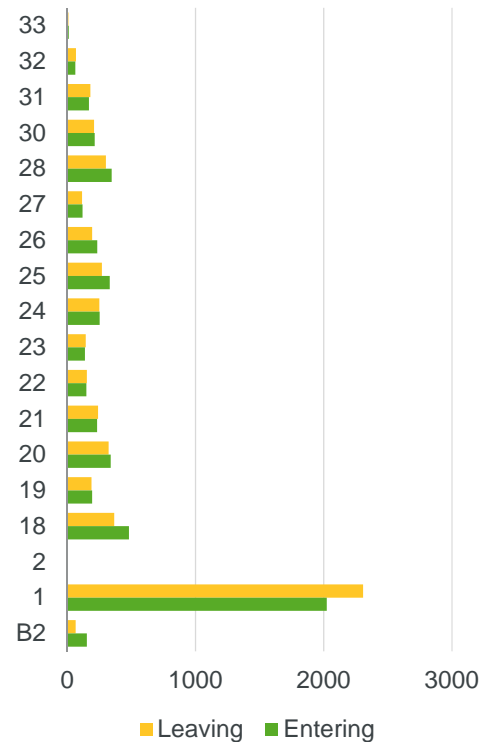
# Reports - People flow by floor



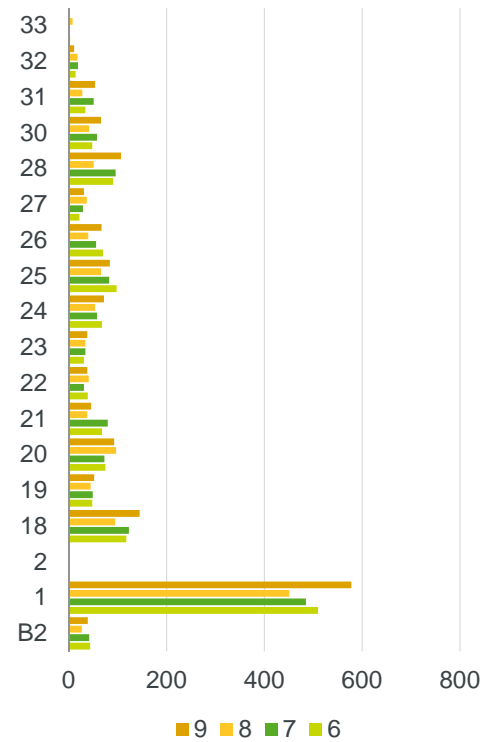
**Group level view shows the number of passangers entering and leaving an elevator at all the served floors.**

**Elevator level views help to understand the performance of each elevator separately.**

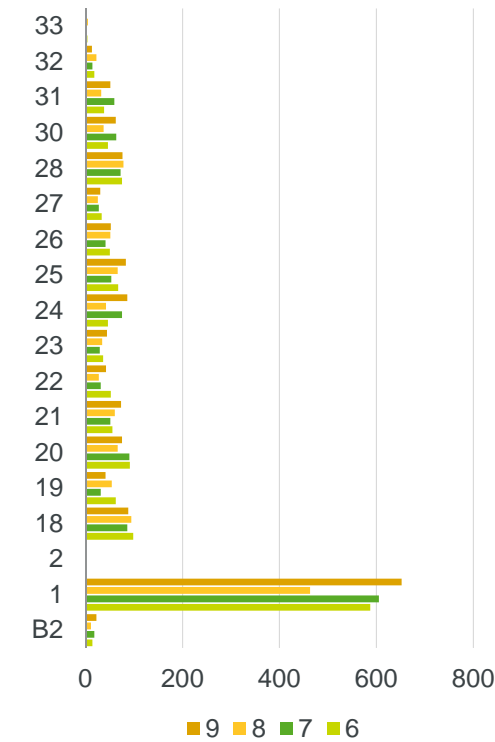
People Flow by Floor



Entering



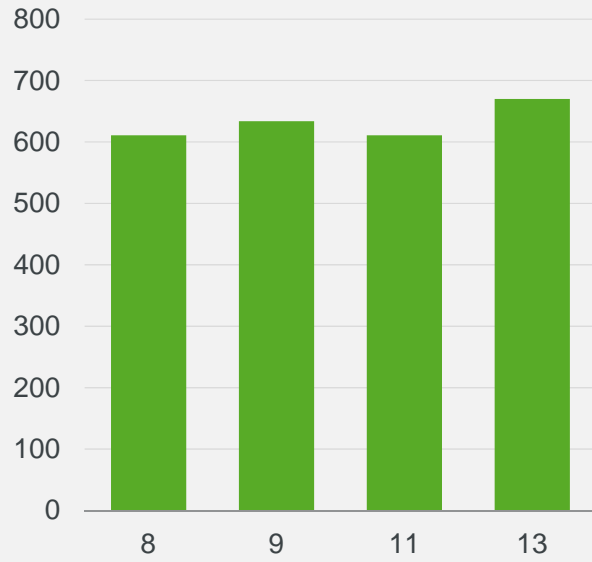
Leaving



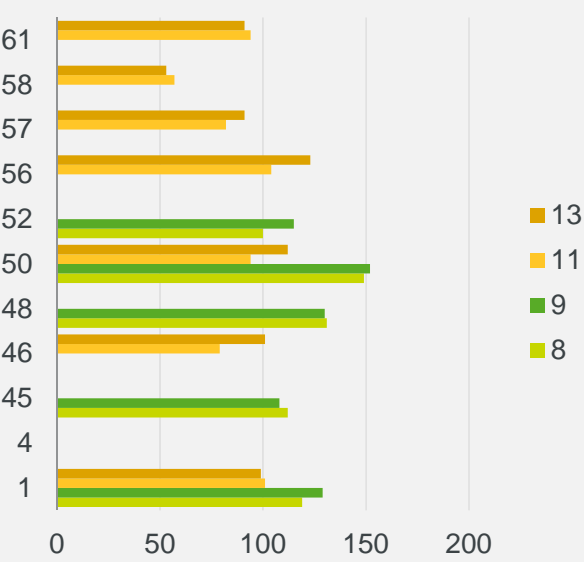
# Reports – Number of starts



Number of Starts in the High Rise Group



Number of Starts by Floor



Floor	Starts			
	8	9	11	13
1	119	129	101	99
4	-	-	-	-
45	112	108	-	-
46	-	-	79	101
48	131	130	-	-
50	149	152	94	112
52	100	115	-	-
56	-	-	104	123
57	-	-	82	91
58	-	-	57	53
61	-	-	94	91
<b>Sum:</b>	<b>611</b>	<b>634</b>	<b>611</b>	<b>670</b>

## Use of the data

The data from EPA reports is used as input for KONE Building Traffic Simulator

- It allows simulation of the current, future and during modernization Vertical People Flow in an existing building based on actual people flow in the building.
- Comparison with industry standards.
- Proposing of the best vertical transportation solution for the building.





# KONE Elevator Performance Analyzer



Accurate  
Measurements



Quick to install  
and easy to use



Minimum  
disturbance to  
building  
operations



Privacy of  
passengers  
Ensured

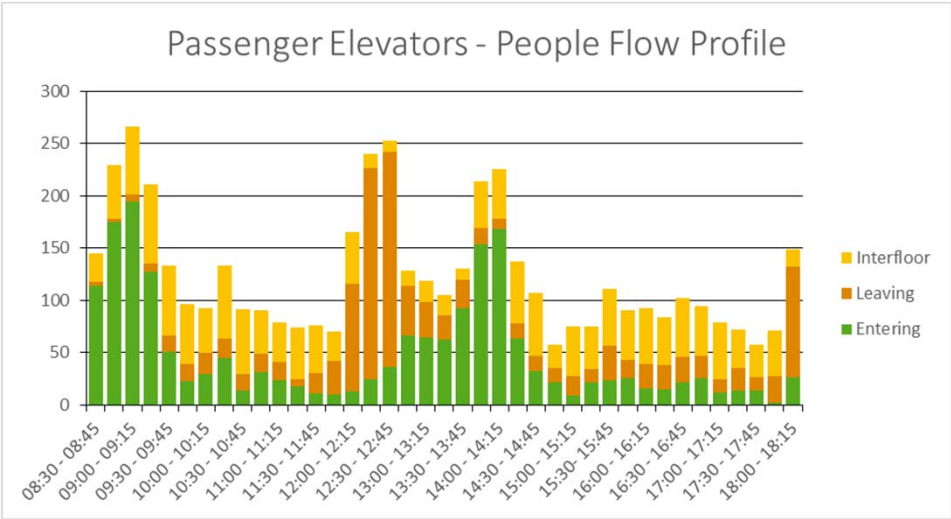




# EPA Measurements & Simulation Passenger Elevators 1 - 4

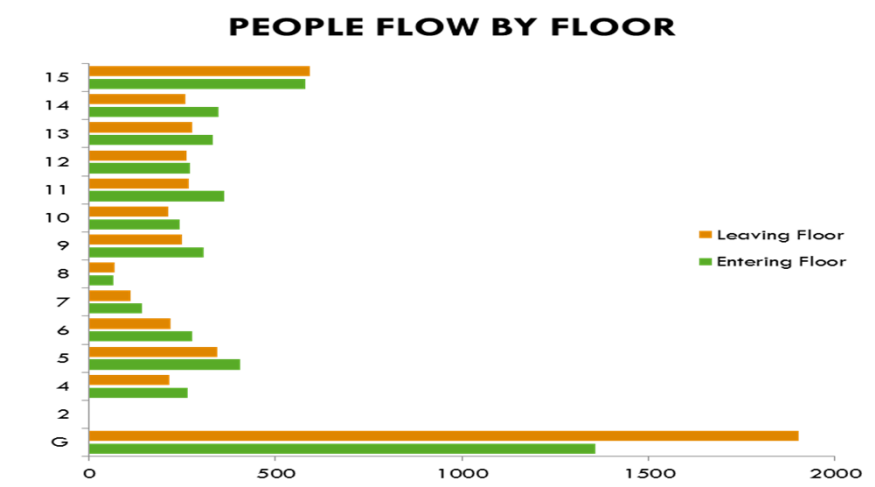


## Measured People Flow - Entry Level G



Level G which was used as entry floor in the simulation.

## Floor Attractions



Based on measurements number of passengers entering / exiting elevators at different floors were used to define floor attractions in the simulation.

# EPA Measurements & Simulation

## Passenger elevators – 1 – 4



### ELEVATOR PARAMETERS IN SIMULATION (CURRENT & MODERNIZED)

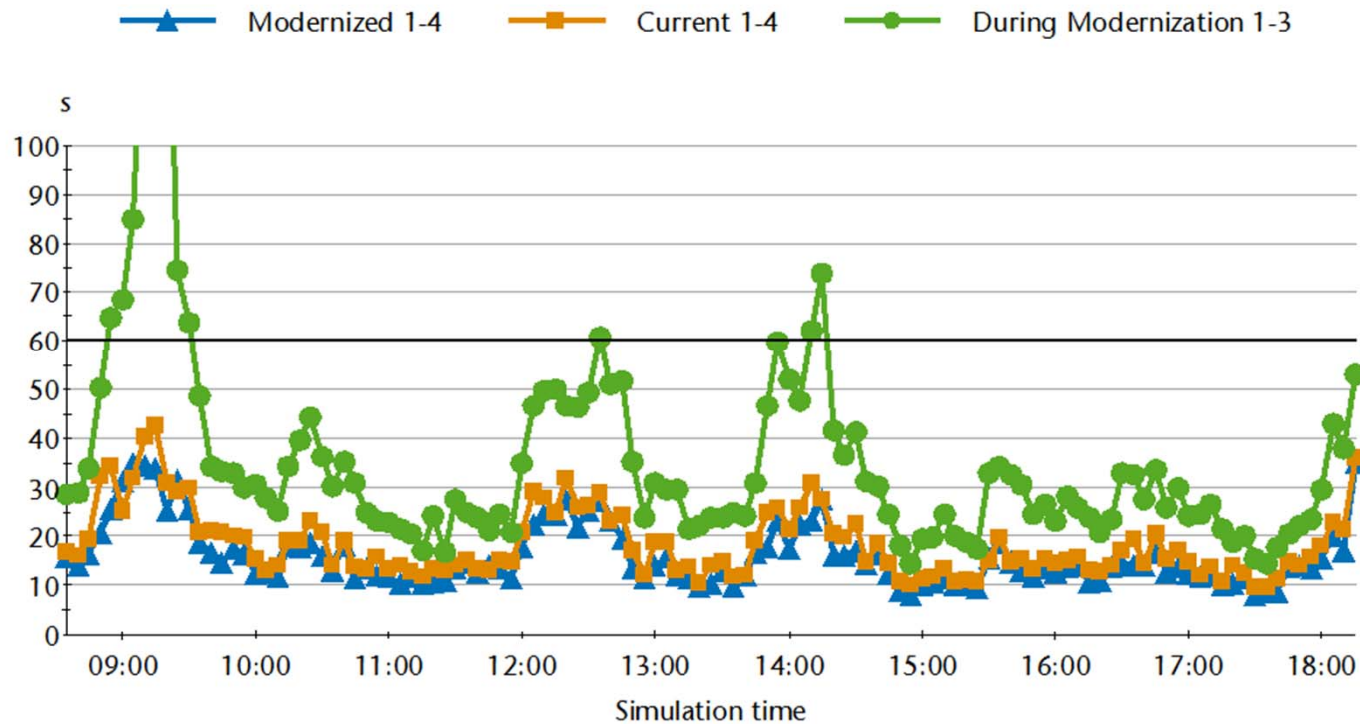
	1	2	3	4
Drive	Custom ▾	Custom ▾	Custom ▾	Custom ▾
$\eta_{\text{S}}$	3.31	4.14	4.1	3.4
$\eta_{\text{S}}^2$	1	1	1	1
$\eta_{\text{S}}^3$	1	1	1	1
	20	20	20	20
	16	16	16	16
Door	1050/CO/III ▾	1050/CO/III ▾	1050/CO/III ▾	1050/CO/III ▾
	3	3	3	3
	3.9	3.9	3.9	3.9
	2	2	2	2
-				
Photocell delay	0.9	0.9	0.9	0.9
Start delay	0.7	0.7	0.7	0.7
ADO speed	0	0	0	0
ADO distance	0	0	0	0
Initial floor	0 ▾	0 ▾	0 ▾	0 ▾
Description	1	2	3	4



# Waiting Time



## Waiting Time Elevator Group 1-4

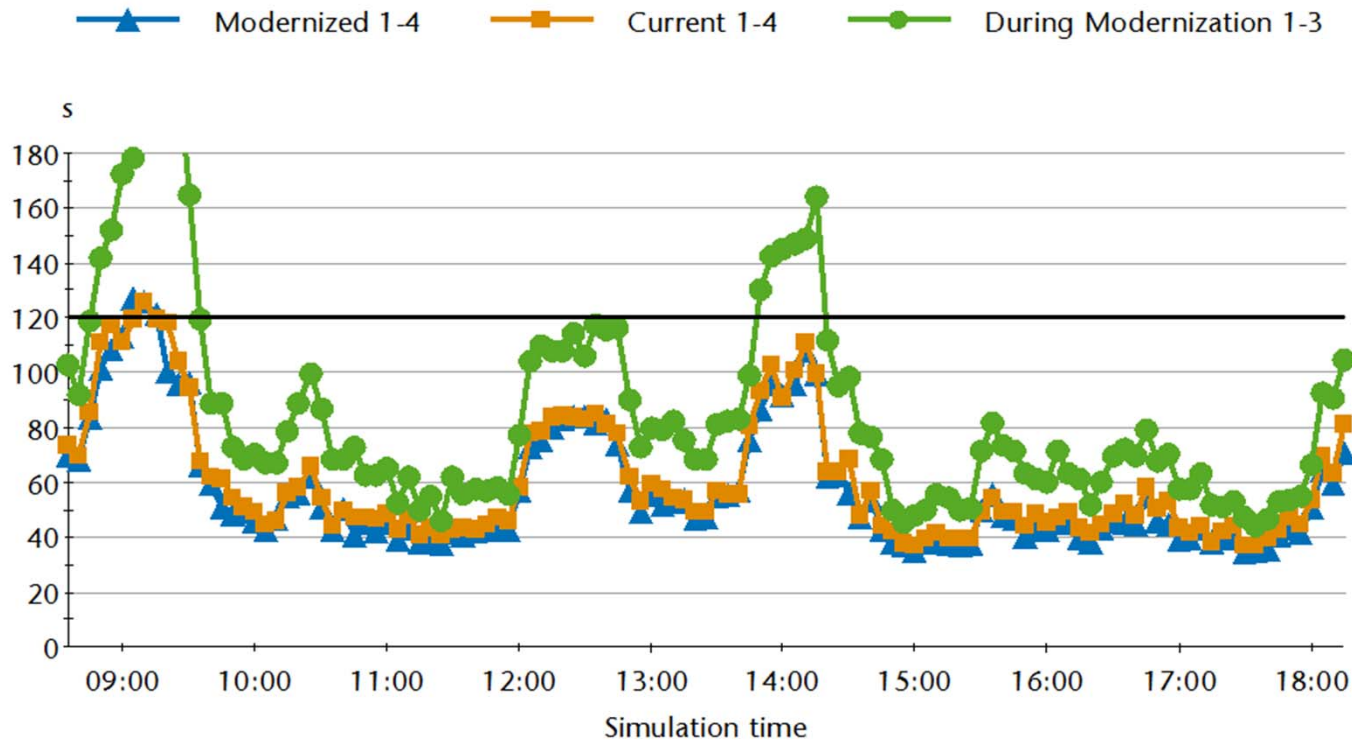


Modernization of the existing full collective elevators 1-4 with new KONE full collective group control will improve slightly the performance especially during peak times

# Time to Destination



## Time to Destination Elevator Group 1-4



Modernization of the existing full collective elevators 1-4 with new KONE full collective group control will improve slightly the performance especially during peak times



# KONE 24/7 Connected Services

INTELLIGENT SERVICES FOR ELEVATORS AND ESCALATORS ARE HERE

282 February 2015

poration



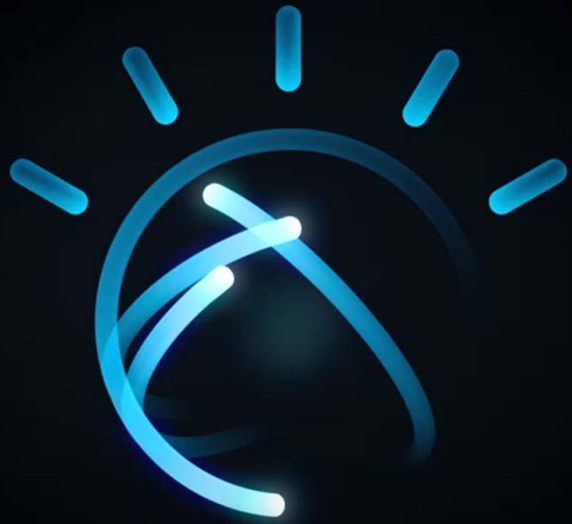


joined forces with



With  
Watson









11<sub>mm</sub>

4,2 S



**Revolutionary**  
CONNECTED  
COGNITIVE  
PREDICTIVE

**Traditional**  
DISCONNECTED  
BLACK BOX  
REACTIVE



# KONE 24/7 Connected Services



So safe,  
by keeping watch 24/7

So transparent,  
you'll stay in the know

So intelligent  
it's predictive



**KONE**

What is KONE Care™  
24/7 Connect?

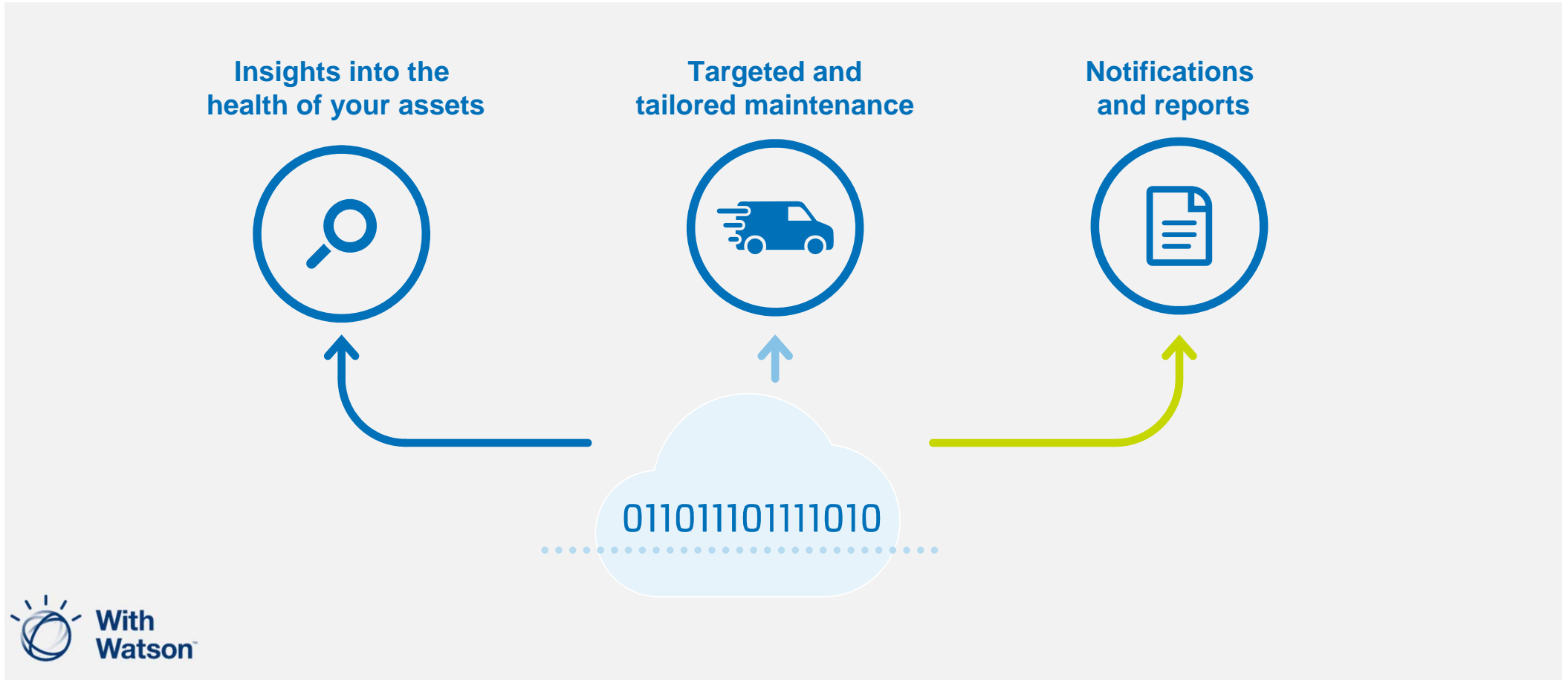




## KONE Care™ 24/7 Connect

is a round-the-clock diagnostics service that gathers data on your equipment's condition. We analyze this data and use it to make intelligent and proactive decisions on how to solve any potential problems – even before they occur. and if something happens, we know about it right away to decide on the right action.

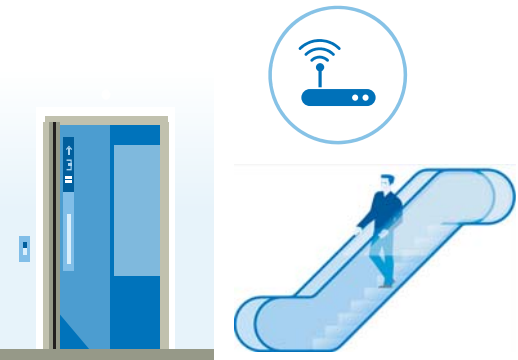
# What you get with KONE Care 24/7™ Connect



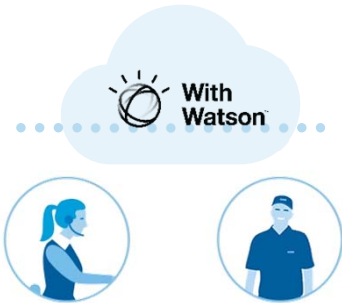
# How it works



The system keeps a constant eye on critical parameters



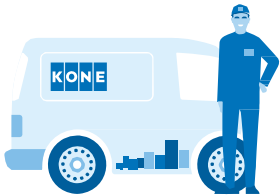
Intelligent technology analyzes maintenance needs and predicts faults



You get trustworthy insights into the health of your assets and proposals for the future



Our technician gets the right information at the right time





# Examples of key parameters monitored



Doors opening and closing behavior



Push button functioning



Stopping accuracy and stopping behavior



Position and movement in shaft



Mileage and drive time



Usage statistics

# Examples of key parameters monitored



Movement



Mileage and drive time



Usage statistics



Stopping accuracy and stopping behavior

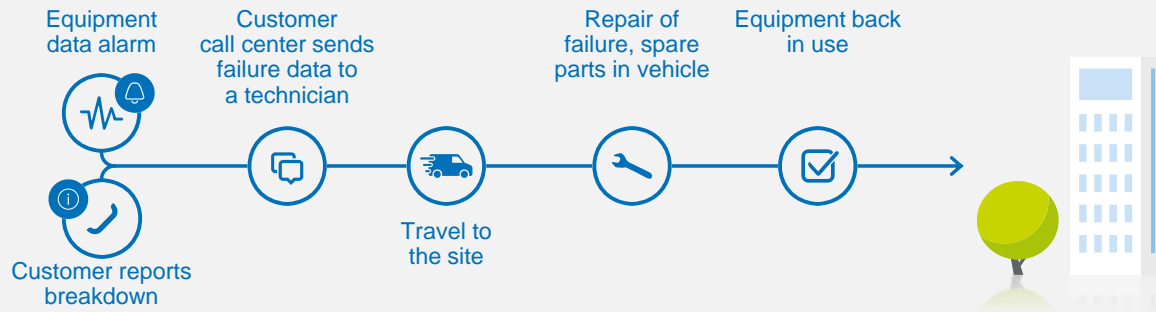


Emergency stops

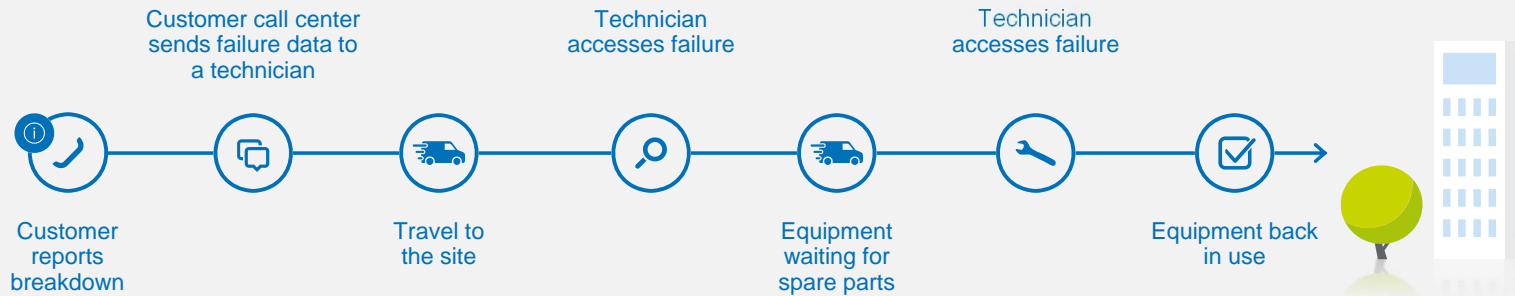
# What makes intelligent services different



## New revolutionary process with KONE Care 24/7 Connect



## Traditional process

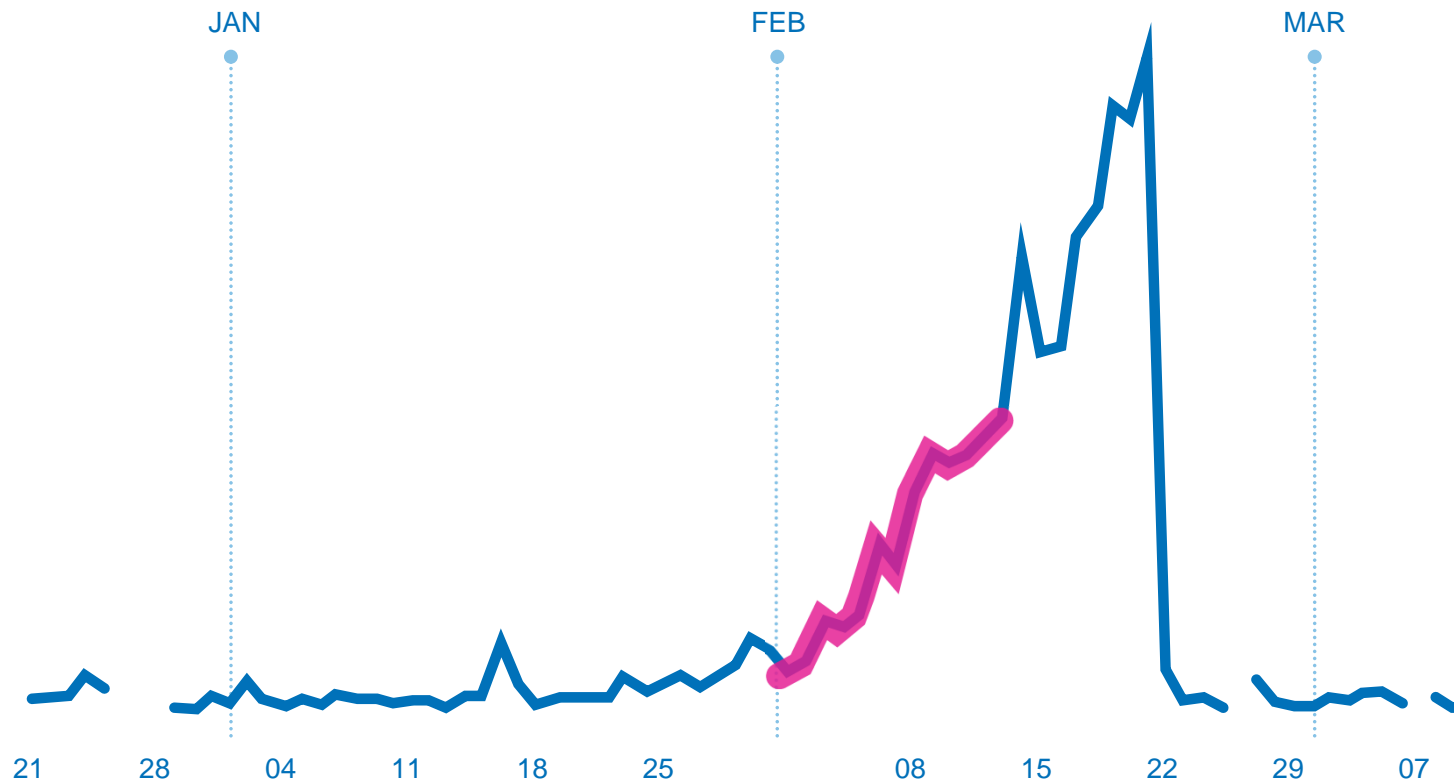


- Data-based diagnosis
- Spare parts in vehicle
- More effective service procedure
- Faster response time
- Equipment back in service faster

# Data tells us when equipment needs attention



## EXAMPLE: ELEVATOR DOOR REOPENINGS



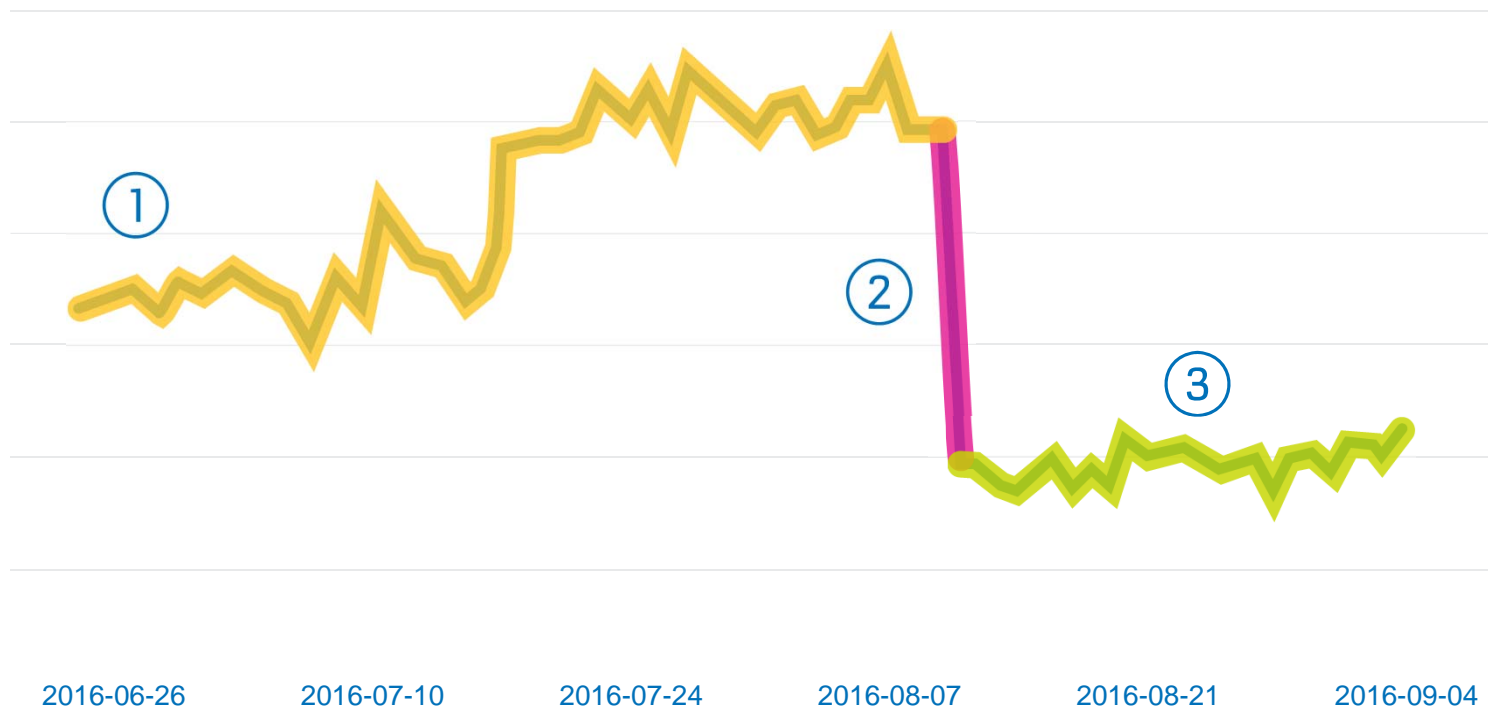
- Significant increase in openings
- Indicates curtain of light issue
- Visible at least two weeks earlier, helping to prevent breakdown

# We can find and fix faults that would go undiscovered



## EXAMPLE: ELEVATOR BRAKE ADJUSTMENT REDUCES NOISE LEVELS

Noise peak value during stopping



- ① Data showed elevator noise level peaks during stops were high
- ② A brake adjustment was suggested as a preventive procedure during a maintenance visit
- ③ Elevator noise back to normal levels



# The service brings real time information to our maintenance process

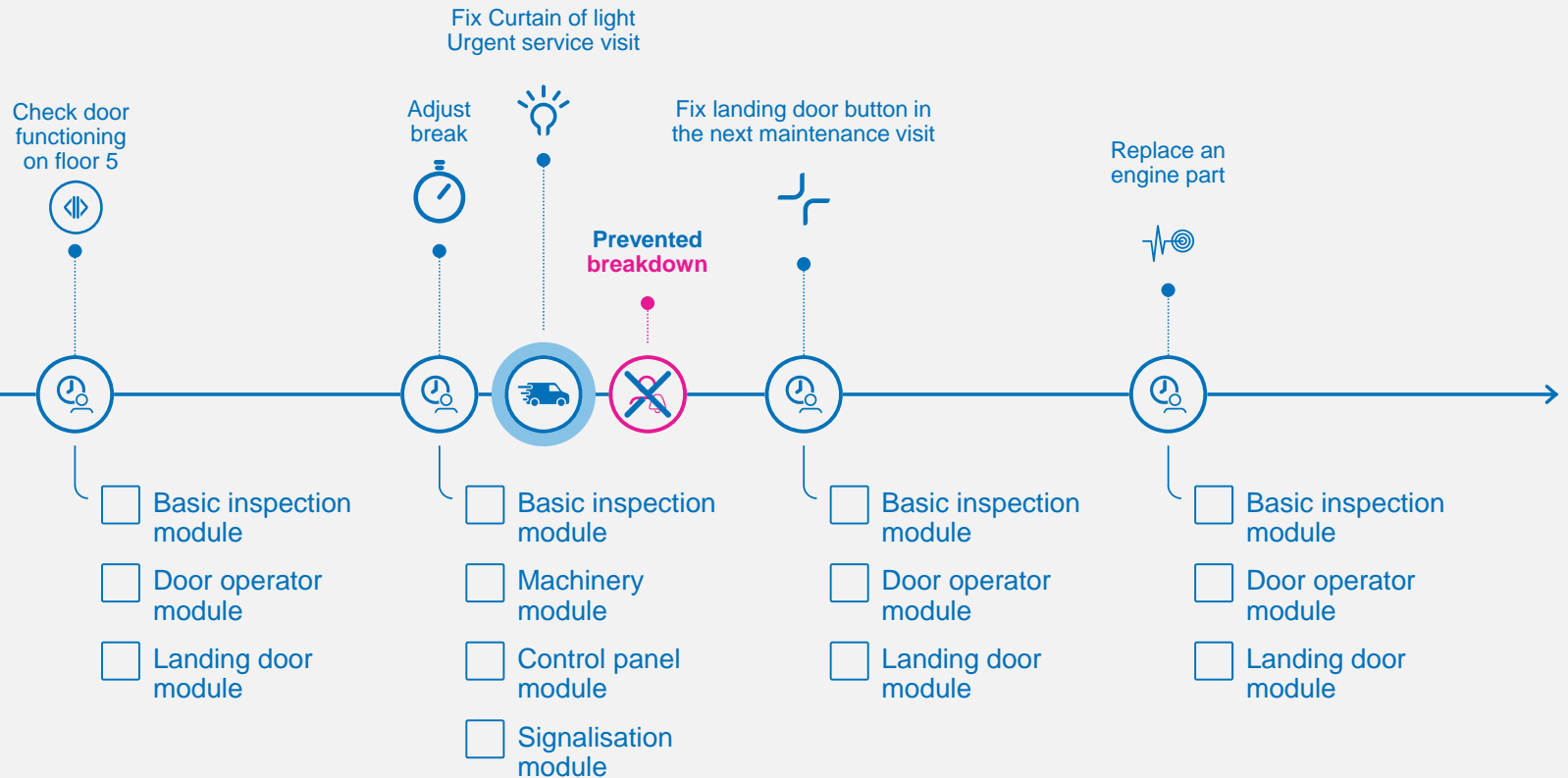


## KONE Care 24/7 Connect

– Data-based, targeted and tailored actions based on equipment's real needs

## Traditional module-based maintenance

– Calendar based maintenance plan



Customer benefits



## Get peace of mind

- Fewer faults and faster repairs
- Less inconvenience for equipment users and tenants
- Fewer user complaints
- Better customer and user satisfaction
- A better user experience enhances a building's value



## Maintain the value of your assets

- Improved equipment performance and service levels
- Keep equipment running while prolonging the value of your assets
- Effectively manage your assets with trustworthy data and our guidance





## Improve safety

- 24/7 tracking of your equipment
- Continuous surveillance of essential safety components
- Improved passenger safety
- Faster response in case of urgent issues
- Immediate information in case of urgent issues





## Get better transparency

- Trustworthy analytics and diagnostic actions
- Have answers before you receive complaints
- Full transparency of suggested service plan and diagnostic actions to be taken
- Ability to plan and budget for costs with factual data and reporting

KONE ONLINE Home

PORTFOLIO: ALL EQUIPMENT

SEARCH

AB ADMIN

KONE

← BACK

VISITS

- Maintenance / Inspection
- Repair
- Callout
- Future

Elevator 31094994

Equipment in same location < 1/4 >

**In Operation**

Remote monitoring data indicates that there is an urgent issue with the equipment's door operation.

24/7 FINDINGS  
3

EQUIPMENT NAME  
Abragam du 4

STATUS  
Out of Operation

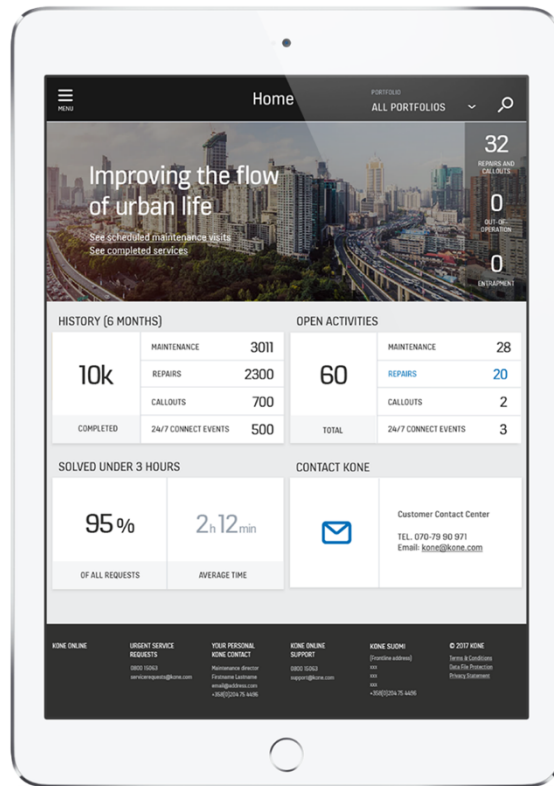
GENERAL DESCRIPTION  
Front Lobby 1

MANUFACTURER #  
31094994

EQUIPMENT #  
31094994

Date	Reason of visit	Job Description	Extra expenses
Pending	Repair	Door broken	No
March 2017	24/7 Preventive check	Doors	No
WORK ORDER TYPE	CREATED	DESCRIPTION:	
Preventive check	01.01.2017	(Customer) (Technician) Changed logic circuit	
WORK ORDER	ARRIVED	CONDITION ON ARRIVAL	
#123456789012	01.01.2017, 10-10	Running	
ORDER STATUS	DEPARTED	SOURCE OF SERVICE NEED	
Ongoing	Date, at time	Doors	
ENTRAPMENT	ETA		
No	01.01.2017 at 10:59		
07.01.2017	24/7 Preventive check	Doors	
23.12.2016	Planned Maintenance	Ropebroken	
20.11.2016	Planned Maintenance	Door check	
16.11.2016	Planned Maintenance	Yearly Rope check just in case	

# We will keep you up-to-date on connected equipment status and our actions



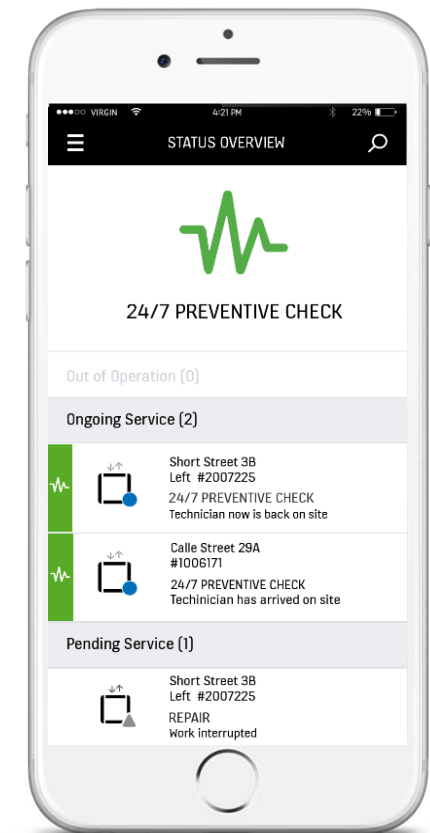
## Easy access to information online

- Actions we have taken based on observations from intelligent equipment analytics
- Current equipment status and previous events
- Equipment usage information: trend and levels in the usage of your equipment

## Mobile app to ensure full visibility

- Ongoing service orders and status of the equipment
- Push notifications that you can customize

# With KONE Care™ 24/7 Connect, you will have added transparency to your equipment



# 24/7 Connected Services bring IBM Watson IoT to our industry



LIVE FEED

## STOCKHOLM, SWEDEN

[Listen live →](#)

06-02-2017 | LOCAL TIME

KONE Elevator 17:46

Humidity at 12 %. Waiting on floor 0.

17:46 KONE Cloud

You're idle. Check.

LIVE FEED

## ILLINOIS, USA

[Listen live →](#)

06-02-2017 | LOCAL TIME

KONE Elevator 10:47

Just rode 25.7 meters down to floor 0.

10:47 KONE Cloud

That's 25.7 meters to floor 0.

LIVE FEED

## DELFT, NETHERLANDS

[Listen live →](#)

06-02-2017 | LOCAL TIME

KONE Elevator 17:47

Now on floor 0.

17:47 KONE Cloud

Thank you. Keep it up.

LIVE FEED

## ESPOO, FINLAND

[Listen live →](#)

06-02-2017 | LOCAL TIME

KONE Elevator 18:47

Went down to floor 1, as requested.

18:47 KONE Cloud

Thank you.





KONE



SENSE • TOUCH • EXPERIENCE  
OUR BRAND NEW SHOWROOM

通力陳列室 嶄新體驗

Reserve your visit today!  
歡迎預約參觀!



Customer Care Centre  
客戶服務中心




EcoMod™  
自動梯更新工程



UltraRope™  
碳纖維帶



Training Centre  
培訓中心



Turnstile  
智能通道



Destination Control System  
目的選層系統