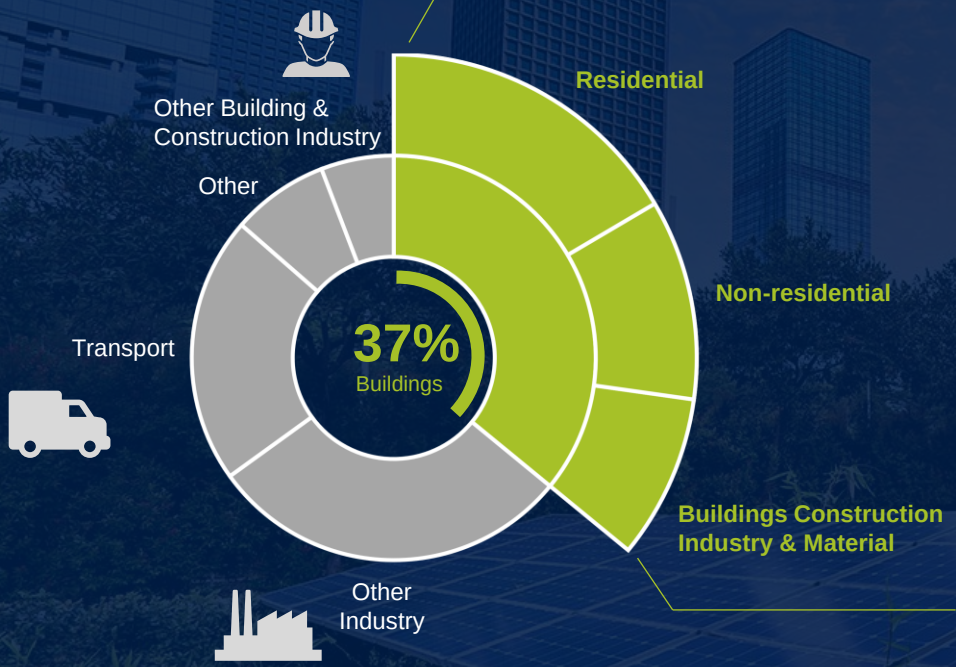

APLEONA
GREEN REAL ESTATE |
PRODUCT PORTFOLIO
PLATINUM
Top 1%
2022
ecovadis
Sustainability
Rating

# ENERGY-EFFICIENT REFURBISHMENT IN EXISTING BUILDINGS IS AN ELEMENTARY BUILDING BLOCK ON THE WAY TO A CLIMATE-NEUTRAL FUTURE

## $CO_2$-Emissions Share of Buildings in Global Energy and Process Emissions, 2021[1]




## Building Facts EU

- **50 %** of the EU building stock is **older than 50 years**
- **75 %** of today's building stock is regarded **energy inefficient**
- **85-95 %** of existing buildings will still **exist in 2050**

[1] Global Alliance for Buildings and Construction based on Tracking Clean Energy Progress (IEA 2022)

# APLEONA IS LEADING IN ENERGY & SUSTAINABILITY!

**"Boots on the Ground" - FM has the best access to driving change on the ground**

**>100 dedicated energy & sustainability experts bundled in competence teams**

**For >10 years increasing energy efficiency has been a core competence**

**Comprehensive product portfolio with strategic goals:**

- Improving data transparency
- Reducing the $CO_2$ footprint
- Decreasing cost

# THE APLEONA GREEN REAL ESTATE OFFERING | OVERVIEW

**Green Real Estate Value Chain**

**Energy Transparency & Assessments** → **Long-term Decarbonization Plan** → **Development of Energy Optimi-sation Measures** → **Implementation of Energy Optimi-sation Measures**

**All Customer: Corporate Real Estate and Investors**

## (Smart) Metering & Monitoring

enerlutec

*Apleona's energy monitoring system*

## Energy Assessments & Audits


## ESG / Sustainability Certificates & Reporting

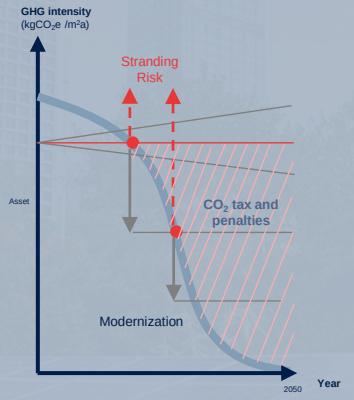
MINERGIE® · SNBS · GRESB · REIDA

## Energy Management

ISO

## Sustainability Strategy & Decarbonization Roadmap

*All on object and portfolio level*




## Energy-efficient Operation

*As important part of FM contract*

User training

## Energy Efficiency Solutions ...

RECOGIZER Self-Learning Building Solutions

*Automated & predictive HVAC Optimization*

PAUL

## Energy Cost Management ...

Subsidies

## E-Mobility & Electric Charging Infrastructure

Impact Assessment & Control

**Investors**

Carbon Due Diligence (as part of Technical Due Diligence)

# THE APLEONA GREEN REAL ESTATE OFFERING | PRODUCTS

**Green Real Estate Value Chain**

**Energy Transparency & Assessments** → **Long-term Decarbonization Plan** → **Development of Energy Optimi-sation Measures** → **Implementation of Energy Optimi-sation Measures**

**All Customer: Corporate Real Estate and Investors**

## (Smart) Metering & Monitoring
- (Smart) Meter Documentation, Concept & Implementation
- Energy Monitoring & Management

## Energy Assessments & Audits
- Apleona Energy Analysis
- Energic Inspection of Ventilation and Air Conditioning
- FM Operations Audit
- Energy Performance Certificate Creation

## ESG / Sustainability Certificates & Reporting
- Consulting for Sustainable Building Certification
- ESG / Sustainability Reporting

## Energy Management
- Apleona Energy Management Program
- ISO 500001 Implementation

## Sustainability Strategy & Decarbonization Roadmap
- Positioning of the Building/Portfolio on the Decarbonization Pathway
- Decarbonization Roadmap (incl. CRREM Decarbonization Pathways)
- Decarbonization Program Management

*All on object and portfolio level*

## Energy-Efficient Operation
- Energy-Efficient FM Operation as part of FM Contracts
- Active User Training & Awareness Program for Sustainability and Energy-Efficient Operations

## Energy Efficiency Solutions
- Lighting / LED
- Heating Ventilation Air Conditioning (HVAC)
- Automated & Predictive HVAC Optimization through Recogizer
- Intelligent Heating System Optimization
- Energy-efficient Refurbishment of the Building Envelope
- On-site Energy Generation (e.g., PV)

## Energy Cost Management
- Subsidy Consulting

## E-Mobility & Electric Charging Infrastructure

Impact Assessment & Control

**Investors**

Carbon Due Diligence (as part of Technical Due Diligence)

# THE APLEONA GREEN REAL ESTATE OFFERING | ENERGY TRANSPRENCY & ASSESSMENT

**Green Real Estate Value Chain**

## Energy Transparency & Assessments

**All Customer: Corporate Real Estate and Investors**

### (Smart) Metering & Monitoring
- (Smart) Meter Documentation, Concept & Implementation
- Energy Monitoring & Management

### Energy Assessments & Audits
- Apleona Energy Analysis
- Energic Inspection of Ventilation and Air Conditioning
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### ESG / Sustainability Certificates & Reporting
- Consulting for Sustainable Building Certification
- ESG / Sustainability Reporting

### Energy Management
- Apleona Energy Management Program
- ISO 500001 Implementation

**Investors**

Carbon Due Diligence (as part of Technical Due Diligence)

## Long-term Decarbonization Plan

Sustainability Strategy & Decarbonization Roadmap

## Development of Energy Optimi-sation Measures

Energy-Efficient Operation

Energy Efficiency Solutions

Energy Cost Management

E-Mobility & Electric Charging Infrastructure

## Implementation of Energy Optimi-sation Measures

Impact Assessment & Control

# (SMART) METERING & MONITORING

CHALLENGE

- **Intransparent consumption data** and **meter structure**
- **Manual recording of** meter readings
- **Low data granularity**
- Lack of overview of energy flows in the building
- Time-consuming billing of costs for subtenants

GOAL

- ✓ **Transparency on energy consumption** for producer and consumer
- ✓ **Automated meter recording** (if requested)
- ✓ Identification of energy and economic **savings potentials**

SOLUTIONS

**(Smart) Meter Documentation, Concept & Implementation**

**Energy Monitoring & Management**

**Data transparency is the basic prerequisite for any optimization!** Our services include

- Identification and **documentation** of the existing measuring equipment in the building
- Creation of an integral **measurement and metering concept**
- **Implementation** of the measurement and metering concept
- Implementation of an **energy monitoring system** including continuous monitoring and derivation of optimization measures

# (SMART) METER DOCUMENTATION, CONCEPT & IMPLEMENTATION

## IMPACT

## KEY FACTS

Creation and implementation of an **integral measurement and metering concept**:

1. **Documentation:** Review of existing metering documentation, ensuring legal compliance
2. **Concept:** Development of a **customized** measurement and metering concept based on customer requirements
   (e.g., incl. upgrade to intelligent metering systems)
3. **Implementation:** Support in upgrading or exchanging existing old meters to smart meters and installing additional meters and sensors according to concept

## TOP BENEFITS

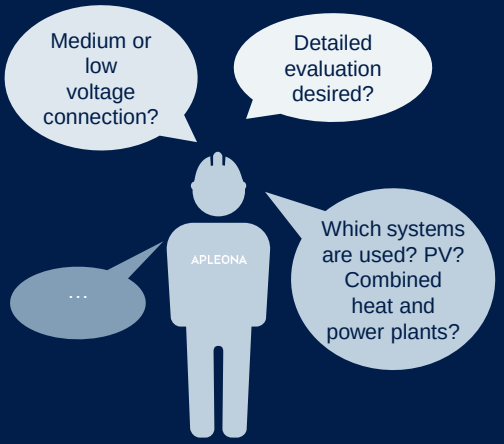
- ✓ Transparent **consumption structure**
- ✓ Intelligent metering replaces labour-intensive and error-prone manual data collection

## 1 Documentation

*Is the current documentation of the meters correct?*

## 2 Concept

*What individual requirements will my customer have? What is important to them?*




## 3 Implementation

*Advice on purchasing the appropriate hardware and installation on site*

All three steps can be contracted separately from each other!

**Recommended add-on solution:** Energy Monitoring & Management

# ENERGY MONITORING & MANAGEMENT (E.G., THROUGH ENERLUTEC)

## IMPACT

## KEY FACTS

Manual and automated collection of energy data for **visualization, analysis, monitoring, optimization** and **documentation** of **energy consumption**:

- **Central data base** for waste, water and energy consumption data
- Complete **energy transparency** for producers and consumers
- Continuous monitoring to detect **consumption anomalies** and identify, recommend and initiate **optimization measures**

## TOP BENEFITS

- ✓ All energy data in one central database
- ✓ **Active energy management** in near real-time and intuitive sustainability reporting

**Supporting all media**
*such as electricity, gas, water, wastewater, heat, refrigeration, compressed air or heating oil; equivalents such as cost and $CO_2$ emissions are also displayed*

**Individual structures**
*(sites, buildings, floors, rooms, organizational units, etc.) can be easily created and meters assigned for consumption and generation*


### Gather Data & Visualize

- ✓ *A wide range of recording options*
- ✓ *Central provision of energy data*

### Analyse & Monitor

- ✓ *Continuous monitoring*
- ✓ *Automated alerting*

*Optional:*

- ✓ *Identification of optimization measures*
- ✓ *Detailed data analysis (incl. benchmarks, KPIs)*

### Report & Document

- ✓ *Documentation for audit and energy management*
- ✓ *Data availability for ESG reporting*

Optimization measures can also be implemented directly by Apleona!

# ENERGY ASSESSMENTS & AUDITS

CHALLENGE → GOAL

- No transparency about energy consumption of the assets/ buildings in operation
- **Interaction of aggregates** unclear
- **Existing hardware** out of date
- **Control functionalities** no longer in line with demand
- **Oversized equipment**

- ✓ Creation of **operational transparency**
- ✓ **Optimization of plant functionality** – result: lower energy consumption, costs, and $CO_2$ emissions
- ✓ **Recommendations for further improvement measures,** including strategic outlook
- ✓ Comply with **legal requirement**

SOLUTIONS


**Apleona Energy Analysis**

**Energetic Inspection of Ventilation & AC**

**FM Operations Audit**

**Energy Performance Certificate Creation**

Implementation or creation of ...

**... interdisciplinary energy analyses** (incl. site inspections) with a focus on low-hanging fruits

... **energy inspections and energy audits** to comply with legal requirements

... **FM audits to review the FM organization**, with strong focus on energy and sustainability

... **energy certificates**

(1) To ensure a **transparent overview and insight** into energy consumption (of individual systems) or the FM organization as a whole (2) to **derive optimization potentials** and (3) to **comply with legal requirements** of the legislator incl. operator responsibility

# APLEONA ENERGY ANALYSIS

## IMPACT

**2 - 5 % energy savings p.a.**

**Payback period usually < 1 year**

## KEY FACTS

- Implementation of an **interdisciplinary energy efficiency analysis**
- Focus: **Low Hanging Fruits**
- **Site visits** with mobile measurements
- **Load curve analyses** and diagnosis of operating anomalies
- Creation of an **efficiency measures catalogue** incl. business cases of individual measures (ROI)

## TOP BENEFITS

- ✓ **Cost-efficient evaluation** of **technical building equipment**
- ✓ Identification of **measures** to increase efficiency, especially with low invest

**Generally possible in various forms:**
*Potential analysis (~5-8 days);*
*Rough analysis, incl. ROI indication (~10-12 days);*
*Detailed analysis, incl. concrete offers and profitability calculation (~20-25 days)*

### 1 CONTACT
Customer has little transparency about their energy cost and consumption and is not able to benchmark it to other data.

### 2 ASSESSMENT
Data collection & on-site inspection
Our experts collect all relevant information and data before inspecting the buildings and facilities during an on-site inspection.

### 3 ENERGY REPORT
incl. definition of measures
Apleona evaluates consumption data, compares it with benchmarks, uncovers irregularities and weak points within the energy systems and derives optimization measures, considering the investment and the payback period.

*Add-on services:*

### 4 CUSTOMER DECISION
Customer decides which measures to implement based on the energy report.

### 5 IMPLEMENTATION
of the desired measures.

### 6 SUPPORT
in the continuous improvement process.

# ENERGIC INSPECTION OF VENTILATION AND AIR CONDITIONING

## IMPACT

## KEY FACTS

- **System-related inspections** for the timely and regular inspection of building services equipment
- Recommendation of **energy-saving measures** including information on energy, cost and $CO_2$ savings
- Ensuring the legal conformity of the property

## TOP BENEFITS

✓ Analysis and identification of improvements of **asset and property efficiency**

## APLEONA CHECKS …

**Efficiency of the components** of the air-conditioning or combined air-conditioning and ventilation systems which **affect** the **efficiency of the system**

**System sizing** in relation to the cooling demand of the building

**Factors that impact the optimal size of the asset,** e.g.,

- *changed room use or occupancy*
- *changed usage times*
- *internal heat sources*
- *structural changes to the building*

**Control parameters**

*Setpoints for air volumes, temperature, room humidity and operating time*

General **state of the art**

## … WHENEVER:

***Nominal cooling capacity ≥12 kW***

## … AND WHEN?

- ***10 years after commissioning***

*or*

- *after **renewal of essential components** (heat exchanger, fan or chiller)*

# FM OPERATIONS AUDIT

## IMPACT

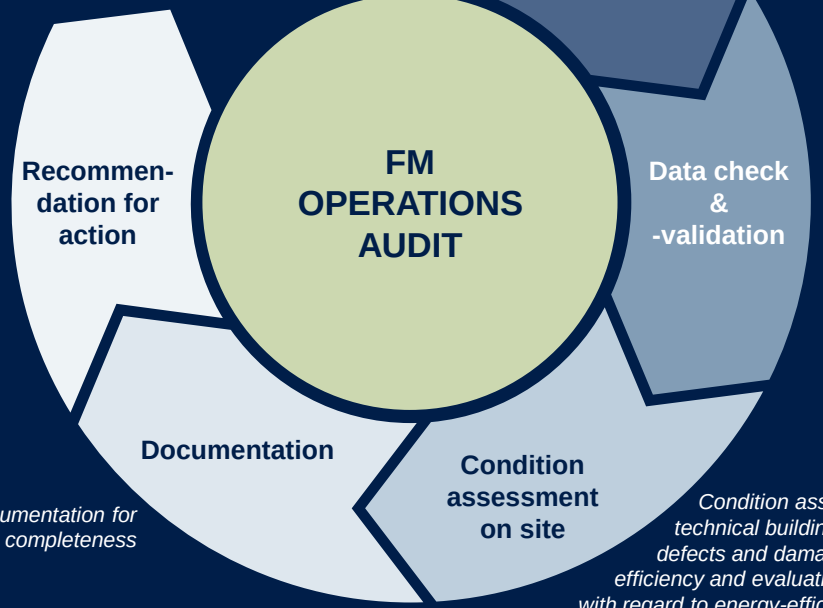
## KEY FACTS

- Independent evaluation of the **facility management service providers** and tenants on behalf of the client against a set of pre-defined quality criteria
  - Special focus can be the **energy-efficient FM operation**
- Identification of **deficiencies** and **areas for improvement** and preparation of recommendations for action
- Audit in accordance with applicable regulations, norms and standards

## TOP BENEFITS

✓ Specific approaches to **improving operations/energy-efficient FM** operations as **the basis for decarbonizing** properties

**Transfer of responsibility for audit from owner to property manager**



# ENERGY PERFORMANCE CERTIFICATE CREATION FOR EXISTING BUILDINGS

## IMPACT

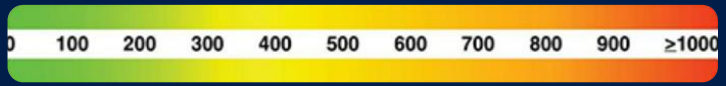
## KEY FACTS

- Preparation of the energy demand or energy consumption certificate to create **comparability of properties**
- Provides **clarity about the energy status** of a building and shows the $CO_2$ emissions
- Contains suggestions for **energy modernization** and thus provides an initial starting point for efficiency-improving measures
- Mandatory for all buildings that are heated normally (few exceptions)

## TOP BENEFITS

- ✓ Compliance with legal requirements
- ✓ Recommendations for modernization
- ✓ 3D model for energy simulation

*For non-residential buildings and existing residential buildings, there is, with a few exceptions, a **free choice** between an energy demand and an energy consumption certificate!*




| | (PRIMARY) ENERGY DEMAND | (END) ENERGY CONSUMPTION |
|---|---|---|
| CENTRAL ASPECT | Creation of a 3D calculation model without the influence of tenants/users | Strong user influence – the basic data is the energy consumption influenced by the tenant |
| CONDUCTED ANALYSIS | Assessment of the energy status of the building envelope and asset technology | All buildings: Annual energy consumption for heat<br>For NRB: additionally total electricity |
| NECESSARY DATA | Physical characteristics of the building and parameters of the building technology | Consumption data for heating, hot water, and electricity (at least 3 last years) |
| ADVANTAGES | ✓ Energetic quality of the building independent of the user<br>✓ Basis for classification for taxonomy<br>✓ Very good basis for comparative calculation and refurbishment | ✓ Residential: Simple data collection<br>✓ NRB: Tenant electricity research often difficult/impossible<br>✓ Statements on approximate energy costs of the users examined can be derived |

# ENERGY MANAGEMENT

CHALLENGE

GOAL

- Implementation of **many individual measures**
- No continuous and **long-term energy savings**
- No **active management**
- Employees do not participate in energy-saving measures or are not involved in the first place
- **No visibility** of the efforts for third parties/the market

- ✓ **Holistic energy management**
- ✓ **Constant monitoring** and adaptation of energy-relevant systems and processes to changing requirements
- ✓ **Continuous improvement** and **energy savings**
- ✓ **Involving employees** through awareness campaigns

SOLUTIONS

**Apleona Energy Management Program**

**ISO 50001 Implementation (Energy Management System)**

- Apleona accompanies its customers holistically with an **energy management program that's individually tailored** to the customer's requirements or that accords with the **ISO 50001** standard
- Coupled with the expertise of the FM service provider on site, an energy management system helps to **optimize energy use**, also in the face of **future regulations**
- ISO 50001 has established itself as an **international standard** for systematic EM and continuous improvement management

# APLEONA ENERGY MANAGEMENT PROGRAM

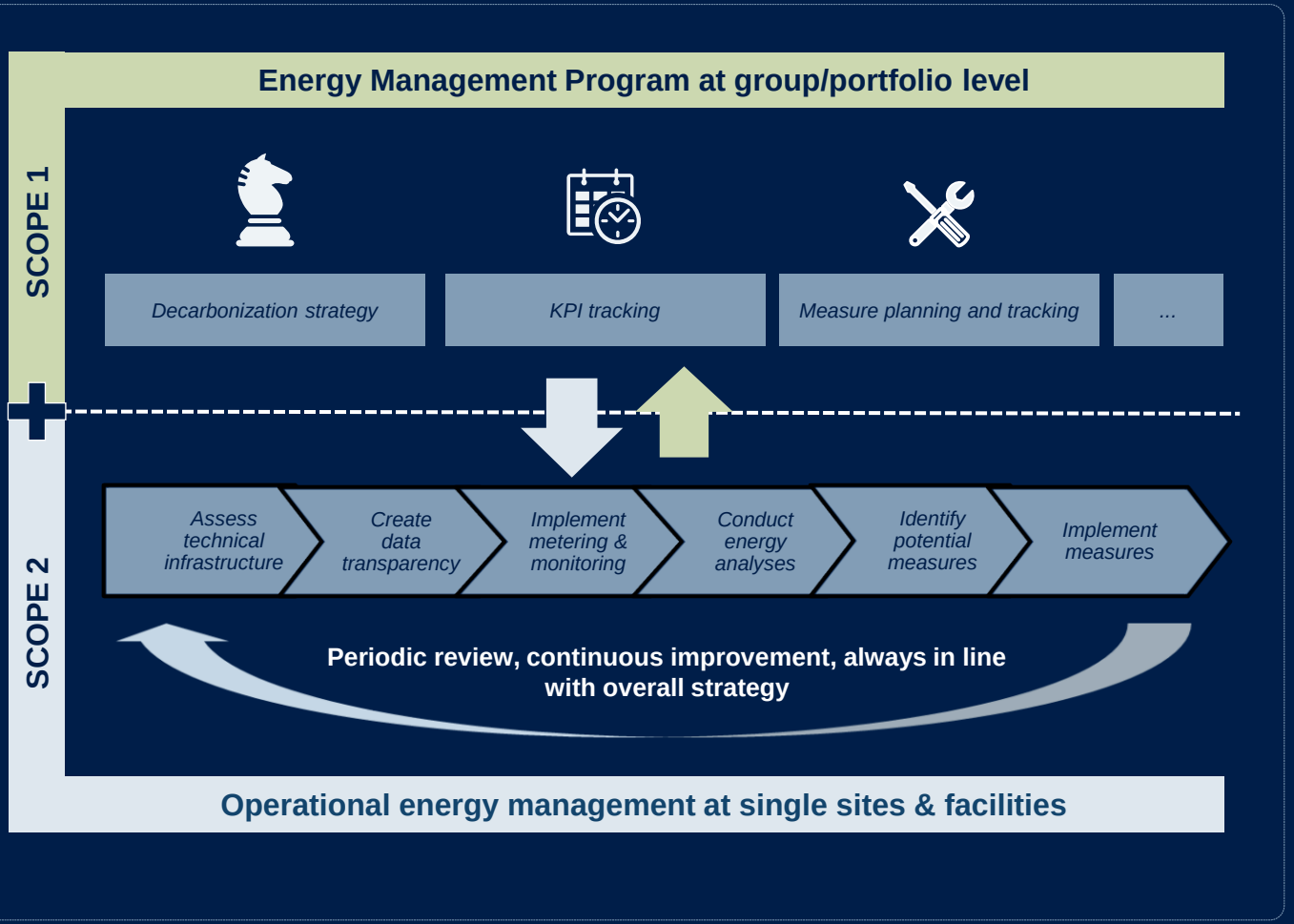
## IMPACT

## KEY FACTS

- Set up of a **customized energy management program** (energy PMO) on **portfolio level** that is supported by **operational energy management** at single sites and facilities
- To be set up based on **individual client needs**, **client ambition level**, and status quo
- Central PMO sets overall strategy, **reports KPIs**, decides on prioritization of measures and drives subsequent implementation of measures

## TOP BENEFITS

✓ Steering the complete energy management with focus on **long-term and continuous improvements**



# ISO 50001 IMPLEMENTATION (ENERGY MANAGEMENT SYSTEM)

## IMPACT

## KEY FACTS

- Apleona advises on requirements, advantages, subsidies and feasibility of an energy management system ISO 50001
- **Monitoring of energy management** through **continuous measurements** and analyses as well as documentation of energy consumption in a customer-specific reporting system – a **detailed energy analysis**
- **Ongoing** identification and **implementation of** optimization potentials

## TOP BENEFITS

✓ **Permanent and continuous further development** of **energy efficiency** – creating a culture of continuous improvement

# ESG / SUSTAINABILITY CERTIFICATES & REPORTING

CHALLENGE → GOAL

- Mandatory **disclosure of sustainability activities**, for instance through EU taxonomy
- Increasing **market pressure** to comply with ESG requirements
- Compliance with **regulation**
- Risk of **stranded assets**
- Lack of a **uniform standard for reporting**

- ✓ Selection of the **suitable certification process** for the company
- ✓ **Comparability** of buildings/ real estate portfolio in terms of **ESG performance**
- ✓ Creating **transparency** about sustainability efforts and performance of individual portfolios/ buildings
- ✓ **Recognition** through well-known building certification

SOLUTIONS

**Consulting for Sustainable Building Certification (e.g. SNBS, Minergie, LEED)**

**ESG / Sustainability Reporting**

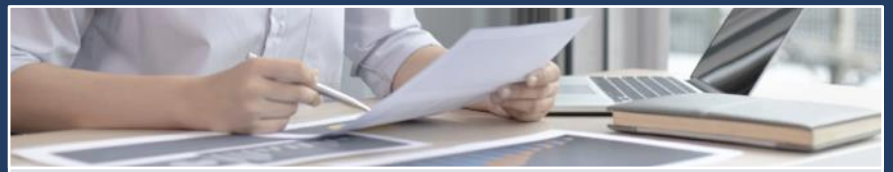
- Assistance with **gaining building certification** in accordance with internationally recognized standards
- Consulting regarding **which certification program best fits individual needs** and how to best approach it
- Implementation of **certification procedures**
- **Data collection**, data interpretation and completing missing data
- Aggregation and provision of data for **ESG/sustainability reporting**
- Identification and implementation of measures to **improve valuation and ESG performance**

# CARBON DUE DILIGENCE (AS PART OF TECHNICAL DUE DILIGENCE)

CHALLENGE → GOAL → SOLUTIONS

- Increasing complexity due to **rising sustainability requirements** resulting from SFDR (Sustainable Finance Disclosure Regulation), CSRD (Corporate Sustainability Reporting Directive), EU taxonomy etc.
- **Stranded asset risk** for asset management
- **Insufficient assessment** of the property or portfolio in terms of sustainability

- ✓ **Transparency of** energy consumption and $CO_2$ emissions of properties, portfolios and individual equipment
- ✓ **Classification of projects and buildings** for investors, portfolio holders, asset and investment managers and project development companies
- ✓ Risk avoidance (detection of stranding assets)



**Carbon Due Diligence**
**(as part of Technical Due Diligence)**

*For investors and asset managers mostly as part of sale/purchase of an asset/portfolio:*

- Analysis of the **nature of a property** or **portfolio** from an **environmental as well as ecological sustainability point of view**
- Assessment of **where the property currently stands** and what **measures need to be planned** in the short, medium or long term to achieve climate neutrality
- Carbon due diligence uncovers **stranding points** and suggests necessary remediation measures

# CARBON DUE DILIGENCE (AS PART OF TECHNICAL DUE DILIGENCE)

## IMPACT

## KEY FACTS

- Depending on requirements, execution of a **short review/red flag report/** comprehensive technical due diligence with focus on ESG or carbon
- Analysis and evaluation of the energy consumption or demand-based **$CO_2$ emissions** of a building
- **Energetic evaluation of** the facilities or the entire object including estimation of promising modernization potential

## TOP BENEFITS

✓ Risk avoidance, transparency and cost certainty regarding the current condition of the building

## Classification of the building status, e.g., regarding

To be adjusted to customer needs

- Energy consumption and $CO_2$ emissions
- Technical equipment & energy efficiency of the plant
- Building envelope and thermal quality
- Meter structures/ energy flows
- Planned measures to improve the $CO_2$ accounting
- Stranding Point

Estimation of the promising modernization potential

Quantification of the financial risks and consequential costs stemming from structural, technical and environmental defects and damages

# THE APLEONA GREEN REAL ESTATE OFFERING | LONG-TERM DECARBONIZATION PLAN

**Green Real Estate Value Chain**

| Energy Transparency & Assessments | Long-term Decarbonization Plan | Development of Energy Optimi-sation Measures | Implementation of Energy Optimi-sation Measures |
|---|---|---|---|

**All Customer: Corporate Real Estate and Investors**

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- Energy Management
  - Apleona Energy Management Program
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- Sustainability Strategy & Decarbonization Roadmap
  - Positioning of the Building/Portfolio on the Decarbonization Pathway
  - Decarbonization Roadmap (incl. CRREM Decarbonization Pathways)
  - Decarbonization Program Management

  *All on object and portfolio level*

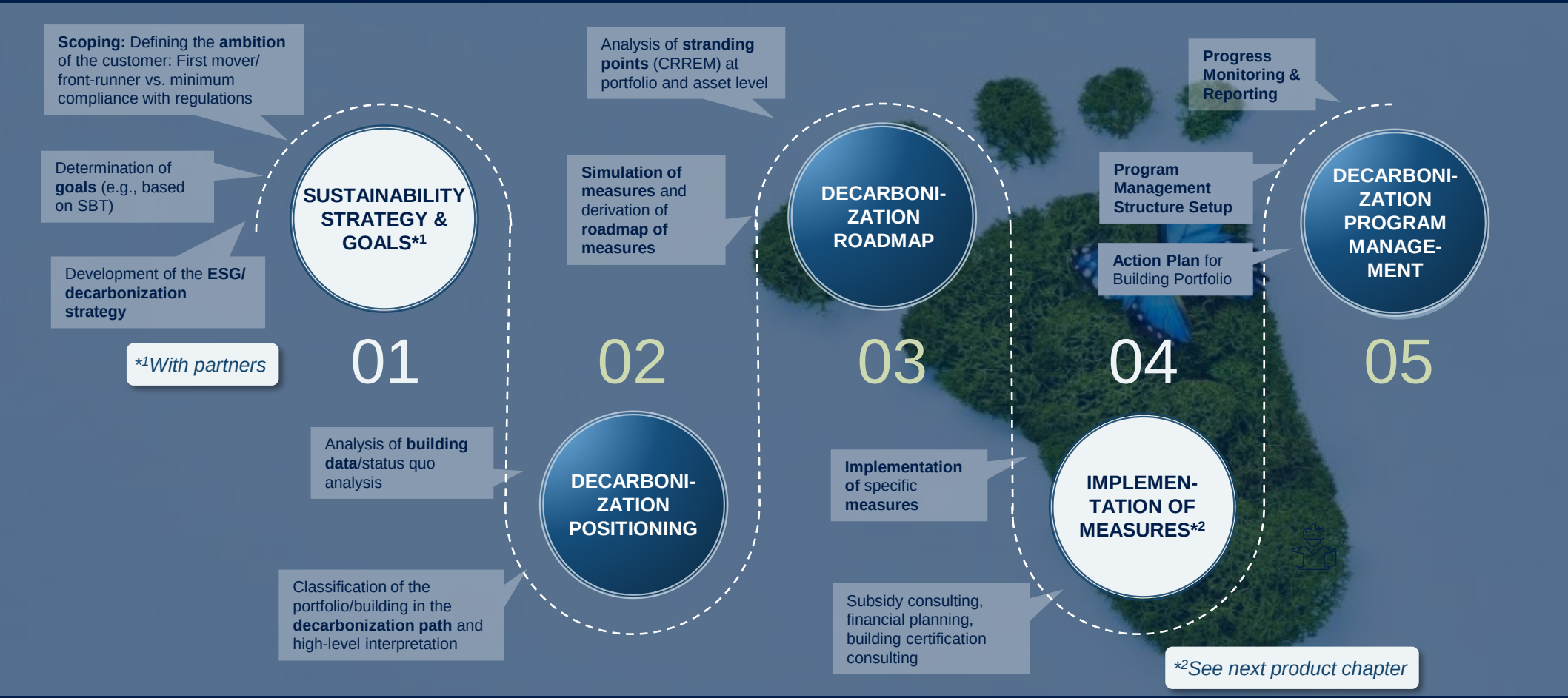
- Energy-Efficient Operation
- Energy Efficiency Solutions
- Energy Cost Management
- E-Mobility & Electric Charging Infrastructure

Impact Assessment & Control

**Investors**

- Carbon Due Diligence (as part of Technical Due Diligence)

# SUSTAINABILITY STRATEGY & DECARBONIZATION ROADMAP | CONCEPT OVERVIEW



# SUSTAINABILITY STRATEGY & DECARBONIZATION ROADMAP

CHALLENGE → GOAL

- **No transparency** on **compliance with net zero strategy** and **stranded assets**
- **Reduction of $CO_2$** footprint desired
- **Regulatory pressure**
- Customer and tenant pressure (ESG compliance)
- Budget pressure requires prioritization

- ✓ Decarbonization roadmap at group or portfolio level including derivation of measures
- ✓ Identification and **avoidance of stranded assets**
- ✓ **Reducing consumption** through economic measures
- ✓ Prioritization with the help of **investment simulations**

SOLUTIONS

**Positioning of the Building/Portfolio on the Decarbonization Pathway**

**Decarbonization Roadmap**

**Decarbonization Program Management**

*Apleona offers the following to portfolio holders who want to focus on maintaining and increasing the value of properties/portfolios (target definition and sustainability strategy should be in place):*

- **Positioning** of the building on the **decarbonization pathway**
- Preparation of an individual, **long-term decarbonization roadmap** at portfolio and/or asset level, including definition of specific measures
- With the help of 3D models: **Simulation of energy investments** including ROI and visualization of the results in the CRREM tool
- Establishment of a **program management** including definition, prioritization and planning of all necessary project activities for the implementation of the preferred decarbonization path as well as the tracking of the achievement of the targets

# POSITIONING OF THE BUILDING/PORTFOLIO ON THE DECARBONIZATION PATHWAY (ACCORDING TO INTERNATIONAL STANDARD)

## IMPACT

## KEY FACTS

- Status quo analysis as well as analysis of portfolio and/or building data in terms of **energy consumption, energy efficiency, $CO_2$** emissions, opportunities and risks, etc.
- Preparation of the **energy and greenhouse gas accounting** to show where the portfolio and/or building stands
- Mapping the portfolio and/or building on the **decarbonization path to** find out **"stranding risk"**

## TOP BENEFITS

- ✓ Transparency about status quo of decarbonization
- ✓ Detection of the "worst performing assets" (if desired)

## Example: Decarbonization Path Positioning Tool of Apleona

– Tool shows how much $CO_2$ individual buildings generate and how large their budget is to meet the Paris climate targets
– The defined paths and targets help investors and owners to detect at what point a particular building is at risk of "stranding" and thus of losing value

**CRREM - Asset Overview**

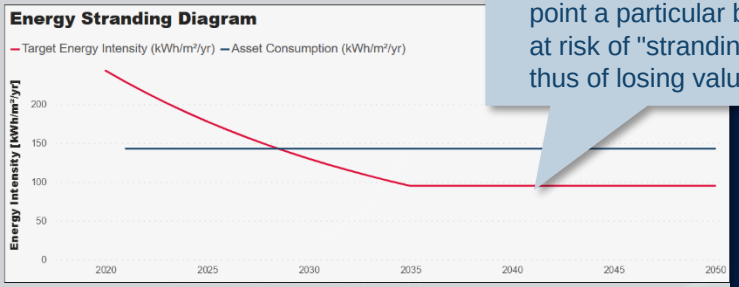
**Filter**

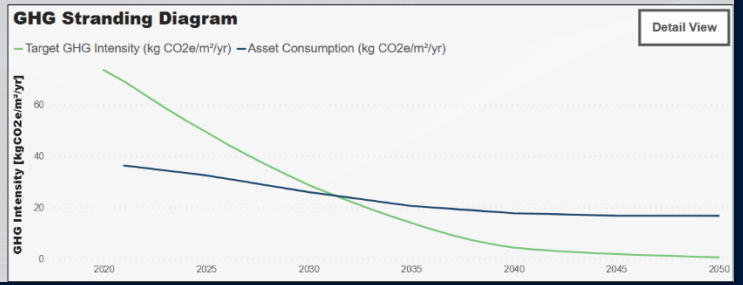
Location: Steinbach Tower

| | |
|---|---|
| Reporting year | 2021 |
| Floor area m² | 28.000 |
| Property type | Retail, Shopping Center |
| Country | Germany |

| Electricity: | Energy | | Greenhouse gas (GHG) | |
|---|---|---|---|---|
| Consumption | 2.000.000 | kWh/a | 650,5 | t CO²e/a |
| Intensity | 71,4 | kWh/m²/a | 23,2 | kg CO2e/m²/a |
| **Heat:** | | | | |
| Consumption | 2.000.000 | kWh/a | 366,3 | t CO2e/a |
| Intensity | 71,4 | kWh/m²/a | 13,1 | kg CO2e/m²/a |
| **Fugitive emissions:** | | | | |
| Consumption | | | 0,0 | t CO2e/a |
| Intensity | | | 0,0 | kg CO2e/m²/a |

| Total: | Energy | | Greenhouse gas (GHG) | |
|---|---|---|---|---|
| Consumption | 4.000.000 | kWh/a | 1.016,8 | t CO2e/a |
| Intensity | 142,9 | kWh/m²/a | 36,3 | kg CO2e/m²/a |
| Intensity target | 228,5 | kWh/m²/a | 69,1 | kg CO2e/m²/a |




**Stranded assets** are at risk of premature economic obsolescence because they do not meet sustainability and climate risk requirements.

# DECARBONIZATION ROADMAP (INCL. CRREM DECARBONIZATION PATHWAYS)

## IMPACT

## KEY FACTS

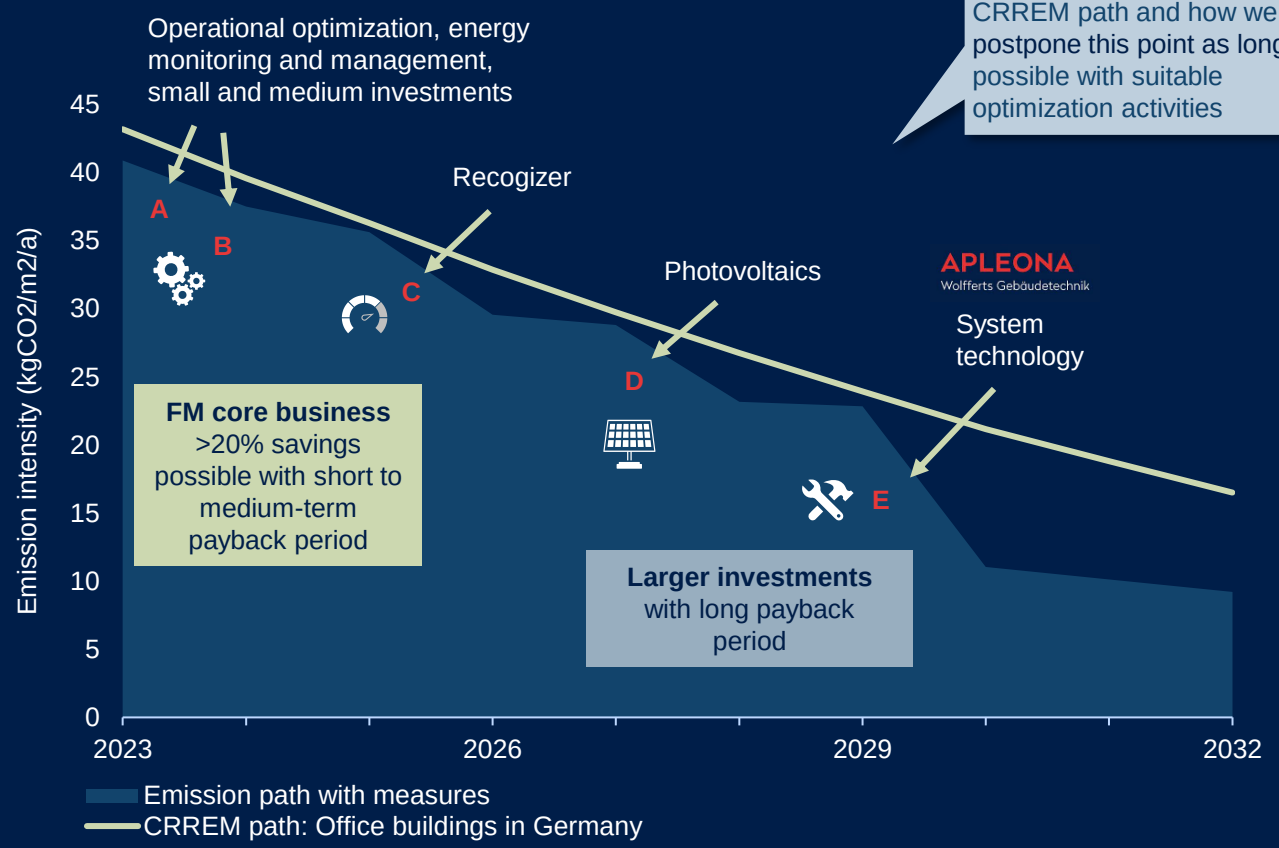
Based on the representation of the portfolio and/or building on the decarb. pathway:

- Analysis of **stranding points**
- **Simulation of the effect of different scenarios**/measures to determine appropriate decarbonization pathways
- Development of **zero carbon strategies** for different building types and derivation of an implementation and action roadmap
- High-level business cases (incl. CapEx)

## TOP BENEFITS

- ✓ Identification of **assets with poor performance**
- ✓ **Avoidance of stranding** of portfolios or buildings

## Exemplary office building with sequence of measures



# DECARBONIZATION PROGRAM MANAGEMENT

## IMPACT

## KEY FACTS

- Development of a **detailed action plan** for the customer's building portfolio based on the outcome of the decarbonization roadmap to reduce stranding risk of buildings
- Ensuring successful implementation of the measures via a **program/project management** structure and through a systematic review/monitoring of the goals
- Optional: Examination of **financing models** for the planned investments

## TOP BENEFITS

- ✓ Long-term and systematic implementation of measures
- ✓ Ensuring constant compliance with the decarbonization plan

### Action plan for Building Portfolio

Define criteria to cluster building portfolio: buildings that need little or no immediate action, buildings that require action and buildings where stranding risk cannot be avoided

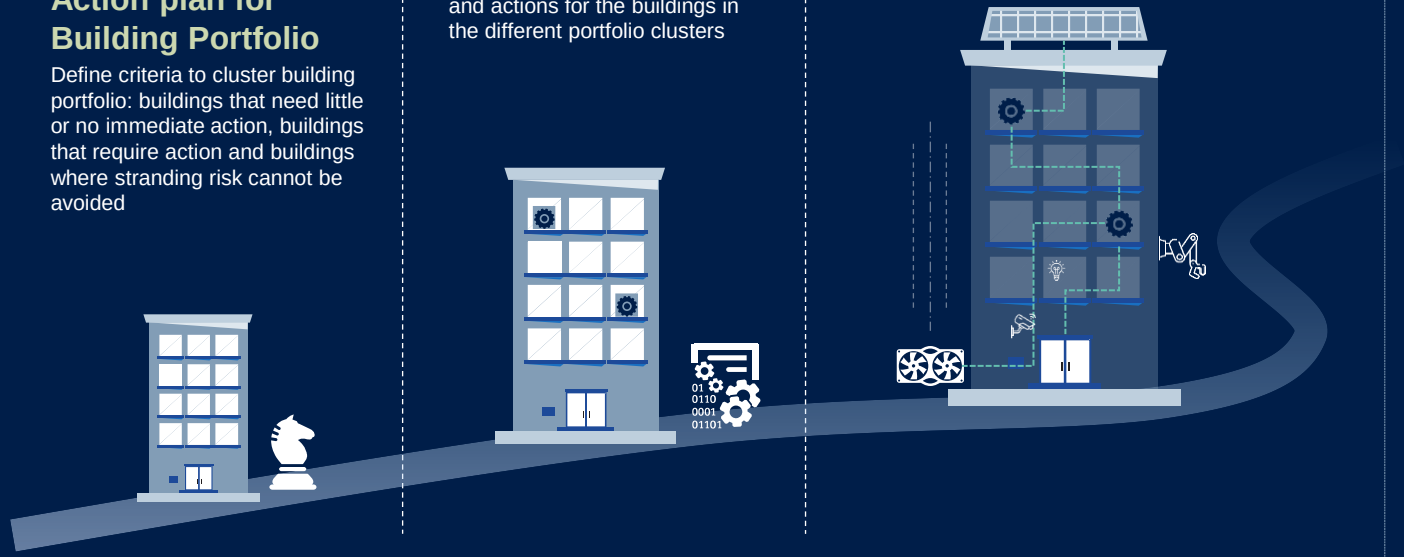
Including detailed business cases and CapEx planning

### Program Management Structure Setup

to execute the defined strategy and actions for the buildings in the different portfolio clusters

### Progress Monitoring & Reporting

including regular emissions tracking, identifying any issues that arise, and making adjustments to the strategy or action as needed



# THE APLEONA GREEN REAL ESTATE OFFERING | PRODUCTS

**Green Real Estate Value Chain**

**Energy Transparency & Assessments** → **Long-term Decarbonization Plan** → **Development of Energy Optimi-sation Measures** → **Implementation of Energy Optimi-sation Measures**

**All Customer: Corporate Real Estate and Investors**

- (Smart) Metering & Monitoring
- Energy Assessments & Audits
- ESG / Sustainability Certificates & Reporting
- Energy Management
  - Apleona Energy Management Program
  - ISO 500001 Implementation

- Sustainability Strategy & Decarbonization Roadmap

- Energy-Efficient Operation
  - Energy-Efficient FM Operation as part of FM Contracts
  - Active User Training & Awareness Program for Sustainability and Energy-Efficient Operations
- Energy Efficiency Solutions
  - Lighting / LED
  - Heating Ventilation Air Conditioning (HVAC)
  - Automated & Predictive HVAC Optimization through Recogizer
  - Intelligent Heating System Optimization
  - Energy-efficient Refurbishment of the Building Envelope
  - On-site Energy Generation (e.g., PV)
- Energy Cost Management
  - Subsidy Consulting
- E-Mobility & Electric Charging Infrastructure

Impact Assessment & Control

**Investors**

- Carbon Due Diligence (as part of Technical Due Diligence)

# ENERGY-EFFICIENT OPERATION

CHALLENGE

- Facility management generally with **little focus** on energy efficient operation on a day-to-day basis
- **Sustainable user behaviour** as a central variable in achieving the customer's sustainability efforts

GOAL

- ✓ Ensuring **sustainable operation** as part of the FM contract
- ✓ Implementation of **“low-hanging fruits"** of asset optimization
- ✓ **Raise awareness of** sustainability activities among customer’s staff

SOLUTIONS

**Energy-Efficient FM Operation as part of FM Contracts**

**Active User Training & Awareness Program for Sustainability and Energy-Efficient Operations**

- Implementation of energy-efficient FM operation: Thanks to measures ranging from **simple checklists** through to **automated analyses** and **intelligent optimization**, the on-site technicians generate significant added value for the customer with their knowledge of the property
- **Training program** tailored to the customer's requirements creates **awareness** about sustainability and gives practical **advice on energy savings** in user behaviour and operation – leading to noticeable savings

# ENERGY-EFFICIENT FM OPERATIONS AS PART OF FM CONTRACTS

## IMPACT

## KEY FACTS

- Implementation of a compliant FM system including advanced energy, water and waste management
- Continuous year-over-year improvements
- Placement of **a site-specific sustainability manager** (as part of the FM team) responsible for setting up and maintaining the management system
- Development of standards and methods for start-up, sustainable operations, and optimization of building technology as well as the transfer to the energy-efficient regular operation

## TOP BENEFITS

- ✓ Improvement of **asset availability** and energy efficiency
- ✓ Lower operating and maintenance costs

# ACTIVE USER TRAINING & AWARENESS PROGRAM FOR SUSTAINABILITY AND ENERGY-EFFICIENT OPERATIONS

## IMPACT

## KEY FACTS

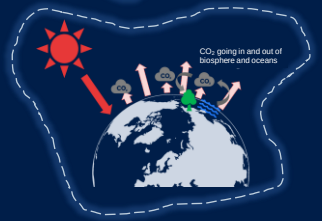
- **Training and awareness program** tailored to specific needs of users and target groups
- From basics on ESG and sustainability to on-site training on energy efficiency in buildings and operations, the whole spectrum can be offered
- **Practical checklists, step-by-step guidance** on energy savings, and **best practices** for building use

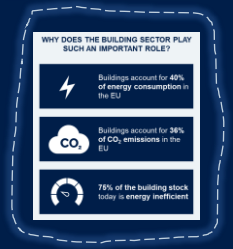
## TOP BENEFITS

- ✓ **Raising** user **awareness of** sustainability activities
- ✓ Generation of **measurable savings on** site

### Basic training

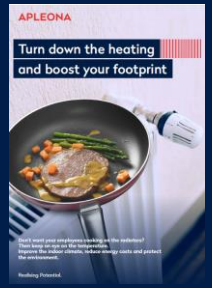
*on ESG and sustainability as well as energy efficiency and regulatory requirements*


### Awareness Programs

*through e.g., flyers, brochures, manuals (can be created by Apleona internal agency)*







### Training on site

*on energy efficiency in buildings and in operation*

| | |
|---|---|
| Energy and buildings | General information about energy and buildings<br>Energy efficiency<br>Assessment of status quo<br>... |
| Energy & heat generation | Type of power generation<br>Type of asset technology<br>Night setback<br>System temperature<br>Energy source<br>... |
| Heat distribution | Type of heat distributors<br>Heat generation control<br>Heat distributor operation<br>Control of heat output<br>Hydraulic balancing<br>... |
| ... | |

# ENERGY EFFICIENCY SOLUTIONS

CHALLENGE → GOAL

SOLUTIONS

| Lighting / LED | Heating Ventilation Air Conditioning (HVAC) | Auto-mated & Predictive HVAC Optimi-sation | Intelligent Heating System Optimi-sation | Building Envelope | On-Site Energy Generation |
|---|---|---|---|---|---|

- **Existing plants run intransparently**
- **Existing hardware** no longer up to date
- Control functionalities no longer in line with demand
- **Interaction** of the **aggregates** unclear
- Oversized systems
- **Manual** identification of errors and settings very time-consuming

- ✓ Optimization of **plant functionalities**
- ✓ Significant improvement in **plant availability** and energy efficiency
- ✓ Automatic identification of inefficient building operation through the support of software
- ✓ Improved certification of buildings, e.g., GRESB and DGNB

- Implementation of **engineering solutions** – from conversion to LED, to optimization of heating, ventilation and air conditioning, to the building envelope and on-site power generation
- Reduction of energy consumption even without the need for structural and cost-intensive measures
- If possible, **automated analyses** and use of **intelligent** and **demand-oriented optimizations of** HVAC systems through predictive solutions (e.g., through Recogizer)

# LIGHTING / LED

## IMPACT

**Energy savings up to 70%**

## KEY FACTS

- Focus on **complete lighting overhauls** towards LED, optionally including control systems
- Creation of a **lighting upgrade concept**, involving customer preferences and feedback as well as status quo analysis
- **Selection of suppliers and products**
- Support in receiving government incentives

## TOP BENEFITS

- ✓ Reduced energy and maintenance costs
- ✓ **Enhanced lighting quality** and work safety


Lighting change can be completed at client site during ongoing operations and often comes at an ROI below 3 years

# HEATING VENTILATION AIR CONDITIONING (HVAC)

## IMPACT

## KEY FACTS

- Conceptual design, planning, replacement and upgrading of heating systems, ventilation systems and chillers
- Analysis of baseline and verification of amended parameters, e.g.:
  - HVAC volumetric flow
  - HVAC differential pressure
  - Air changes per hour (ACPH) rates
  - Electrical motive power
  - Heating power

## TOP BENEFITS

- ✓ Reduction of energy consumption through the use of the most efficient technology as well as **updating to the latest state of the art in** the field of technical building equipment


Only optimally operating components and systems meet **efficiency**, **security of supply**, **comfort** and **production requirements**, as well as legal requirements

### Heating systems

- Complete exchange
- Heating analysis
- Pumps
- Combined heat and power
- MSR optimization

### Ventilation systems

- Complete exchange
- Fans
- Drive technology
- Filter
- MSR optimization

### Chillers

- Complete exchange
- Pumps
- Cooling demand analysis
- MSR optimization

# AUTOMATED & PREDICTIVE HVAC OPTIMIZATION THROUGH RECOGIZER

## IMPACT

**Ø 28 percent energy savings in the HVAC sector**

## KEY FACTS

- AI-supported cloud solution for reducing the energy consumption of HVAC systems
- Service includes:
  - **Predictive control** for heating, ventilation and air conditioning
  - **Customer portal** (savings, consumption & operating data)
  - Expert engineering support
- Achieving DGNB Silver (existing buildings)

## TOP BENEFITS

- ✓ Reduced $CO_2$ footprint
- ✓ Improved **indoor climate**
- ✓ Amortization in < 2 years

## Input data:

- **Weather & calendar data** *(e.g., outdoor temperature)*
- **Usage data** *(e.g., occupancy, room temperature)*
- **Operating data** *(e.g., ventilation, heating)*

RECOGIZER
Apleona is a shareholder



Self-learning & fully automated solution

# INTELLIGENT HEATING SYSTEM OPTIMIZATION

## IMPACT

## KEY FACTS

**Monitoring and optimizing various components of heating systems:**

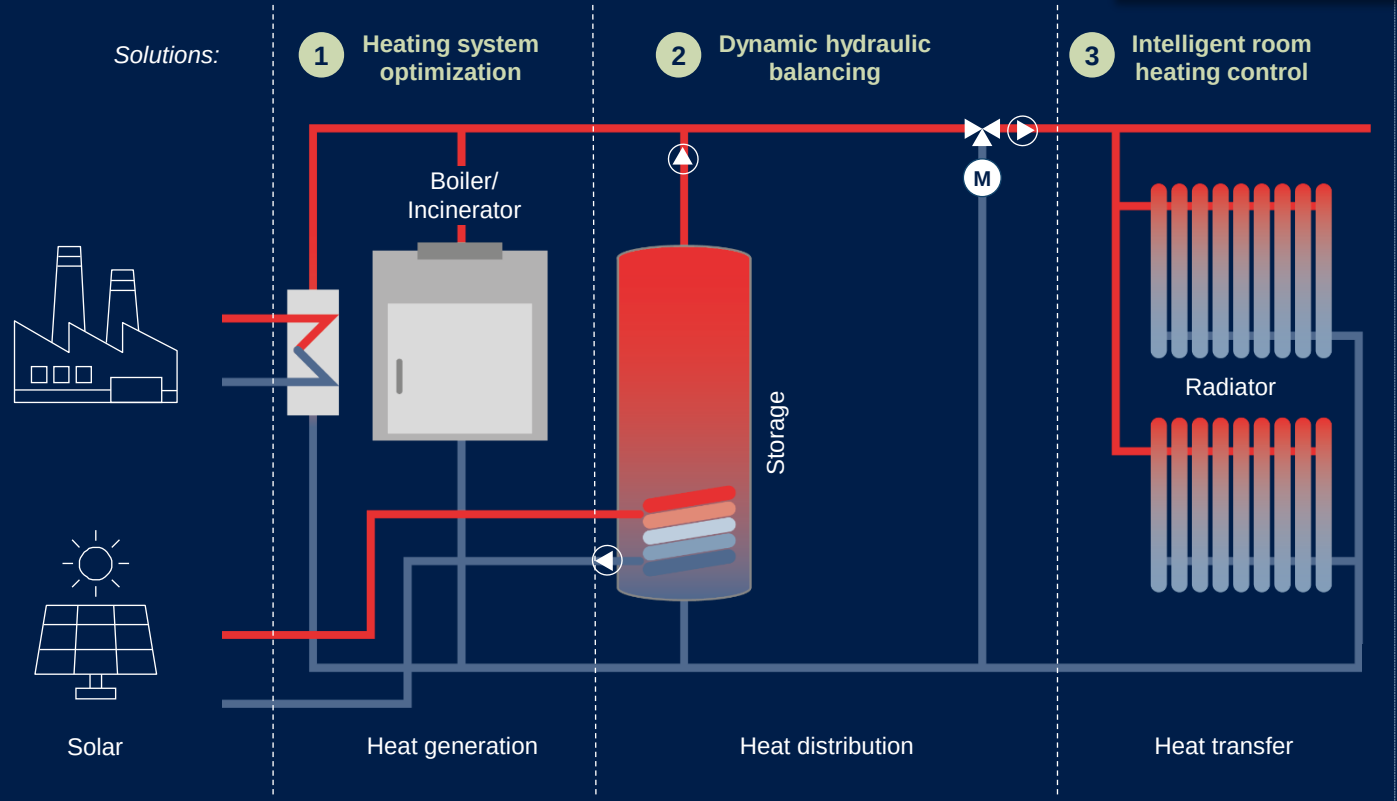
1. Continuous optimization of heating plants in buildings, energy centres and heating networks via operations data monitoring and remote control functionality
2. Continuous monitoring and adjustments of the water-carrying systems through dynamic hydraulic balancing
3. Automatic adjustment of room temperatures based on end user presence and heat demand through intelligent thermostats

## TOP BENEFITS

- ✓ Increased **equipment lifetime**
- ✓ **Reduced service & maintenance costs**

## Interaction of the various heating optimization solutions

The solutions each read data from the different heating system components for visualization, analysis and optimization



# E-MOBILITY & ELECTRIC CHARGING INFRASTRUCTURE

CHALLENGE

- **Ban on new car registrations** for combustion engines in the EU by 2035
- Currently **few buildings with charging possibilities**
- Employees and customers increasingly **expect charging options** at workplaces

GOAL

- ✓ **Modernize vehicle fleet sustainably**
- ✓ Positive contribution to external/internal **image**
- ✓ Increasing the **attractiveness of real estate**
- ✓ Compliance with regulatory requirements
- ✓ **Full-service offer of the FM service provider**

SOLUTIONS

**E-MOBILITY &**
**ELECTRIC CHARGING INFRASTRUCTURE**

- Offer **turnkey solutions** for the realization of charging infrastructure projects – everything from a single source
- Organization of the complete service from **initial analysis and consulting to acceptance and operation** or, alternatively, takeover of operation of charging stations that have already been installed
- **Manufacturer-independent** and **tailored to individual requirements** and demands

# E-MOBILITY & ELECTRIC CHARGING INFRASTRUCTURE

## IMPACT

## KEY FACTS

- Holistic charging infrastructure solution, including **consulting** and **planning** of individual charging infrastructure concepts**, implementation** of the concept**, operation and maintenance** of customer-owned charging infrastructure
- **Implementation by a single provider:** Hardware & software installation, administration, operational management and 24/7 support
- **Transparent reporting and accounting**

## TOP BENEFITS

- ✓ **Full-service offering,** so that client can focus on core business
- ✓ Manufacturer-independent operation

## Consulting

All processes and the technical infrastructure are evaluated in advance regarding the company's internal and building-specific requirements:

- ✓ Consulting and identification of requirements
- ✓ Site-specific feasibility check
- ✓ Infrastructure concept design & review
- ✓ Review of available subsidies
- ✓ Implementation planning

## Installation

Provision of standardized hardware solution that can be installed efficiently and quickly.

- ✓ Project management
- ✓ Sales of hardware
- ✓ Installation of chargers and accompanying infrastructure
- ✓ Set-up of related processes, e.g., billing, load and charge management

## Operation & Maintenance

Backend solution covers the operation of charging stations, the billing of charging processes and general reporting. The software is manufacturer-neutral:

- ✓ Load and charge management
- ✓ Cost administration and billing
- ✓ Ad-hoc service support
- ✓ Regular maintenance and monitoring