

Going sustainable in buildings

TOOL 04

Operation and Use

Introduction

This guidance tool supports users from different backgrounds in exploring how sustainability can be integrated into the the operation and use stage of buildings. It is intended for both practical implementation and education and learning, making it suitable for use in real projects, training activities and learning environments. It helps users define the project context, identify sustainability priorities, explore design options, consider relevant data and tools, and select practical actions to improve early-stage decision-making.

There are no right or wrong answers. Use the questions to reflect on your current situation and identify possible next steps.

User Journey

- 1 Identify user
- 2 Assess knowledge
- 3 Check habits
- 4 Improve energy
- 5 Monitor performance
- 6 Plan maintenance
- 7 Assess carbon
- 8 Tools suggestions

WHO AM I?

User profile

Define yourself or your team

Reflect and define your role – Defining a simple user profile in the initial phase is an important step in driving meaningful self-reflection. Encouraging users to reflect on who they are and assess their current situation, helps to gain a clear understanding of users background, needs and context.

This self-awareness lays a foundation for the entire guidance journey. Understanding the current baseline makes it significantly easier to identify specific training needs and select the most relevant tools.

Note: This initial step aims to establish contact between the user and the guidance tool. Although it does not directly influence the selection of tools presented to the user, it prompts them to reflect on their purpose and goals. Defining a profile statement serves to characterize their profile and objectives, guiding their overall action

Select your profile

- ☐ Municipality / public authority
- ☐ Housing provider / developer
- ☐ Architect / designer / engineer
- ☐ Construction company
- ☐ Manufacturer / supplier
- ☐ Construction waste manager
- ☐ Facility or property manager
- ☐ Educator / trainer
- ☐ Student
- ☐ Researcher
- ☐ Other:

Main sustainability
needs

Profile statement

I am _____ working on _____ and
need guidance to _____ .

Operation and Use Knowledge Level

Define your level

Assess your current knowledge of sustainable building operation and use. This step helps users understand how well they manage daily energy use, occupant habits, maintenance, monitoring and operational carbon, and what support is needed to improve building performance.

Level	Maturity stage	Description
Level 1	Limited	Little knowledge of sustainable building operation and daily energy use.
Level 2	Basic	Understands key concepts, but actions are not regularly applied.
Level 3	Developing	Understands key operation and use topics and tests some monitoring, maintenance or user-related actions.
Level 4	Applied	Strong knowledge of sustainable building operation and regularly applies and checks relevant practices.
Level 5	Advanced	Advanced knowledge of sustainable operation and integrates monitoring, maintenance and carbon data to evaluate and continuously improve performance.

What support is needed to move one level forward?

☐	Training	☐	Better energy data	☐	Monitoring tools
☐	Maintenance plan	☐	User guidance	☐	Clear KPIs
☐	Management support	☐	Digital documentation	☐	Other

Select your level

Level 1 Limited	Level 2 Basic	Level 3 Developing	Level 4 Applied	Level 5 Advanced
☐	☐	☐	☐	☐

Justify your selection

Support needed

Building Use and Occupant Habits

Daily behaviour and building use affect energy consumption, comfort and performance. Improving heating, cooling, ventilation, lighting, appliances, water and user habits can support more sustainable operation.

Occupant habits to check

The habits below are examples; other relevant behaviours may also be considered.

Areas	Habits
Heating and cooling use	How users set thermostats, use heating/cooling schedules, and adjust systems during the day
Ventilation habits	How users open windows, ventilate spaces, and manage indoor air quality.
Lighting use	How users use artificial lighting, daylight, and lighting controls
Appliance and plug loads	How users operate appliances, office equipment, chargers and standby devices
Water use	How users consume hot/cold water and report leaks or system problems.
Space use	How spaces are occupied, shared, scheduled and used during the day.

Habit improvement pathway

Use this pathway to think about the selected habit before completing the exercise

01	Observe	What behaviour or habit affects energy, comfort or resource use?
02	Understand	Why does this habit happen? Is it linked to comfort, routine, information or system problems?
03	Improve	What action can improve the habit?
04	Communicate	What guidance or reminder is needed for users?
05	Monitor	How can the improvement be checked?

Practical exercise: Improve one occupant habit

All the habits indicated can affect building performance. In this exercise, select one habit as an example and reflect on its cause, an improvement action, the guidance needed, and how the change can be monitored.

Pathway step	Answer item	User answer
Observe	Main habit selected	
Understand	Reason / cause	
Improve	Improvement action	
Communicate	User guidance needed	
Monitor	How to monitor change	

Energy Efficiency in Daily Operation

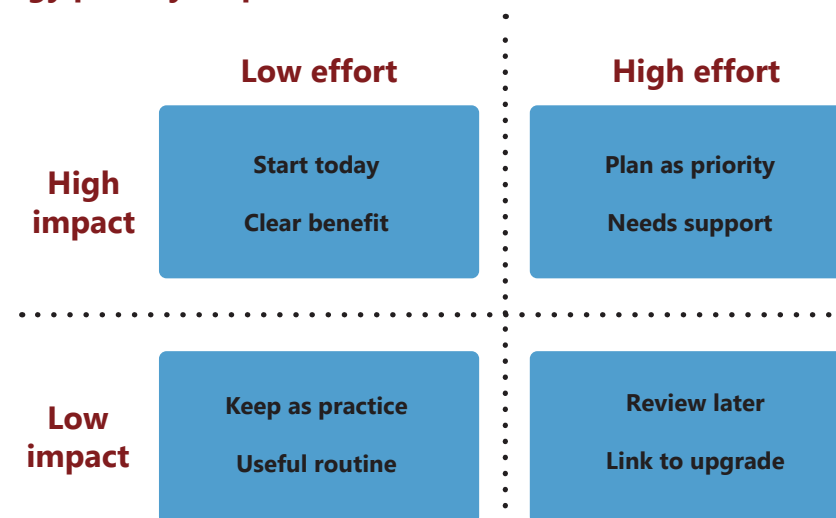
This topic helps users identify simple daily operation actions that can reduce energy use while maintaining comfort and good building performance. It focuses on heating, cooling, ventilation, lighting, appliances, hot water and system schedules.

Daily energy operation dashboard

The energy-use areas below are examples; other relevant areas may also be considered.

Energy-use area	Description
Heating / cooling	Check setpoints, schedules and unused spaces.
Lighting / Controls	Check daylight use, sensors and switching patterns
Ventilation	Check settings, window opening and indoor air quality.
Appliance and plug loads	Check standby devices, equipment and chargers.
Hot water	Check daily demand, leaks and system settings.
Meters / energy data	Check bills, meters, alerts and unusual peaks.

Energy priority map



Practical exercise: Plan one daily energy operation action.

Select one energy-use area, explore it in the priority map, and define one practical daily operation action.

Selected energy area

wewew

Current energy issue

Priority area

Daily operation action

Responsible person / team

Evidence or data to check

Expected energy benefits

Building Performance Monitoring

This topic helps users check whether the building is performing as expected during operation. It focuses on collecting simple evidence from meters, systems, comfort feedback and maintenance records to identify problems early and support continuous improvement.

Performance monitoring checklist

The indicators below are examples; other relevant building-performance indicators may also be considered.

Indicator	What to monitor	Data Source	Warning Sign
Energy use	Monthly or daily consumption	Bills, meters, sub-meters	Unexpected peak or increase
Indoor Comfort	Temperature, humidity, complaints	Sensors, surveys, feedback	Too hot, too cold or discomfort
Ventilation	Fresh air, CO2, window use	Sensors, user reports	Poor air quality or stuffiness
System operation	Heating, cooling, lighting controls	Schedules, inspections	Systems running at wrong times
Maintenance issues	Faults, leaks, filters, equipment	Maintenance log, inspections	Repeated faults or delays
User feedback	Comfort, usability, problems	Questionnaire, helpdesk, meetings	Frequent complaints or confusion

Monitoring status review

Use the scale to decide what the monitoring result means.

OK	Performance is acceptable. Continue monitoring.
Watch	Small change or uncertainty. Check again soon
Action	Problem detected. Assign a follow-up action

Practical exercise

Select one performance indicator, identify the data source and frequency, then decide the status and follow-up action.

Selected indicator

Data source

Monitoring frequency

Current status

Issue detected

Follow-up action

Evidence to record

Maintenance and Performance Improvement

This topic helps users identify maintenance issues affecting performance, energy use or comfort, and define one improvement action

Choose one maintenance focus

The maintenance focuses below are examples; other relevant maintenance areas may also be considered.

Focus		Possible action
Heating / cooling	System setting or schedule	Adjust schedule or check system setting.
Ventilation	Airflow, filters or indoor air	Clean/replace filters or check airflow.
Lighting / controls	Sensors, timers or daily use.	Adjust sensors, timers or lighting schedules.
Water / Hot water	Leaks, hot-water use or system issue	Repair leaks or check hot-water settings.
Meters / Sensors	Energy data, alerts or readings	Check readings, alerts or meter accuracy.
Envelope Elements	Windows, doors, seals or shading	Check and repair gaps around windows and doors.

Maintenance action route

01 Check	What is the issue?
02 Act	What action is needed?
03 Record	What evidence is needed?

Practical exercise: Improve one maintenance area

All the areas are important. Select one as an example and reflect on the issue, improvement action, responsibility, evidence and expected performance benefit.

Maintenance focus selected

Current issue or risk

Maintenance / improvement action

Responsible person / team

Evidence to record

Expected performance benefit

Operational Carbon Footprint

This topic helps users identify operational carbon sources, the data needed to assess them, and practical actions to reduce emissions.

Operational carbon sources to check

The sources below are examples; other relevant sources may also be considered.

Energy consumption	Source
Electricity use	Lighting, appliances, pumps, lifts, common areas
Heating energy	Gas, district heating or electric heating use
Cooling energy	Cooling demand, setpoints and operating hours
Hot water use	DHW demand, schedules and energy source
Energy data/Evidence	Monthly kWh, fuel use and energy invoices
User/operation data	Occupancy, schedules and unusual consumption

Carbon check route

01 Select source	What creates emissions?
02 Collect data	What evidence is available?
03 Reduce impact	What action can reduce it?

Practical exercise: Assess one operational carbon source

This exercise uses one selected source as an example to record its data, main issue, reduction action, responsible person and expected carbon benefit.

Selected carbon source

Current data or evidence

Energy source of emission

Main issue

Reduction action

Responsible person / team

Expected carbon benefit

Recommended tools

Excel4housing toolbox

Review your answers from the previous pages and identify your main planning and design needs. Then use the tables below to find the tools that best match those needs.

If the user needs...	Recommended tools	Why it fits
To monitor building performance over time To track energy consumption and other operational data, identify unusual performance or inefficiencies, and understand how the building performs during use.	Deepki	Monitors building energy performance by connecting meters, sensors and existing data sources, supporting continuous and comparable performance tracking over time
To assess the operational carbon footprint of a building To calculate and track carbon emissions associated with building energy use and compare performance against decarbonisation targets or pathways.	CRREM – Carbon Risk Real Estate Monitor	Helps assess operational carbon emissions and understand carbon-risk pathways for real estate
	DGNB Toolbox "Carbon neutral building"	Provides guidance and practical instruments for CO ₂ accounting, operational emissions and climate-oriented building management, supporting strategies for moving buildings towards carbon-neutral operation.
To evaluate the impact of energy-efficiency measures To understand how operational actions, system adjustments or efficiency measures influence building energy use and overall performance.	Tool to be defined	Helps understand how daily operation actions can reduce energy use, improve comfort and support more efficient building performance.
To improve building performance through maintenance and operational actions To identify maintenance or operational measures that can improve energy performance, system efficiency, com	Tool to be defined	Helps connect maintenance actions with better energy performance, system efficiency, comfort and evidence-based operation

Recommended tools

Excel4housing toolbox

If the user needs...	Recommended tools	Why it fits
To identify suitable Operation & Use tools for your next steps	EXCEL4Housing 4.0 toolbox filter	Allows users to select tools by phase, need, difficulty, data requirement and sustainability goal