Stage 06

Assessing the practical feasibility of least-cost energy solutions

Regio1st Training Sessions

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Agenda

1 **Assessing the practical feasibility and socio-environmental aspects of regional energy planning**

- 1.1 **Step: Assess distributional impacts**
- 1.2 **Step: Evaluate the readiness of supply chains for the proposed technologies and solutions**
- 1.3 **Step: Assess the workforce capacity for the implementation of proposed options**
- 1.4 **Step: Organise stakeholder consultations to gather feedback and review options**

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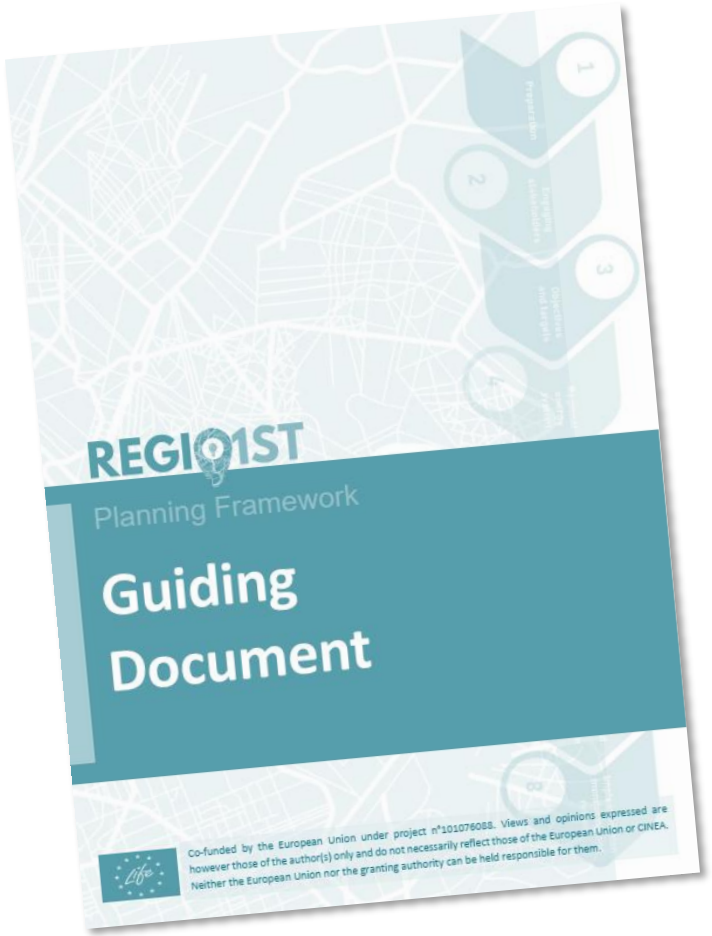
Overview of Step 6.1

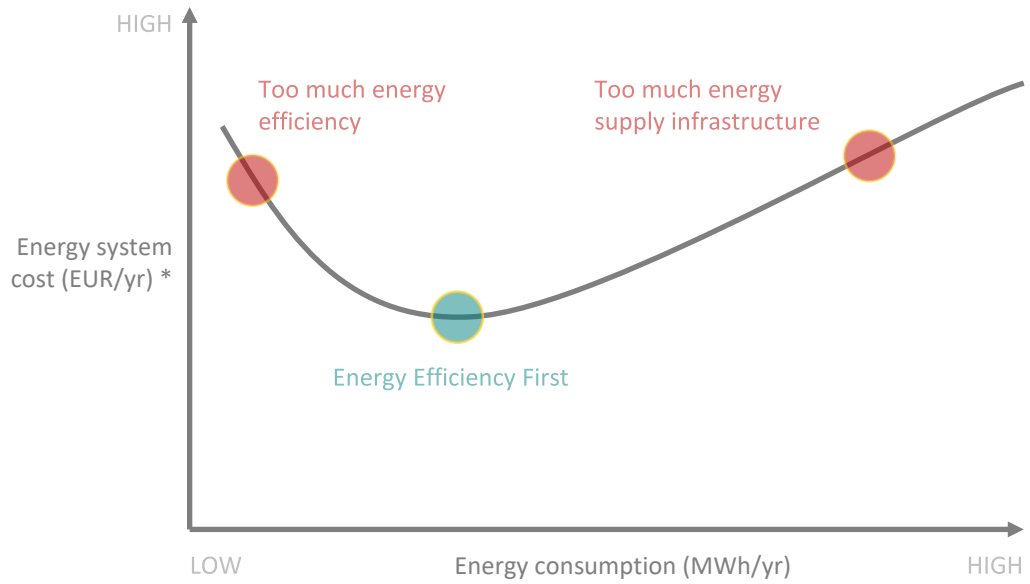


Assess distributional impacts

Planners should evaluate the distributional impacts of the energy solutions on different groups within the region, such as residents, businesses, and vulnerable populations. This assessment should consider factors such as energy access, affordability, and potential job creation or displacement. Identifying and addressing potential inequalities will help ensure that the regional energy plan promotes social equity and has broad support from the community.

Why assess distributional impacts?

Recap from last week's training: the EE1st principle is about optimality from society's perspective



* Total societal costs, including both direct (priced) costs, such as ongoing operating expenses, and indirect (unpriced) costs, such as the socio-environmental impacts of air pollution

Why assessing distributional impacts is crucial for regional energy planning in the context of EE1st

1. **Equity and fairness** | Different socioeconomic groups may be disproportionally affected differently by planning decisions (e.g. low-income households)
2. **Social acceptance** | Decisions gain more public support if they are seen as fair and if they consider the circumstances of all community members.
3. **Legal compliance** | Assessing distributional impacts is not just good practice but a legal requirement at the EU level (e.g. Art. 3(5)(b) EED)

What socioeconomic attributes can be relevant?

Income levels	Lower-income households often spend a higher proportion of their income on energy, making them more vulnerable to energy price fluctuations.
Age groups	Different age groups may have different needs. For example, elderly people might be more affected by decisions that lead to higher heating costs.
Geographical location	Residents of rural areas may have different energy needs and access issues compared to urban dwellers.
Household types	The composition of households (e.g., single-parent households vs. multi-family households) can influence energy consumption patterns and needs.
Employment status & sector	Individuals employed in certain sectors (e.g. coal industry) might be differently impacted by energy transitions.
Homeowner-ship vs. renting	Homeowners may have more flexibility to make energy-efficient upgrades than renters, who rely on landlords to make such improvements.
Educational level	Education level can influence a group's ability to access information about energy-saving measures and to adopt new technologies.

How to assess distributional impacts?

Data collection and analysis

Collect data on socioeconomic attributes (e.g. income) to understand baseline energy usage and expenditure

Stakeholder engagement

Hold meetings with community members to gather insights and concerns about planning decisions.

Scenario development

Use models to simulate the effect of different planning decisions on different groups.

Distributional impact analysis

Quantify impacts, e.g. energy expen-ditures, access to energy services, and economic welfare.

Equity-focused policy decisions

Develop strategies to mitigate negative impacts on vulnerable groups (e.g. grants).

Monitoring & evaluation

Regularly evaluate effects of decisions on different groups to make adjustments as necessary.

What does distributional impact analysis involve?

Distributional impact analysis

A Economic indicators

- Energy expenditure as percentage of income
- Employment impact

B Social indicators

- Energy poverty levels
- Access to energy services and health impacts

C Behavioural indicators

- Changes in energy usage patterns
- Adoption rates of energy efficiency solutions

D Policy-specific indicators

- Effectiveness of support measures
- Ease of access to support measures

What policy decisions could be drawn from this?

Equity-focused planning decisions

Types of targeted interventions to help ensure that measures are accessible and beneficial to all

Financial incentives

- Rebates and discounts on energy-efficient products to make them more affordable for specific groups, such as low-income households

Educational and outreach programmes

- Energy literacy campaigns among groups that have less access to information

Regulatory adjustments

- Flexible standards that take into account e.g. financial capabilities
- Requiring affordable and energy-efficient housing developments

Support services

- Providing free or subsidized technical assistance and installation support for energy efficiency improvements

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Overview of Step 6.2

Evaluate the readiness of supply chains for the proposed technologies and solutions

Planners should assess the availability and maturity of supply chains for the proposed energy technologies and solutions. This includes evaluating the local and regional availability of necessary equipment, materials, and services, as well as the degree of technological maturity and market readiness. An understanding of the supply chain landscape will help planners identify potential bottlenecks, risks, and opportunities, and inform the selection and prioritization of energy options.

Why should you care about supply chain readiness?

Reasons to care about supply chain readiness

What might happen if ignored

Feasibility and success of regional energy plan | Ensuring technologies and materials are available allows projects to start and finish on schedule, achieving planned energy savings and benefits.

Delays in project start or completion could lead to missed opportunities for energy savings and financial benefits. It may also result in loss of stakeholder trust and support.

Financial efficiency | A robust supply chain helps reduce costs through economies of scale and competitive pricing, making projects more affordable and appealing.

Costs may spiral, making projects financially unviable. This could deter investment in future energy efficiency initiatives.

Stimulating local economic growth | Developing a local supply chain for energy efficiency projects supports local businesses and creates jobs, boosting the regional economy.

Dependence on external supplies could lead to capital flight, fewer local jobs, and slower economic growth.

What does supply chain readiness involve?

Speed of deployment

A well-prepared supply chain can quickly provide the necessary technologies, materials, and skilled labour to roll out energy efficiency upgrades.

Scale of deployment

The capacity of the supply chain to operate at scale is essential for the widespread adoption of energy efficiency solutions, e.g. materials for building insulation.

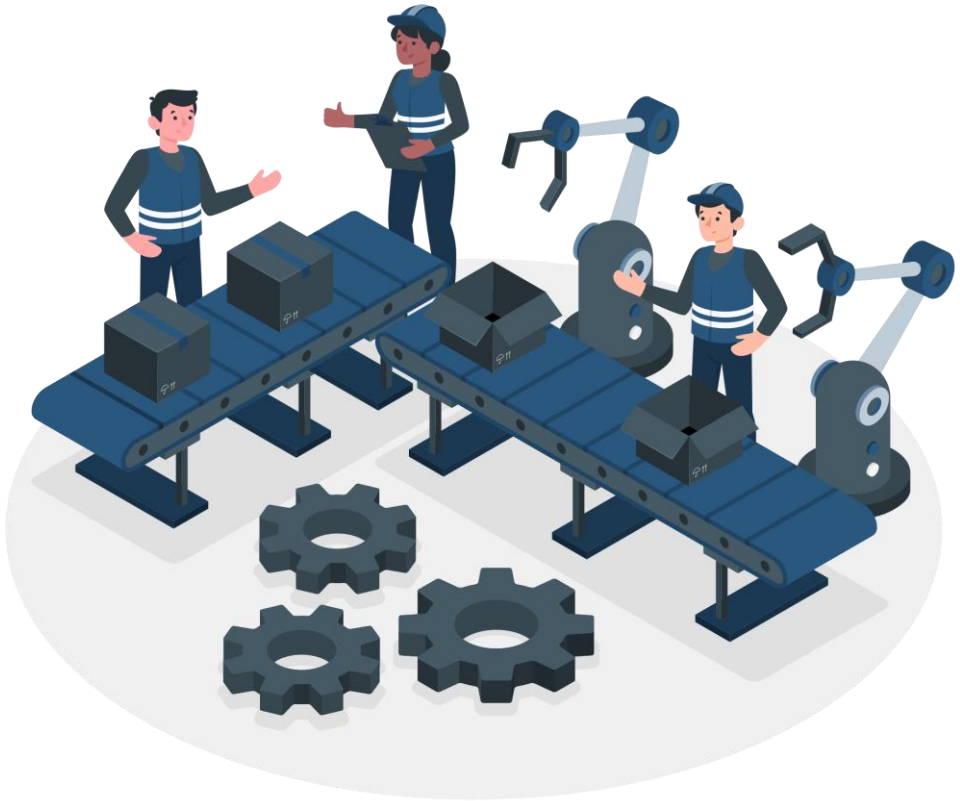
Resilience in supply

Resilience is about ensuring consistent availability of supply, even in the face of disruptions such as economic volatility, political changes, or natural disasters.

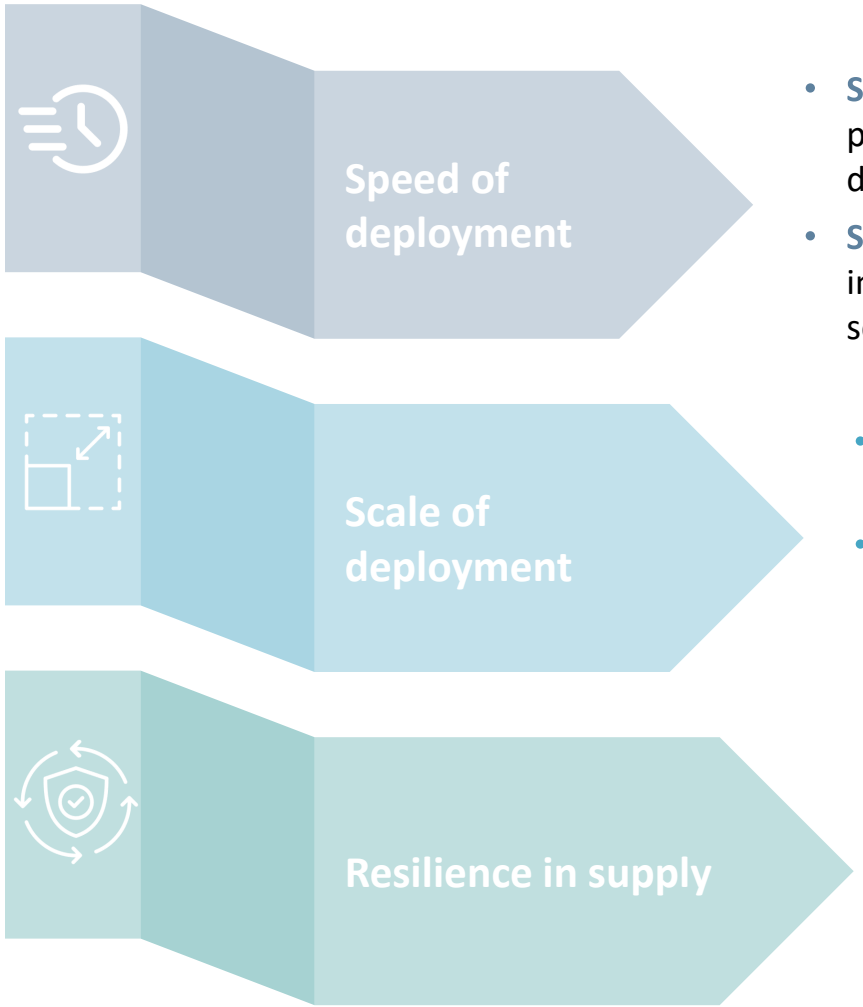
How to assess supply chain readiness?

Possible indicators to assess supply chain readiness in the region

Aspect	Indicator	Unit	Potential data sources
Speed	Time to implement energy efficiency projects (including equipment procurement and installation)	Days or weeks	Project management databases, contractor reports
Scale	Number of local suppliers for energy-efficient goods and services	Number of suppliers	Business registries, local chamber of commerce
	Volume of energy-efficient goods and services supplied	Units (could be number of items, service hours, etc.)	Production and sales data from suppliers, industry reports
Resilience	Number of alternative suppliers for key goods and services	Number of suppliers	Supplier diversity audits, risk management assessments



What are strategies to promote supply chains?



- **Streamlining permitting procedures** | Simplify and accelerate the approval processes for energy projects to reduce wait times and facilitate faster deployment of energy efficiency measures.
- **Supporting rapid prototyping and innovation** | Fund and encourage local innovation hubs and research institutions to develop and test energy efficiency solutions quickly, reducing time to market.

- **Strategic public procurement** | Set high standards in public tenders to promote wider adoption of sustainable and efficient technologies.
- **Promoting standardisation** | Encourage the adoption of standardized products and processes to facilitate large-scale production and implementation (e.g. through building codes).

- **Creating resilience audits** | Regularly conduct audits to assess the resilience of current energy-related supply chains, identifying vulnerabilities and planning necessary enhancements.

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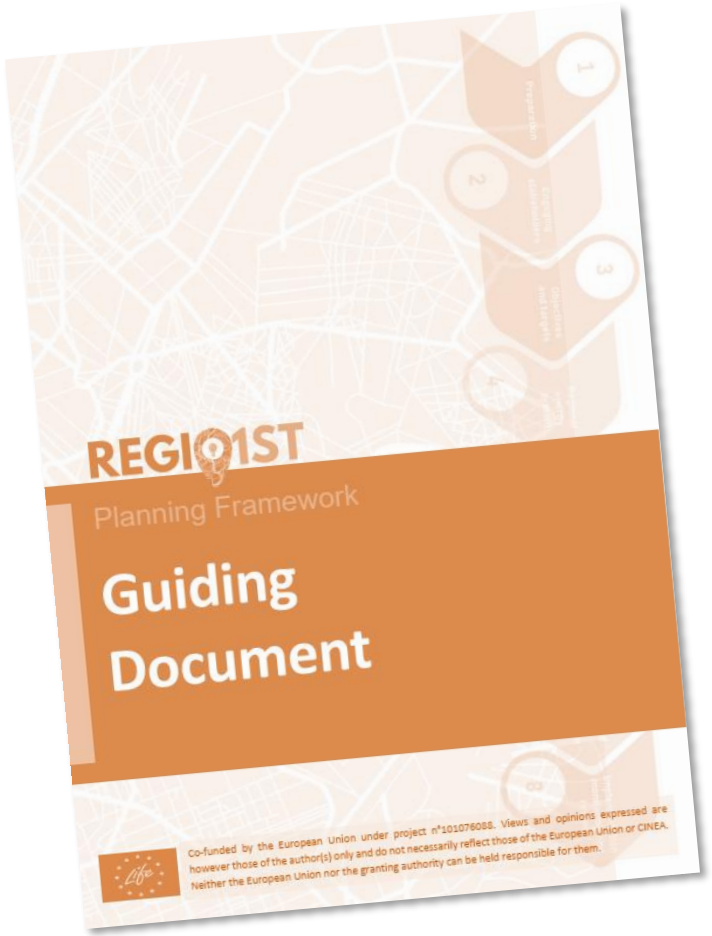

Assess the workforce capacity for the implementation of proposed options

In addition to supply chain considerations, planners should assess the workforce capacity to implement the proposed energy solutions. This involves evaluating the availability of skilled labour, the need for training and capacity-building programs, and the potential for job creation. Ensuring that the regional workforce has the necessary skills and expertise to support the selected energy solutions will be crucial for the successful implementation of the regional energy plan.

How to assess workforce capacity?

Possible indicators to assess workforce capacity in the region

Indicator	Unit	Description	Potential data sources
Educational attainment	%	Percentage of the workforce with relevant higher education degrees (e.g., in engineering, environmental sciences).	National statistics offices
Professional certification	Number	Number of professionals with certifications relevant to energy efficiency (e.g., certified energy managers).	Professional associations, certification bodies
Training programs completion	Number	Number of individuals completing specialized training programs in energy efficiency.	Training centres, trade schools, government reports
Employment in energy efficiency sector	Number	Represents the number of people employed in the energy sector, focusing on roles related to energy planning and efficiency.	Industry reports, labour market surveys, government reports
Research and development	Number / funding amount	The volume and scale of R&D projects related to energy efficiency within the region.	Research databases, government grants
Job vacancy rates	%	The proportion of unfilled positions in the energy sector, which can signal a skills shortage.	National statistics offices, industry reports

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Organise stakeholder consultations to gather feedback and review options

Finally, planners should organize stakeholder consultations to gather feedback and review the different energy solutions. These consultations should engage a diverse range of stakeholders, for instance businesses, local authorities, and other interested parties (including the public if deemed appropriate). Stakeholder consultations can take various forms, such as workshops, focus groups, online surveys and meetings. The objectives of the stakeholder consultations should be to:

- Present the findings of the cost-benefit analysis and practical feasibility assessment
- Solicit feedback on the proposed energy options, their distributional impacts, and potential implementation challenges
- Address concerns and answer questions from stakeholders
- Build stakeholder support and buy-in for the regional energy plan

From cost-benefit analysis to multi-criteria decision analysis

Cost-benefit analysis (CBA)

All impacts expressed in monetary values (€€€)

Criteria that are often hard to monetise and thus hard to integrate in a CBA

Criterion	Description
Distributional effects	Equity considerations and impacts on vulnerable populations.
Supply chain readiness	Availability and accessibility of specific technologies.
Workforce capacity	Availability of skilled labour to implement energy efficiency solutions
System reliability	Likelihood and frequency of system failures or maintenance needs.
Scalability	Ability of the system to cope with future demands or expansions.
Aesthetics	Impact of the installation measures on the visual appearance of the neighborhood.
Flexibility	Ability of the system to adapt to changing conditions, e.g., fluctuating energy prices.
Regulatory compliance	Compliance with local, national, and international regulations and laws.
...	...

Multi-criteria decision analysis (MCDA)

Impacts can be quantitative, qualitative, or a mix

Decision-support tools for regional energy planning

Aspect	Cost-Benefit Analysis (CBA)	Multi-Criteria Decision Analysis (MCDA)
Decision approach	Monetary-based; ideal for decisions where financial cost is the predominant concern.	Flexible and integrative; suitable for complex decisions with diverse and conflicting criteria.
Methodology	Quantitative; converts all impacts into monetary values for comparison.	Can be quantitative, qualitative, or a mix; uses scoring, ranking, or weighting of various criteria without necessarily converting to monetary values.
Outcome	Typically results in a single optimal solution based on net monetary gain.	Can result in multiple acceptable solutions, highlighting trade-offs and synergies among different criteria.
Stakeholder engagement	Limited direct engagement	Promotes active stakeholder engagement by incorporating diverse views and values in the decision-making process.
Transparency	High in financial transparency but may overlook wider benefits, unless monetised	Enhances decision-making transparency by showing how different criteria are valued and weighted.
Implementation	Requires sophisticated energy systems modelling and complementary approaches to quantify both system dynamics and wider benefits	Requires careful design to ensure criteria are relevant and appropriately weighted; can be complex to implement due to its participatory nature.
Suitability for regional energy planning	**Effective for assessing the economic viability of energy efficiency projects (incl. wider benefits) but typically needs supplementary MCDA for non-monetary impacts.**	**Highly suitable for aligning with the EE1st principle by considering a broad range of impacts and stakeholder perspectives, but typically requires CBA as a decision criterion for cost-effectiveness.**

Coming up in the Stage 7 workshop

Stage 7 Defining actions and developing the regional energy plan

This stage focuses on selecting specific actions and formulating a robust regional energy plan, based on the potential impact, cost-effectiveness, net benefits, distributional impacts, and alignment with stakeholder priorities of the optimal energy solutions.

Steps

Step 7.1 Prioritise energy interventions and develop the regional plan

In this step, planners should prioritize and select the energy solutions/interventions, considering their potential impact, cost-effectiveness, and alignment with the priorities of the various stakeholders. The prioritization process should be aligned with the energy efficiency first principle. Subsequently, a sound plan should be developed with specific actions/interventions and outlining for each, scope, responsibilities, timelines, estimated implementation costs, expected impact and likely funding sources/mechanisms. Demonstration projects should also be identified, i.e. projects that address specific challenges or opportunities in the region that can showcase the feasibility and benefits of innovative energy technologies or approaches and provide valuable learning experiences to the local community. These can help build public support, attract investments and stimulate local markets for new energy solutions.

Step 7.2 Establish a monitoring and evaluation system

Planners should establish robust monitoring and evaluation systems to track progress in implementing the regional energy plan and assess its performance against established objectives and targets. These systems should involve regular data collection, analysis, and reporting on key performance indicators, such as energy consumption, greenhouse gas emissions, renewable energy generation, and energy efficiency improvements. The monitoring and evaluation process should also involve periodic reviews and assessments of specific projects and actions to identify challenges, successes, and lessons learned.

Step 7.3 Pursue public acceptance and finalise the regional energy plan

The regional energy plan should be put out to public consultation to gather feedback from stakeholders and citizens, in order to ensure the public's acceptance and buy-in. After thoroughly considering the results of the public consultation, the plan should be finalised and published.

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elated Tools

ULTI-CRITERIA DECISION ANALYSIS (MCDA) TOOL

his Excel tool serves as a valuable aid for energy planners by facilitating the prioritization of arious energy options and ultimately supporting the decision-making process. The tool nables planners and stakeholders to derive aggregated scores and rankings, thus identifying he most feasible energy options for the region. In particular, it allows the selection of criteria nd the assignment of weights to these criteria, encompassing factors such as environmental ustainability, social equity and economic feasibility. Stakeholders and/or planners can then ssign scores to the selected criteria for each solution, aiding in a qualitative assessment, whilst the tool also assists decision-makers in quantifying qualitative impacts when evaluating olutions. Subsequently, it calculates scores to provide a quantitative assessment of impacts, nabling more informed decision-making.

ONITORING TEMPLATE

his template can assist planners in monitoring the implementation of the ctions/interventions incorporated in the regional energy plan. It can enable planners report n progress and on the impact of actions/interventions and evaluate their effectiveness.

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