Greening your Buildings with Schindler Modernisation
Investing in a sustainable future

The importance of greening buildings
Buildings account for one third of the world’s total energy consumption and a similar percentage of the world’s total greenhouse gas emissions. In a ‘skyscraper city’ like Hong Kong, buildings account for 89% of the total energy consumption.

Green building ratings, such as LEED in the US, Hong Kong BEAM and Singapore’s GREENMARK, are increasingly sought-after by major tenants and these standards can also be applied to existing buildings.

How can Schindler help you in greening your building?
There are many reasons to modernise lifts and escalators in a building, for example to improve safety, change on out-of-date style, improve traffic handling etc. And there is also great potential to reduce the environmental impact of your building by decreasing the power consumption of its lifts and escalators.

Schindler offers many innovative solutions to improve the energy efficiency of your lift and escalator systems. Modernisation enables you to achieve substantial energy savings, shrinking your building’s ecological footprint, reducing electricity costs and attracting or retaining tenants.

How much energy are your lifts and escalators consuming?

<table>
<thead>
<tr>
<th>Commercial Building</th>
<th>Residential Building</th>
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<tbody>
<tr>
<td>Air conditioning and heating</td>
<td>48%</td>
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<tr>
<td>Lighting</td>
<td>19%</td>
</tr>
<tr>
<td>Office Equipment</td>
<td>22%</td>
</tr>
<tr>
<td>Pumping</td>
<td>18%</td>
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Hong Kong EMSD Guideline on Energy Audit, typical values

For common utilities only: estimated values

Energy savings and more

Enjoy significant energy savings with the latest drive and control systems

Enhance building value through increased lift performance, reliability and user satisfaction

Improve passenger safety by bringing your lift up to date with the latest safety standards
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How much energy are your lifts and escalators consuming?

Commercial Building

- Air conditioning and Heating: 48%
- Lighting: 19%
- Office Equipment: 22%
- Lifts and Escalators: 11%

Residential Building

- Space Conditioning: 10%
- Pumping: 18%
- Lighting: 22%
- Lifts and Escalators: 50%

Hong Kong EMSD Guideline on Energy Audit, typical values

For common utilities only, estimated values

Energy savings and more

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Enhance building value through increased lift performance, reliability and user satisfaction
Improve passenger safety by bringing your lift up to date with the latest safety standards
Overview of Schindler’s green modernisation solutions

Controls, Drives and Machines
- Outstanding VVVF (Variable Voltage, Variable Frequency) technology
- Available in AC & DC options (with or without controller upgrade)
- Significantly lower energy consumption
- Regenerative drive
- Best in class power factor performance (Power Factor 1) - total harmonic distortion less than 5%
- Peak starting current reduced by as much as 80%
- Reduced heat dissipation
- Use of motor generator set eliminated – standby power reduced and carbon pollutant eliminated
- Improved reliability of electrical components and data communication
- Improved speed control, levelling accuracy and ride comfort
- High efficiency
- Reduced wear and tear
- Improved mechanical efficiency if Planetary Gear drive machine replaces traditional worm gear machine
- Full range of geared and gearless machines available, fully compatible with VVVF control and drive system

Machine Room
- Conversion of hydraulic lift system or low-rise machine-room solution to machine-room-less (MRL) technology
- Freeing up machine room space for other use
- Reduced machine room cooling requirement
- Possible use of PF1 (Power Factor 1) regenerative power for machine room lighting and ventilation

Car
- Car lighting and ventilation automatically switched off when lift not in use

Traffic Management System
- Schindler ID : Schindler’s intelligent, energy-saving traffic management system
- Building access control interface
- Increased handling capacity with same number of lifts
- Direct travel with minimal intermediate stops, reducing energy use
- Shorter destination time
- Fewer empty car trips
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Schindler modernisation – making the difference

Bank of Indonesia
Jakarta, Indonesia

Jardine House
Hong Kong

Reserve Bank
Pretoria, South Africa

Marriott Marquis
New York, USA
New energy-efficient drive systems
Enhanced performance and reliability plus impressive energy savings

Many of the aging lifts driven by old-fashioned Ward-Leonard motor-generator or SCR drive systems are energy-inefficient and now obsolete. Vintage DC lift systems use a motor-generator set, which runs continuously and is thus very inefficient. SCR drive systems are similarly energy-inefficient and have the additional drawback of excessive heat dissipation, adding to the machine room cooling load.

Industry-standard systems now use an ACVF hoisting motor coupled to an AC VVVF drive, which offers improvements in performance, reliability and ride comfort, and consume up to 60% less energy than older systems.

Modular approach
Schindler offers a phased modernisation approach which enables you to plan the scope of the modernisation stages to suit your project schedule and financial planning.

In many cases, total replacement of the old large DC machines would be too costly and too complicated. Often the most practical approach is to reuse an existing DC gearless machine, provided it is still in good working condition.

In older drive technologies, an existing DC motor and controller can be converted to a VF system simply by installing a new DCVF drive inverter. This solution can offer energy savings of up to 55% over conventional Ward-Leonard DC or SCR drive systems, without installing new machines.

Similarly, in old AC 2-speed geared and ACVV installations, changing the drive system to new AC drives can deliver energy savings, improved levelling precision and enhanced ride comfort.

DC Frequency Inverters
Relative energy consumption (typical values)

<table>
<thead>
<tr>
<th>Old System – Ward-Leonard</th>
<th>New System – DC PF1</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>47%</td>
</tr>
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</table>

Schindler Power Factor One (PF1) converters ensure a high level of energy efficiency, by allowing power generated by the lift back into the building’s power grid. The regenerated energy is fully compatible with the building mains at a total harmonic distortion (THD) of less than 5 percent.

The regenerated ‘clean’ energy can therefore be consumed by other electrical systems in the building, such as other lifts, lighting or air-conditioning.

You decide – we implement
Our modular modernisation approach provides you with all the flexibility that you need. Schindler uses technologies that are backwards compatible. So components can be replaced or retrofitted into existing installations, extending the lifetime of the lift system.

This permits progressive upgrades to your existing installations. Obsolete drive systems can be replaced with the latest ecological technologies immediately, while machine and controller replacement, or complete transformation of the lifts to the latest industry standards, can be carried out now or deferred to the future.
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DC Frequency Inverters
Relative energy consumption (typical values)

| Existing Controller | DC inverter | + | AC2 or ACVV Drive  |
| Existing Controller | DC inverter | + | Field Module |
| New Controller | AC inverter | + | AC Machine |

DCVF Inverters combined with PF1 regenerative drive
A modular modernisation approach

Power Factor One (PF1) Regenerative Drive
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Use of Regenerated Power

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You don’t need to look for the lift.
The lift looks for you.

**Schindler Traffic Management system**

An effective solution for improved traffic performance and energy use in an existing building

**Increase traffic efficiency and handling capacity**

The innovative Schindler ID traffic management system optimises traffic efficiency and saves energy by grouping passengers going to the same destination floor. The system’s advanced software drives a powerful logic program to manage the complexities of traffic patterns as they change throughout the day.

By selecting the destination floor before entering the lift, passengers going to the same floor will be directed to take the same lift. The system reduces the number of intermediate stops for each round trip, enabling the lift to return to the main lobby sooner to collect more passengers.

**Less crowding at the lobby**

Unlike a conventional lift system, every passenger will know in advance which lift to take upon entering his call. Passengers are arranged in small groups in front of their respective lifts, which avoids crowding in the lobby area.

**Energy savings**

With fewer intermediate stops per trip, the Schindler ID reduces the total energy used by starts and stops, thereby generating savings in power costs throughout the entire operational cycle of the lift.

**Card-reader access and individualisation**

Schindler ID can provide multiple levels of security, from simple access control to highly restricted use – defined by individual rights, authorizations and requirements. The terminals are available in interactive touch-screen or touch-less options.

**Smooth modernisation process — minimum inconvenience, maximum impact**

You can enjoy a smooth transition from a conventional system to Schindler ID without additional structural work to your building, maximising the benefit and minimising any inconvenience for your tenants throughout the modernisation process.

**Schindler ID Mod Overlay – a process revolution**

With the Schindler ID Mod Overlay method, we install the Schindler ID control into your existing lift system prior to commencing modernisation work. The use of Schindler ID technology allows us to maintain a similar traffic handling capability when we take out one or two lifts from the group to modernise. As each lift is finished, it is re-integrated into the group control system (which links the old lifts and modernised lifts) before another one is removed. The modernisation process can therefore be completed with no disruption to service and minimal impact to passengers.
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Eco-friendly escalator

Older escalators and moving walks that are not equipped with frequency converters are not energy-efficient. Often these escalators run for relatively long periods of time during off-peak hours without being used at all.

Engineering know-how and advances in drive technology now allow your escalators and moving walks to operate more economically and in a more eco-friendly manner. Schindler offers technologies which generate energy savings by providing soft start/soft stop functionality, stop-and-go operation when passenger flow is discontinuous, crawling speed and peak current reduction. The operation of these escalators is determined by the presence or absence of passengers, so energy is saved during off-peak hours.

Auto Start / Stop Escalator Mode
Dependent on the type of building and passenger flow pattern, auto start/stop mode can save up to 52% of the energy used by an escalator. (*Hong Kong EMSD Published Statistics)

Crawling Speed Escalator Mode
Automatic two-speed control determined by the presence or absence of passengers. Average saving of 14% in an office building. (*Hong Kong EMSD Published Statistics)

Energy savings potential from greening your lifts and escalators

The level of energy savings achieved by installing new lift or escalator technology varies, and is mainly dependent upon the age and technology of the original system.

In practice, to maximise reliability and performance, most lift systems old enough to warrant control upgrades are also likely to warrant complete modernisation.

The Schindler modernisation team has the extensive experience and technical know-how needed to find the best solution for your building. Whether you are looking for a partial upgrade or a complete replacement, Schindler will help you with a tailor-made modernisation package that meets your needs and matches your budget.

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<tr>
<th>Solution</th>
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<td>Power Factor 1 Regenerative Drive</td>
<td>30% to 55%</td>
</tr>
<tr>
<td>DCVF Drive inverter</td>
<td>25% to 50%</td>
</tr>
<tr>
<td>VVVF Controller</td>
<td>20% to 60%</td>
</tr>
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We don’t just talk Green
We act Green

To reduce our own carbon footprint and our impact on the environment, Schindler engages government-licensed collectors and recyclers of chemical and solid waste who comply with environmental protection processes for packaging, labelling, storage and waste disposal.

We optimise our logistics to reduce material handling and transportation, and we reuse the packaging materials received in our warehouse.