FORESIGHT DICTIONARY

Backcasting is a method for relating future visions, such as <u>scenarios</u>, with present day issues and policy-making agendas. It usually starts with defining a desirable future and then works backwards to identify events and decisions that will connect the future vision to the present. The purpose of backcasting is to identify areas of action to support certain scenarios or to suppress unwanted consequences. Backcasting also aims to determine several pathways for reaching desirable futures and avoiding undesirable futures and to provide transparent evidence for reflected and responsible decision-making.

Brainstorming is a method for collecting ideas without judgment or filtering. It involves spontaneous contributions of ideas, encouraging wild and unconstrained suggestions, and listing the ideas as they emerge. The method is typically used in early stages of futures workshops in order to explore possible and/or (un)desirable future trends, events and/or situations.

Delphi is a method for conducting an *expert survey in two or more 'rounds'. In the second and lsubsequent rounds of a survey, the results of the previous round(s) are given as feedback*. The method applies a set of predefined questions about the future that organisers present to participants so as to receive their rankings and comments on the future. On this basis the organisers refine the questions and run the processes again in a series of rounds until a consensus answer is arrived at. The aim of the Delphi is to structure group communication processes to deal with complex issues.

Designing is a method for visualising parts of a <u>horizon scan</u> or a <u>scenario</u> study in order to better communicate the results. This can be done by making maps, manipulated photographs, sketches, artists' impressions and the like. A well-chosen visual language makes the essence of a scenario clear at a glance. A lively visualisation also stimulates the imaginativeness of a <u>forward-looking study</u>.

Driver of change analysis is a method aimed at identifying drivers of change, their mutual relationships and their impacts on the system under study. In addition, it aims to explore the possible, future courses of the drivers, their relationships and their impacts on the system. A driver of changeis any physical or societal factor outside the system under analysis, for example, an ecosystem, a sector or a region, that will shape future dynamics in predictable

or unpredictable ways and that can potentially influence a given strategic focus. Examples of drivers of change are trends, <u>megatrends</u> and <u>wild cards</u>. Synonyms are *driver* and *driving force*.

Early warning is a series of procedures and methods, including <u>horizon scanning</u> and <u>weak signal analysis</u>, set in place to detect sudden or potential threats to people, property or the environment at the first sign of danger.

Expert panel is a method for soliciting informed opinions from individuals with particular expertise. It is used to obtain a rapid assessment of the state of knowledge about a particular aspect of a system and its environment.

Forecasting is a <u>forward-looking</u> approach aimed at exploring and predicting a surprise-free future. On the basis of assumed continuity or expected events, trends are projected and extrapolated from the past into the future. The uncertainty related to the future courses of the trends is often, but not always, presented as a bandwidth. Key forecasting methods are trend-extrapolation techniques and modelling. Forecasting is sometimes considered to be one of the ancestors of <u>foresight</u>.

Foresight is a <u>forward-looking</u> approach that aims to help decision-makers explore and anticipate in a participatory way what might happen, as well as prepare for a range of possible future <u>scenarios</u>, influence them and shape the futures. Instead of predicting the futures (see *<u>forecasting</u>*), foresight typically involves systematic, participatory, future-intelligence-gathering and medium-to-long-term vision-building processes to uncover a range of possible alternative future visions. Key foresight methods include <u>horizon scanning</u> and <u>scenario building</u>.

Foresight produces the kind of knowledge needed to handle the uncertain, complex and ambiguous nature of long-term sustainability transitions. Foresight takes the systems perspective on social reality, instead of studying how a limited number of parts of social reality such as sectors behave in a regular manner (see *<u>forecasting</u>*). Thus foresight allows to capture the non-linearity and interactions between multiple parts of dynamic systems, such as energy, transport and the food system. By not being restricted to predicting a single future, foresight is suitable for thinking beyond existing mental frameworks in terms of radical and even disruptive change. By developing qualitatively different and open future scenarios, foresight allows to explore new qualities such as technological and social innovations and niches and to capture multiple perspectives on the future (e.g. Europe of contrast, harmony and innovation) as opposed to changing quantities while the qualities remain the same (see *<u>forecasting</u>*).

Due to its participatory nature, foresight also brings several process benefits in addition to providing information and advice for shaping the future (see *forward-looking studies*). Foresight allows not only drawing on the respective knowledge of policymakers and stakeholders in devising future pathways and agendas, but also creating shared normative views of the future, i.e. visions or *Leitbilder*, which can play a soft coordinating and orchestrating role in policy networks. Foresight may also contribute to making potential conflicts of interest transparent, which may otherwise surface at some stage of the transition processes as barriers and blocking mechanisms.

Foresight	Forecasting
deeply uncertain nature of the future	future can be predicted well enough
interpretative nature of knowledge	contestable facts
reflexive learning	stimulus-response learning problem-oriented learning
system approach	reductionist approach, sectoral focus
open	predict-and-act approach
exploring and shaping the future	controlling the future
participatory, interpretative, transdisciplinary	data near
mostly qualitative data	mostly quantitative data
scenario building	modelling
systemic type and worldview visions	single-value visions, quantitative deviations
trends and variations	trends and ruptures
mode 2 science	mode 1 science

Forward-looking studies aim to provide information and advice for shaping the future based on the knowledge of a rather small group of expert authors. The results of forward-looking studies can be fed into the foresight processes, as well as into other strategic decision-making processes, but taken alone they cannot deliver the governance-related benefits that foresight processes offer. Examples of forward-looking studies are environmental outlooks and scenario and megatrend studies. They can be applied as stand-alone services supporting policy-makers throughout the policy cycle, as well as in other policy fields, independently of the original aim of the study.

Futures essay consists of written story lines that are used as parts of a horizon scan or a scenario study. They are typically based on a literature review and on creative and logical thinking of the authors. A story line consists of a coherent description of several possible or desirable future developments and/or events which can lead to a possible or desirable future, such as a breakthrough towards the green economy after a long period of technological and behavioural change.

Futures workshop is a method for involving policy makers, stakeholders, scientists and outsiders to jointly generate ideas for (parts of) an horizon scanning, a scenario study or another forward-looking study or to jointly comment on the results of other methods and techniques, such as modelling and futures essays.

Horizon scanning is a key foresight method for identifying possible future drivers of change that are at the margins of current thinking and acting, and the potential challenges, opportunities, and threats that may be generated by these developments. Horizon scanning aims to provide early warning about important changes and to detect weak signals that can challenge present assumptions and provide new perspectives on future threats and opportunities. The main use of horizon scanning is providing basic evidence for scenario building. Synonym is *environmental scanning*.

Integrated environmental assessment is a domain that analyses the cause-effect links of human and natural action on the environment, and in turn, the resultant environmental changes in the state of the environment and human well-being. It integrates social, economic and environmental issues in the analyses. Integrated environmental assessments aim not only to provide an overview of the state of the environment but also to give decision makers guidance on how to better govern the environment.

Megatrend indicates a widespread and long-term social, economic, environmental, political or technological change that is slow to form but has a major impact once in place. Megatrends influence a wide range of activities, processes and perceptions in a system, such as an ecosystem, a sector or a region, possibly for decades. Megatrend as a process of transformation is composed of sub-trends which in themselves are capable of major impacts. See also trend analysis.

Method is a path for collecting, analysing, interpreting and disseminating plausible, inspirational and robust knowledge and information about the past and the present to make statements about the future. Methods are highly heterogeneous and context-dependent. They typically encompass various techniques, i.e., sets of distinct steps necessary to follow a method. The choice and the use of methods are informed and determined by a methodology.

Methodology refers to a research logic consisting of a more or less consistent set of assumptions about the relevant conditions that need to be fulfilled to gain plausible, inspirational and robust knowledge and insights. Forward-looking approaches commonly follow two methodologies: quantitative – explaining, data near, high measure level, and qualitative – understanding, data remote and low measure level.

Mind mapping is a method for drawing one or more diagrams to visually organize knowledge and information, for instance about a trend or a megatrend. A mind map is often created around a single concept to which associated representations of ideas such as images, words and parts of words are added. Major ideas are connected directly to the central concept, and other ideas branch out from those.

Modelling is a method for building a model, i.e., an abstract representation of a system, its components and its environment, and/or applying it to imitate the behaviour of a real-world process or system over time. An example of a qualitative model is a flow chart, and an example of quantitative model is a set of mathematical equations.

Outlook is a forward-looking study estimating possible, probable and/or desirable mid-to-long-term futures. It can be based on different forward-looking approaches such as foresight and forecasting.

Policy messages represent an element of the scenario building method. They provide an overview of the most important policy challenges in the mid-to-long term and policy options to deal with them. They are derived from a systematic comparison of context scenarios, policy scenarios, and these scenarios and the scenario base.

Prediction is an estimate of a likely future situation, based on a study of present trends often obtained by using deterministic models. When a projection is branded *most probable/likely* it becomes a prediction. Synonym is *forecast*.

Projection describes a potential future evolution of a trend or a megatrend that is often computed with the aid of a mathematical model. Thus it is also referred to as a model-derived estimate of a future, such as, for example, future climate. When a projection is branded *most probable/likely* it becomes a prediction.

Risk assessment aims to estimate the risks posed by inherent hazards involved in processes or situations, either quantitatively or qualitatively. Risk is often defined as the combination of the probability, or frequency, of an occurrence of a defined hazard and the magnitude of the consequences of that occurrence. Risk is usually estimated by incorporating a measure of the likelihood of the hazard actually causing harm, and a measure of the severity of harm in terms of the consequences to people and/or the environment. Risk assessment can be informed by <u>forward-looking</u> approaches such as <u>forecasting</u> and <u>foresight</u>.

Road mapping is a method for visualising detailed <u>projections</u>, for instance of future trends or <u>megatrends</u>. Usually, <u>road mapping</u> is applied in a normative way, i.e., a desired future state is taken as a starting point. Then it is considered how, via which pathways, this future state can be reached.

Scenarios are plausible and imaginative descriptions of how the future may develop, based on a coherent and internally consistent set of assumptions about key relationships and driving forces, such as the rate of technological change. Scenarios are neither <u>projections</u> nor <u>predictions</u> that explore one future that is considered most probable/likely. Rather, scenarios are <u>simulations</u> of alternative futures.

A complete scenario study consists of a scenario base, several context scenarios, several policy scenarios and policy messages. In practice they do not always include all four elements or some of them only in a summarized way. The main types of scenarios include normative and exploratory scenarios.

- **Scenario base** provides a systematic overview of the various aspects of the policy issue under consideration, the policies aiming at purposefully influencing the issue, and the drivers of change with significant impacts on the issue and the policy under consideration. While the policy issue and the policies are framed as a part of the system, the drivers of change refer to the system environment.
- **Context scenarios** explore, in an integrative way, some of the possible future courses of the drivers of change, their mutual relationships and their impacts on the policy issue and the policy under consideration.
- **Policy scenarios** explore several (un)desired future states of the policy issue under consideration and the alternative policies that may realise them. By doing this, the possible future courses of the drivers of change explored by the context scenarios are also taken into consideration.
- **Reference scenario** is the future that scenario developers, policymakers and/or stakeholders believe, either explicitly or implicitly, will occur. This is usually a plausible future, featuring no surprising changes. A reference scenario is usually

made to contrast with alternative scenarios – context or policy scenarios. Synonym is *baseline scenario*.

- **Normative scenarios** start with a preliminary view of a possible future and look backwards to see if and how this might or might not grow out the present.
- **Exploratory scenarios** start with the present and move forward to the future by asking what-if questions about implications of possible events beyond familiar trends. They use data about the past and present, bearing in mind the possible, probable and desirable.

Scenario building is a key <u>foresight</u> method by which a set of <u>scenarios</u> is conceived, formulated and elaborated. It allows to connect various drivers, trends, conditioning factors and/or policies to envisage alternative futures that allow decision makers to explore how the future might or should evolve in different ways and to prepare for a range of different possible futures so as to influence and shape the future. Scenario building is based on the notion of deep uncertainty that consists of a range of possible alternatives, more or less probable and more or less desirable. A synonym is *scenario development*.

Simulation aims to describe and analyse the behaviour of a system, its components and/or its environment, asking what-if questions about them. This can be done by <u>modelling</u>, by organising a game or by combing both, for instance by simulating decision making related to water management confronted with climate change. Simulations aim at gaining insights into the past, present, and future behaviour of a system, its components and its environment.

STEEP analysis is a <u>method</u> used to scan, structure and gain insight into past, current and/or future developments in the environment of a system. The framework classifies drivers of change into five broad categories: **s**ocial (changes in composition or attitudes of people); **t**echnological (changes due to innovation and the application of science and technology); **e**nvironmental (changes in natural systems); **e**conomic (changes in the production system); and **p**olitical (changes in government, related institutions, issues, and their constituents). Depending on the focus of a <u>forward-looking</u> approach or study, other drivers may be included, such as legislative, policy or military developments. The main use of STEEP analysis is structuring basic evidence for <u>scenario building</u>. Other known acronyms derived from STEEP include STEEPL, PEST, PESTLE, PESTEL, STEP, STEPJE, STEEPLED and LEPEST.

Sustainability transitions refer to long-term, multi-dimensional and fundamental processes of change in socio-technical systems and to their interactions with ecosystems towards

essentially sustainable modes of consumption and production. The idea of sustainability transition emphasises the need for societal transitions from efficiency gains to systems change.

SWOT analysis is a method used to identify and categorise significant internal factors, i.e., strengths and weaknesses, and external factors, i.e., opportunities and threats, of a system, such as an organisation, sector or region. It provides information that is helpful in matching the system's resources and capabilities to the environment in which it operates, and is therefore an important contribution to strategy development. A SWOT analysis can be applied as part of a scenario study.

Systems thinking is one way to get a hold over the complexity of social reality. The systems thinking approach is an holistic approach that focuses on the way that a system's constituent parts relate and how systems work over time and within the context of larger systems. It can be contrasted with reductionism, which studies social reality by breaking it down into a limited number of separate elements that behave in a regular manner. Systems thinking is often used in foresight that aims to account for the deep uncertainty of the future, due to complexity of the societal and physical systems. Systems thinking can be used in any area of research and has been applied to studies of medical, environmental, political, economic, human resource and educational systems, among many others.

Time horizon is a point in the future or past where the visions, scenarios, projections or predictions are set. The time horizon in foresight is typically mid- to long term ranging from 5 to 50 years. The time horizon should ideally lie beyond the normal planning horizons of the decision makers involved, but close enough that it could still be influenced by today's decisions.

Tipping point is an unexpected sudden change of a system from one dynamic equilibrium to another, by which the system gains fundamentally new characteristics, for example, an ecosystem changing from a wetland into a dryland as a result of climate change.

Transition governance refers to modes of political steering, involving public and private actors, aimed at promoting system transitions from one equilibrium (e.g. energy system based on fossil fuels) to another (e.g. an energy system based on renewable energy). Transition governance aims to influence the outcome of transformation to lessen inherent

uncertainty and produce desirable outcomes during the transformation process. This is primarily achieved by long-term policy frameworks such as the EU's 2050 agenda on energy and climate, biodiversity, resource efficiency and green economy, by high-level government support, long-term research, innovation and technology programmes engaging a wide range of stakeholders over multiple levels, and by strong engagement with citizens.

Trend analysis is a <u>method</u> for locating a trend that is apparent over time and projecting it into the future, based on historical data on the rates of change and the extent of change achieved. A trend curve is fitted to historical data to calculate a future trend, given no unprecedented future events. A trend is a statement about the direction of a change in the forces that shape the future of a system, sector, organisation, etc. Usually the focus of such a statement is gradual and long-term challenges. Trend analysis provides a basis for building <u>scenarios</u>.

Trend impact analysis is a <u>method</u> aimed at extrapolating historical data into the future, while taking unprecedented future events into account. It involves systematically examining the effects of possible future events likely to affect the trend that is extrapolated. The events can include technological, political, social, economic and value-oriented changes. In <u>forecasting</u>, expert opinions are used to identify future events that might cause deviations from a surprise-free <u>projection</u> and calibrate their likelihood and potential strength. In <u>foresight</u>, expert opinions are used to determine the ruptures in trends as a consequence of nonlinearity, multiple interactive parts and the evolution in dynamic systems.

Uncertainty is defined as an indetermination regarding future developments. The main determinants of deep uncertainty in <u>foresight</u> include complexity and/or dynamism of societal and physical systems and the perspective dependence of knowledge and observations. <u>Forecasting</u> practitioners assume that uncertainty can be reduced well enough to predict and control the future.

Visioning is a <u>method</u> for building one or more images of probable, possible, plausible and/or (un)desirable futures in order to inspire or warn decision makers in policymaking and other domains.

Weak signal analysis is a <u>method</u> to determine early and inaccurate indicators of an upcoming event or development that may have a significant impact on the system under

consideration. By informing policymakers and stakeholders involved in strategy development, they are helpful to better deal with uncertainties and wildcards. Synonyms are *emerging issues* and *seeds of change*.

Wild card analysis is a <u>method</u> to determine a future event or development with a low probability of occurrence but a high impact on the system under consideration. Synonyms are *black swan*, *discontinuity* and *low-probability/high-impact event*.

Wind tunnelling is a <u>method</u> for checking existing policies, such as strategies, plans, visions or policy measures, against several context <u>scenarios</u> in order to explore their relevance and possible impacts. Wind tunnelling allows for checking the robustness of policies in various circumstances that may occur in the future.

Source: https://forum.eionet.europa.eu/nrc-flis/portal_glossary/glossary