

Environment and climate policy evaluation

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Foreword

The intended audience of this European Environment Agency (EEA) publication is the professional environmental evaluation community, that is, evaluators of European environment and climate policies, the EEA's networks and interested evaluation professionals, including those that are active in the European Environmental Evaluators Network (EEEN). The publication aims to facilitate a dialogue on policy evaluation, by clearly setting out the EEA's views on some of the challenges that evaluators encounter in the areas of environment and climate policy.

The evaluation of environment and climate policies is, today, a well-established discipline. The EEA initiative that resulted in the publication *Reporting on environmental measures — Are we effective?* in 2001 shows there was already interest in evaluation approaches at that time. Since then, environmental evaluators have developed increasingly robust approaches for investigating which environment and climate policies work, how they work and under what conditions. Policy evaluation approaches have continued to be analysed — including by the EEA — most recently in the emerging area of the monitoring, reporting and evaluation of climate change adaptation policies. At the same time, the community of environmental evaluators recognises that evaluation approaches alone do not determine the quality and impact of an evaluation. Planning for the use of the evaluation outcomes from the very inception of an evaluation is, at least, as important.

Environment and climate policy evaluation underpins the delivery of the EEA's multiannual work programme in the strategic areas of 'informing policy implementation' and 'assessing systemic challenges'. Although evaluations conducted or coordinated by the EEA can inform the evaluation work carried out by the European institutions, they do not necessarily follow the same processes. By assessing and contrasting the effects of policy alongside other factors that influence the state of

the environment, EEA evaluations can add value beyond formal evaluation procedures, for example those carried out by (or on behalf of) the European Commission in the context of the Better Regulation agenda. The EEA evaluates policy within a different context and according to its autonomous mandate, but it has also built a conceptual framework for policy evaluation that builds upon key policy evaluation criteria.

In the framework of the EEA's current multi-annual work programme 2014–2019, the EEA is strengthening its tradition of carrying out policy evaluation. The EEA is also consolidating evaluation approaches in the light of the advances made over the last two decades. In addition, it is important to recognise that evaluating the effect of policies on changes in ecosystems, the production and consumption system, or the food, energy and mobility systems remains challenging for any evaluator. The EEA seeks to engage in a dialogue about these challenges with our member countries and the European Environment and Information Network (Eionet), European institutions, the environment evaluators community and interested evaluation professionals.

This publication aims to facilitate this dialogue with professional evaluators and evaluation users by:

- setting out how the EEA currently approaches a number of key issues related to environment and climate policy evaluation;
- discussing practical approaches for environmental evaluation, such as the ones outlined in Section 2.4 ('The evaluator's toolbox') of this publication.

Dr Hans Bruyninckx
EEA Executive Director

1 Why evaluate environment and climate policy?

This chapter summarises the evolution of European environment and climate policy (Section 1.1), in order to provide an initial context for European environment and climate policy evaluation. It also highlights some recent efforts to improve environmental regulation (Section 1.2).

1.1 More than 40 years of environment policymaking in Europe

Policies play a key role in determining and improving the state of our environment (¹). European environment policies have developed significantly since the first Environment Action Programme (EAP) was established in 1973 (Council of the European Communities, 1973), and several hundred legal acts addressing environmental issues have been adopted. In many instances, environment policy developed even earlier at national levels.

When European and national environment policies were first developed, many policies focused on specific environmental problems. Since no single policy instrument can provide solutions to all problems, the spectrum of policies has broadened gradually since the 1970s to address the increasingly complex environmental and related health problems.

Table 1.1 represents this general trend in a simplified way. It shows that many of the targeted environment and

climate policy approaches adopted in the past remain relevant today. More experience has been gained with regard to using these targeted environment and climate policy approaches than, for example, has been gained with using more recent, integrated and systemic policy approaches. Sufficient experience has been gained with regard to all environment and climate policies for carrying out stocktaking and evaluation, regardless of when they were adopted.

The European Environment Agency (EEA) would therefore like to work with its stakeholders on:

- more explicit use of existing approaches for evaluating environment and climate policies and their implementation;
- developing evaluation approaches for more recent, and increasingly systemic, environment and climate policies, particularly policies that influence ecosystems, the production and consumption system, and the food, energy and mobility systems.

1.2 Better regulation

As a recent study by the European Parliament pointed out, there are many different reasons to evaluate policies (EPRS, 2015a). For example, there may be clauses for reviewing legislation (EPRS, 2015b),

Table 1.1 Environmental challenges and policy responses

Characterisation of the type of challenge	Key features	Decades the policy type has been in the spotlight	Example of policy approach
Specific	Linear cause–effect; large (point) sources; often local	1970s/1980s (and continuing today)	Targeted policies and single-issue instruments
Diffuse	Cumulative causes; multiple sources; often regional	1980s/1990s (and continuing today)	Policy integration and raising public awareness
Systemic	Systemic causes; interlinked sources; often global	1990s/2000s (and continuing today)	Policy coherence and other systemic approaches

Source: EEA, 2010.

(¹) For the latest assessment, see *The European environment — state and outlook 2015: synthesis report* (EEA, 2015a).

requirements for prior evaluation or legislation that requires evaluation (e.g. river basin management plans). Auditors may address evaluation-related questions as part of performance audit activities (ECA, 2015; EPRS, 2015c; EUROSAI WGEA, 2015). Or, evaluations may also be conducted as part of more general efforts to improve regulation.

With budgetary constraints becoming more acute in many parts of Europe in the wake of the 2008 financial crisis and subsequent economic downturn, there is a clear demand to demonstrate the worth and merit of environmental regulation. The questions 'What works?', 'How?', 'Under what circumstances?' and 'At what cost?' are often at the centre of the discussion of 'better regulation'.

The European Commission (EC, 2015a) defines 'better regulation' as being 'about designing EU policies and laws so that they achieve their objectives at minimum cost'. Similar efforts are being undertaken by several EEA member countries.

The results of environment and climate policy evaluation can support efforts to improve regulation, for example by evaluating specific pieces of environment and climate policy or by informing on sustainability-related aspects that are relevant in order to evaluate the impact of other policies (see, for example, EC, 2015b). Moreover, the development of new environment and climate policies can build upon the knowledge developed with evaluations of already-adopted and implemented policies.

The EEA promotes exchanges among evaluation professionals on the contributions of environment and climate policy evaluation to better regulation, particularly in the context of frameworks of European environment and climate policies (see, for example, EU, 2013a, and FOEN, 2015). The EEA will cooperate closely with key networks of European environmental evaluation professionals, including, for example, the European Environmental Evaluators Network (EEEN).

Box 1.1 Defining evaluation

There are many definitions of evaluation, some more relevant than others for environment and climate policy evaluation. The EEA frequently uses two of these definitions. The first definition stresses the real-world utility of evaluation, and the fact that ex post evaluation should aim to be relevant:

'[...] evaluation is minimally defined as careful retrospective assessment of public-sector interventions, their organization, content, implementation and outputs or outcomes, which is intended to play a role in future practical situations' (Vedung, 2010).

The second definition of evaluation (EC, 2015b) emphasises a set of evaluation criteria (see also Section 2.3) commonly used in evaluations and, like the first definition, accentuates the retrospective (ex post) character of evaluation:

'Evaluation is defined as an evidence-based judgement of the extent to which an intervention has:

- been effective and efficient;
- been relevant given the needs and its objectives;
- been coherent both internally and with other EU policy interventions; and
- achieved EU added-value.'

2 Evaluating environment and climate policy

This chapter provides a short overview of the types of public intervention that are evaluated in policy evaluations (Section 2.1). Moreover, it discusses the differences among the goals, objectives and targets of these public interventions (Section 2.2), an important element for structuring policy evaluations (Section 2.3) and the use of a set of established evaluation 'tools' (Section 2.4).

2.1 Types of public intervention

The starting point of policy evaluation is often the question: 'What is the "policy" that is being evaluated?'

The term 'policy' is typically used to refer to objectives and actions in relation to a political issue. These can be, for example but not exclusively, financial programmes, public interventions, strategic plans and legislative measures.

Today, many environment and climate policies combine different types of public interventions, such as:

- traditional regulatory approaches, sometimes labelled 'command-and-control measures'

(e.g. emission standards, bans of toxic substances or land planning instruments);

- market-based instruments (e.g. environmental taxes and emissions trading) (EEA, 2016a);
- awareness raising (e.g. energy efficiency labels or communication campaigns).

These interventions are expected to lead to changes, for example changes in the behaviour of a target group. Understanding the mechanism through which a change is expected or assumed to be brought about, understanding the choice of the target group and considering the resources set aside for the implementation of a policy are all important for the better understanding of the functioning of a policy, and its ultimate successes and/or failures.

In practice, public interventions are often grouped together. This is also the case for many policies included in EEA's comprehensive database of climate change mitigation policies and measures (PaMs) in Europe (see Box 2.1). Analysing the coherence of a group of measures is an important aspect of policy evaluation. This aspect is likely to require even more attention in the light of more integrated, long-term policies.

Box 2.1 Policies and measures under the greenhouse gas monitoring mechanism

At the end of 2015, the EEA started a project to investigate the climate change PaMs reported by countries under the EU Monitoring and Reporting Regulation (EU, 2013b) and compiled in an EEA database (<http://pam.apps.eea.europa.eu>). The project started with a comparison of the performance of the EEA's PaMs database with other databases for the purposes of climate policy evaluation. The EEA has continued to analyse evaluation approaches for a limited number of national PaMs reported by countries, consolidated through a stakeholder consultation. The purpose of the project is to find out how well current policy and measure platforms that are similar to that of the EEA can inform evaluations. Moreover, the project also focuses on national policies that are not directly related to EU policies. This focus of the EEA project is expected to lead to the identification of examples of climate policy evaluation approaches that are more effective and which could potentially be replicated.

2.2 Goals, objectives and targets

Understanding the goals, objectives and targets associated with public interventions and policies is crucial for policy evaluation, as it allows a choice to be made of indicators appropriate for measuring progress.

In the European context, environment and climate policy objectives are often expressed in terms of the expected effect of a policy on the situation it is designed to influence. Objectives reflect the desired change from a baseline and are linked to the problem to be solved.

Different levels of precision and specification of objectives are used for different purposes (see also Box 2.2). Their distinction is also useful for analytical purposes. The different types of objectives are described below.

- **General objectives** are the overall goals of a policy, expressed in terms of a 'policy outcome' or

the ultimate 'policy impact'. Such general objectives can be expressed in strategic programmes and are often reiterated in preambles of legislation.

- **Specific objectives** are the targets that must be reached for general objectives to be achieved. The specific objectives of a policy are typically formulated as a result of an intervention among those directly affected by the intervention.
- **Operational objectives** refer to those deliverables that a policy is expected to produce. Their achievement is usually under the direct control of those managing the intervention, and can be directly verified.

The EEA routinely identifies and measures progress in the context of environment and climate policy objectives, such as the 2020 climate and energy targets (EEA, 2015c) or targets on marine protected areas (EEA, 2015d). Tracking progress towards targets is a core element of the EEA's work on environment and climate policy evaluation.

Box 2.2 Why distinguish objectives and targets?

Classifying policy objectives (as general, specific or operational) can be challenging. The distinctions made often derive from convention and expert appreciation rather than universally accepted approaches.

The EEA's 2011 review of resource efficiency policies in 31 European countries (EEA, 2011a and 2011b) illustrates this point. When analysing the information provided by countries, analysts of resource efficiency policies were quickly confronted with the challenge of distinguishing between:

- general statements of intent, such as 'to ensure sustainable use of resources' or 'to achieve decoupling';
- concrete goals, such as 'doubling abiotic material productivity by 2020 compared to 1994' or 'the total arable land farmed organically should be 8 % by 2013'.

It was decided that the analysis of resource efficiency policies should distinguish between strategic objectives and targets. 'Strategic objectives' were considered to refer to broad policy goals that are not quantifiable without a specific timeline. 'Targets' were defined as specific and measurable policy goals with a deadline or a specified time limit to achieve.

However, other approaches are also feasible, such as the one chosen by analysts working on the EEA report *Towards a green economy in Europe — EU environmental policy targets and objectives 2010–2050* (EEA, 2013a). The authors considered that both objectives and targets can have specific timelines. Targets were defined as referring to binding goals, whereas objectives were considered to refer to non-binding goals.

Classifications of objectives can facilitate evaluation. As the two EEA reports mentioned in this text box show, it matters less which classification system is followed, but, rather, that classifications should be coherent and comprehensible for everybody involved in an evaluation.

2.3 Structuring evaluations — a framework and related evaluation criteria

In 2001, the EEA had already included objectives, targets and goals in a broader policy evaluation framework to help structure evaluations (EEA, 2001). An adapted version of the EEA's initial policy evaluation framework is represented in Figure 2.1.

The EEA (2001) previously described some of the elements of this framework (shown in the rectangular boxes in Figure 2.1) ⁽²⁾ as follows:

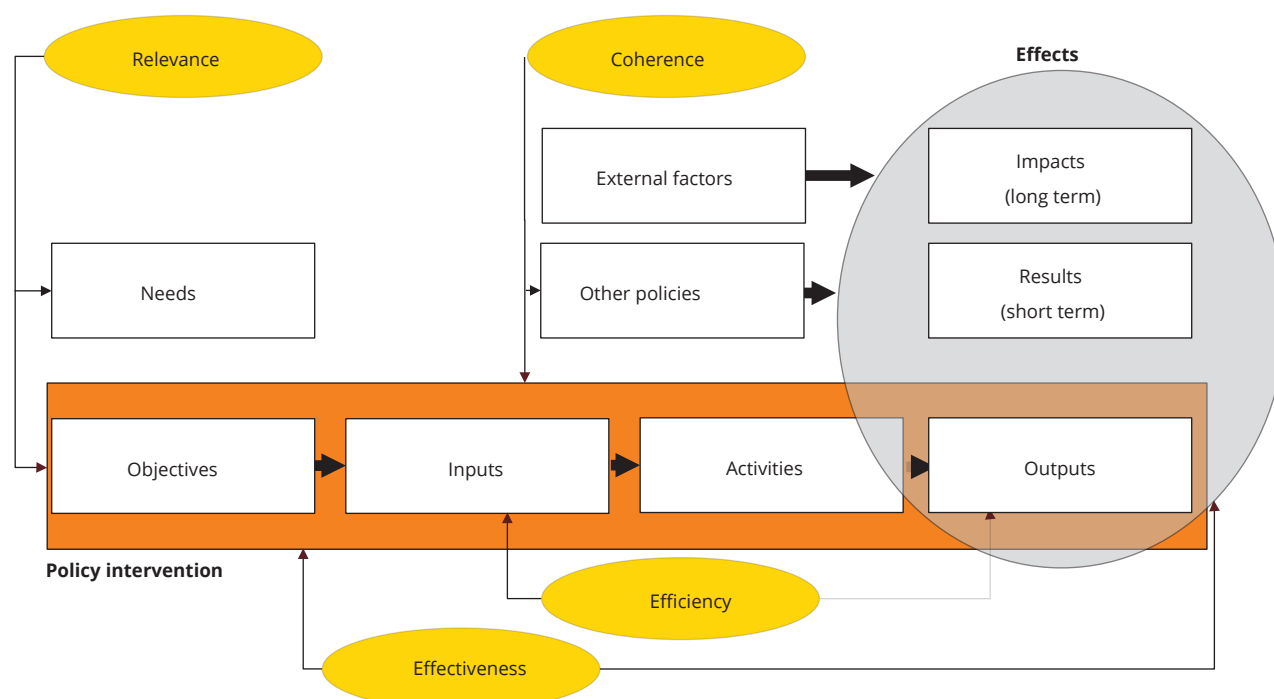
- inputs — the resources dedicated to the design and implementation of a measure (staff, administrative structures, financial investment, training, awareness raising, etc.);
- outputs — the tangible results of a measure (e.g. the number of purification plants constructed, the number of conservation sites designated or the number of organisations certified under the

European Eco-Management and Audit Scheme (EMAS);

- impacts — the ultimate effects of these changes in behaviour on the environment and human health; impacts may occur, after a certain period, among direct addressees or indirect addressees (ECA, 2015);
- results — these are, in turn, more short-term effects; the European Court of Auditors (ECA, 2015) describes results as '*immediate changes* that arise for *direct addressees* at the end of their participation in an intervention';
- external factors (e.g. the weather) and other policies (e.g. a fossil fuel subsidy) — these can intervene on, that is, support or weaken, the effect of policies.

The yellow balloons represented in Figure 2.1 are the criteria typically used in the evaluation of policies ⁽³⁾, including the evaluation of environment and climate policy. These criteria and examples of related evaluation questions are outlined below.

Figure 2.1 Policy evaluation framework



Sources: Modified from EEA, 2001; EC, 2015b and 2015c; and ECA, 2015.

⁽²⁾ Objectives are excluded here, since, as discussed in Section 2.2, 'Activities' were not included in the evaluation framework presented in EEA, 2001.

⁽³⁾ The European Commission (EC, 2015c) uses a similar definition of evaluation criteria that emphasises different aspects.

- **Relevance** — To what extent do the (original) objectives (still) correspond to needs and issues?
- **Effectiveness** — To what extent did a public intervention cause observed effects and changes? To what extent do the observed effects correspond to the objectives?
- **Efficiency** — Were the costs involved justified, given the changes and effects achieved?
- **Coherence** — External coherence: To what extent is a public intervention coherent with other interventions? Internal coherence: To what extent is the public intervention coherent internally?

Another criterion can be added to the four evaluation criteria already presented: the value added of an intervention at a certain level of governance (i.e. local, regional, national, European or global). For example, in light of the subsidiarity requirement of the Treaty of Lisbon (EU, 2012), evaluations in the context of the European Union often ask: 'What is the additional value of an EU intervention compared to what could be achieved by Member States at national, regional and local levels?'

The EEA plans to continue using the policy evaluation framework represented in Figure 2.1 to structure its work on environment and climate policy evaluation. In many instances, the EEA will put the emphasis of its work on the specific evaluation criteria agreed with its stakeholders, for example effectiveness.

The approach that the EEA developed in 2001 can have limitations in more complex settings. It could, however, be complemented by a more systems-oriented approach considering complex interactions and changes over time (see Section 3.2).

2.4 The evaluator's toolbox

Although it aims to draw upon inputs from various academic disciplines, policy evaluation can be considered a discipline of its own. Policy evaluation often (but not exclusively) uses economic and social science research methods, including qualitative and quantitative techniques, to examine the effects⁽⁴⁾ of policies.

Different types of analysis, data, methods, sources and theories can be combined in evaluations⁽⁵⁾. Broadly speaking, there are three elements of an evaluator's toolbox relevant in this context: (1) evaluation approaches, (2) evidence collection methods, and (3) analytical methods. This section provides some examples of each of these methods.

(1) Examples of evaluation approaches

(a) the **logical framework** (referred to as LogFrame) approach is a means to identify objectives and to trace an intervention logic. It asks how a programme or a policy is intended to operate in order to achieve objectives along the objectives–inputs–outputs–impacts chain of Figure 2.1. The direct participation of key stakeholders of the policy process in a LogFrame analysis can help to clarify this. Evaluators can address specific aspects of this chain or isolate specific elements of the intervention logic that may put the achievement of objectives at risk.

(b) **Theory-based evaluation** is similar to LogFrame approaches and focuses on how a policy is intended to work (i.e. a 'theory of change'). In this context, theory refers to assumptions to be tested and a 'logic of enquiry' (Treasury Board of Canada, 2012), not scientific theory. Since theory-based evaluation relies on a broader mapping of the elements that influence success or failure, and a consideration of the interaction of these factors, it can provide a more comprehensive picture than LogFrame. Using all appropriate methods, theory-based evaluation allows close monitoring of elements with critical influence on performance. Theory-based evaluation also helps to evaluate whether policies or programmes were implemented in line with theory or not.

(c) Related to the theory-based evaluation, but not identical, is **counterfactual evaluation**. This method attempts to identify causal effects (typically quantitatively) for a specific intervention against a counterfactual scenario in the absence of that intervention. Both theory-based and counterfactual evaluation can be seen as parts of the broader category of **impact evaluation**.

⁽⁴⁾ For a distinction of the different types of effects, please refer to Annex 1.

⁽⁵⁾ Such combinations are often referred to as 'triangulation' which is defined as the 'use of three or more theories, sources or types of information, or types of analysis to verify and substantiate an assessment' (OECD, 2010). Triangulation aims to increase the confidence in the results of an evaluation. For a more comprehensive overview of evaluation methods and techniques, see for example EC, 2013.

(2) Examples of evidence collection processes and methods

- (a) **Environmental monitoring**, a range of activities that can be carried out to generate data and information relating to different aspects of environmental issues. The activities can be carried out, for example, in situ (i.e. using on site observation) or by remote sensing.
- (b) **Data and information** results from evidence collection. In the context of European environmental policy, data and information is often reported; also for the purpose of policy evaluation.
- (c) **Case studies** can be particularly useful for designing evaluations, as they allow the exploration of hypotheses, the examination of complex interactions and the definition of boundaries. Very rich in information, case studies often combine quantitative and qualitative methods. It is also possible to combine a number of case studies, for example by replicating their main features for various cases.
- (d) **Literature reviews** attempt to summarise findings published in scientific or other literature on specific aspects of evaluations. However, literature reviews critically depend on the identification of relevant literature, a task that may be influenced by the reviewers' choices, the accessibility of information sources and language. **Systematic reviews** aim to reduce potential bias by establishing a strict review protocol.
- (e) **Focus groups** allow for the collection of data and information from stakeholders in a structured discussion. Evaluators often take the role of a facilitator in these groups, and aim to generate insights on policy implementation, outputs or results. Focus groups can reveal divergent perspectives at the same time as allowing in-depth discussion.

(3) Examples of analytical methods

- (a) **Cost-benefit analysis** considers whether costs in relation to the monetised benefits are adequate or not. **Monetary valuation** plays a prominent role in cost-benefit analysis. Cost-benefit analysis allows a ranking of different alternatives. Closely related is **cost-effectiveness analysis**, which considers the monetary input

required to achieve a certain outcome (typically non-quantifiable in monetary terms). Another approach, **multi-criteria analysis**, allows navigation in complex situations by assessing alternative courses of action, but relies less on monetary approaches.

- (b) **Indicator analysis** uses single or multiple indicators to track progress towards objectives. **Expert judgement**, another method that can be used in evaluations, can usefully complement indicator analysis, as in EEA's synthesis report entitled *The European environment — state and outlook 2015: synthesis report* (EEA, 2015a).
- (c) **Mapping analysis** is relevant to the evaluation of policies that can be strongly influenced by geographical factors. Geographic information system (GIS) software, that is, software for the analysis of spatial data, plays a key role in mapping analysis.
- (d) **Modelling** can usefully support evaluations, but often requires rather extensive efforts and resources. Many models attempt to link policy instruments to variables for which a change is expected to occur (the 'target variable') by using the instrument. Target variables can, in turn, relate to economic variables. Modelling can also be used in cost-benefit analysis.
- (e) The **modus narranti** is an "'Effect Evaluation Method" for Environmental Policy' (Gysen et al., 2006). The method respects 'the specific conditions and characteristics of environmental policy' and 'expectations attached to causality-based evaluations' (Gysen et al., 2006).

These evaluation approaches, evidence collection methods and analytical methods are not only relevant to policy evaluation. Some of them can also be used in the context of strategic environmental assessments and environmental impact assessments, that is, in programme and project development, such as countryside planning or the construction of a dam (see, inter alia, EC, 2016a and 2016b).

The EEA plans to use established evaluation approaches, evidence collection methods and analytical methods in its work on policy evaluation, consolidating and developing them further together with EEA member countries, European institutions and the environmental evaluators community.

3 The European Environment Agency's work on environment and climate policy evaluation

This chapter presents the directions that the EEA intends to pursue in the area of policy evaluation. While continuing efforts to attribute observed changes in the state of the environment to policies (Section 3.1), more systemic policies may require new evaluation approaches (Section 3.2). The EEA seeks to contribute to enhancing environmental evaluation in both areas (Section 3.3) in a way that underpins and complements evaluation activities by other European bodies and institutions.

3.1 Attributing changes in the state of the environment to policies

'Attribution' aims to address the question 'Do policies explain observed changes and to what extent?' Or, to put it differently, it is an 'ascription of a causal link between observed (or expected to be observed) changes and a specific intervention [...] taking account of other interventions, (anticipated or unanticipated) confounding

factors, or external shocks' (OECD, 2010). Attribution is relatively simple if policies deal with simple cause-effect relationships. The more policy-related (or other) factors that intervene in such relationships and the more interactions there are among such factors, the more difficult it is to attribute the observed changes to policies (see Box 3.1 for an example of attribution).

The challenges related to multiple factors and their interactions are particularly relevant when evaluating policy packages (often connected across different thematic areas) with multiple objectives (e.g. the climate and energy package) or policy frameworks (e.g. the 7th EAP). The environmental evaluation of such policy frameworks with multiple objectives is complicated by the transboundary nature of many environmental issues and the fact that European environmental policies are implemented at different levels of governance (transnational, European, national, regional and local).

Box 3.1 Decomposing factors that influence greenhouse gas emissions

The EEA has used a 'decomposition analysis' method on several occasions to analyse and explain changes in greenhouse gas emissions over certain periods (EEA, 2011c). This method attributes quantitatively observed changes in the state of the environment to influencing factors.

The 'decomposition analysis' method quantifies the relative impacts of a pre-defined set of factors on greenhouse gas emissions. Examples of such factors are changes in population, economic development (i.e. gross domestic product (GDP)), the energy intensity of the economy, the proportion of fossil fuels in final energy consumption and the emission content of fossil fuels. However, the attribution of changes in emissions to policies remains more complicated. Each of these factors may be affected by several policies at the same time, as well as other, non-policy-related factors. Conversely, certain policies may affect more than one factor at the same time.

For example, the energy intensity of the economy can vary because of energy efficiency improvements resulting from various policy measures. But macro-economic shifts can also influence energy prices, thereby incentivising or disincentivising efforts to increase energy efficiency.

Decomposition analysis can be used as a tool to determine which factors play a role in changing emissions, and through that what proportion of changes in emissions are likely to be due to a set of policies. The contribution of the specific policies, that is, the attribution of the effect of a policy on changes in emissions, needs to be determined by other means, for example by using the methods outlined in Section 2.4.

Therefore, in order to attribute observed changes in the state of the environment to specific policy frameworks, it is important that evaluators understand implementation responsibilities and processes, as well as the effectiveness of implementation at different levels of governance (see also Box 3.2). Moreover, evaluators can face a number of other challenges when evaluating policies (see, for example, the challenges explained in EEA, 2015f). The EEA plans to continue work, with its stakeholders, on improving the capacity to attribute changes in the state of the environment to policies in complex settings and to address related challenges.

3.2 Evaluating systemic change

Evaluators also need to navigate complexity in the area of 'systemic change'. As Table 1.1 indicates, there is an increased awareness of the systemic causes of environmental change, and the challenge is to design policies that reflect this. Policies build on this increasing awareness; for example, there is recognition that long-term climate mitigation targets should be achieved by a transition 'to a low-carbon, resource-efficient, safe and sustainable economy', as reflected in the 7th EAP (EU, 2013a). At the national level, countries are developing and adopting transition policies that target different systems, for example the energy and transport systems in the case of the French law on the energy transition for green growth (Legifrance, 2015), or various technical systems and ecosystems in the case of climate change adaptation policies (EEA, 2014b; EEA, 2015f; EUROSAT WGEA, 2012).

'Systemic evaluation' therefore evaluates the role and effectiveness of policies with regard to transformational changes towards achieving sustainability in systems

(e.g. ecosystems, the mobility system or the energy system) and in creating space for niche innovations that support these transformational changes. This intuitively appealing idea of systemic evaluation is difficult to apply in practice. Although there are solid methods for evaluating well-established policy approaches (see, for example, Table 1.1) that may need consolidation in some instances, more recent policy developments (policy coherence and other systemic approaches, Table 1.1) are likely to require further methodological development because of their complexity. However, researchers are already discussing and developing approaches for analysing the role of policies in transformational changes and systemic policy instruments. For example, Geels et al. (2016) discussed the usefulness of different approaches for analysing low carbon transitions, and Rogge et al. (2015) developed a typology and analysis of systemic policy instruments in the area of renewable energy.

The EEA will explore, with its partners, systemic evaluation and other tools for improving the understanding of transitions to sustainability and for evaluating latest generation policies.

3.3 The European Environment Agency's future activities in the area of environment and climate policy evaluation

The EEA's earlier work (e.g. EEA, 2001) focused on the effectiveness of specific policy interventions. For example, the EEA has worked, in many instances, on specific regulatory (in particular market-based) instruments for addressing environmental issues, such as water pricing (EEA, 2013b), environmental tax reform (EEA, 2011d) and the effectiveness of environmental

Box 3.2 Evaluating the direct and indirect impacts of EU policies on land use

The EEA report entitled *The direct and indirect impacts of EU policies on land* (EEA, 2016b) presents a methodology for the evaluation of European Union policies in terms of their land-related implications in Europe. The EU policies considered are Cohesion Policy, Transport Policy, Energy Policy and the Common Agricultural Policy.

The report tests the methodology using these examples of EU policies. The methodology reflects a 'chain' of policies and actions, from EU to Member-State level. It also identifies key steps, data and information sources, as well as methods of analysis for use in the assessment of the impacts of EU policies on land.

The specific contexts, including policies and institutions within each Member State, play a key role in shaping the impacts of EU policies. The methodology allows individual assessments, based on the specific policy objectives identified, to be carried out. Two in-depth case studies focused on Cohesion Policy spending on transport in Poland and Spain. The Spanish case study focused on the region of Andalusia, as governance in Spain is highly decentralised. The Polish case study focused on the national level and the region of Lower Silesia, a region with high economic growth but substantial land degradation.

taxes (EEA, 2008). Closely related to the questions of what works and under what circumstances, is the question of whether and how environment and climate policy is actually implemented. The EEA also addressed such implementation issues, for example in projects assessing the implementation of air quality policy in European cities (EEA, 2013c) and urban wastewater policies (EEA, 2005).

The EEA's current multiannual work programme (EEA, 2014a) places renewed emphasis on environment and climate policy evaluation. The EEA seeks to support efforts to improve the way in which policies are managed and delivered. The consideration of how the EEA's contributions will be used in policy evaluation is key for the success of this work on environmental evaluation.

Moreover, Decision No 1386/2013/EU on the 7th EAP (EU, 2013a) foresees an evaluation of the programme by the Commission, informed by EEA contributions. The EEA is currently preparing indicator-based annual reports on the 7th EAP's three main thematic objectives, which could support the evaluation of the 7th EAP.

In light of the new challenges set out in this report, and in order to meet the ambition to consolidate and develop evaluation approaches, as set out in the foreword and Section 1.1, the EEA plans to focus its policy evaluation work on the following areas:

- methodologies for evaluation, in order to consolidate the toolbox for understanding the relationship between policies and changes in the state of Europe's environment;
- the integration of environment and climate policies in other policy areas (e.g. transport policy);
- the effect of policies on specific systems, such as ecosystems, food systems or the mobility system, in order to better understand and evaluate the way in which policies can contribute to transitions towards a more sustainable society in Europe.

In its work on environment and climate policy evaluation, the EEA plans to cooperate closely with its networks (including the European Environment and Information Network (Eionet) and the European Environmental Evaluators Network (EEEN)) and other partners (including evaluation professionals and scientists).

Glossary

Attribution is 'the ascription of a causal link between observed (or expected to be observed) changes and a specific intervention' (OECD, 2010).

Better regulation is 'about designing EU policies and laws so that they achieve their objectives at minimum cost' (EC, 2015a).

Effects are 'intended or unintended change[s] due directly or indirectly to an intervention.' (OECD, 2010).

Environment policy describes 'courses of action which are intended to affect society [...] in such a way as to improve, or to prevent the deterioration of, the quality of the natural environment' (Lundqvist, 1996).

External factors (e.g. the weather) and other policies than the one evaluated (e.g. a fossil fuel subsidy) can strengthen or weaken the effects of policies.

Impacts are 'the ultimate effects of [...] changes in behaviour on the environment and human health' (EEA, 2001). Impacts may occur, after a certain period, among direct addressees or indirect addressees (ECA, 2015). Impacts can also be considered as 'long-term effects' (OECD, 2010).

Inputs are 'the resources dedicated to the design and implementation of a measure' (EEA, 2001). These resources can be 'financial, human, and material' (OECD, 2010).

Objectives are an 'initial statement of the outcomes intended to be achieved by an intervention' (ECA, 2015).

Outcomes relate to the 'change that arises from the implementation of an intervention and which normally relates to the objectives of this intervention. Outcomes include results and impacts' (ECA, 2015).

Outputs are 'the tangible results of a measure, e.g. number of purification plants constructed, [the] number of conservation sites designated, or the number of organisations certified under EMAS (the European Eco-Management and Audit Scheme)' (EEA, 2001).

A policy instrument is a tool for achieving a public intervention's objective. As the European Commission writes in the *Better Regulation 'Toolbox'* (EC, 2015c), 'A range of regulatory and non-regulatory instruments or combinations of instruments may be used to reach the objectives of the intervention'.

Results are 'immediate changes that arise for direct addressees at the end of their participation in an intervention' (ECA, 2015).

Triangulation refers to 'the use of three or more theories, sources or types of information, or types of analysis to verify and substantiate an assessment' (OECD, 2010).

References

Council of the European Communities, 1973, Declaration of the Council of the European Communities and of the representatives of the Governments of the Member States meeting in the Council of 22 November 1973 on the programme of action of the European Communities on the environment (<http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1436946864426&uri=CELEX:41973X1220>) accessed 13 October 2015.

EC, 2013, *EVALSED — The resource for the evaluation of socio-economic development: Sourcebook — Method and techniques*, European Commission (http://ec.europa.eu/regional_policy/en/information/publications/evaluations-guidance-documents/2013/evalsed-the-resource-for-the-evaluation-of-socio-economic-development-sourcebook-method-and-techniques) accessed 24 July 2015.

EC, 2015a, 'Better regulation: why and how' (http://ec.europa.eu/smart-regulation/index_en.htm) accessed 12 August 2016.

EC, 2015b, *Better regulation guidelines*, Commission Staff Working Document, SWD(2015) 111 final, European Commission (http://ec.europa.eu/smart-regulation/guidelines/docs/swd_br_guidelines_en.pdf) accessed 22 July 2015.

EC, 2015c, *Better Regulation 'Toolbox'*, European Commission (http://ec.europa.eu/smart-regulation/guidelines/docs/br_toolbox_en.pdf) accessed 27 July 2015.

EC, 2016a, 'Environmental Impact Assessment — EIA' (<http://ec.europa.eu/environment/eia/eia-legalcontext.htm>) accessed 21 March 2016.

EC, 2016b, 'Strategic Environmental Assessment — SEA' (<http://ec.europa.eu/environment/eia/sea-legalcontext.htm>) accessed 21 March 2016.

ECA, 2015, *Performance audit manual 2015*, European Court of Auditors (http://www.eca.europa.eu/Lists/ECADocuments/PERF_AUDIT_MANUAL/PERF_AUDIT_MANUAL_EN.PDF) accessed 11 January 2016.

EEA, 2001, *Reporting on environmental measures — Are we effective?* Environmental issue report No 25/2001, European Environment Agency (<http://www.eea.europa.eu/publications/rem>) accessed 27 July 2015.

EEA, 2005, *Policy effectiveness evaluation — The effectiveness of urban wastewater treatment and packaging waste management systems*, Brochure No 3/2005, European Environment Agency (http://www.eea.europa.eu/publications/brochure_2006_0305_111039) accessed 1 April 2016.

EEA, 2008, *Effectiveness of environmental taxes and charges for managing sand, gravel and rock extraction in selected EU countries*, EEA Report No 2/2008, European Environment Agency (http://www.eea.europa.eu/publications/eea_report_2008_2) accessed 20 October 2015.

EEA, 2010, *The European Environment — state and Outlook 2010: synthesis*, European Environment Agency (<http://www.eea.europa.eu/soer/synthesis/synthesis>) accessed 21 July 2015.

EEA, 2011a, 'Survey of resource efficiency policies and approaches' (<http://www.eea.europa.eu/themes/economy/resource-efficiency/resource-efficiency-policies-country-profiles>) accessed 21 July 2015.

EEA, 2011b, *Resource efficiency in Europe — Policies and approaches in 31 EEA member and cooperating countries*, EEA Report No 5/2011, European Environment Agency (<http://www.eea.europa.eu/publications/resource-efficiency-in-europe>) accessed 21 July 2015.

EEA, 2011c, *Greenhouse gas emissions in Europe: a retrospective trend analysis for the period 1990–2008*, EEA Report No 6/2011, European Environment Agency (<http://www.eea.europa.eu/publications/ghg-retrospective-trend-analysis-1990-2008>) accessed 7 October 2015.

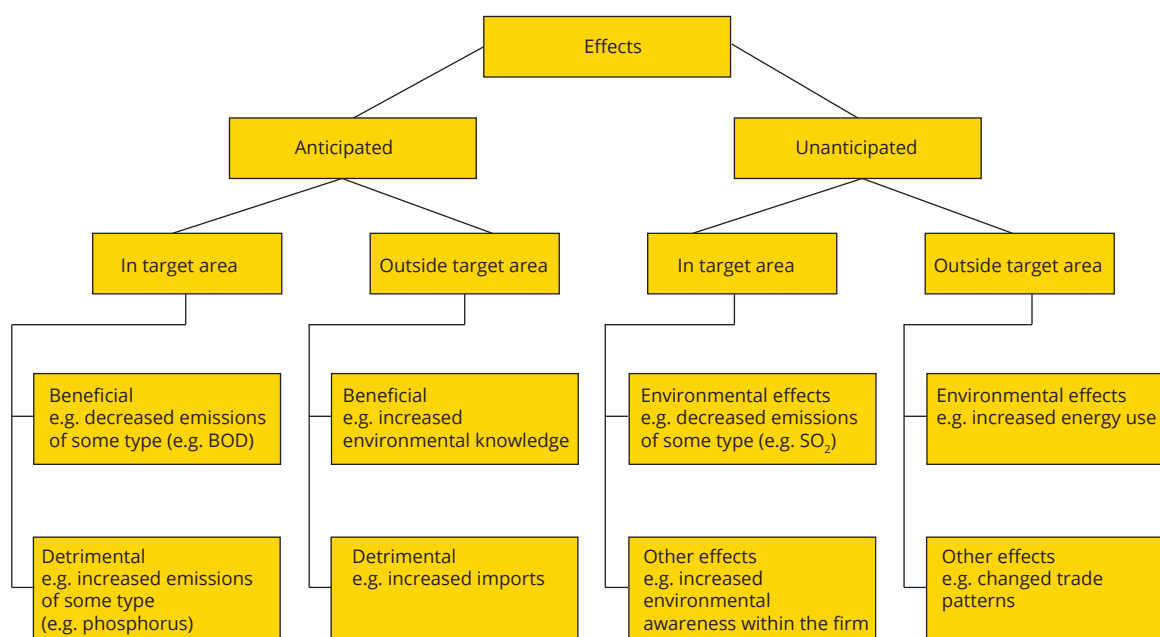
EEA, 2011d, *Environmental tax reform in Europe: opportunities for eco-innovation*, EEA Technical report No 7/2011, European Environment Agency (<http://www.eea.europa.eu/publications/environmental-tax-reform-opportunities>) accessed 20 October 2015.

- EEA, 2013a, *Towards a green economy in Europe — EU environmental policy targets and objectives 2010–2050*, EEA Report No 8/2013, European Environment Agency (<http://www.eea.europa.eu/publications/towards-a-green-economy-in-europe>) accessed 24 July 2015.
- EEA, 2013b, *Assessment of cost recovery through pricing of water*, EEA Technical report No 16/2013, European Environment Agency (<http://www.eea.europa.eu/publications/assessment-of-full-cost-recovery>) accessed 20 October 2015.
- EEA, 2013c, *Air Implementation Pilot — Lessons learnt from the implementation of air quality legislation at urban level*, EEA Report No 7/2013, European Environment Agency (<http://www.eea.europa.eu/publications/air-implementation-pilot-2013>) accessed 20 October 2015.
- EEA, 2014a, *Multiannual Work Programme 2014–2018: Expanding the knowledge base for policy implementation and long-term transitions*, European Environment Agency (<http://www.eea.europa.eu/publications/multiannual-work-programme-2014-2018>) accessed 20 October 2015.
- EEA, 2014b, *National adaptation policy processes in European countries — 2014*, EEA Report No 4/2014, European Environment Agency (<http://www.eea.europa.eu/publications/national-adaptation-policy-processes>) accessed 1 April 2016.
- EEA, 2015a, *The European environment — state and outlook 2015: synthesis report*, European Environment Agency (<http://www.eea.europa.eu/soer-2015/synthesis/report>) accessed 5 October 2015.
- EEA, 2015b, 'EEA database on climate change mitigation policies and measures in Europe' (<http://pam.apps.eea.europa.eu/>) accessed on 20 October 2015.
- EEA, 2015c, *Trends and projections in Europe 2015 — Tracking progress towards Europe's climate and energy targets*, EEA Report No 4/2015, European Environment Agency (<http://www.eea.europa.eu/publications/trends-and-projections-in-europe-2015>) accessed 20 October 2015.
- EEA, 2015d, *Marine protected areas in Europe's seas — An overview and perspectives for the future*, EEA Report No 3/2015, European Environment Agency (<http://www.eea.europa.eu/publications/marine-protected-areas-in-europes>) accessed 20 October 2015.
- EEA, 2015e, *Overview of reported national policies and measures on climate change mitigation in Europe in 2015*, EEA Technical report No 21/2015, European Environment Agency (<http://www.eea.europa.eu/publications/overview-of-reported-national-policies>) accessed 11 January 2016.
- EEA, 2015f, *National monitoring, reporting and evaluation of climate change adaptation in Europe*, EEA Technical report No 20/2015, European Environment Agency (<http://www.eea.europa.eu/publications/national-monitoring-reporting-and-evaluation/#parent-fieldname-title>) accessed 1 April 2016.
- EEA, 2016a, *Environmental taxation and EU environmental policies*, EEA Report No 17/2016, Publications Office of the European Union, Luxembourg.
- EEA, 2016b, *The direct and indirect impacts of EU policies on land*, EEA Report No 8/2016, European Environment Agency (<http://www.eea.europa.eu/publications/impacts-of-eu-policies-on-land>) accessed 25 July 2016.
- EPRS, 2015a, *Evaluation in the European Commission: Rolling check-list and state of play*, European Parliamentary Research Service ([http://www.europarl.europa.eu/RegData/etudes/STUD/2015/558789/EPRS_STU\(2015\)558789_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/558789/EPRS_STU(2015)558789_EN.pdf)) accessed 22 January 2016.
- EPRS, 2015b, *Review clauses in EU legislation: A rolling check-list*, European Parliamentary Research Service ([http://www.europarl.europa.eu/RegData/etudes/STUD/2015/573286/EPRS_STU\(2015\)573286_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/573286/EPRS_STU(2015)573286_EN.pdf)) accessed 22 January 2016.
- EPRS, 2015c, *Special reports of the European Court of Auditors: A rolling check-list of recent findings*, European Parliamentary Research Service (https://polcms.secure.europarl.europa.eu/cmsdata/upload/7801556f-135b-407b-b36f-18f81906b2cb/EPRS%20study%20Special_Reports%20of%20the%20ECA%20-%20A%20rolling%20check-list%20of%20recent%20findings.pdf) accessed 22 January 2016.
- EU, 2012, *Consolidated versions of the Treaty on European Union and the Treaty on the functioning of the European Union: Charter of Fundamental Rights of the European Union*, European Union (<http://bookshop.europa.eu/en/consolidated-versions-of-the-treaty-on-european-union-and-the-treaty-on-the-functioning-of-the-european-union-pbQC3211020/>) accessed 13 October 2015.
- EU, 2013a, Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet' (<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013D1386>) accessed 22 July 2015.

- EU, 2013b, Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC (<http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1417431825480&uri=CELEX:32013R0525>) accessed 22 July 2015.
- EUROSAI WGEA, 2012, *Adaptation to climate change — are governments prepared? A cooperative audit*, EUROSAI Working Group on Environmental Auditing (<http://www.eurosaiwgea.org/audits/Audit%20documents/Adaption%20to%20Climate%20Change%20-%20Are%20the%20governments%20prepared.pdf>) accessed 7 April 2016.
- EUROSAI WGEA, 2015, 'Auditing tools' (<http://www.eurosaiwgea.org/auditingtools/>) accessed 23 October 2015.
- FOEN, 2015, *Environmental limits and Swiss footprints based on planetary boundaries*, Swiss Federal Office for the Environment (http://pb.grid.unep.ch/planetary_boundaries_switzerland_report.pdf) accessed 12 August 2016.
- Geels, F., Berkhout, F. and van Vuuren, Detlef P., 2016, 'Bridging analytical approaches for low-carbon transitions', *Nature Climate Change*, (6), 576–583.
- Gysen, J., Bruyninckx, H. and Bachus, K., 2006, 'The modus narrandi: A methodology for evaluating effects of environmental policy', *Evaluation*, (12) 95–118.
- IBRD/World Bank, 2004, *Monitoring & evaluation — Some tools, methods and approaches*, the International Bank for Reconstruction and Development/the World Bank ([http://lnweb90.worldbank.org/oed/oeddoclib.nsf/24cc3bb1f94ae11c85256808006a0046/a5efbb5d776b67d285256b1e0079c9a3/\\$FILE/MandE_tools_methods_approaches.pdf](http://lnweb90.worldbank.org/oed/oeddoclib.nsf/24cc3bb1f94ae11c85256808006a0046/a5efbb5d776b67d285256b1e0079c9a3/$FILE/MandE_tools_methods_approaches.pdf)) accessed 22 July 2015.
- Legifrance, 2015, 'LOI n° 2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte' (<https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000031044385&dateTexte=20151026>) accessed 26 October 2015
- Lundqvist, L., 1996, 'Environmental politics in the Nordic countries: Policy, organisation, and capacity', in: Christiansen, P. M. (ed.), *Governing the Environment: Politics, Policy, and Organization in the Nordic Countries*, Volume 5, Nordic Council of Ministers, Copenhagen, 13–27.
- Mickwitz, P., 2003, 'A framework for evaluating environmental policy instruments — Context and key concepts', *Evaluation*, (9) 415–436.
- OECD, 2010, *Glossary of Key terms in evaluation and results based management*, Organisation for Economic Co-operation and Development (<http://www.oecd.org/development/peer-reviews/2754804.pdf>) accessed 22 July 2015.
- Rogge, K. et al., 2015, *Green change: renewable energies, policy mix and innovation*, Fraunhofer ISI, Karlsruhe (http://www.projekt-gretchen.de/GRETCHEN_report.pdf) accessed 22 January 2016.
- Treasury Board of Canada, 2012, *Theory-based approaches to evaluation: Concepts and practices* (<https://www.tbs-sct.gc.ca/hgw-cgf/oversight-surveillance/ae-ve/cee/tbae-aeat/tbae-aeat-eng.pdf>) accessed 25 July 2016.
- Vedung, E., 2010, 'Four waves of evaluation diffusion', *Evaluation*, (16) 263–277.

Annex 1 Overview of different types of policy-related effects

Figure A1.1 Effects of policy interventions



Source: Mickwitz, 2003.

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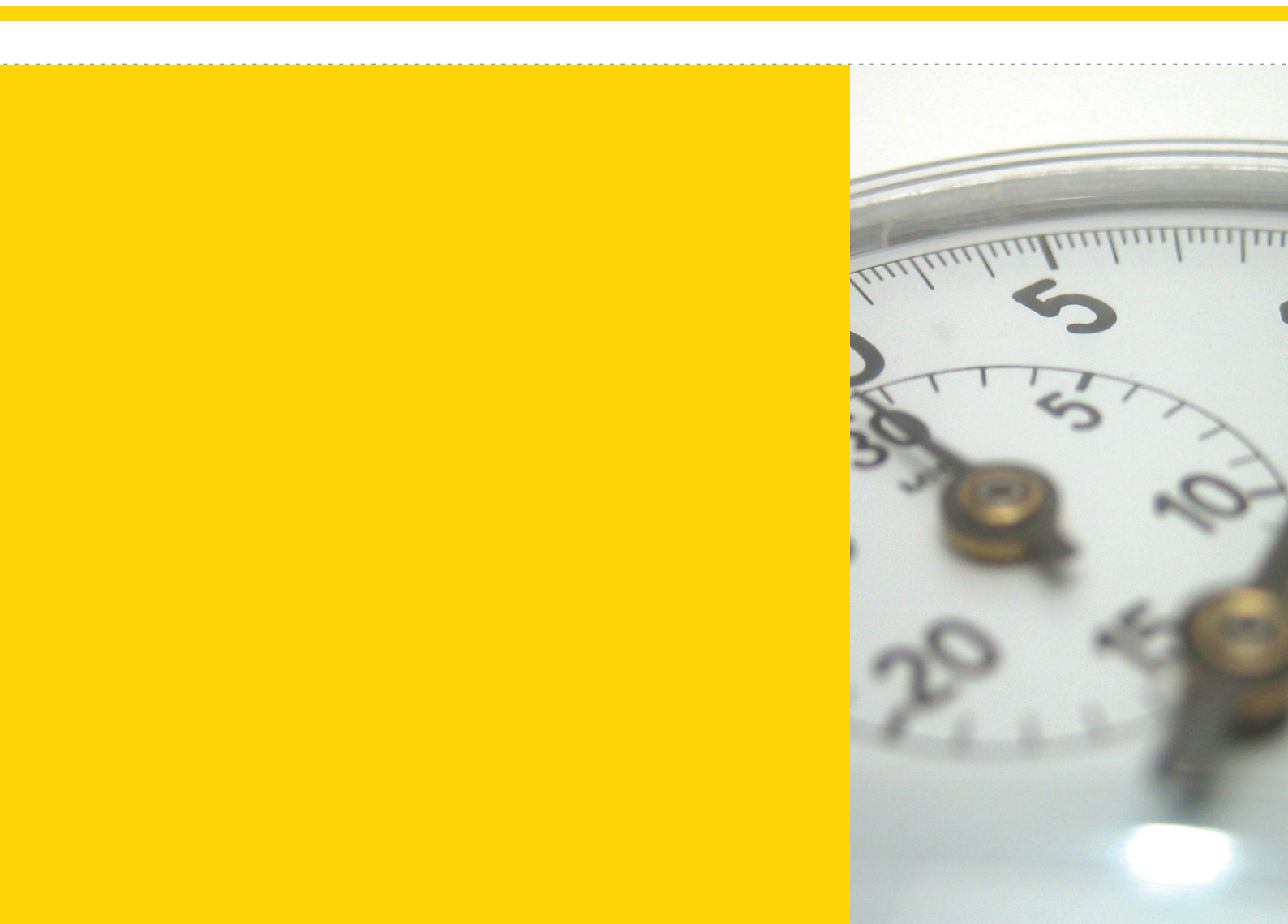
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