

The Local Net Zero Accelerator (LNZA)

Net Zero Investment Training Programme

Module 2: Options Analysis and Appraisal

Funded by



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Fit4Finance

The Local Net Zero Accelerator



Department for
Energy Security
& Net Zero

Government has provided £19 million to unleash the potential of local government to attract new investment for green growth by piloting new approaches in three areas.

1. Two Local Net Zero Accelerators: Greater Manchester Combined Authority and West Midlands Combined Authority will develop aggregated bundles of projects to secure long-term sustainable investment.
2. A City Leap Replicator: York & North Yorkshire Combined Authority will replicate a similar model to Bristol City Leap, which has established an innovative public-private partnership to secure investment into decarbonising Bristol's council owned estate.
3. Local Net Zero Finance Support Service: to provide access to relevant financial skills, knowledge, and experience.

GMCA GREATER
MANCHESTER
COMBINED
AUTHORITY


West Midlands
Combined Authority


YORK
& NORTH
YORKSHIRE
COMBINED AUTHORITY


Greater
South East
Net Zero Hub

The Net Zero Investment Training Programme

Objectives:

- Provide specialised investment training tailored for local authority professionals that hold positions related to the development and/or financing of net-zero projects
- Up-skill local authority professionals so that they are better placed to both develop and finance Net Zero projects
- Provide training to local authority staff so that they are better placed to support their respective authorities to deliver on climate ambitions/targets

Audience:

- Local Authority Section 151 Officers (Finance Directors)
- Climate, Environment or Sustainability Officers/Directors
- Any other local authority professionals involved in the development or financing of Net Zero projects

The Net Zero Investment Training Programme: Structure

The Net Zero Investment Training Programme is a specialised programme consisting of 6 modules, each requiring a total of 20 hours split between guided and independent learning to complete. The 6 modules are:

1. Understanding the Basics of Net Zero Finance
2. Options Analysis and Appraisal
3. Develop an Effective Business Case
4. Financial Modelling for Net Zero Projects
5. Exploring Innovative Financing for Net Zero
6. Whole-System Financing for Net Zero

Module 2: Options Analysis and Appraisal

This module comprises **20 hours of Total Qualification Time (TQT)**, made up of:

- **10 hours of** Guided Learning Hours
- **10 hours of** Independent Learning Hours

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Overview

The purpose of this learning module is to provide a fundamental knowledge of Options analysis and appraisal to an audience with no or limited analysis and appraisal knowledge or experience.

The objective is to upskill personnel with practical knowledge that is relevant to their other specialisms and focus areas.

Use of jargon or complex explanations is limited only to the extent that they are absolutely needed or relevant to know.

Contents

Each section requires a total of either **4 or 6 learning hours: split 50:50** between **Guided Learning** and **Independent Learning**.

Section 1:

- Identifying the problem and desired outcome

Section 2:

- Determining the Local Authority's Role

Section 3:

- Identifying and Evaluating Options

Section 4:

- Critical Success Factors for Appraisal

Glossary

- **EV:** Electric Vehicle
- **CO2e:** Carbon Dioxide Equivalents
- **EPC:** Energy Performance Certificate
- **PV:** Photovoltaic
- **LED:** Light Emitting Diode
- **ICE:** Internal Combustion Engine
- **HVO:** Hydrotreated Vegetable Oil
- **MCA:** Multi Criteria Analysis
- **CSF:** Critical Success Factors

Section 1: Identifying the problem and desired outcome

Summary

By the end of this section, participants will be able to articulate well-defined problems and outcomes that enable effective comparison of options in net zero appraisal.

Learning Outcomes

- Clearly define problems with a focus on causes
- Set clear, measurable outcomes to support effective appraisal.
- Align problems and outcomes with strategy

Section 1 requires 6 learning hours: 3 hours of Guided Learning and 3 hours of Independent Learning.

Why problem definition is the foundation of appraisal

A strong appraisal starts with asking the right question, not jumping to the answer. This:

- Defines what success actually looks like
- Focuses effort on the real issue, not assumptions
- Sets the direction for options, appraisal criteria, and investment decisions
- Underpins credibility of the business case

The Cost of Poor Scoping

Weak problem definition leads to weak options, weak appraisal, and weak decisions.

- Unclear scope results in misaligned or unrealistic options
- Appraisal criteria that don't reflect real priorities
- Increased delivery, funding, and reputational risk
- Business cases that fail to secure approval or funding

Symptoms vs Root Causes

What is the difference between symptoms and underlying causes?

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Symptoms vs Root Causes

If you define the problem by what you see, you risk missing what actually needs fixing.

a) Symptoms (what is visible)

- Observable outcomes or complaints
- Highlight that something is wrong, not why
- Example: low EV uptake, high energy bills, slow project delivery

Symptoms vs Root Causes

If you define the problem by what you see, you risk missing what actually needs fixing.

b) Underlying causes (what drives the issue)

- Structural, behavioural, or system-level factors
- Evidence-based and diagnosable
- Explain why the symptom exists
- Example: lack of charging access, poor building fabric, planning constraints

Clarifying the Problem

Good diagnostic questions turn a vague issue into a clear, appraisable problem.

- What is happening and where?
- Who is affected and how?
- What evidence supports this?
- What happens if nothing changes?

Connecting to Net Zero Goals

A well-defined problem shows how action today supports net zero tomorrow.

a) Problems should be linked to:

- Council climate strategies
- Regional carbon reduction targets
- National Net Zero frameworks

b) Demonstrates relevance and prioritisation.

Drivers and Constraints

Key drivers

- Statutory duties and policy commitments
- Legal requirements (e.g Climate Act Reporting)
- Political priorities and public expectations

Key constraints

- Financial capacity, funding rules and financing windows
- Technical capability and infrastructure
- Legal, planning, and procurement requirements

Tightening the Problem

Exercise: Rewrite the vague problem statement

Before: We need to improve energy use in buildings.

Hint: Use specific outcomes, scope (who/where), a measurable target, constraints

Tightening the Problem

Exercise: Rewrite the vague problem statement

Before: We need to improve energy use in buildings.

Answer

After: Reduce annual energy consumption in 50 highest-using council buildings by 25% by 2028 while staying within existing capital budget.

Example: Heat Network Framing

Exercise: Rewrite the vague problem statement

Before: *We want a heat network.*

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Example: Heat Network Framing

Exercise: Rewrite the vague problem statement

Before: *We want a heat network.*

Answer

After: Assess feasibility of a low-carbon heat network in Ward A to reduce building emissions by 40% by 2030, considering local heat demand profiles, funding options, and planning constraints.

Example: EV Charging Problem Framing

Exercise: Rewrite the vague problem statement

Before: Need more EV chargers.

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Example: EV Charging Problem Framing

Exercise: Rewrite the vague problem statement

Before: Need more EV chargers.

Answer

After: Increase access to EV charging in underserved neighbourhoods (Zones X and Y) to support 50% EV adoption by 2030, addressing grid capacity and equitable siting.

What Outcomes Mean in Appraisal

Outcomes define what success looks like, not what is built or delivered.

- Describe the change the project is intended to achieve
- Focus on impacts, not activities or assets
- Provide the benchmark against which options are appraised
- Anchor decision-making to purpose, not preferences

Strategic vs Operational Outcomes

Good appraisal distinguishes long-term ambition from day-to-day delivery.

Strategic Outcomes

- Long-term, policy-level change
- Aligned to net zero targets and place-based strategies

Operational outcomes

- Short-to medium-term, project-level results
- Directly influenced by the intervention

Carbon-Specific Outcomes

Carbon outcomes must be explicit, measurable, and decision-relevant.

- a) Absolute reductions: total tonnes of CO₂e reduced
 - Absolute reductions support net zero pathways
- b) Intensity reductions: emissions per unit (e.g. per m², per user)
 - Intensity metrics support efficiency and benchmarking

Social and Economic Co-Benefits

Net zero projects deliver more than carbon and outcomes should reflect that.

- Reduced fuel poverty and energy bills
- Improved health, comfort, and wellbeing
- Local jobs, skills, and supply-chain benefits
- Stronger case for political and community support

Social and Economic Co-Benefits

Clear outcomes are specific enough to guide appraisal — and flexible enough to adapt.

- **Specific:** clearly defined change
- **Measurable:** quantifiable or assessable
- **Achievable:** realistic within constraints
- **Relevant:** linked to net zero and local priorities
- **Time-bound:** tied to a delivery timeframe

Baselines and Counterfactuals

You can't measure impact without knowing what would happen anyway.

a) Baseline – where we are now

- Current emissions, energy use, costs, or performance levels
- Captures the status quo against which progress will be measured

b) Counterfactual – what would happen without action

- Expected trajectory if no intervention occurs
- Accounts for policies, trends, and natural changes over time

Why it matters

- ✓ Enables fair comparison of options on a like-for-like basis
- ✓ Supports credible carbon reduction and value-for-money assessment

Baselines and Counterfactuals

Every appraisal needs a reference point, even if it's not acceptable.

a) Do Nothing – maintain current practice

- No new intervention beyond existing activities
- Assumes current performance, emissions, and risks continue

b) Do Minimum – meet minimum requirements

- Only what is necessary to remain legally or operationally compliant
- Reflects likely short-term actions without strategic ambition

Why it matters

- ✓ Provides a benchmark for comparing costs, benefits, and risks
- ✓ Makes the consequences of inaction visible and explicit

Exercise: Drafting Outcome Statements

Clear outcomes turn a vague idea into something that can be appraised and funded.

Start with this project idea:

“We want to improve council buildings.”

Rewrite it as an outcome statement that:

- Describe change, not activity
- Include at least one carbon outcome
- Are measurable and time-bound

Exercise: Drafting Outcome Statements

Clear outcomes turn a vague idea into something that can be appraised and funded.

Start with this project idea:

“We want to improve council buildings.”

Rewrite it as an outcome statement that:

- Describe change, not activity
- Include at least one carbon outcome
- Are measurable and time-bound

Answer: By 2028, reducing energy consumption across the council’s highest-using buildings by 25%, will result in lower operational emissions and reduced energy costs

Example: Retrofit Programme Outcomes

Strong retrofit outcomes balance carbon impact, affordability, and delivery realism.

Baseline

- High energy consumption in council housing
- EPC ratings mostly D–E

Outcome statements

- Reduce operational emissions from council housing stock by 35% by 2030
- Improve EPC ratings to Band C or above for 80% of homes

Final: Implement fabric and heating upgrades across council-owned housing to cut operational carbon emissions by 35% by 2030, improve EPC ratings to at least Band C, and reduce average tenant energy bills.

Example: Solar Rooftop Outcomes

Solar projects succeed when outcomes focus on resilience and value, not just capacity.

Baseline

- High grid electricity costs for council buildings
- Limited on-site generation

Outcome statements

- Generate X MWh of renewable electricity annually by 2028
- Reduce grid electricity demand across council buildings by Y%

Answer: Install rooftop solar PV on suitable council buildings by 2028 to deliver 800 MWh of renewable electricity per year, reduce grid electricity demand, and cut operational emissions by 5 tonnes of CO₂e.

Alignment with Local Authority Strategies

Outcomes must clearly support what the local authority has already committed to deliver.

- Link outcomes to climate strategies, corporate plans, and place-based priorities
- Show how the project contributes to existing targets and programmes
- Helps secure internal buy-in and senior approval

Alignment with National Policy

Well-defined outcomes also demonstrate alignment with national net zero policy.

- UK Net Zero Strategy and sector pathways → local emissions reduction
- Public Sector Decarbonisation (Clean power, heat, and transport) → public asset retrofit
- Transport decarbonisation → EV infrastructure access

Importance: Strengthens the case for external funding and support

Alignment with Community Priorities

Strong outcomes reflect the priorities and concerns of local communities.

Ask

- Who sees the benefit first?
- Who might be left out?

Factors that can be addressed include:

- Address affordability, access, and fairness
- Reflect local consultation and lived experience
- Increase legitimacy and public support

How Outcomes Shape Appraisal Criteria

Appraisal criteria should flow directly from the outcomes you are trying to achieve.

If the outcome is...

- Carbon outcomes → assess emissions reduction criteria
- Social outcomes → assess affordability and equity criteria
- Economic outcomes → assess value for money and resilience criteria

How Outcomes Influence Delivery Models

Outcomes help determine how a project should be delivered, not just what is delivered.

- Scale and timing of outcomes influence procurement approach
- Risk allocation depends on outcome certainty
- Ownership and financing models reflect long-term objectives

Common Mistakes in Outcome Definition

Poorly defined outcomes weaken appraisal before it even begins.

- Describing activities instead of impacts
- Being too vague or overly ambitious
- Ignoring constraints and baselines
- Focusing only on carbon and missing co-benefits

Which is stronger?

-  *“Install EV chargers across the borough”*
-  *“Increase access to EV charging to support 50% EV uptake by 2030”*

Exercise: Mapping Outcomes to Strategy

Exercise

Take the outcome drafted below:

Reduce emissions from council offices through energy efficiency improvements.

Map it against:

- Local climate strategy
- Corporate plan
- National net zero priorities

Exercise: Mapping Outcomes to Strategy

Exercise

Take the outcome drafted below:

Reduce emissions from council offices through energy efficiency improvements.

Map it against:

- Local climate strategy
- Corporate plan
- National net zero priorities

Answer: By 2030, reduce operational emissions from council office buildings by 30%, directly supporting the council's Climate Action Plan and the UK Net Zero Strategy for public sector decarbonisation.

Case Study: Public Building Decarbonisation

Decarbonising public buildings shows how outcomes guide appraisal and delivery.

- The council's public buildings are old and energy-intensive, contributing to high operational emissions and costs.
- They need to cut emissions but face limited budgets and delivery capacity.
- Outcome:** “By 2030, reduce operational carbon emissions from council-owned buildings by 40% while improving energy efficiency and maintaining service continuity.”
- Appraisal focus:** Compare retrofit and upgrade options on carbon savings, cost, and deliverability.

Case Study: Public Building Decarbonisation

EV charging rollout illustrates balancing carbon targets with equitable access.

- EV uptake was low in some areas due to limited public charging, mostly in affluent neighbourhoods.
- The council wanted to expand access quickly but fairly, while managing grid constraints.
- **Outcome:** “By 2030, increase access to publicly available EV charging in priority and underserved areas to support local transport decarbonisation targets and improve equitable access.”
- **Appraisal focus:** Compare delivery models on coverage, equity, scalability, and cost.

Section 1 Summary

1. Problem definition

- Focus on causes, not just symptoms
- Link to local net zero targets, statutory duties, and operational realities

2. Outcomes

- Outcomes describe *change*, not activity
- Include carbon, social, and economic impacts
- SMART: Specific, Measurable, Achievable, Relevant, Time-bound

3. Alignment

- Outcomes should map to local strategies, national policy, and community priorities
- Clear alignment ensures appraisal criteria are meaningful and delivery models are appropriate

Section 2: Determining the Local Authority's Role

Summary

By the end of this section, participants will be able to understand how role clarity ensures local authorities select options that match their capabilities, risk appetite, and delivery responsibilities.

Learning Outcomes

- Identify realistic delivery roles for different project types.
- Assess how role choice affects risk, finance, and procurement.
- Avoid common pitfalls in role definition.

Section 2 requires 4 learning hours: 2 hours of Guided Learning and 2 hour of Independent Learning.

Why Role Clarity Is Essential

Clear role definition ensures the appraisal tests the *right options* and allocates risk appropriately.

- Role determines level of control, risk, and financial exposure
- Unclear roles lead to mismatched delivery models and weak business cases
- Role clarity should come *before* options are appraised

Guiding questions

- What role is the authority actually willing to play?

The Spectrum of Local Authority Roles

Local authorities can engage in net zero delivery in different ways, from light-touch to hands-on.

- Roles sit on a spectrum rather than being binary
- Moving along the spectrum increases control, risk, and resource commitment
- Different projects may justify different roles

Role 1: Enabler / Facilitator

As an enabler, the authority creates the conditions for others to deliver net zero outcomes.

- Focus on planning, policy support, and coordination

What levers does the authority realistically control?

- Minimal capital commitment and delivery risk

How much capital is needed for results to be seen?

- Relies heavily on market appetite and partner capability

Is the market willing and able to deliver without direct investment?

Role 2: Investor / Co-Investor

An investor role allows the authority to influence outcomes while sharing risk with partners.

- Public capital is used to unlock or accelerate private investment
- Risk and returns are shared, rather than fully transferred or retained
- This role requires stronger commercial capability and governance arrangements

Role 3: Asset Owner / Developer

An Ownership gives the authority maximum control over outcomes but also maximum responsibility.

- The council takes on construction, performance, and operational risks
- Ownership enables long-term value capture and direct emissions control
- This role demands sufficient skills, balance-sheet capacity, and appetite for risk

Guiding questions

- Does the authority have the capability to deliver and operate assets?
- Is ownership essential to achieve the desired outcomes?

Role 4: Regulator / Policy Shaper

As a regulator, the authority shapes the environment in which net zero projects are delivered.

- Planning, policy, and standards are used to steer private and public investment
- Impact is achieved at scale but with limited control over individual projects
- Effectiveness depends on enforcement, compliance, and market response

Role 5: Convenor of Partnerships

The convenor role focuses on coordination to unlock scale and reduce fragmentation.

- The authority brings together public, private, and community actors
- Aggregating demand can improve viability and reduce delivery risk
- The council adds value through leadership rather than capital or ownership

How Role Selection Affects Risk Exposure

Each role exposes the authority to different types and levels of risk.

- Enabler roles limit financial and delivery risk
- Investor roles introduce shared financial and performance risk
- Ownership concentrates construction, operational, and demand risk

Guiding questions

- Which risks can the authority realistically manage?
- Which risks should be transferred?

How Role Selection Affects Financing Options

The role chosen determines which financing routes are available and appropriate.

- Enablers rely primarily on grants and third-party finance
- Investors can use blended finance, equity, or loans
- Owners depend on public borrowing and on-balance-sheet finance

Guiding questions

- What financing tools are available under each role?
- How does this affect affordability and value for money?

How Role Selection Affects Procurement Routes

Procurement approaches must reflect the authority's role in delivery.

- Enabler roles require proportionate, light-touch procurement
- Investor roles focus on selecting and managing delivery partners
- Ownership requires full, compliant procurement to manage risk and value for money

Guiding questions

- Is the procurement route proportionate to the role?
- Does procurement support or constrain delivery speed?

Internal Capability Assessment

A local authority's role must reflect what it can realistically deliver with existing skills and systems.

- Consider technical, commercial, legal, and programme management capacity
- Distinguish between *capability gaps* and *capacity constraints*
- Plan early for external support where gaps exist

Consideration: Which capabilities are essential to keep in-house, and which can be bought in without increasing risk?

External Market Capability Assessment

The authority's role should complement the market, not replace it.

- Strong markets reduce the need for public ownership
- Weak markets may justify enabling, convening, or early-stage investment
- Market maturity can differ by technology and location

Guiding question

If the council stepped back completely, would this project still happen?

Fiscal Autonomy and Borrowing Capacity

Financial capacity sets hard limits on how far an authority can go in delivery and ownership.

- Borrowing headroom and revenue certainty affect ownership viability
- Investor roles may stretch capital further than full ownership
- Long-term liabilities must be considered alongside short-term funding

Statutory Powers and Limitations

Legal powers determine the boundaries of what is possible.

- General powers of competence enable flexibility, not exemption
- Procurement and subsidy control rules shape delivery choices
- Legal feasibility should be tested before options appraisal

Key question

What would stop this role from proceeding even if funding were available?

Appetite for Commercial Risk

Risk appetite is as much a political decision as a financial one.

- Higher control comes with higher public exposure
- Political cycles influence tolerance for delay or loss
- Governance must evolve with risk level

Exercise: Mapping Your Authority's Realistic Role

Starting statement

“Our authority wants to lead on delivery to maximise impact and pace.”

What to do

- Test this ambition against capability, finance, and risk appetite
- Identify which risks the authority can genuinely manage
- Compare ambition to the role spectrum

Exercise: Mapping Your Authority's Realistic Role

Starting statement

“Our authority wants to lead on delivery to maximise impact and pace.”

What to do

- Test this ambition against capability, finance, and risk appetite
- Identify which risks the authority can genuinely manage
- Compare ambition to the role spectrum

Answer

“Based on current capability, financial capacity, and risk appetite, our authority is best placed to act as a [role], using [partnerships/investment/enabling tools] to manage delivery risk.”

Example: Local Authority Role in Heat Networks

Starting statement

“The authority wants to deliver a heat network to decarbonise public buildings and nearby housing.”

What to consider

- High upfront cost and demand uncertainty
- Need for anchor loads and long-term coordination
- Market reluctance at early stages

Final role statement

“The authority acts initially as an enabler and convenor, using anchor demand and planning powers to de-risk private delivery, with the option to co-invest once demand is established.”

Example: Local Authority Role in Ground-Mounted Solar

Starting statement

“The authority wants to accelerate local renewable generation using council-owned land.”

What to consider

- Mature technology and competitive market
- Limited need for public ownership
- Planning certainty as key value-add

Final role statement

“The authority adopts an enabling and land-leasing role, facilitating private investment while avoiding construction and operational risk.”

Common Pitfalls in Role Definition

Poor role definition can undermine otherwise strong net zero projects.

- Selecting roles based on ambition rather than capability
- Assuming ownership is required to achieve impact
- Underestimating governance, skills, and long-term risk

Warning sign

If the role feels uncomfortable/difficult to explain to members, it is probably misaligned.

Summary

Role clarity underpins credible appraisal and successful delivery.

■ Key messages

- There is no “right” role, only a realistic one
- Capability, market conditions, and risk appetite must align
- Clear roles enable better financing, procurement, and governance

■ Takeaway

A well-chosen role simplifies decisions; a poorly chosen role multiplies them.

Section 3: Identifying and Evaluating Options

Summary

By the end of this section, participants will be able to understand how robust options analysis explores a wide range of possibilities before systematically narrowing to credible and deliverable choices.

Learning Outcomes

- Identify what constitutes a valid option in appraisal.
- Create and screen a longlist using clear criteria.
- Evaluate options across technical, financial, and social dimensions.

Section 3 requires 6 learning hours: 3 hours of Guided Learning and 3 hours of Independent Learning.

What Counts as an Option in Appraisal

An option is not an idea, it is a credible way of achieving the outcome.

- An option must be distinct, deliverable, and appraisable
- Options differ in *how* outcomes are achieved, not just *what* is delivered
- “Do nothing” and “do minimum” are always valid options even though they are not the most ideal.

If two options lead to the same delivery approach, they are not separate options.

Types of Options

Options are not just technical choices, they are strategic choices.



Technical: technology or solution used



Delivery: who delivers and how



Financial: how the project is funded and paid for



Commercial: ownership, risk allocation, and incentives

Which type of option is driving the biggest difference in outcomes or risk?

Longlist Creation Techniques

A strong longlist explores the full solution space before judgement begins.

- Start from outcomes, not preferred solutions
- Combine different option types to create genuinely distinct approaches
- Use structured methods (workshops, scenario building, market sounding)

A good longlist challenges assumptions, exposes trade-offs, and includes options that feel risky, unfamiliar, or politically uncomfortable

Avoiding Premature Narrowing

Most weak appraisals narrow options too early.

If the shortlist looks obvious from the start, narrowing has happened too soon.

- Favourite options crowd out alternatives
- Perceived constraints are treated as fixed
- Delivery assumptions go untested

Exercise: Creating a Longlist

The authority wants to decarbonise heat in public buildings quickly and affordably

What participants do

- Generate options across *at least two* option types
- Include do nothing and do minimum
- Avoid testing feasibility at this stage

Final longlist statement

“The longlist includes a range of technically and commercially distinct options that could plausibly deliver the desired outcomes.

Screening from Longlist to Shortlist

Screening is about eliminating the unworkable, not picking the winner.

- Apply clear, proportionate criteria
- Remove options that clearly fail key tests
- Retain diversity in the shortlist

Key principle:

Screening should reduce noise, not insight.

Strategic Fit as a Screening Criterion

Options must align with the authority's strategic direction.

- Fit with local net zero strategy and wider priorities
- Consistency with political commitments and policy direction
- Contribution to multiple objectives

Would this option still make sense if funding were delayed or reduced?

Technical Feasibility as a Screening Criterion

Technical feasibility is about *whether an option could work in this context*, not whether it is fully designed.

- Distinguish proven, adapted, and emerging solutions
- Consider site-specific constraints (space, grid, interfaces, users)
- Recognise that uncertainty can be managed, but complexity compounds risk

Financial Viability as a Screening Criterion

An option that cannot be financed is not a viable option.

- Capital and lifecycle cost implications
- Revenue certainty and funding availability
- Affordability within public finance constraints

Guiding question

Is this option viable without assuming best-case funding scenarios?

Environmental and Social Impacts

Net zero options should improve outcomes beyond carbon alone.

- Distributional impacts on communities
- Air quality, health, and fuel poverty effects
- Wider environmental risks and benefits

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Distributional Impacts and Equity Considerations

Net zero options can deliver overall benefits while creating unequal impacts across different communities and user groups.

- Some groups may face higher upfront costs or disruption
- Benefits may accrue later or to different stakeholders
- Design choices influence whether impacts are mitigated or amplified

Questions to ask

- Who benefits first?
- Who pays upfront?
- Who bears disruption or risk?

Risk Assessment at the Options Stage

At the options stage, risk assessment is about comparing exposure not developing mitigation plans.

- Some risks can be shared or transferred, while others remain with the authority
- Reducing one type of risk often increases another
- Political and delivery risks may be as significant as technical risks

Guiding question

Which risks differ most clearly between options, and which are unacceptable for the authority to carry?

Understanding Interdependencies

Many options depend on other actions, decisions, or infrastructure that sit outside the project itself.

- Dependencies on grid, planning, skills, behaviour
- Timing risks between linked projects
- Hidden interdependencies frequently emerge late in delivery

These can affect deliverable factors and change timelines which are very crucial

Lifecycle Costing and Whole-Life Value

Whole-life costing considers the full cost and value of an option over its entire lifespan, not just the initial capital spend.

- Operating, maintenance, and replacement costs can outweigh upfront costs
- Performance may change over time due to degradation or user behaviour
- Flexibility and resilience have value under uncertainty

Guiding question

Which option offers the most robust value over time, not just the lowest initial cost?

Carbon Impact Assessment

Carbon impact assessment compares the scale, timing, and certainty of emissions reductions NOT just intent

- Early emissions reductions may be more valuable than larger later savings
- Estimates vary in accuracy depending on data and technology
- Some options risk displacing emissions rather than eliminating them

Guiding Questions:

How confident are we that these carbon savings will actually materialise?

Co-Benefits Assessment

Co-benefits describe the additional social, economic, and environmental outcomes delivered alongside carbon reduction.

- Some co-benefits are immediate and tangible, others indirect or long-term
- Qualitative benefits still influence public and political support
- Over-stating co-benefits can undermine credibility

Guiding question

Which benefits would remain valuable even if carbon outcomes were lower than expected?

Co-Benefits Assessment

The authority has developed a longlist of options to decarbonise heat in public buildings. All options could plausibly contribute to net zero objectives, but not all are suitable for detailed appraisal.

- Do nothing (continue with gas boilers)
- Do minimum (boiler upgrades and controls optimisation)
- Individual air-source heat pumps per building
- Centralised heat network using gas CHP
- Heat network using large-scale heat pumps
- Hybrid heat pumps with retained gas backup
- Biomass boilers for larger sites

Co-Benefits Assessment

Task

- Apply agreed screening criteria (strategic fit, feasibility, affordability, impacts)
- Remove options that clearly fail one or more criteria
- Retain a small number of *distinct* options for detailed appraisal

Case Study: Retrofit Programme

The authority aims to reduce emissions from its housing stock while tackling fuel poverty and minimising disruption to residents.

Longlist considered

- Do nothing
- Basic energy efficiency measures (LEDs, draught proofing)
- Fabric-first retrofit (insulation, windows, airtightness)
- Fabric-first plus heat pumps
- Whole-house deep retrofit

Case Study: Retrofit Programme

Key considerations

- Trade-off between depth of retrofit and number of homes reached
- Supply-chain capacity and resident disruption
- Distributional impacts on low-income households

Shortlist outcome

- Basic energy efficiency measures
- Fabric-first retrofit
- Fabric-first plus heat pumps (targeted)

Case Study: Fleet Electrification

The authority plans to decarbonise its operational vehicle fleet while maintaining service reliability and controlling costs.

Longlist considered

- Do nothing (replace like-for-like ICE vehicles)
- Immediate full fleet electrification
- Phased electrification aligned with replacement cycles
- Mixed fleet (EVs for light vehicles, ICE/HVO for heavy vehicles)
- Outsourced fleet and transport services

Case Study: Fleet Electrification

Key considerations

- Charging infrastructure readiness at depots
- Operational impacts on critical services
- Capital cost versus long-term operating savings

Shortlist outcome (example)

- Phased electrification aligned with replacement cycles
- Mixed fleet approach for specialist vehicles

What Multi-Criteria Analysis (MCA) Is and When to Use It

Multi-Criteria Analysis is a structured method for comparing options across multiple, often competing, objectives.

- Useful where trade-offs cannot be resolved through a single metric
- Supports transparent and auditable decision-making
- Should be used alongside professional judgement

Guiding question

Is MCA helping to clarify trade-offs, or is it being used to avoid difficult choices?

Strengths and Limitations of MCA

MCA provides a helpful structure for comparison but does not remove subjectivity from decision-making.

- Strength: makes assumptions and trade-offs explicit
- Limitation: outcomes depend heavily on weights and scores
- Risk: excessive complexity can reduce trust

Guiding question

Are the assumptions behind the MCA clear and defensible?

Weighting and Scoring Approaches

Weighting and scoring translate strategic priorities into a comparative framework.

- Weights reflect what matters most to decision-makers
- Scores compare relative performance, not absolute precision
- Sensitivity testing improves confidence

Guiding question

Would the weighting still feel appropriate if circumstances changed?

Building an MCA Matrix

An MCA matrix brings together criteria, weights, and scores to support structured comparison.

- Agree criteria
- Set weights
- Score consistently
- Sense-check results

Final takeaway

The purpose of the matrix is to support informed judgement, not to produce a single “correct” answer.

Building an MCA Matrix

The local authority has shortlisted a small number of options to decarbonise heat across a portfolio of public buildings.

Shortlisted options

- Option A: Gas boiler efficiency upgrades
- Option B: Building-level air-source heat pumps
- Option C: Area-wide heat network

Assessment criteria & weights

- Strategic alignment – **25%**
- Carbon reduction – **25%**
- Affordability / value for money – **20%**
- Deliverability & risk – **20%**
- Flexibility & future-proofing – **10%**
- Options are scored **1–5** against each criterion.

Building an MCA Matrix

ANSWER

Headline result

- Option A: Low cost and low risk, but weak carbon performance
- Option B: Balanced performance, moderate delivery challenges
- Option C: Highest carbon impact and strategic fit, but higher cost and risk
- Option C achieves the highest weighted score overall.

Final conclusion sentence

“Using MCA, the heat network emerges as the preferred option because its long-term carbon reduction and strategic value outweigh higher upfront costs and delivery risks.”

Example MCA: Heat Network

Context

The authority is comparing three shortlisted heat options for public buildings.

Options assessed

- Do minimum (boiler upgrades)
- Heat network with large-scale heat pumps
- Individual building heat pumps

Example MCA: Heat Network

What the MCA reveals

- Heat networks score highest on long-term carbon impact
- Do-minimum performs best on cost and delivery risk
- Individual heat pumps sit between the two across most criteria

Example conclusion sentence

“The MCA shows that the heat network offers the greatest long-term carbon benefits, while the do-minimum option performs better on affordability and delivery risk, highlighting a clear strategic trade-off.”

Example MCA: Solar Farm

Context

The authority is assessing options for delivering a ground-mounted solar project on council-owned land.

Options assessed

- Enable private development through land lease
- Co-invest with a private partner
- Fully council-owned and operated

Example MCA: Solar Farm

What the MCA reveals

- Ownership scores highest on long-term financial returns and control
- Enabling scores highest on risk and deliverability
- Co-investment balances control and exposure

Example conclusion sentence

“The MCA indicates that a co-investment model offers the best balance between risk, control, and financial return under current market conditions.”

Example MCA: Building Retrofit

Context

The authority is comparing retrofit approaches across its housing stock.

- Options assessed
- Basic efficiency measures
- Fabric-first retrofit
- Deep retrofit with heat pumps

Example MCA: Building Retrofit

What the MCA reveals

- Basic measures score highest on cost and speed
- Deep retrofit scores highest on carbon but lowest on deliverability
- Fabric-first performs consistently across most criteria

Example conclusion sentence

“The MCA highlights fabric-first retrofit as the most balanced option, delivering strong carbon benefits while remaining affordable and scalable.”

Common Mistakes in MCA

MCA can weaken decision-making if used mechanically or without reflection.

Common issues

- Over-complex criteria and excessive weighting
- Treating scores as precise rather than indicative
- Using MCA to justify a preferred option

Reality check

If the MCA result feels predetermined, the process has not added value.

Summary

What good practice looks like

- A broad longlist that tests assumptions and avoids early lock-in
- Clear screening criteria that explain *why* options progress or fall away
- Use of MCA where trade-offs exist and no option is obviously best

What this enables

- Transparent comparison of carbon, cost, risk, and deliverability
- Defensible decisions that stand up to scrutiny
- Clear justification for preferred options in the business case

Section 4: Critical Success Factors for Appraisal

Summary

By the end of this section, participants will be able to use Critical Success Factors to define the non-negotiable conditions that determine whether an option should proceed.

Learning Outcomes

- Define CSFs relevant to net zero projects.
- Apply CSFs to test and compare options.
- Use CSFs to support transparent decision-making.

Section 4 requires 4 learning hours: 2 hours of Guided Learning and 2 hours of Independent Learning.

What Critical Success Factors Are and Why They Matter

Critical Success Factors are the essential conditions that must be in place for a preferred option to succeed in practice.

- CSFs focus on *what must go right*, not what is merely desirable
- They act as a final realism check before commitment
- Failure to meet a CSF usually means the option should not proceed

Guiding question

If this factor is not met, would the project still be viable?

CSFs vs Evaluation Criteria

CSFs are not another set of evaluation criteria and should not be scored or weighted.

Evaluation Criteria	Critical Success Factors
Used to compare options	Used to test viability
Can be traded off	Generally non-negotiable
Scored or weighted	Yes/No Judgement

CSFs are about *whether* an option can succeed, not *how well* it performs relative to others.

CSFs for Financial Sustainability

Financial sustainability means:

The option remains affordable and fundable across its full life, even if assumptions change.

Stress-test prompts

- What happens if costs increase?
- What happens if revenues are delayed or reduced?
- Who ultimately carries the financial risk?

CSFs for Deliverability

Deliverability CSFs test whether the option can be implemented within real-world constraints.

Deliverability is credible when:

- Responsibility for delivery is clearly assigned
- Decision-making authority matches accountability
- Timelines reflect real approval and procurement processes

CSFs for Carbon Reduction

Carbon-related CSFs ensure that emissions reductions are both material and credible.

Carbon impact must be:

Aspirational —▶ Credible —▶ Conservative

- Reductions must align with local net zero pathways
- Measurement and reporting must be feasible
- Carbon savings must not rely on unrealistic behaviour change

CSFs for Community Acceptance

Projects that lack community acceptance face delays, redesign, or failure, regardless of technical merit.

Consider this scenario:

- The project meets all technical and financial tests but faces sustained local opposition.

Implication:

- Delays, redesign, or cancellation can undermine value for money and carbon outcomes.

Judgement test:

- *Is there a credible pathway to public acceptance, not just consultation?*

CSFs for Risk Management

Risk-related CSFs focus on whether risks are understood, owned, and manageable.

A risk is manageable only if:

- It is clearly identified
- It is owned by a party with control
- The worst-case impact is tolerable

Red flag

- Risks that are high-impact, poorly understood, and unowned.

CSFs for Long-Term Resilience

Long-term resilience ensures that the option remains viable under future uncertainty.

A resilient option:

- Can adapt to policy, technology, or demand change
- Avoids locking the authority into outdated solutions
- Retains value under different future scenarios

Future test

Would this still be the right choice if assumptions change significantly?

Exercise: Drafting Critical Success Factors (CSFs)

You are appraising a preferred option for a council-led decarbonisation project. The option performs well on carbon reduction and strategic alignment, but delivery depends on external funding, internal capacity, and market readiness.

Task

- Define the *critical conditions* that must be met for this option to succeed.

Guide:

- What would cause this option to fail if it went wrong?
- Which risks cannot be mitigated later?
- What must be true before committing public funds?

Exercise: Drafting Critical Success Factors (CSFs)

Sample Answer:

“The project will only proceed if external funding is secured, delivery roles are clearly assigned to experienced partners, and projected carbon reductions can be evidenced and verified.”

Example: CSFs for Different Project Types

Why this matters

- Different project types fail for different reasons.
- CSFs should therefore reflect the *specific risk profile* of the intervention, not generic best practice.

Initial statements

- “This is a large-scale retrofit programme delivered across multiple buildings.”
- “The programme relies on contractor capacity and resident participation.”

Example: CSFs for Different Project Types

Final CSFs

Retrofit programme – final CSFs

- *“Sufficient contractor capacity must be secured to deliver works at the required scale and pace.”*
- *“Resident engagement and access arrangements must be confirmed prior to rollout.”*

EV charging infrastructure – final CSF

- *“Grid capacity upgrades must be confirmed before procurement is initiated.”*

Heat network – final CSF

- *“Long-term anchor heat demand must be contractually secured to underpin financial viability.”*

Key learning

CSFs reflect what could stop a project from working, not what would make it ideal.

How CSFs Influence Preferred Option Selection

CSFs can override appraisal scores by testing whether a high-scoring option is realistically deliverable.

How this plays out in practice

- An option may score highest overall but fail one critical CSF
- A lower-scoring option may proceed because it meets all CSFs
- CSFs therefore act as a final decision filter

Illustrative sentence

“Although Option A scored highest overall, it was not recommended because it failed to meet a critical deliverability CSF.”

How CSFs Support Transparent Decision-Making

CSFs make explicit why certain options proceed and others do not.

Why this matters

- Decisions are traceable to clearly stated conditions
- Trade-offs are visible rather than implicit
- Scrutiny bodies can see how judgement was applied

Transparency statement

“The recommended option meets all critical success factors, while rejected options failed one or more non-negotiable conditions.”

How to Present CSFs to Senior Leadership

Senior leaders should see CSFs as decision safeguards, not technical detail.

Effective presentation approach

- Limit CSFs to five or fewer
- State each CSF in plain language
- Clearly indicate whether each CSF is met

Example leadership-facing sentence

“Approval is recommended subject to confirmation that all critical success factors are satisfied.”

Summary: Using CSFs to Strengthen Appraisal

Critical Success Factors translate strategy, risk, and ambition into clear conditions that determine whether an option should proceed.

CSFs sit *above* detailed scoring and help decision-makers focus on what truly matters for success — financial sustainability, deliverability, carbon impact, community acceptance, and long-term resilience.

Well-defined CSFs:

- Prevent technically strong but undeliverable options from progressing
- Make trade-offs explicit and defensible
- Support transparent, auditable decisions for senior leadership and funders

References

- [An Introductory Guide to Multi-Criteria Decision Analysis \(MCDA\)](#)
- [Use of Multi-Criteria Decision Analysis in options appraisal of economic cases](#)
- [Multi-criteria Analysis](#)

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