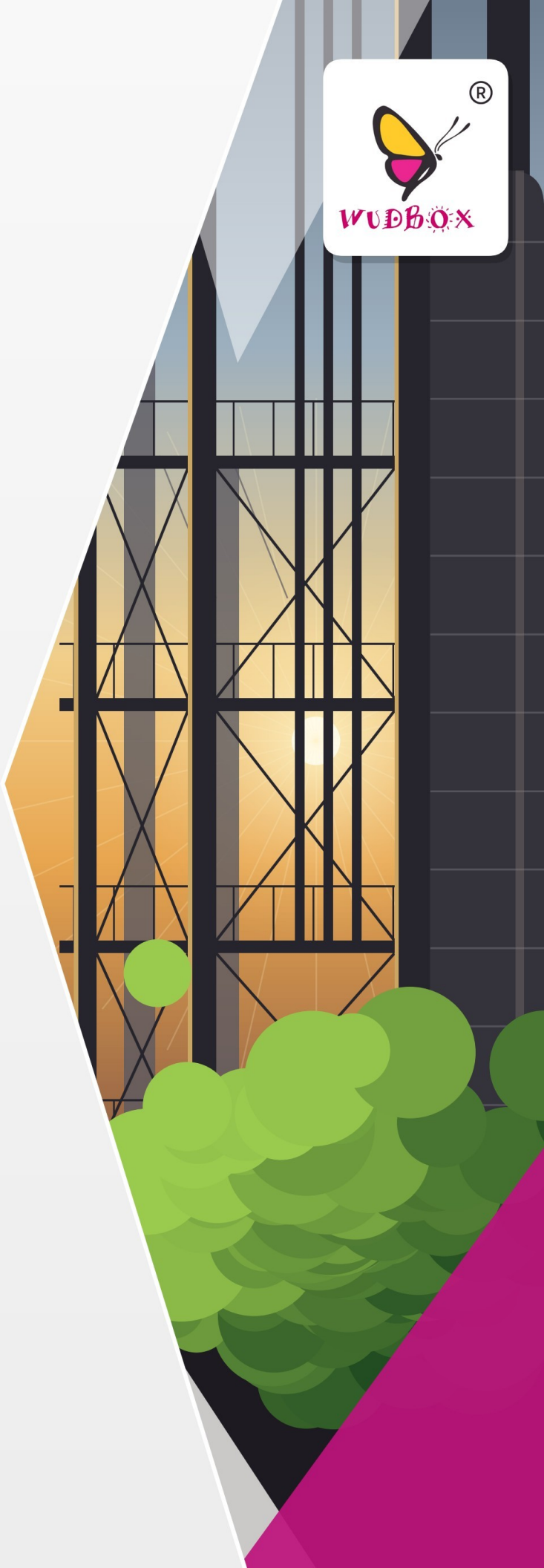
WUDBOX SUSTAINABILITY SERVICES

The Manufacturing Decarbonisation Opportunity Checklist

12 areas to assess before investing

Practical guide | October 2026

A practical screening framework for identifying credible emission-reduction opportunities before committing to investment.



12 AREAS · 4 THEMES · 1 SCREENING FRAMEWORK

For manufacturing leaders and plant teams

Purpose and scope

A practical screening framework for identifying credible emission-reduction opportunities before committing to investment.

Manufacturers need to reduce greenhouse gas emissions while maintaining product quality, production reliability, safety and commercial performance. Opportunities may involve capital projects, but they can also begin with better operating data, maintenance, process control, material efficiency and purchasing decisions.

12	4	3–5	90
areas to assess	criteria scored 1–5	opportunities shortlisted	day action plan

This checklist is designed for manufacturing leaders, plant heads, operations, maintenance, procurement and sustainability teams. It is an initial screening tool, not a technical audit or investment approval.

DESIGNED FOR

Manufacturing leaders | Plant heads | Operations | Maintenance | Procurement | Sustainability teams

✓ This checklist is

- An initial screening tool
- A way to find credible, measurable opportunities
- A consistent basis to compare options

✗ This checklist is not

- A technical audit
- An investment approval
- A promise of a particular reduction

Start with credible, measurable opportunities.

How to use the checklist

Work through the twelve areas below, then use the screening steps at the end of this guide to turn what you find into a prioritised shortlist and a 90-day plan.

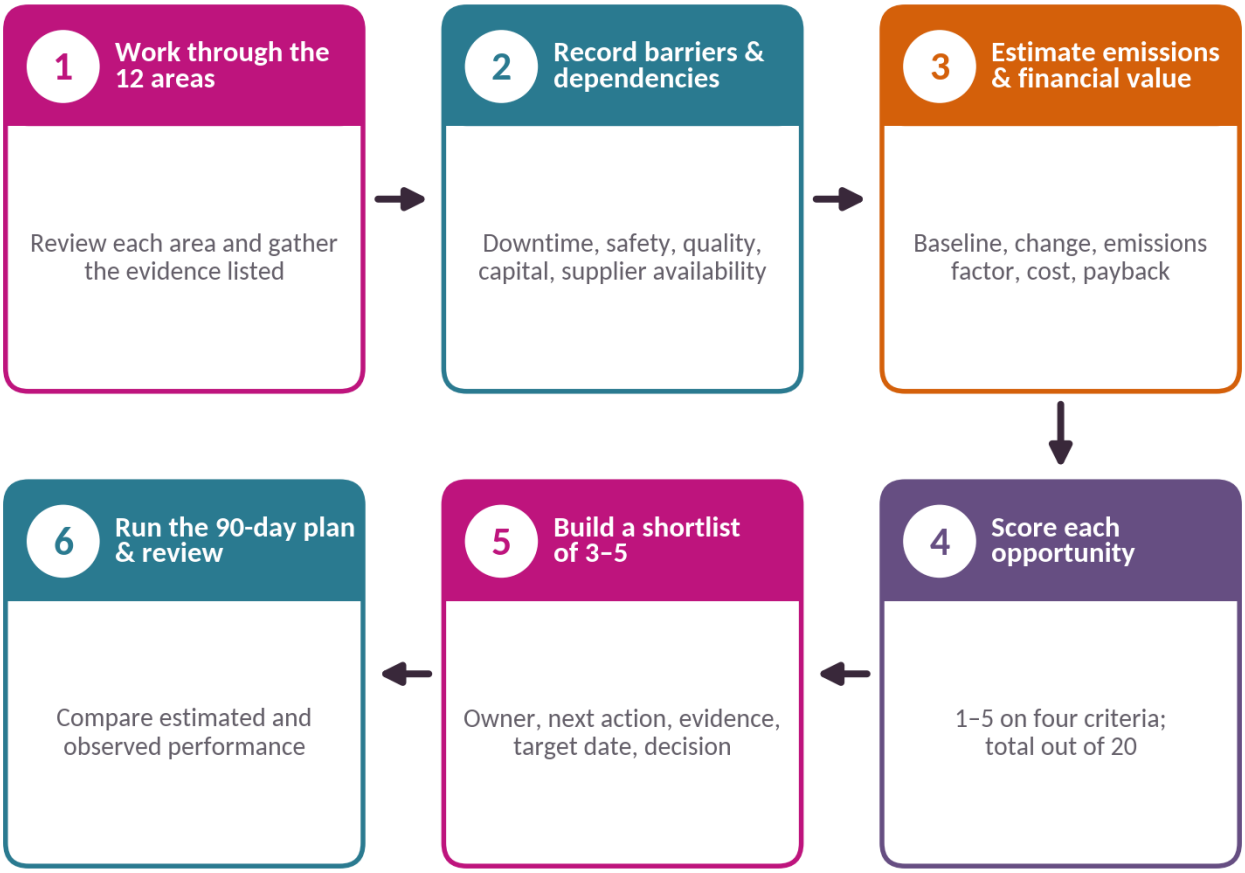


Figure 1 · From assessment to action: the six-step screening process

HOW TO READ EACH AREA

☐ **LOOK FOR**
Quick prompts to tick off during a site walk or data review.

● **START WITH THIS EVIDENCE**
The records and measurements that make findings defensible.

ACTION NOTE
What to weigh before turning a finding into a project.

WORKING PRINCIPLES

Mark unknowns

If a value is unavailable, mark it as unknown and record how it will be obtained.

Keep scores visible

Keep individual scores visible and record the reasoning, especially where evidence is limited.

ENERGY & UTILITIES

01 Electricity use

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Peak demand and power-factor issues ☐ Avoidable idle loads ☐ Equipment energised with no productive output ☐ Gaps that need sub-metering or monitoring	• Utility bills and meter data • kWh per tonne, batch, component or unit • Trends over time, not a single month

Review electricity consumption by plant, production line, shift and major equipment load. Begin with utility bills and available meter data, then identify where additional sub-metering or monitoring would help explain consumption. Examine peak demand, power factor, avoidable idle loads and periods when equipment remains energised without productive output.

Compare electricity use with a relevant production measure, such as kilowatt-hours per tonne, batch, component or saleable unit. Choose a denominator that reflects the process and use it consistently. Investigate changes over time rather than relying on a single month, because production volume, weather, maintenance shutdowns and product mix can affect results.

ACTION NOTE Potential actions include switching off avoidable loads, improving schedules and adding targeted monitoring, while preserving process stability.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

ENERGY & UTILITIES

02 Compressed air

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Leaks in lines, fittings, hoses and connections ☐ Pressure settings higher than equipment needs ☐ Compressors running unloaded ☐ Air used where a safer, more efficient option exists	• System pressure readings • Compressor electricity use and operating hours • Leak survey and maintenance records

Compressed air is convenient but can be costly when systems are poorly controlled or used for tasks that do not require it. Check for leaks in distribution lines, fittings, hoses and connections. Review compressor pressure settings, operating hours, sequencing, maintenance and the amount of time compressors run unloaded. Look for inappropriate uses, such as using compressed air where a safer and more efficient alternative may be suitable.

Record system pressure, compressor electricity consumption and operating patterns where data are available. A leak survey can help locate losses, while maintenance records may reveal recurring faults. Estimate the cost of losses using measured or defensible engineering estimates rather than assuming that every leak has the same impact.

ACTION NOTE Leak repair, pressure optimisation and better compressor controls may help, but changes must maintain the pressure required by connected equipment.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

ENERGY & UTILITIES

03 Motors, pumps and fans

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Oversized or inefficient motors, pumps and fans ☐ Throttling and unnecessary recirculation ☐ Blocked filters, worn parts, misalignment ☐ Variable loads without suitable controls	• Equipment inventory and nameplate data • Run hours and maintenance logs • Available power measurements

Identify motors, pumps and fans that are oversized, inefficient, poorly maintained or operated in ways that do not match actual demand. Check for throttling, unnecessary recirculation, blocked filters, worn components, misalignment and other conditions that increase energy use. Variable-load applications may warrant closer review of controls or correctly sized variable-speed drives.

Start with equipment inventories, nameplate information, run hours, maintenance logs and available power measurements. Prioritise large or continuously operated loads, but also consider equipment that operates inefficiently for long periods at partial load. Compare the expected operating profile with the equipment's intended duty.

ACTION NOTE Consider maintenance, control optimisation or correctly sized drives only after checking the actual load profile and whole-system requirements.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

ENERGY & UTILITIES

04 Heating and thermal systems

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Poor combustion efficiency ☐ Damaged insulation and heat loss ☐ Standby or idle running ☐ Heating and cooling at the same time ☐ Temperatures above specification	• Fuel and electricity records vs production • Combustion tests and flue-gas conditions • Temperature profiles

Boilers, furnaces, ovens, dryers and heat-treatment systems can be significant energy users. Review combustion efficiency, insulation condition, temperature settings, heat losses, operating schedules and the time equipment spends at standby or idle. Examine whether heating and cooling are occurring unnecessarily at the same time, and whether process temperatures are higher than product specifications require.

Use fuel and electricity records alongside production data to understand energy intensity. Where appropriate, review combustion tests, maintenance findings, flue-gas conditions and temperature profiles with qualified technical personnel. Check insulation around equipment, pipework, valves and other surfaces where heat loss may be occurring.

ACTION NOTE Insulation, control improvements, heat recovery or fuel switching require site-specific engineering, safety and cost assessment.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

PROCESS & MATERIALS

05 Process efficiency and cycle time

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Rework and waiting time ☐ Excessive changeovers ☐ Unstable operating conditions ☐ Equipment running during breaks or between batches	• Process map from input to finished product • Cycle time, downtime and energy by shift • Operator and maintenance knowledge

Decarbonisation opportunities may be hidden in the way production is scheduled and controlled. Look for rework, waiting time, excessive changeovers, unstable operating conditions, unnecessary heating or cooling, and process settings that increase energy per saleable unit. Investigate whether equipment runs during breaks, between batches or while waiting for upstream or downstream operations.

Map the process from input to finished product and compare cycle times, downtime and energy intensity across shifts or product types. Talk to operators and maintenance teams; they may know why a process repeatedly stops, overheats or requires extra processing. Validate these observations against production and energy records.

ACTION NOTE Measure improvements against output and quality indicators so faster production does not increase defects, wear or safety risks.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

PROCESS & MATERIALS

06 Material yield and input intensity

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Cutting and nesting losses	• Bills of material
☐ Over-processing and trimming	• Purchase records and production output
☐ Excess packaging	• Inventory movements
☐ Avoidable vs unavoidable process loss	

Material efficiency affects both the resources purchased and the emissions associated with extracting, processing and transporting them. Measure raw material consumed per saleable unit and examine where losses arise. Review cutting patterns, nesting, over-processing, trimming, excess packaging, specification choices and opportunities to reduce material intensity without weakening product performance.

Use bills of material, purchase records, production output and inventory movements to establish a consistent view of material input and saleable output. Distinguish unavoidable process loss from avoidable loss, and check whether figures include work in progress, stock changes or returned material. Compare products or lines only where the production context is sufficiently similar.

ACTION NOTE Review cutting plans, tolerances and specifications, assessing alternatives for performance, durability, compliance and total cost.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

PROCESS & MATERIALS

07 Scrap, rejects and rework

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Causes: material, machine, operator, process or handling ☐ Energy and material already invested in rejects ☐ Inconsistent definitions between teams ☐ The same loss counted twice	• Scrap and rework by product, line, shift and cause • Clearly defined, shared measures • Root-cause analysis

Track scrap, rejects and rework by product, production line, shift and cause. Overall scrap figures can indicate a problem, but detailed records help identify whether losses are linked to material quality, machine settings, operator practices, process variation or handling. Include the energy and material already invested in items that are later rejected or reworked.

Calculate defect and rework rates using clearly defined measures, and ensure that teams use the same definitions. Where possible, estimate the material value, processing time and utility consumption associated with non-conforming output. Avoid counting the same loss twice when material is reintroduced into the process or recorded in more than one system.

ACTION NOTE Use root-cause analysis and verify that corrective actions reduce total resource use rather than moving waste elsewhere.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

WATER & WASTE

08 Water use and treatment

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Leaks and unusually high consumption ☐ Large swings between shifts and runs ☐ Gaps in meter coverage ☐ Energy used for pumping, heating, cooling and treatment	• Meter readings and production data • Targeted measurement where metering is thin • Intake, reuse, wastewater and discharge kept distinct

Map major water uses across production, cooling, cleaning, boilers and other site activities. Review meter coverage, leaks, water quality requirements, discharge volumes and the energy used for pumping, heating, cooling and treatment. Identify processes with unusually high consumption or large variations between shifts and production runs.

Establish a water baseline using reliable meter readings and production data. Where a site lacks detailed metering, a targeted measurement exercise can help identify the largest uses before a broader monitoring programme is considered. Distinguish freshwater intake, reused water, wastewater generated and water discharged, because these measures describe different parts of the system.

ACTION NOTE Assess reuse and treatment changes against process quality, cooling, hygiene, discharge requirements and associated energy use.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

WATER & WASTE

09 Waste and by-products

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Incorrect segregation	• Weighbridge records and waste manifests
☐ Reusable by-products being discarded	• Contractor reports
☐ Waste from a preventable process step	• Internal collection data
☐ Recycling masking prevention at source	

Measure waste by type, source, quantity and destination. Review production residues, packaging, rejected materials, sludge and other waste streams relevant to the site. Check whether materials are segregated correctly, whether reusable by-products are being discarded and whether waste is generated by a preventable process step.

Use weighbridge records, waste manifests, contractor reports and internal collection data where available. Confirm that reported quantities and destinations are supported by documentation. Waste sent for recycling may have a different impact from waste sent for disposal, but recycling should not be used to obscure opportunities to prevent waste at source.

ACTION NOTE Check contamination, storage, transport, market demand and regulatory requirements before assuming a waste stream can be recovered.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

VALUE CHAIN

10 Inbound and outbound logistics

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Part-load movements ☐ Urgent shipments ☐ Bulky packaging ☐ Mode, route and frequency choices	• Shipment weights, distances and modes • Vehicle types and freight activity • Provider data, or a transparent estimate

Review the movement of raw materials, components, finished goods and packaging into and out of the facility. Examine transport modes, load utilisation, route planning, shipment frequency, packaging volume and supplier or customer proximity where these choices are within the organisation's influence. Part-load movements and urgent shipments may create avoidable transport activity.

Gather available data on shipment weights, distances, modes, vehicle types and freight activity. Work with logistics providers to understand what information they can supply and how consistently it is recorded. If detailed data are unavailable, begin with a transparent estimate and document the assumptions rather than presenting the result as precise.

ACTION NOTE Evaluate logistics changes against delivery commitments, product protection, resilience, cost and service quality.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

VALUE CHAIN

11 Procurement and materials

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ High-impact materials and consumables ☐ Specifications that could change ☐ Recycled content and lower-impact alternatives ☐ Emissions claims with unclear scope or method	• Categories material to the business • Supplier scope, boundary, method and date • Total cost over the product life

Purchased goods and materials can contribute substantially to a manufacturer's wider value-chain emissions. Identify high-impact materials and consumables, then review their specifications, durability, recycled content, production characteristics and available lower-impact alternatives. Begin with categories that are material to the business and for which meaningful supplier information or alternative options may be available.

Procurement decisions should consider product performance, safety, compliance, reliability of supply and total cost over the product life. A lower purchase price or an environmental claim does not necessarily indicate a better overall outcome. Ask suppliers for clear, comparable information and understand the scope, boundary, methodology and date of any emissions data provided.

ACTION NOTE Engineering, quality, procurement and sustainability teams should validate alternatives before changing material specifications.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

VALUE CHAIN

12 Supplier data and engagement

✓ LOOK FOR	START WITH THIS EVIDENCE
☐ Suppliers driving purchased-goods and transport emissions ☐ Who can supply activity or product-level data ☐ Data limitations not yet recorded ☐ No internal owner for follow-up	• A manageable group of priority suppliers • A clear request: products, quantities, period • Source, period, boundary and method on record

Map suppliers that may contribute most to purchased-goods and transport emissions. Review which suppliers can provide activity data, product-level information or other evidence that supports emissions estimates. Data quality may vary, so record the source, reporting period, boundary, method and any limitations associated with the information received.

Start with a manageable group of priority suppliers rather than requesting detailed data from every supplier at once. Explain why the information is needed, provide a clear format and specify the relevant products, quantities and reporting period. Where primary data are not available, document the estimation approach and confidence level instead of treating incomplete information as verified.

ACTION NOTE Start with priority suppliers, document data limitations and assign an internal owner for follow-up and review.

SITE ASSESSMENT · complete during review		
OWNER	DATA AVAILABLE? ☐ Yes ☐ Partly ☐ No	OPPORTUNITY ☐ High ☐ Med ☐ Low
NOTES, FINDINGS AND NEXT ACTION		

From checklist to prioritised action

Use the steps below to turn findings from the twelve areas into a short, owned and time-bound list of opportunities.

Implementation barriers and dependencies

Before assigning a final priority, record any barrier that could change feasibility or timing. Consider production downtime, worker and process safety, product quality, equipment compatibility, infrastructure readiness, technical expertise, supplier availability, capital constraints and dependencies on other projects. Note whether the proposal could shift emissions, costs or waste to another part of the system.

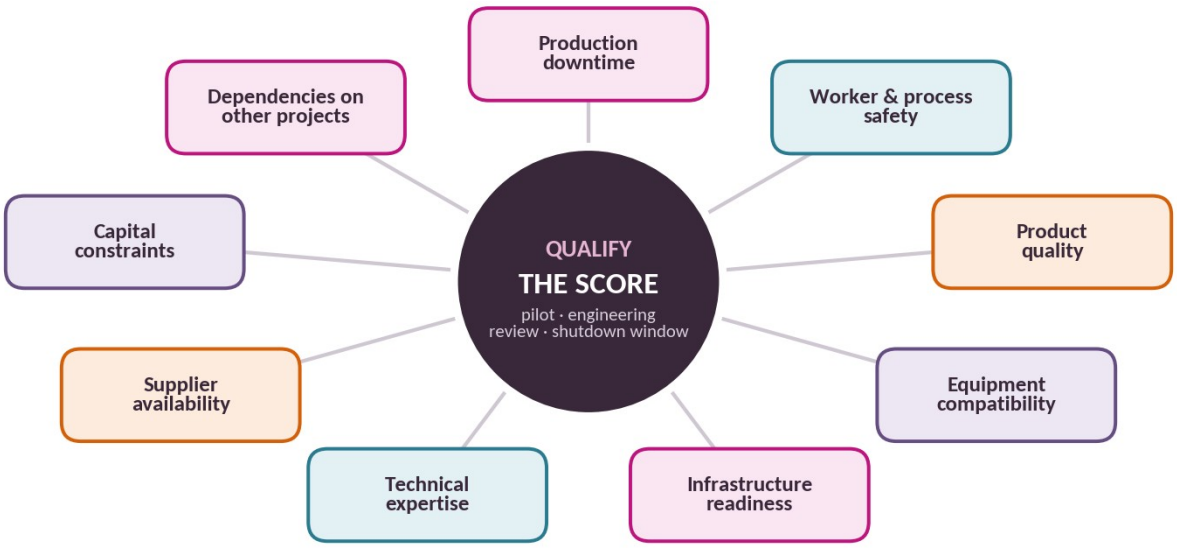


Figure 2 · Barriers and dependencies to record before assigning a final priority

Use these factors to qualify the score, not to create a false sense of precision. A high-scoring opportunity may still require a pilot, engineering review or shutdown window. Compliance and safety obligations remain important even when a project receives a low screening score.

Estimating emissions reduction and financial value

For each shortlisted opportunity, prepare an indicative estimate using site-specific information wherever possible. The purpose is to compare options consistently—not to promise a particular reduction or replace detailed engineering and financial analysis.

Use the worksheet below to make assumptions visible. If a value is unavailable, mark it as unknown and record how it will be obtained.

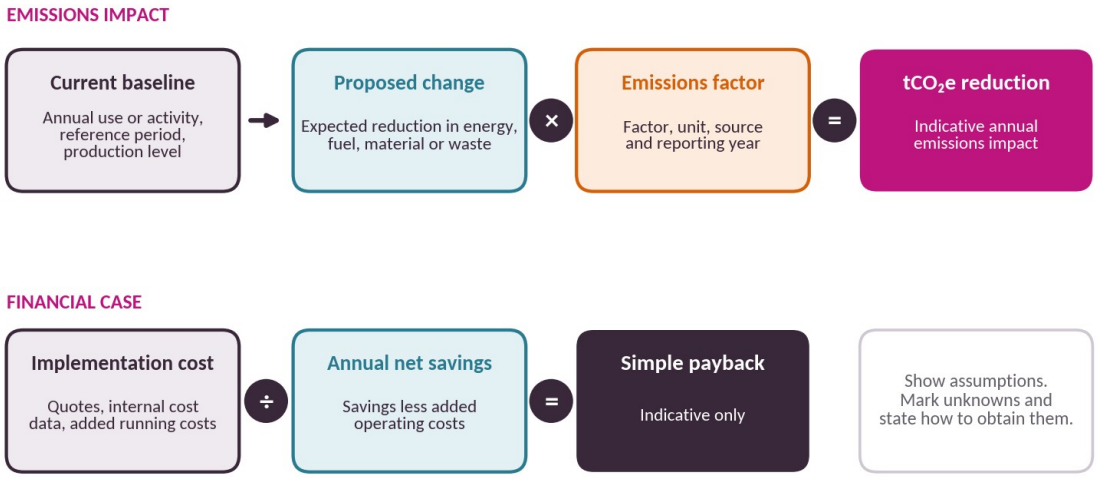
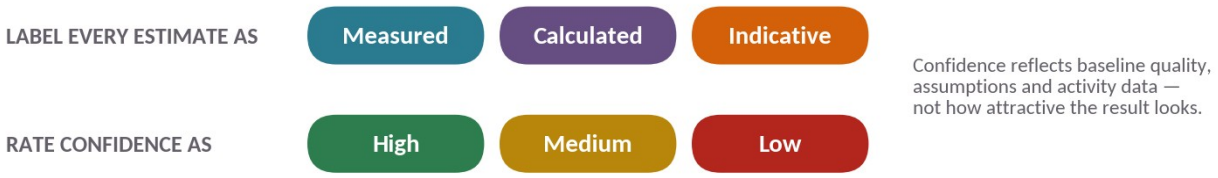


Figure 3 · Building an indicative estimate: emissions impact and financial case

Label estimates as measured, calculated or indicative, and rate confidence as high, medium or low. Confidence should reflect the quality of the baseline, assumptions and activity data—not how attractive the result appears. Check whether projects interact, whether savings overlap and whether emissions are shifted to another process or reporting category.



ESTIMATION WORKSHEET

MEASURE	WHAT TO RECORD	EVIDENCE / NOTES
Current baseline	Annual consumption or activity; reference period; production level	Meter data, bills, production records
Proposed change	Expected reduction in energy, fuel, material or waste	Measurement, supplier data or engineering estimate
Emissions factor	Factor, unit, source and reporting year	Record source and calculation boundary
Estimated emissions impact	Indicative annual tCO_2e reduction and calculation method	State assumptions and uncertainty
Financial case	Implementation cost, annual savings and added operating costs	Quotes, internal cost data, maintenance impacts
Simple payback	Investment divided by estimated annual net savings, where appropriate	Indicative only; not a substitute for financial appraisal

Scoring and priority bands

After screening, score each shortlisted opportunity from 1 to 5 against four criteria: potential emissions impact, financial case, implementation ease and data readiness. A score of 1 indicates low, weak, complex or uncertain performance; 5 indicates a strong plausible reduction pathway, attractive savings or strategic value, relatively straightforward implementation, or reliable baseline data.

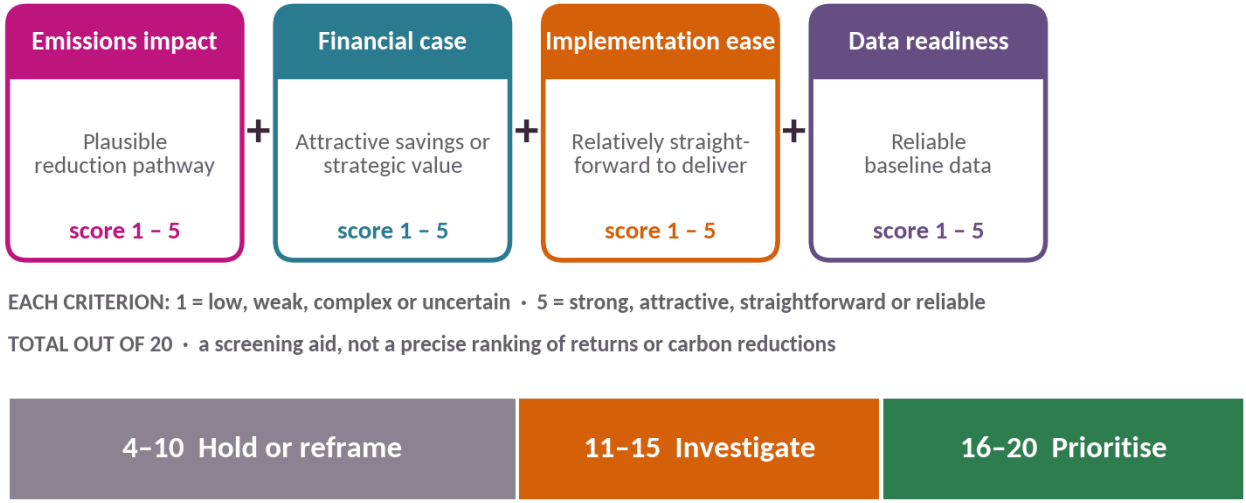


Figure 4 · The screening score: four criteria, total out of 20

Add the four scores for a total out of 20. This is a screening aid, not a precise ranking of returns or carbon reductions. Keep individual scores visible and record the reasoning, especially where evidence is limited. Two opportunities with the same total may have different costs, risks or strategic importance.

16–20: Prioritise. Advance to a focused feasibility check. Validate the baseline, estimate costs and savings, confirm operational constraints and assign an owner.

11–15: Investigate. Close information gaps or run a targeted diagnostic or pilot to reduce uncertainty before committing.

4–10: Hold or reframe. Do not discard automatically. Revisit if costs, technology, production plans or data quality change. Compliance or safety requirements may require action regardless of score.

Build a shortlist of three to five opportunities, balancing near-term operational improvements with larger, longer-term changes. For each, name an accountable owner, the next action, required evidence, a target date and the decision needed at the next review.

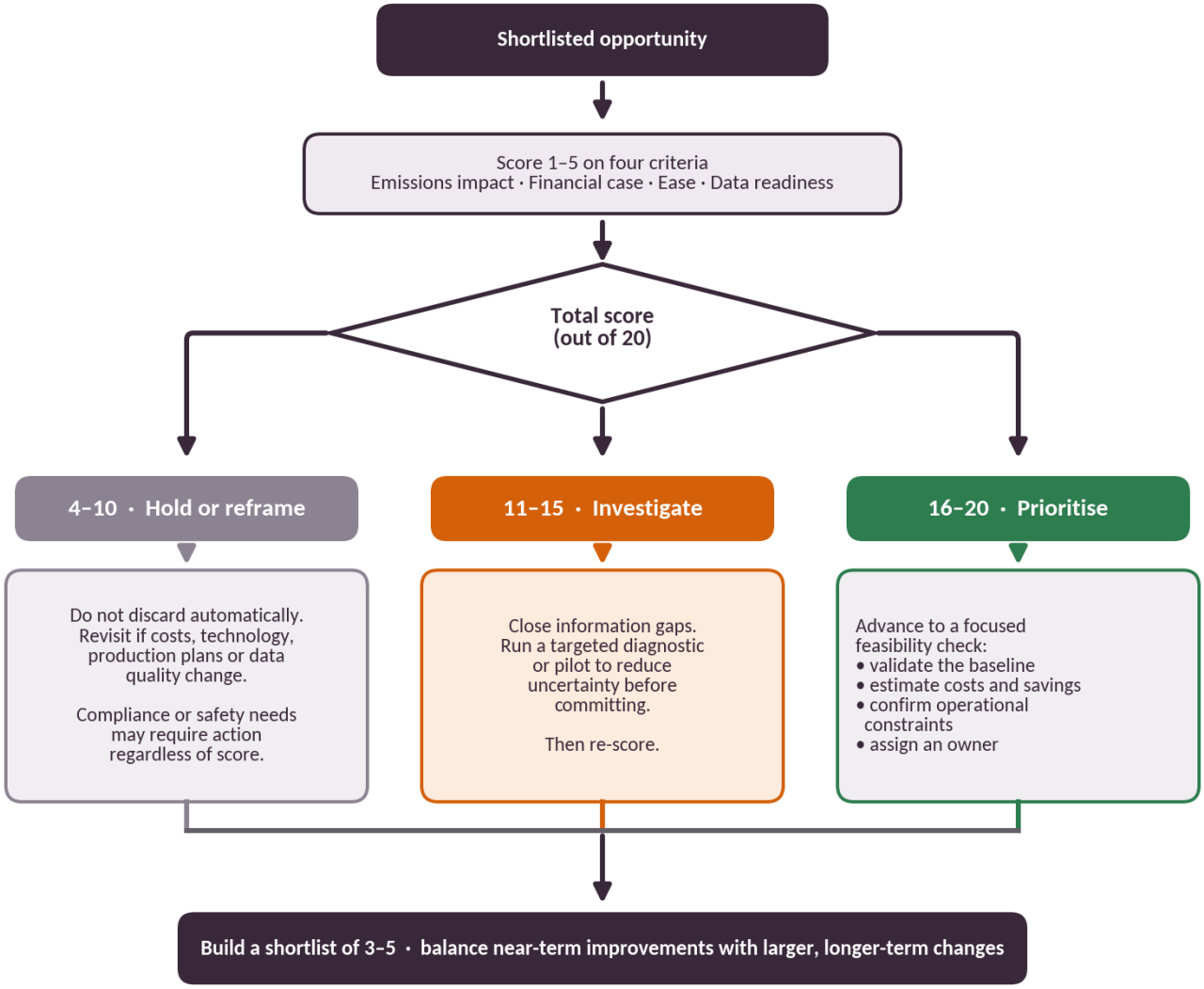


Figure 5 · Decision flow after scoring

FOR EACH SHORTLISTED OPPORTUNITY, RECORD

Accountable owner	Next action	Required evidence	Target date	Decision needed

Suggested 90-day action plan

Adapt the timing to project complexity; these are planning intervals, not guaranteed delivery deadlines.

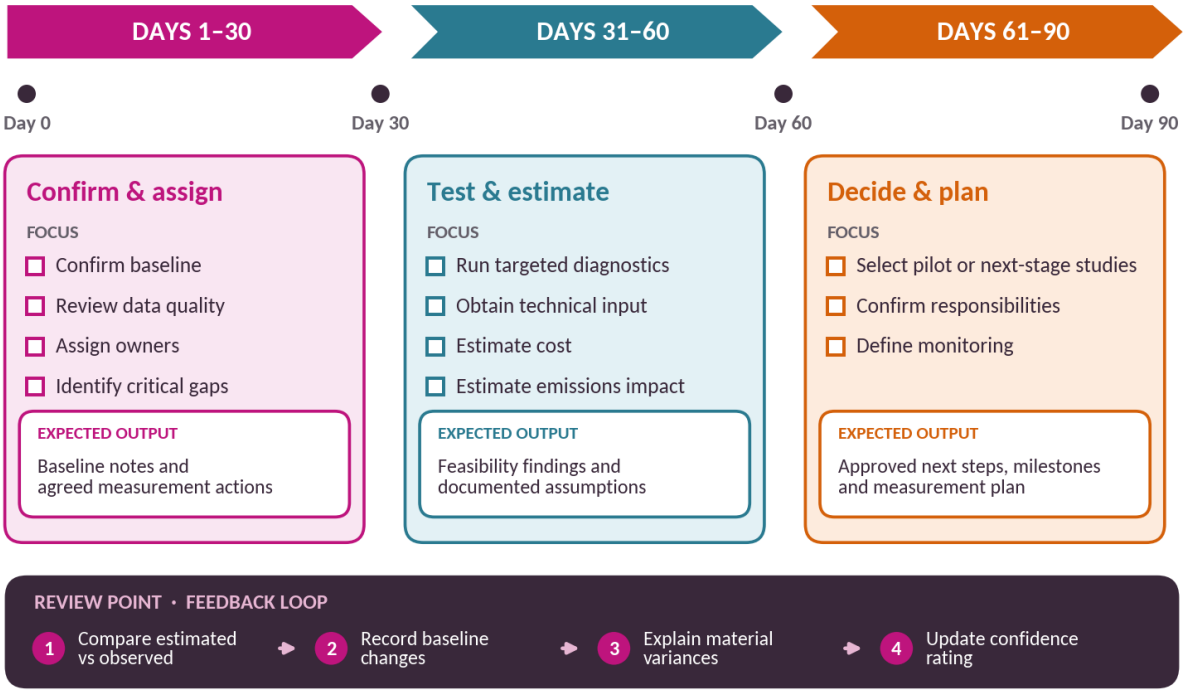


Figure 6 · The 90-day action map

At the review point, compare estimated and observed performance where implementation has begun. Record changes to the baseline, explain material variances and update the opportunity's confidence rating. This creates a feedback loop for improving future estimates and decisions.

PERIOD	FOCUS	EXPECTED OUTPUT
Days 1–30	Confirm baseline, review data quality, assign owners and identify critical gaps	Baseline notes and agreed measurement actions
Days 31–60	Run targeted diagnostics, obtain technical input and estimate cost and emissions impact	Feasibility findings and documented assumptions
Days 61–90	Select pilot or next-stage studies, confirm responsibilities and define monitoring	Approved next steps, milestones and measurement plan

Compare opportunities using absolute emissions reduction and business value. Record estimated cost, annual savings, expected tCO_2e reduction and confidence in each estimate. Identify whether figures are measured, calculated or indicative. Check dependencies between projects so that one intervention does not change another project's baseline or cause reductions to be double-counted.

Implementation discipline and measurement

Before investment approval, confirm the baseline period, calculation method, operating assumptions and evidence needed to verify results. Define success measures such as lower energy per saleable unit, reduced fuel use, less scrap or improved supplier data coverage. Use a measurement period that reflects normal conditions and account for production volume, product mix, weather and downtime where relevant.

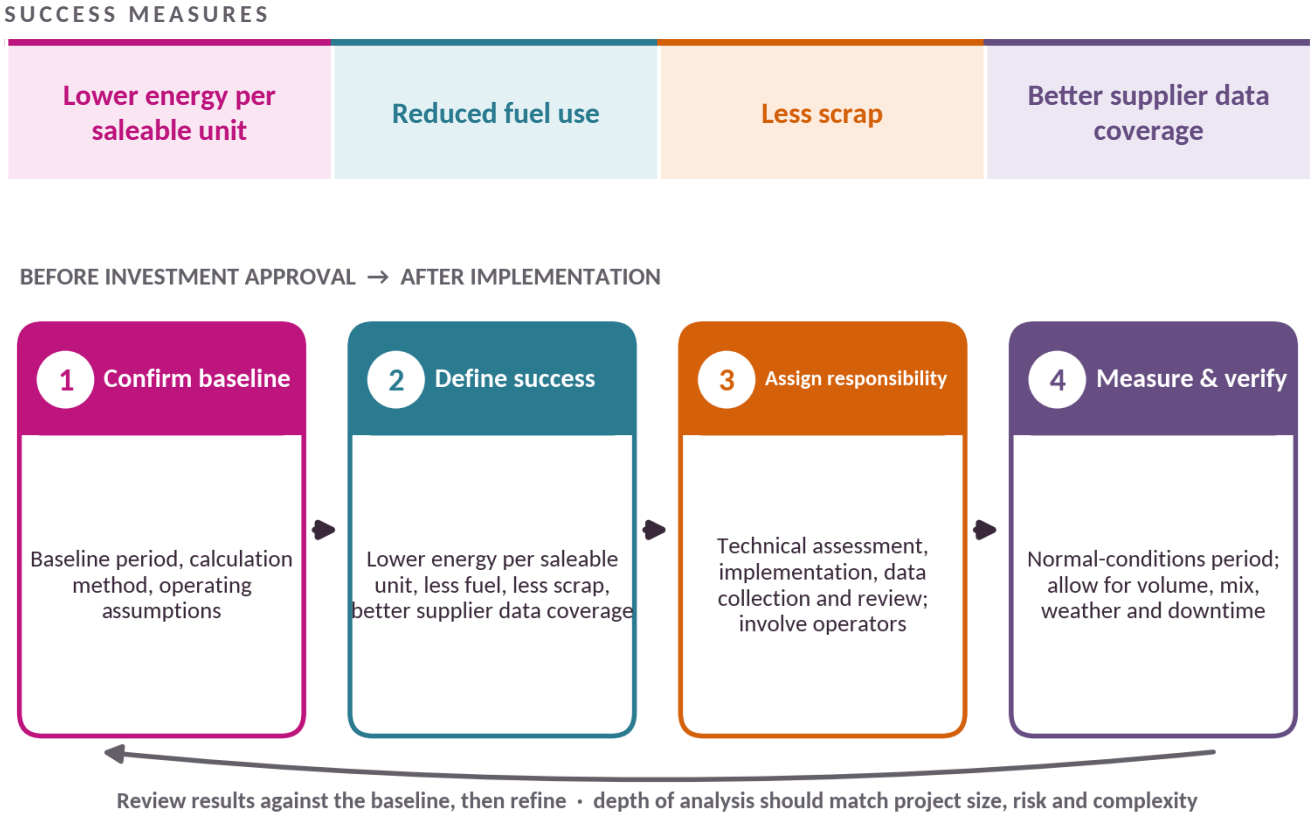
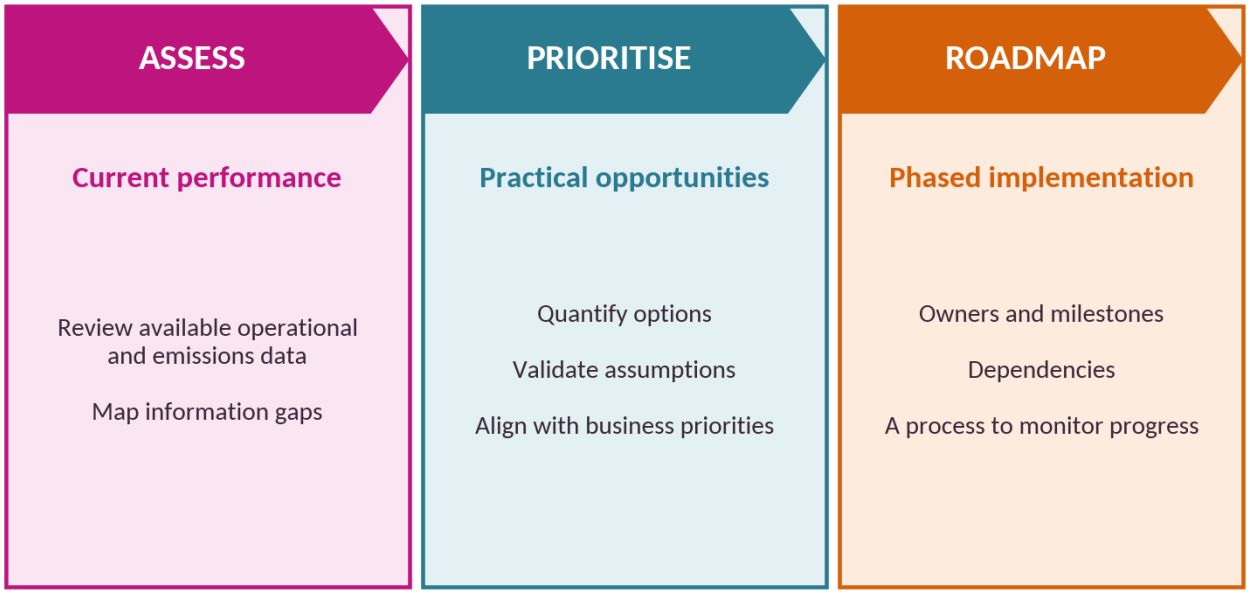


Figure 7 · Implementation discipline: from baseline to verified results

Assign responsibility for technical assessment, implementation, data collection and review. Involve operators and maintenance teams early, and evaluate safety, product quality, reliability and regulatory requirements alongside carbon and financial outcomes. Major investments may require detailed engineering, a validated emissions baseline and financial appraisal; the depth of analysis should match project size, risk and complexity.



How Wudbox can help



Wudbox Sustainability Services can support manufacturers in assessing current performance, identifying and prioritising practical decarbonisation opportunities, and developing a phased implementation roadmap. Work may begin by reviewing available operational and emissions data, mapping information gaps and identifying which opportunity areas warrant deeper investigation.

Further assessment can focus on quantifying options, validating assumptions and aligning technical opportunities with business priorities. A useful roadmap distinguishes actions that can be assessed quickly from those requiring more data, technical design, supplier engagement or capital planning. It should identify owners, milestones, dependencies and a process for monitoring progress.

SORTING THE ROADMAP

Assessed quickly

- Actions that can be assessed with data already available

Needs more first

- More data
- Technical design
- Supplier engagement
- Capital planning

This checklist is an initial screening tool. Scores and indicative estimates must be validated against site data, technical requirements, applicable standards and detailed financial analysis before investment decisions are made. Start with credible, measurable opportunities.