GENERAL DIRECTORATE OF
DEVELOPMENT AGENCIES

İZMİR
DEVELOPMENT
AGENCY

GREEN TRANSFORMATION AND
BLUE OPPORTUNITIES
PERSPECTIVE FOR İZMİR

APPROACH and METHODOLOGY

BACKGROUND DOCUMENTS NO. 1

2022

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NO. 1

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CHAPTER 1.

Introduction

"Green Transformation and Blue Opportunities Perspective for İzmir", prepared in line with our agency's mission "To generate information based on Green and Blue Growth approaches and to develop pioneering, original and exemplary projects for İzmir" is the product of a long-term and intensive research, analysis and synthesis process.

The main basis of the perspective document, prepared with a differentiated and customized methodology while taking into account the needs of İzmir, is comprised of the studies carried out in the background, including different analyses, evaluations, calculations and studies. All these studies that provided input to the perspective document were reported under the following topics and published under the name of "Background Studies".

The report titled as "Approach and Methodology" is the first report among the "Background Studies" publication series, and aims to convey the technical background of the "perspective" study, which is the final synthesis report. This report covers the context and approach of the perspective study, its relationship with the upper scale documents, and the method followed to achieve the targeted result.

TCDD İzmir Port, Alsancak

CHAPTER 2.

Context and Approach

It has become a necessity to take measures for the efficient use and protection of natural resources in order to eliminate or minimize human-induced pressures on the environment. In the green and blue growth approach that emerged as a result of such necessity, efficient resource use and management is considered as the main objective of economic policy. The critical limit for the sustainable use of natural resources determines the threshold of production and consumption activities. For this reason, the process for transition to green and blue growth should be considered as starting a transformation that aims to change production and consumption structures on the basis of innovation, while encompassing the channeling of existing economic investments to green economic activities and clean technologies. The activation of the underutilized potential of the seas and coasts for employment and growth, and the introduction of necessary measures and rehabilitation programs with an understanding that will ensure the preservation of the marine environment and biodiversity also open a new window, which we refer to as blue opportunities. Considering the stabilizing role of the seas on global climate characteristics, supporting biodiversity, capturing increased carbon dioxide in the atmosphere, and other functions in combating climate change, it should not be forgotten that this window of opportunity, if properly utilized, will offer a perspective towards ensuring the well-being of not only our economies but also our planet.

In the current period, the agenda and developments on climate change, sustainable and inclusive development, strengthening resilience, and national policies and engagements provide an important basis and impetus for a transformation based on the green and blue growth approach. The Paris Agreement, which forms the framework of the climate change regime, entered into force in 2016 in result of fulfilling the condition that at least 55 parties, which account for 55% of global greenhouse gas emissions, ratify the agreement. The Paris Agreement aims to strengthen global socioeconomic resilience against the threat of climate change in the post-2020 period. In our country, the Proposal for Approval of the Paris Agreement was accepted in the General Assembly of the Grand National Assembly of Turkey and became effective after being published in the Official Gazette with date 7 October 2021 and no. 31621.

With The European Green Deal announced towards the end of 2019, the European Union has set its goal of being the first climate-neutral continent in 2050. The Union has also announced that it will adopt a new growth strategy that requires the transformation of its industry and that it will reshape all its policies in the axis of climate change. The growth strategy of the Union within the scope of the defined goals is structured around a total of 7 policy areas: clean energy, sustainable industry, building and renovation, farm to fork, elimination of pollution, sustainable mobility and biodiversity. The policies to combat the climate crisis, organized within the framework of the Green Deal, not only bind the European Union and the European continent countries, but also bind all other countries that have commercial and economic relations with these countries.

The Green Deal includes creating standards, labeling systems, taxes and non-tariff barriers for efficient use of resources and reduction of waste emissions, especially for export products. Through this system to be implemented with the aim of effectively pricing carbon in the entire economy, it will become mandatory for the polluting sectors that consume resources and energy in the coming period to meet the determined standards, otherwise, there may be losses in foreign trade revenues.

Turkey, in connection with foreign trade, carefully monitors the policy changes aimed to be implemented by the European Union and the effects of the Customs Union relations. The need has arisen also for a roadmap for evaluating the effects of these changes on industry, agriculture, energy and transportation policies and for ensuring harmonization. In this direction, as a result of the studies carried out under the coordination of the Ministry of Commerce, the Green Reconciliation Action Plan was published in 2021. The plan includes a total of 32 targets and 81 actions under 9 main headings.

Considering the experiences gained internationally, it is observed that the transition to green and blue growth is generally realized through programs carried out on a national scale and under public ownership. Transition programs implemented on a regional scale, on the other hand, aim to initiate the transformation by creating an impact in the short term with clear and applicable targets determined in line with the needs of the local, and to establish the regional capacity, will and coordination required for a long and permanent transformation. In the transition to green and blue growth, it is necessary to focus on certain areas, that is, to determine a strategic path by prioritizing and by taking into account the constraints and opportunities that arise in the current economic order. In the determination of these areas, factors such as institutional and social capacity at the relevant socio-spatial scale, workforce and skills, state of natural resources, development of urban infrastructure, current technology level, qualifications of economic activities, industrial structure occur to be determinative.

It takes a long time to see the gains from the investments made for green and blue transformation and the improvement effects on natural resources at national or regional scale. However, it is expected that the incremental action programs implemented to achieve these long-term goals will provide incremental improvements that can be followed in a short time. From this perspective, it is necessary to focus on strategically determined intervention areas where improvements can be achieved in the short term, and to identify the points where change will be most effective, taking into account the required investment sizes and capacities. In addition, it is likewise important to ensure that the priority determination study to be carried out at the regional level for İzmir is compatible with national priorities.

Considering the striking examples where regional green transformation efforts have led to national policies in recent years, it is considered that a green growth transition strategy to be implemented at the regional level in our country will provide guidance in terms of national policies. With its natural resources that have reached the limit of its capacity to renew itself, sensitive ecosystems that need to be protected, a rapidly growing polluting industry and marine areas waiting to be evaluated with a sustainable understanding, İzmir employ a strategic and advantageous location in terms of initializing the regional green and blue transformation initiative with its current social and institutional capacity, opportunities in the field of renewable energy.

Karaburun, Sarpıncık

CHAPTER 3.

Stages and Methodology Of The Study

The Green Transformation and Blue Opportunities Perspective, prepared for İzmir, aims to demonstrate the magnitude of the existing risks and how they can be mitigated with the transition to green and blue growth, the economic, environmental and social benefits that will occur with various intervention scenarios, how the opportunities will be created around sustainable technologies and industries, and the gains offered by such opportunities.

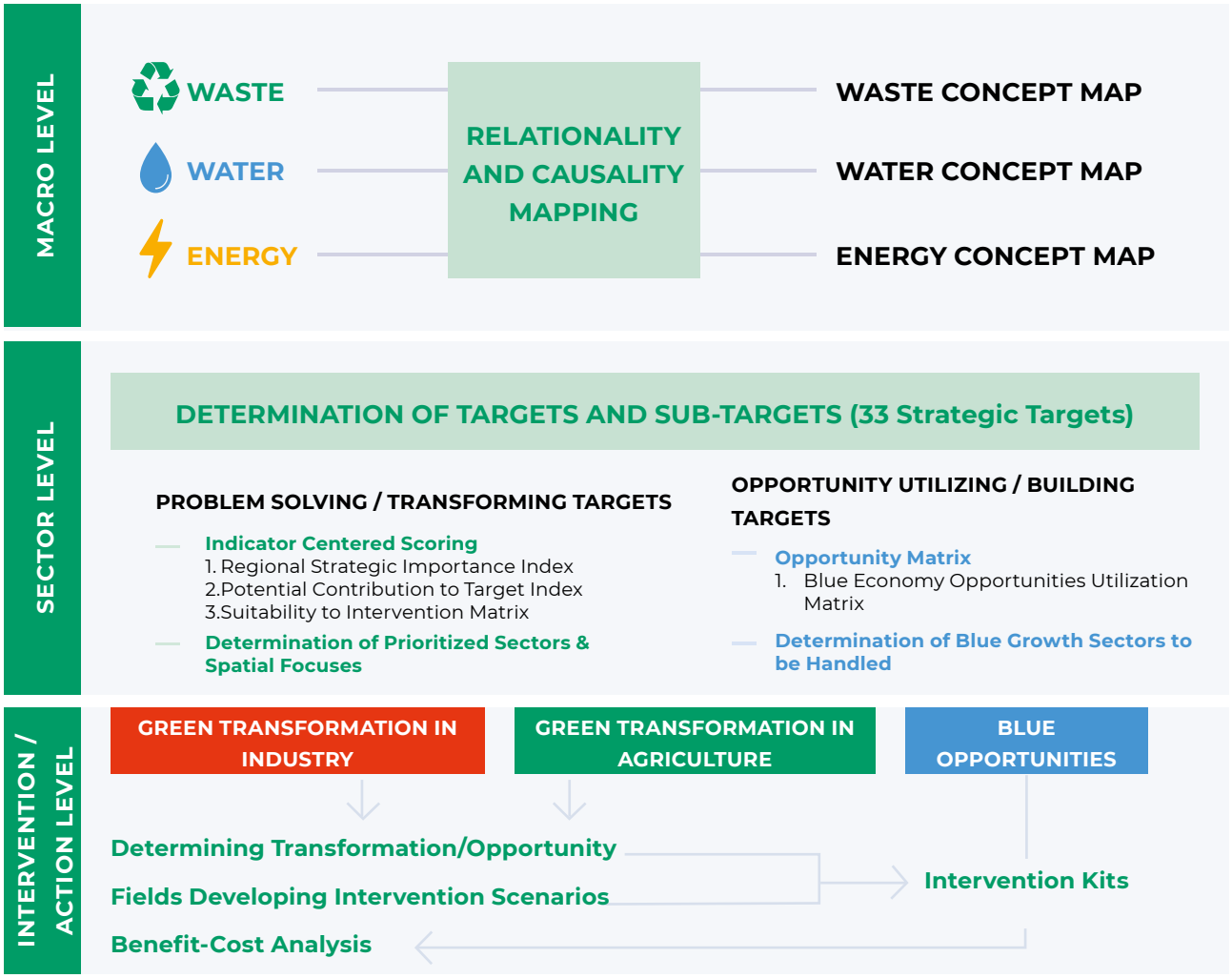
The perspective study addresses the whole issue of transformation in İzmir, determines targets, and makes strategic choices among potential areas where interventions will be developed, in order to achieve such targets. The original methodology adopted in the study;

- Narrows the focus area for intervention through qualitative and quantitative assessments from macro level to sub-sector level,
- Keeps in mind the elements that were abandoned during the high-level strategic selections as opportunities that can be used in the lower-level evaluations,
- Thus differentiates the weight given to the criteria used for selection according to the reality of the scale in which the evaluation is made, and
- Prioritizes the needs of the local.

From this point of view, the methodology of the study that reveals the green transformation and blue opportunities for İzmir, has a three-layered architecture.

- Macro level
- Sector level
- Intervention / action level

FIGURE 1. The scope of the study, the study stages and the methodology followed



3.1. Macro Level

The macro level aims to create an analytical and strategic framework in line with meso-level evaluations (sector level) and micro-level evaluations (intervention/action level) that will provide sectoral focus. In terms of its scope; it involves putting a large, difficult to understand and uncontrollable problematic into a framework that can be understood, planned and intervened by subjecting it to a multi-faceted evaluation, and determining the priority areas suitable for the nature of the intervention by making strategic choices.

Determination of Transformation / Opportunity Fieldsi

In order to transform an existing mode of operation into another, it is necessary to soundly analyze the existing situation, determine the possibilities and constraints, and take into account the capacity to do, that is, the possibility of operationalization. In this context, within the scope of the study, there is certain need for an evaluation as to which of the green and blue strategic fields such as energy, water, air quality, waste, green jobs, biodiversity and nature protection will be the planes that will form the framework of the regional transformation perspective, namely the transformation/opportunity fields.

For the determination the transformation / opportunity fields for İzmir, (1) the problem areas within the current economic structure and the potential healing effect of the transformation in these fields, (2) the existing assets and the desired transformation accelerator effect of the opportunities indicated by such asset potential were evaluated. In addition, the availability of local capacities and skills required for green transformation, the completed and ongoing work for the region's transition to green growth (hands-on and near-future engagements), and finally the national policy framework have been guiding. In this direction, three inclusive and strategic priority areas for İzmir, where the impact of transformation can be seen at high levels, have been determined, namely as **waste, water** and **energy.**

WASTE

Izmir alone produces 9% of Turkey's total waste and a quarter of hazardous waste. However, the recycling rate of the collected waste is as low as 10%. Unless an effective waste management system is established in Izmir, where waste is separated, collected and recovered according to the types of sources, it does not seem possible to obtain high-quality and sufficient amounts of sustainable raw materials needed by the plastic, paper, glass and metal sectors from within the Jul.

Along with the transition to green growth, re-economizing waste with a circular economy approach will ensure that input costs are reduced in sectors dependent on imported raw materials, as well as protecting natural resources.

WATER

One of the most strategic natural resources in ensuring the continuity of the current economic structure of İzmir is water. The effect of water scarcity due to excessive use and pollution of water reserves is observable today, especially in regions with high agricultural production and agro-industrial potential, such as the Küçük Menderes Basin; there is risk of interruption in production and the type of production here is growing in a way that increases the existing problems related to water. This reveals a deepening conflict situation.

With the transition to green growth, ensuring the controlled and efficient use of water resources, revealing the economic value of water and reducing the risks related to water resources for the continuity of growth bring a strategic and urgent transformation program for the region.

ENERGY

İzmir is a province where many opportunities can be found for green transformation in energy focus, with its high potential for primary resources in renewable energy, the existence of significant installed power and investment, its relative superiority in the production of renewable energy equipment and its growth perspective in the context of increasing investments. Considering the energy-intensive industrial structure and the increasing energy needs of the population, it is considered that it will be one of the regions where the impact of the transformation will be observed the most.

It is expected that new investments with high environmental performance will increase, clean production practices will become widespread, energy efficiency and clean energy use will rise, and new sectors and technologies will develop with the realization of green transformation and blue opportunities of İzmir in these three fields where economic opportunities will be created while reducing environmental impacts. Thus, new job opportunities will be created, employment and income increase will be provided.

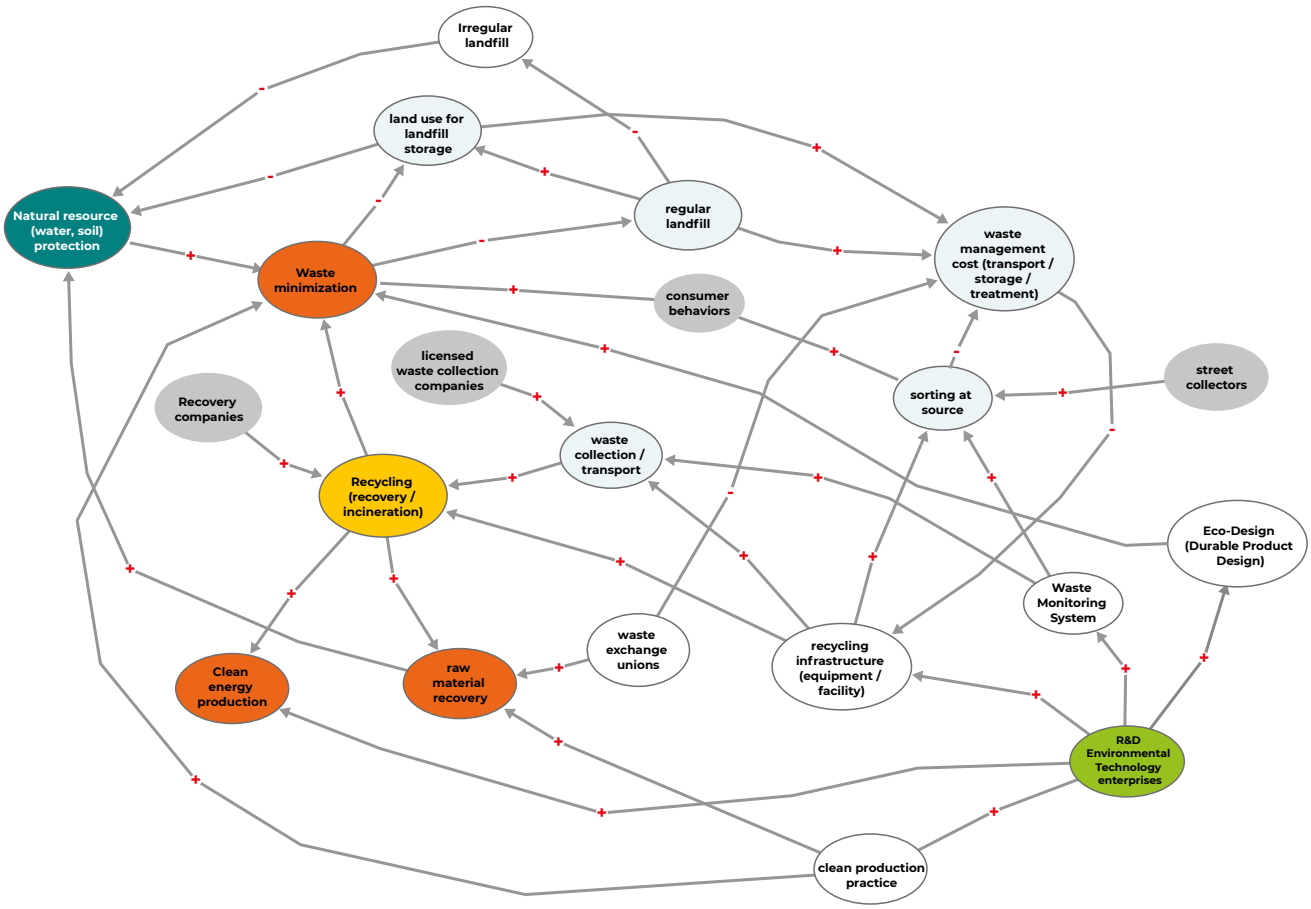
It is important to see the potential returns to İzmir within a certain time projection of the transformation and opportunity effect in terms of making fundamental choices. In this direction, as a first step within the scope of macro evaluation, gain and cost calculations are made based on transformation scenarios in the fields of resource efficiency, sustainable waste management and renewable energy (See Background Studies No:3, Potential Gains Offered by Green Transformation in İzmir).

Relationality / Causality Mapping

After revealing the potential gains in the fields of waste, water and energy, the programming phase for realizing these gains at the highest level was commenced, and causalities and relations in the relevant fields are analyzed.

In order to initiate a comprehensive transformation and transition to a green and blue economy, it is necessary to evaluate the problems, opportunities, limitations and possibilities at the regional level and to determine the targets as a result. This study is based on the evaluation of the information and findings about the region obtained from the different content studies carried out by our agency in the past on the subject, and the review of relevant national, regional, sectoral and thematic studies and policy documents. On the basis of such information, problems, possibilities and causality relations between them are evaluated with conceptual/mental mapping exercises carried out in the three determined fields (waste, water and energy).

FIGURE 2. Conceptual mapping study for the field of waste



Determination of Targets and Sub-Targets

In the international and national studies conducted on the transition to a green and blue growth economy, various development axes on which there is a great deal of consensus may be observed seen. It is seen that the elements revealed in the conceptual mapping study, the causality/relationality links between them, and the actions that focus on the targets and stakeholders they point to are grouped under four basic axes;

- Conservation of Natural Resources
- Efficient and Sustainable Use of Resources
- Green and Blue Growth Economic Opportunities
- Social Welfare and Inclusive Growth

With the growth axes conceptualization, the mapping results are finalized with forward and feedback feeds. A total of 13 targets, five in the 'waste' field, five in the 'water' field and three in the 'energy' field, are determined, a total of 52 sub-targets are determined under all these targets (ANNEX-1).

It is considered that the targets determined within the scope of the study present a framework that points to the necessary interventions for the transition of our region to the envisaged blue and green economy. An analysis method has been designed to determine the sectors to be focused and prioritized and the places where they are concentrated in line with these determined targets. By means of the analysis method developed, it is aimed to make significant progress towards a specific target in the short-medium term in the sectors to be prioritized within the İzmir Region, and to maintain the level of such progress, the regional multiplier effect and the diffusion power at high levels. Therefore, on the one hand, it is aimed to identify the focal sectors that have the potential to serve such purposes, and on the other hand, it is aimed to concentrate on the targets that could provide rapid results open to interventions at the regional level. In this respect, 52 sub-targets determined are subjected to a strategic selection and the ones suitable for the mentioned qualifications are determined.

The expectation that each sub-target field will meet both of these criteria is checked through the evaluations made with the criteria of getting rapid results and suitability for regional/sectoral intervention. As can be seen from Table 2, the target areas that were evaluated as meeting both criteria are determined, and it is decided to continue the following processes based on these targets. While 33 of the 52 sub-target fields are prioritized in this strategic selection, 19 target areas are excluded from the scope of the study as they did not meet one or both of these criteria (ANNEX-1).

TABLE 1. Example cross-section for targets and sub-targets

Opportunity & Transformation Field	Priorities & Targets	Sub-Targets
WASTE	1) Reducing waste generation	1.1. Extending product life through design, reuse and shared use
		1.2. Reducing the use of raw materials and chemicals
		1.3. Use of technologies that reduce waste generation in production
		1.4. Dissemination of sustainable consumption habits
		1.5. Reducing the use of packaging, promoting simple packaging

TABLE 2. Strategic sub-target selection

Opportunity & Transformation Field	Priorities & Targets	Sub-Targets	Strategic sub-target selection	
			Rapid Results	**Suitability for Regional/Sectoral Intervention**
			Long-term and high-cost targets are not taken into account. 5-year period is taken into account	Types of interventions considered for evaluation; 1- Physical investment (common) (-) 2- Technology & R&D development (+) 3- Physical infrastructure investment (joint) (+) 4- Developing human and social capital (+) 5- Financial resource development (+) 6- Legal, administrative framework and standard setting (-) 7- Creating a governance mechanism (+) 8- Multi-level governance (suitability for regional intervention) (-)
WASTE	1) Reducing waste generation	1.1. Extending product life through design, reuse and common use		*
		1.2. Reducing the use of raw materials and chemicals	*	*
		1.3. Use of technologies that reduce waste generation in production	*	*
		1.4. Dissemination of sustainable consumption habits	*	
		1.5. Reducing the use of packaging, promoting simple packaging	*	*

It should be noted that this evaluation is a macro-level evaluation. Interventions that are evaluated as not meeting the criteria determined by this scale may be brought to the agenda again in the future evaluations to be made at meso and micro scale. To give an example, although the target 1.4. 'Disseminating Sustainable Consumption Habits' is not a priority in the macro-level evaluation since it requires a widespread and multi-dimensional intervention design and can only be achieved with the implementation of a long-term and stable policy, it may be possible to include if it describes a sub-intervention in the target field and a focus sector to be determined in the later stages of the studies.

When the determined targets are evaluated, it is seen that they can be classified under two different types in terms of their qualities. The first of these are the objectives that are determined based on problem identification, and therefore lead to problem-solving actions. Which sectors should be focused on for these types of objectives will be defined by answering where the problem is seen at the highest level, independent of other variables that will determine the success and impact of the intervention. For example, sectors with the highest amount of waste generated will potentially make the highest contribution to the goal of reducing waste.

For the targets under the others classification, the term 'opportunity-based' is made within the scope of the study. Targets of this type rather exhibit qualities that indicate which R&D and technology development areas should be focused by pointing to the technology portfolio that may be prioritized, mostly seeking and evaluating the 'new' and the 'opportunity', and incline towards mobilizing the potentials within the framework of an asset-oriented approach.

In order to overcome the problem of determining the problem-based and opportunity-based targets and the intervention unit/focus to achieve them, a need for an interim evaluation has arisen.

In problem-based targets, the targeted sector, which should be dealt with as a priority for intervention, may be the place where the problem arises and occurs due to its nature. In this case, it will be necessary to identify the sector as the 'perpetrator of the problem'. It is possible to do this on the basis of various indicators. On the other hand, the actor of the main intervention to solve the problem may be the public sector, which is not a direct party to the problem, but can be the 'agent of the solution' due to its regulatory and executive qualities. Most of the time, the responsibilities and authorities related to the development of solutions are determined within the framework of the law. Therefore, in certain problem areas (as in the problem-based target of 'development and strengthening of area management models such as integrated basin management and integrated coastal areas management'), the main actor of the solution is indisputably public institutions and organizations. To give another example, in cases where the basic activity required to solve the relevant problem is the development of information and technology (as in the problem-based objective of 'development of techniques and technologies for the reduction of hydrological disaster risks'), while the unit/focus for the response occurs to be universities, technoparks, R&D and design centers and technology entrepreneurs. Therefore, when the development of an intervention for certain targets requires a public policy/intervention or focuses on the development of knowledge, technique and technology, it becomes difficult to determine the intervention unit on the basis of economic sectors.

Considering the opportunity-based targets, the targeted sector that should be focused on for the intervention may be a sector that benefits from the potential gains of the opportunity. Such a relatively passive sector will need to act together with other sectors (public sector and/or information & technology developers) that are the 'agent of the solution'. Therefore, the focus of the intervention is likely to have a multi-stakeholder composition, not resting on a single economic sector.

TABLE 3. Intervention unit/focus type classification

Intervention Unit/Focus	Characteristic	Suitable for Comparison of Prioritization	Not Suitable for Comparison of Prioritization
Economic Sectors	Sectoral	+	
Public Sectors	Sectoral & Thematical		+
Information & Technology Developers *	Thematical		+
Spatial Focuses (OIZ, Basin, City etc.)	Spatial	+	

** University, Technopark, R&D and Design Centers, Entrepreneurs*

Seen above, the point of the analysis attempt on the problem of determining the problem-based and opportunity-based targets and the intervention unit to be focused on to achieve them indicates that the unit/focus that will be determined as the study/research object for the realization of a certain target within the scope of this study can be defined in different types (an industrial sector, a government agency, a technology development cluster, or an industrial site). Therefore, there is a need to develop a variable approach among different study phases to cover these different types.

Since the main question of our study is to identify the priority sectors that need to be intervened in order to initiate the green and blue transformation in our region, an analysis study to be carried out using regional indicators based on the classification of economic activities may result in a comparative prioritization for economic sectors and agglomeration/clustering (spatial) focuses. For public sectors and information & technology developers, whose qualifications and organizational forms may be evaluated thematically, the available data infrastructure does not offer a similar analysis opportunity. For this reason, in the next stage of the study, a lower level analysis will be carried out to provide sectoral and spatial focus.

When it comes to the intervention/action development phase for the relevant target field, that is, while the micro-level assessment is made, the public sectors and information & technology developers may be positioned as the main interlocutor/actor/owner of the intervention design and execution, if the results of the stakeholder analysis necessitate it.

Accessible and reliable data opportunities are evaluated and appropriate indicators are determined for 33 targets defined as a result of strategic selections.

The problem of determining the strategic areas that İzmir should focus on in order to make progress in green and blue transformation in the next 10 years has been approached from the perspective of interventions that solve problems, program the transformation of the existing structure, and aim to build the 'new' one by utilizing competitive advantages and opportunities. While on one hand the evaluation was made in the context of the scale, dominance and depth of the problems, on the other hand, the assets of the region, the level of local capacity and skills, the studies and investments carried out in the region and expected to be carried out in the near future, and the national and regional policy agenda formed the basis for this evaluation.

3.2. Sector Level

The aim at this point is to identify the sectors that should be focused primarily in terms of transformation and opportunities that will arise with transformation in the fields of **waste, water** and **energy,** together with their spatial connections. Multi-criteria decision making method was used to prioritize the sectors on the basis of the determined targets. The decision-making method developed at the sector level has a three-stage evaluation framework.

In the first stage, the Potential Contribution to the Target Index is developed to measure the contribution of the sectors to achieving the target through the indicators determined for each target, and then the Strategic Importance Index is created for the Region by using foreign trade, specialization, dominance, scale and value added data for all sectors operating in İzmir. In the last stage, using the Suitability to Intervention Matrix, sectors with high potential contribution to the target and strategic importance for the region are evaluated on the basis of model implementation and expansion potential, sectoral multiplier effect, suitability for regional intervention and necessity/motivation criteria for transformation and expert opinions.

Sectors selected for each target are synthesized in terms of green transformation and blue economy opportunities, and study areas are created on a sectoral scale. A different method has been followed in determining the sectors to be prioritized within the scope of the target of “evaluating the blue economy potential” under the transformation field of water. Blue growth sectors are analyzed on the basis of employment-based specialization, dominance and scale indicators, and those with a 'mature' and 'growing' nature are identified. In addition, 'promising' blue growth sectors are determined in the expert evaluation carried out using innovation, competitiveness, policy compliance, spillover effect and sustainability criteria.

As a result of the data-based studies carried out for the identified priority sectors, the sub-sectors with the potential to make the greatest contribution to the green transformation and blue opportunities perspective and the spatial focuses where they are concentrated are determined.

At the regional level, there are difficulties in making sector prioritization in order to achieve multidimensional, multi-actor and differentiated objectives. The most important of these occurred to be the difficulty in obtaining data to base such prioritization on. The availability of 'high resolution' and reliable data that can be used is important for an accurate representation of the situation. On the other hand, if a region determines where it will focus its attention and resources on a sectoral basis in order to realize the green and blue transformation on waste, water and energy levels, this will force it to make a multi-faceted evaluation. As a matter of fact, a sector to be prioritized is a strategic part of the regional socio-economic system in terms of both its ability to serve the target at a high level of transformation/opportunity effect, therefore being one of the leading parties of the problem or opportunity, it is also expected to be in terms of production, export, employment, technology used and similar factors. Even if all these are provided, it is very important to have operational availability and aptitude that allows the desired intervention to be carried out effectively in a prioritized sector, beyond its structural characteristics. In the light of these evaluations, a decision-making method with a three-dimensional evaluation framework, has been developed for the realization of sectoral prioritization.

For the 33 areas identified as strategic targets, accessible and meaningful indicators have been identified in order to measure the depth and dominance of the problem, especially in problem-based ones (ANNEX-1). Based on these indicators defined, an index is developed for each target area according to the sector classification, and this index developed for problem-based target areas is named as the “Potential Contribution to the Target Index” (Table 4).

In determining the sectors to be prioritized, it is important to identify the sectors with the highest share/contribution on the basis of indicators in terms of achieving the target, as well as the regional position of the relevant sector and thus the potential for the direct and indirect impact of an intervention on the regional economy. This evaluation level is included in the analysis framework in the form of the "Strategic Importance for the Region Index" (Table 5).

These two indices created for each target area are evaluated together, and sectors (Group 3) determined to be relatively low in both their contribution to the target and their strategic importance for the region (Group 3) are excluded from the analysis made for the relevant target. In Figure 3, the sectors located in Group 1 and Group 2 are subjected to expert evaluation by using the "Suitability to Intervention Matrix" developed to form the third level of the evaluation.

TABLE 4. Potential contribution to the target ındex

Indicators				Potential Contribution of the Sector/ Intervention Unit to the Strategic Target									Average Score
				Water - Target A			Water - Target B			Water - Target C			
				G-1	G-2	G-3	G-1	G-4	G-5	G-3	G-4	G-5	
Opportunity & Transformation Field	Problem Based Target-1	Economic Sectors	Sector-A										
			Sector-B										
			Sector-C										
			Sector-D										

TABLE 5. Strategic ımportance for the region ındex

Indicators		Strategic Importance of the Sector/Intervention Unit for the Region							Average Score
		Foreign Trade		Specialization(LQ)		Scale	Dominance	Value Added	
		Export (Dollar) 2019	Foreign Trade Balance (Dollar) 2019	Number of Social Insured 2019	Net Sales 2018	Number of Social Insured 2019	Net Sales 2018	Value Added Ratio (GVA/Total Production)	
Economic Sectors	Sector-A								
	Sector-B								
	Sector-C								
	Sector-D								

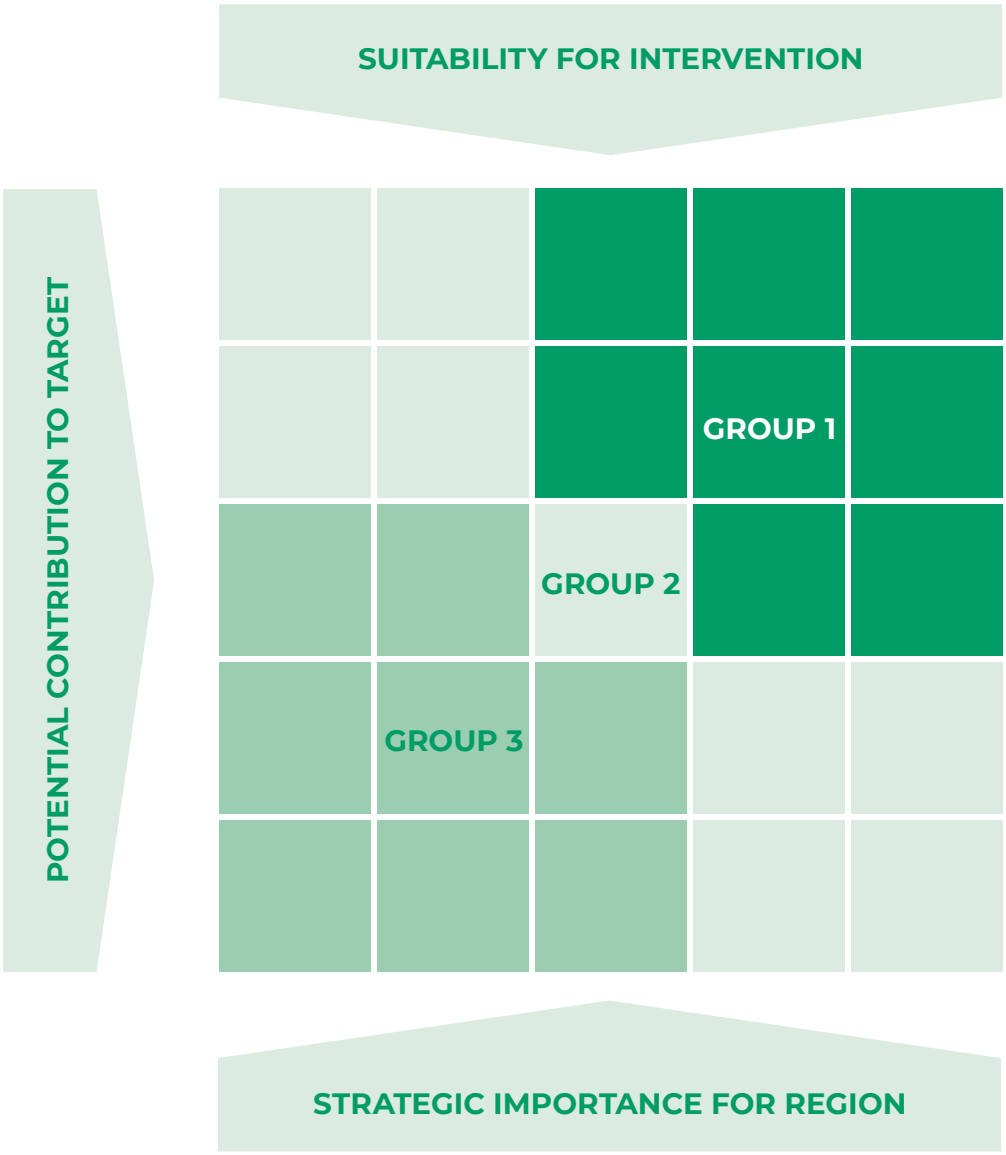
TABLE 6. Suitability for intervention matrix

Criteria		C. Sector/Intervention Unit Suitability for Effective Intervention				
		Importance for Regional Intervention Evaluation of sector classification results Group 1 *** Group 2 **	**Potential to Become a Model Application with Widespread Use** 1) Potential for social, technological, financial innovation and adaptability 2) Relevance of the product lifecycle to systemic intervention and the orientation of different interest groups towards collaborative solutions 3) Potential to create behavioral change in the context of environmental sustainability 4) Potential contribution to social welfare, inclusion and participation in the region	**Sectoral Multiplier Effect** Input-Output Analysis assessment	**Availability and Feasibility of Regional Intervention** 1) Existence of defined, auditable stakeholder composition and institutional/social depth 2) Spatial and administrative organizational capacity 3) Potential for rapid local results (not too long-term and not too costly) 4) Level of prioritization, ownership by stakeholders and investment attractiveness at international, national, local and sectoral levels	**External Motivation/ Mandatory Adaptation Necessity** 1) Obligation to adapt to changes in foreign trade rules and standards 2) Obligation to comply with national legal and administrative policies and regulations 3) Motivation to eliminate risks that reduce efficiency and profitability
Opportunity & Transformation Field, Problem Based Target-1	Sector-A					
	Sector-B					
	Sector-C					
	Sector-D					

[1] In the conformity assessment, each sector was given at least 1 and maximum 3 stars within the scope of the relevant criteria.

With the completion of this level, which is based on expert evaluation on the basis of the criteria determined and which in a way forms the 'z' axis of our evaluation universe, priority sectors have been determined for each target field that we have defined under problem-based classification.

FIGURE 3. Evaluation index chart



In identifying priority sectors for opportunity-oriented targets, a different evaluation method was used than the approach followed for problem-oriented targets. In the determination of priority sectors for the opportunity-oriented objective of “utilizing the blue economy potential of the water transformation/opportunity area”, firstly, the sectors that will contribute to the blue economy potential are defined. Definitions, sub-groups and activity codes of these sectors have been determined by taking into account the international strategies and acceptances on blue growth. Next, blue growth sectors were analyzed in terms of development, performance and development potentials.

In order to determine the sectors to be prioritized, the relevant sectors were analyzed on the basis of “employment-based specialization”, “dominance” and “scale” indicators and classified as “mature sectors” and “growing sectors”. In addition, 'promising' blue growth sectors that are not exactly covered in NACE classification, not currently operating at a significant level, or with thematic features are determined using the criteria of “innovation”, “competitiveness”, “compliance with policies”, “spillability” and “sustainability”, as a result of expert evaluation. (Table 7).

TABLE 7. Blue economy opportunities evaluation matrix

Evaluation of Blue Economy Potential	Mature Sectors	Growing Sectors	Promising Sectors			
Industries	Sophistication Score (Employment/Specialization+ Dominance+ Scale, 2019)	Change Score (Specialization, 2015-2019	Innovation	Competitiveness	Policy Compliance	Spillover Effect
Aquaculture Primary Production						
Aquaculture Processing and Distribution						
Ports						
Water Projects Construction						
Shipbuilding and Repair						
Marine Equipment and Machinery Production						
Ship Recycling						
Sea Freight Shipping and Transportation						
Coastal Tourism Accommodation						
Coastal Tourism Transportation						
Marine Biotechnology						
Marine Energy (wave, tide, hydrogen)						
Offshore Oil and Gas Extraction						
Marine Mining						
Coastal Tourism (Cruise, yachting and marinas, marine recreation)						
Preventing Hydrological Disaster Risks						
High-Tech Marine Products and Equipment						

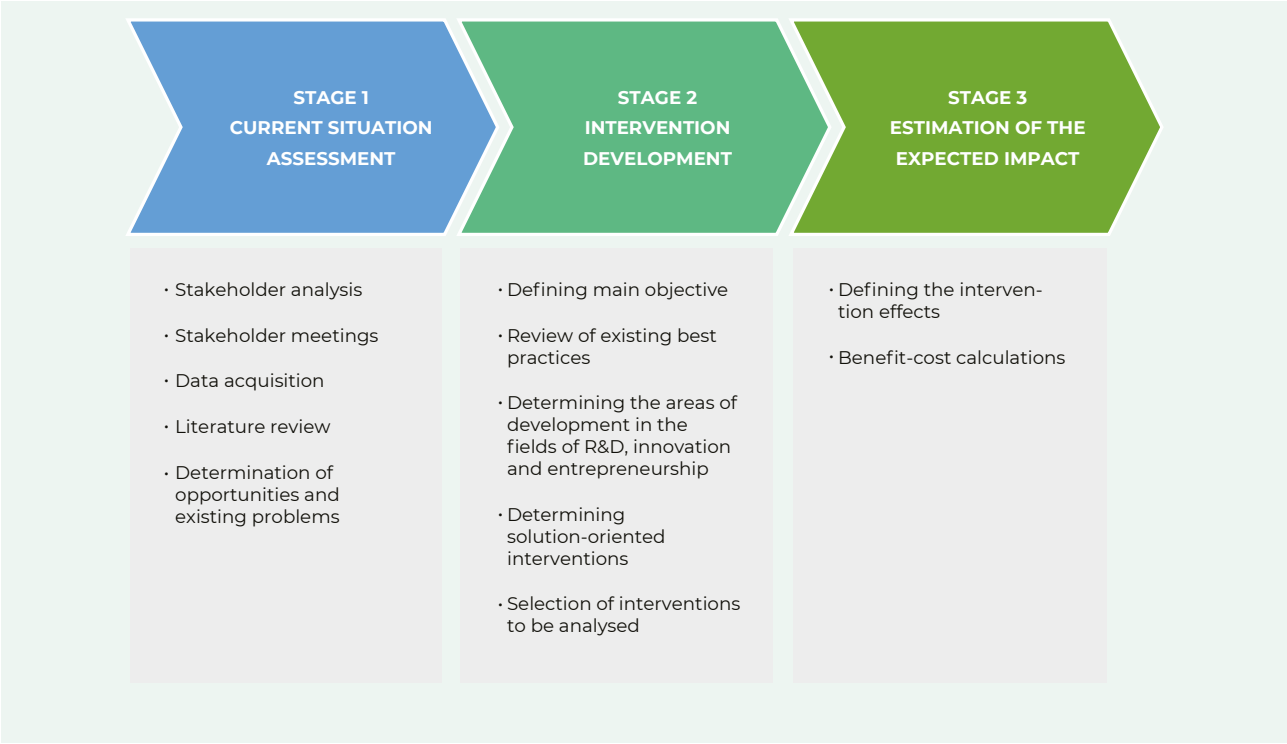
The processes, calculations and the steps followed in accordance with this methodological framework announced for the determination of priority sectors for intervention in problem and opportunity-based targets, are detailed in “Background Documents - No. 2”.

3.3. Intervention/Action Level

Sectoral opportunity analyzes were carried out for each of the sectors prioritized in the fields of industry, agriculture and blue opportunities in order to reveal the sectoral gains offered by green transformation and blue opportunities in İzmir. In this context, initially, a comprehensive current situation determination was made dealing with the general economic outlook of the sector, production processes, the current situation in the field of transformation and its main problems. Afterwards, national and international best available techniques, exemplary projects, technology opportunities for solution were studied, intervention options were determined and final intervention sets were created through strategic choice. Finally, the impact that will occur in the sector and the economic, environmental and social gains that will be created by the implementation of the final interventions selected are calculated over a cost-benefit model developed specifically for the study (Figure 4).

Working groups created specifically for priority sectors to carry out the project/policy dimension and most of the Agency experts were involved in the study. It is aimed to develop interventions that are compatible with local realities through stakeholder meetings held for each sector. As a result of the studies carried out with the strategic prioritization and focus approach followed in the whole perspective, a "sectoral opportunity report" was prepared for twelve sectors. The economic, environmental and social gains for the next ten years calculated for the interventions determined in the relevant transformation/opportunity field in the sectoral opportunity reports are grouped under agriculture, industry and blue opportunities (See Background Studies No:3, Potential Gains Offered by Green Transformation in İzmir).

FIGURE 4. Sectoral opportunities analysis process



Annex 1. Determination of Priority Targets and Indicators

Priorities & Targets	Sub-Targets	Strategic Sub-Target Selection		Strategic Sub-Targets	Indicators
		Rapid Result	Suitability for Regional / Sectoral Interventions		
		▸ Long-term and high-cost targets are not taken into account. ▸ 5-year period is taken into account.	Types of interventions considered for evaluation; 1- Physical investment (common) (-) 2- Technology & R&D development (+) 3- Physical infrastructure investment (joint) (+) 4- Developing human and social capital (+) 5- Financial resource development (+) 6- Legal, administrative framework and standard setting (-) 7- Creating a governance mechanism (+) 8- Multi-level governance (suitability for regional intervention) (-)		
1) Reducing waste generation	1.1. Extending product life through design, reuse and common use		*	1.2. Reducing the use of raw materials and chemicals 1.3. Use of technology that reduces waste generation in production 1.5. Reducing the use of packaging, promoting simple packaging	Amount of waste generated (tons/year) Amount of hazardous waste generated (ton/year)
	1.2. Reducing the use of raw materials and chemicals	*	*		
	1.3. Use of technologies that reduce waste generation in production	*	*		
	1.4. Dissemination of sustainable consumption habits	*			
	1.5. Reducing the use of packaging, promoting simple packaging	*	*		
2) Increasing the use of waste as raw material and energy source	2.1. Improving raw material recovery	*	*	2.1. Improving raw material recovery 2.3. Realizing high quality recycling 2.4. Increasing cooperation between enterprises for waste/raw material exchange	Amount of recyclable waste (ton/year) Amount of raw material imports (ton/year)
	2.2. Increasing waste-to-energy production	*			
	2.3. Realizing high quality recycling	*	*		
	2.4. Increasing the cooperation of enterprises for waste/raw material exchange	*	*		

Priorities & Targets	Sub-Targets	Strategic Sub-Target Selection		Strategic Sub-Targets	Indicators
		Rapid Result	Suitability for Regional / Sectoral Interventions		
3) Improving waste management	3.1. Improvement of the separation/ collection/transport and storage infrastructure of domestic wastes at source			3.2. Modernization of waste management processes of enterprises and industrial zones 3.3. Developing the infrastructure for recovery and recycling 3.4. Improving the waste collection/ recovery sector, developing technical and human capacity	Amount of waste processed (tons/year)
	3.2. Modernization of waste management processes of enterprises and industrial zones	*	*		
	3.3. Developing the infrastructure for recovery and recycling	*	*		
	3.4. Improving the waste collection/ recovery sector, developing technical and human capacity	*	*		
	3.5. Increasing the efficiency of the waste monitoring and control system		*		
4) Ensuring waste disposal and preventing pollution	4.1. Prevention of irregular waste storage			4.2. Reducing the amount of landfilled waste	Amount of waste stored (tons/ year)
	4.2. Reducing the amount of landfilled waste	*	*		
	4.3. Reducing the need for land required for storage				
	4.4. Reducing pollution risks caused by waste imports	*			
5) Development of technologies for obtaining raw materi- al efficiency and economic benefit from waste	5.1. Developing recycling equipment/material technologies	*	*	5.1. Developing recycling equipment/ material technologies 5.2. Developing cleaner production techniques and technologies for waste reduction	-
	5.2. Developing cleaner production techniques and technologies for waste reduction	*	*		

Priorities & Targets	Sub-Targets	Strategic Sub-Target Selection		Strategic Sub-Targets	Indicators
		Rapid Result	Suitability for Regional / Sectoral Interventions		
1) Reducing water consumption	1.1. Transition to production models and techniques that will reduce water demands	*	*	1.1. Transition to production models and techniques that will reduce water demands	Amount of water consumption (ton/year)
	1.2. Reducing domestic water consumption	*			
2) Protection of aquatic ecosystems and water reserves	2.1. Prevention of water pollution; ▸ Marine pollution ▸ Groundwater pollution ▸ Surface water (streams, lakes) pollution	*	*	2.1. Prevention of water pollution 2.2. Rehabilitation of practices that harm the aquatic ecosystem 2.3. Developing and strengthening area management models such as integrated basin management and integrated coastal zone management	Wastewater treatment plant capacity (m3/day) Amount of wastewater (m^3/year)
	2.2. Rehabilitation of practices that harm the aquatic ecosystem; ▸ Caused by overfishing ▸ Caused by urban infrastructures ▸ Caused by maritime transport ▸ Combating species harmful to the ecosystem	*	*		
	2.3. Developing and strengthening area management models such as integrated basin management and integrated coastal zone management	*	*		
3) Su kayıplarının azaltılması ve rezerv kapasitesinin artırılması	3.1. Reducing evaporation and system losses and leaks			No target suitable for intervention	
	3.2. Developing applications and technologies such as water collection, water retention gardens, underground dams etc.				

Priorities & Targets	Sub-Targets	Strategic Sub-Target Selection		Strategic Sub-Targets	Indicators
		Rapid Result	Suitability for Regional / Sectoral Interventions		
4) Utilization of blue economy potential	4.1. Developing the maritime industry; ▸ Developing Port Services ▸ Developing Marine Vessel Construction and Repair Activities ▸ Development of Sea Freight Activities	*	*	4.1. Developing the maritime industry; 4.2. Developing aquaculture production and fisheries; 4.3. Developing marine recreation and ecological tourism; 4.4. Developing techniques and technologies for the protection and efficient use of water resources	Employment Specialization Scale Dominance
	4.2. Developing aquaculture production and fisheries; ▸ Supporting commercializable innovation and entrepreneurship based on blue biotechnology ▸ Developing sustainable fisheries ▸ Strengthening the sustainable production of fishery products in cultural environment	*	*		
	4.3. Developing marine recreation and ecological tourism; ▸ Developing water sports ▸ Developing underwater and above-water recreational activities ▸ Developing gastronomic tourism based on seafood ▸ Developing accommodation opportunities in accordance with ecological principles ▸ Ensuring sustainable development of other supportive ecotourism and recreation opportunities in coastal areas	*	*		
	4.4. Developing techniques and technologies for the protection and efficient use of water resources	*	*		
5) Development of techniques and technologies related to water management	5.1. Developing techniques and technologies to reduce water consumption	*	*	5.1. Developing techniques and technologies to reduce water consumption 5.2. Developing techniques and technologies to reduce water losses, protect reserves and increase their capacities 5.3. Developing techniques and technologies to reduce	
	5.2. Developing techniques and technologies to reduce water losses, protect reserves and increase their capacities	*	*		
	5.3. Developing techniques and technologies to reduce hydrological disaster risks	*	*		

Priorities & Targets	Sub-Targets	Strategic Sub-Target Selection		Strategic Sub-Targets	Indicators
		Rapid Result	Suitability for Regional / Sectoral Interventions		
1) Reducing energy losses and energy consumption	1.1. Dissemination of clean production practices that will reduce energy consumption in production processes	*	*	1.1. Dissemination of clean production practices that will reduce energy consumption in production processes	Electricity Consumption (kWh/year
	1.2. Reducing the energy consumed within the scope of transportation through public transportation and alternative transportation methods	*			
	1.3. Reducing energy consumption with green construction techniques and technologies	*			
	1.4. Prevention of loss and leakage in transmission and distribution	*			
	1.5. Establishment of smart energy transmission systems (such as smart grid)	*			
	1.6. Ensuring digitalization in the energy sector	*			
2) Increasing and generalizing clean energy production	2.1. Increasing clean energy production by establishing Clean Energy Systems / Power Plants	*	*	2.1. Increasing clean energy production by establishing Clean Energy Systems / Power Plants 2.2. Dissemination of practices that will increase the clean energy consumption rate of households (such as energy cooperatives, roof systems, other energy generating systems) 2.6. Carrying out awareness studies on cultural change in energy consumption 2.8. Dissemination of green purchasing, green tariff, certification, labeling and standardization practices that will increase clean energy consumption	Electricity Consumption (kWh/year) CO_2 Emission (kg/year)
	2.2. Dissemination of practices that will increase the clean energy consumption rate of households (such as energy cooperatives, roof systems, other energy generating systems)	*	*		
	2.3. Establishment of distributed energy systems		*		
	2.4. Developing financing instruments for the establishment of clean energy systems	*			
	2.5. Facilitating the legislative processes related to clean energy systems in a manner that encourages the expansion of production	*			
	2.6. Carrying out awareness studies on cultural change in energy consumption	*	*		
	2.7. Implementation of a carbon tax on the use of fossil energy sources	*			
	2.8. Dissemination of green purchasing, green tariff, certification, labeling and standardization practices that will increase clean energy consumption	*			

Priorities & Targets	Sub-Targets	Strategic Sub-Target Selection		Strategic Sub-Targets	Indicators
		Rapid Result	Suitability for Regional / Sectoral Interventions		
3) Development of clean energy technologies	3.1. Developing clean production techniques and technologies that will reduce energy consumption	*	*	3.1. Developing clean production techniques and technologies that will reduce energy consumption 3.2. Strengthening cost-effective domestic production that will reduce the use of imported inputs in the clean energy sector 3.3. Developing new technologies for clean energy production 3.4. Developing efficient energy storage technologies and systems with reduced environmental damage 3.5. Developing sustainable transportation vehicles/systems	
	3.2. Strengthening cost-effective domestic production that will reduce the use of imported inputs in the clean energy sector	*	*		
	3.3. Developing new technologies for clean energy production	*	*		
	3.4. Developing efficient energy storage technologies and systems with reduced environmental damage	*	*		
	3.5. Developing sustainable transportation vehicles/systems (electric transportation vehicles / car sharing systems etc.)	*	*		

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