



# Trucost Methodology Overview

## Incorporating Nature into the Economy

Trucost uses an economic modelling technique based on extensive survey data<sup>1</sup> to analyse the products used and produced by over 130 business activities or sectors. The model also describes the economic interactions between each sector. Trucost has adapted the standard model by integrating the use and emissions of over 700 environmental resources. By applying a price to each environmental resource, based on the environmental impact of that resource<sup>2</sup>, the model is able to analyse, in financial terms, the economic and environmental performance of each sector.

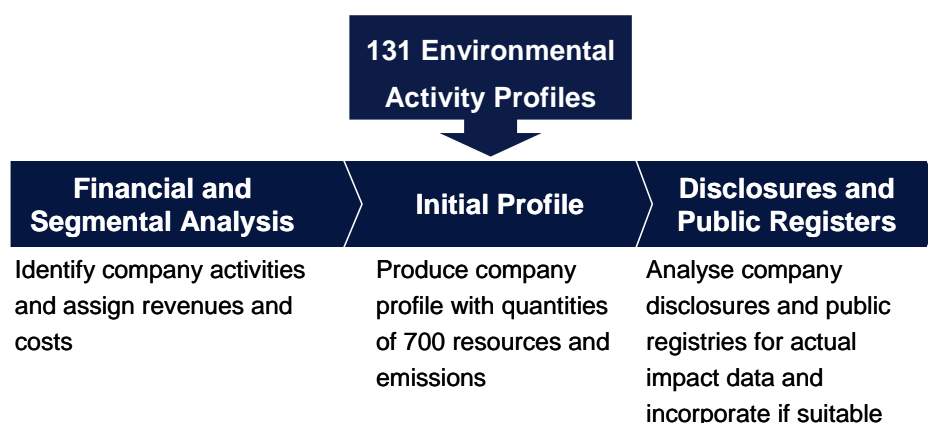
## Evaluating the Environmental Performance of Companies

Trucost’s methodology naturally extends to the analysis of corporate environmental performance by using the segmental revenue data contained in company accounts to map each company to a set of sectors. Trucost has modelled the environmental impacts of over 130 different sectors, and these impacts are proportionally allocated to the company according to the proportion of costs and revenues a company has in each sector. This provides a profile of environmental resource use that can then be improved by adding company specific environmental information where it is available. Trucost incorporates any appropriate, quantitative environmental disclosures that companies make in Annual Reports and Accounts, Environmental Reports, Sustainability or Corporate Social Responsibility Reports and company websites.

## Company Evaluation Process

### Stage 1: Quantifying emissions and resource usage

Stage one of the evaluation involves analysing the quantities of emissions and resources used. Trucost uses quantity data that companies disclose and where this is not available, Trucost provides an estimate. This allows comparisons to be made between companies that make comprehensive environmental disclosures and those that do not.



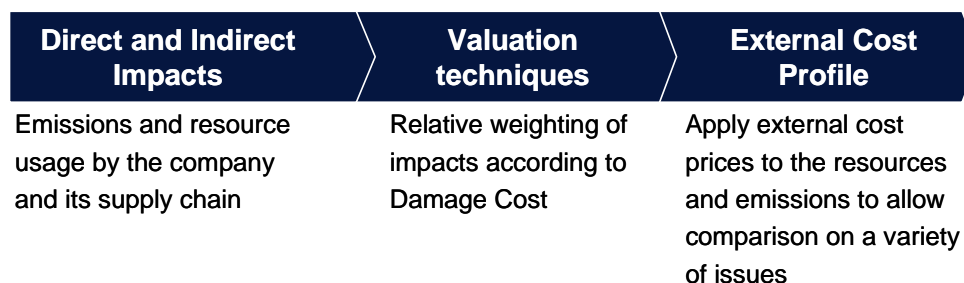
<sup>1</sup> Trucost uses the most up-to-date U.S. census data adapted to generate a global input-output model

<sup>2</sup> The prices in the Trucost model are based on external cost principles. In simple terms, the external cost of using an environmental resource, such as timber, or emitting a pollutant, such as carbon dioxide, is the cost that is borne by society through the degradation of the environment but which is not borne by the firm that uses the resource or emits the pollutant.



### Stage 2: Applying a cost to environmental impacts

Stage two determines the size of the environmental impacts relative to the financial performance of the company, and provides measures of materiality and comparisons with peer companies.



### External Costs

The use of a given natural resource or the emission of a waste product can be measured in empirical units such as tonnes or cubic metres, and traditionally they have been. However if a comparison was required between the relative importance of one resource to that of an emission they need to be represented using a weighting factor. This weighting factor would indicate a preference as to which impact is more damaging.

Trucost, and many leading academics, believe that pricing these resources in financial terms is the most suitable method as it allows easy comparison not only between resources, but also between the external costs across companies. Expressing all impacts in financial terms enables comparison between the external costs and traditional financial performance measures. Increasingly companies are required to contribute to these costs through environmental regulation and taxation, and this is often based on per unit of resources used and emissions released.

This environmental performance measure incorporates both the direct impacts and the indirect, supply chain impacts by using the information on the interactions between industries. External Costs are incurred whenever a natural resource is used or emissions are made to air, land or water.

### What are externalities?

In economic terms a 'cost' is something that reduces economic welfare. So if the inputs needed to produce a certain product are reduced, this reduces the full cost of production to the customer, supplier and society. Conversely, if the necessary inputs increase, then so do the costs.

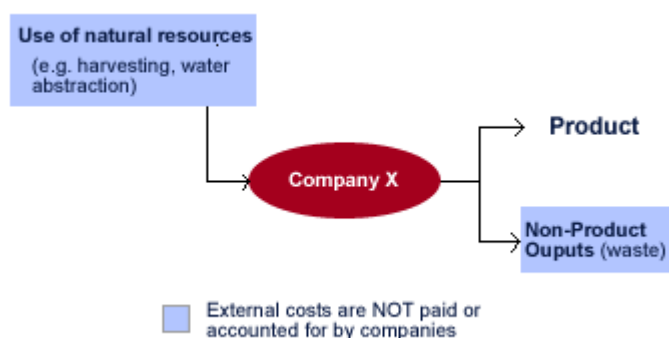
The full costs of production can be divided into two parts:

- Costs which are recorded in market transactions, contributing to the market price of the product or service
- Costs which are not included in markets, and therefore do not contribute to market prices



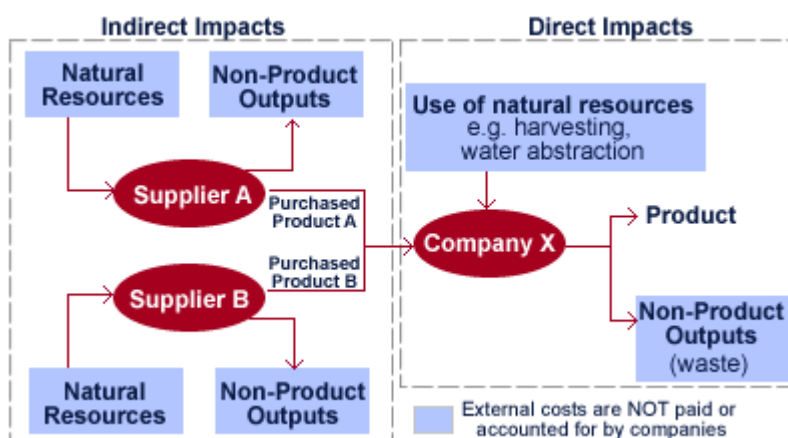
The latter category of costs is external to the market, and so they are called 'external costs'. The fact that these external costs are not included in the market price means that the prices used in markets are generally too low, but not all in the same proportion.

For example, diesel burning for road transport generates large quantities of particulates which have an adverse effect on human health. However, there is currently no cost charged to consumers of diesel fuel for the damage done, so the market price does not fully reflect the full social costs of this product. Here, the external cost is a significant proportion of the full costs. On the other hand, the direct external costs of, say, software production, are a rather small proportion of full costs.



Companies can incur costs both directly, by their actions, and indirectly, through their purchases. By purchasing goods and services, a company is paying the supplier to use natural resources and produce waste products on its behalf. If these effects are not taken into account, the picture of a company's environmental impact will be incomplete, as it will exclude impacts from outsourced or divested operations.

### Direct and Indirect External Costs



Trucost's analysis takes into account both direct and indirect (supply chain) impacts. Indirect impacts are initially estimated by using Trucost's input-output methodology to present a model of the purchases a company makes, and the environmental impacts caused as a result of these purchases. This analysis can be extended to include not only the first tier suppliers that the company buys from, but also their suppliers, and so on until reaching the supplier of the raw material. In this way, Trucost can cost the impact of a purchase to point of sale. This provides a means to differentiate between low impact supplied goods, such as renewable energy, and high impact supplied goods, such as fossil fuel energy. Indirect external costs incorporate the entire supply chain of the company.



## Valuations

Drawing on an extensive international resource of academic research into the pricing of environmental externalities, Trucost has compiled a library of prices for over 700 different natural inputs and outputs. Trucost constantly updates this library with the latest thinking on environmental prices with the assistance of an independent International Advisory Panel (see Appendix).

## A Note on Input-Output Modelling

Trucost has adopted an input-output modelling approach to analyse the economic and environmental interactions throughout the global economy. This form of modelling has been a branch of economics for over 40 years, and earned Wassily Leontief the 1973 Nobel Prize for Economics.

Input-output models show the amount of resources required (the inputs) to produce a unit of output and where this output is sold. Trucost uses a global input-output model based on detailed government census and survey data. This model includes individual companies and the interactions between the economy and the environment.

**Trucost International Advisory Panel**

Dr. Robert Costanza - Coordinator	Director of the Gund Institute of Ecological Economics and Gund Professor of Ecological Economics at the University of Vermont. Co-founder and former president of the International Society for Ecological Economics (ISEE) and chief editor of the Society's journal, Ecological Economics.
Dr. Robert U. Ayres	Emeritus Professor at INSEAD, Fontainebleau, France, visiting Professor at Chalmers University, Gothenburg, Sweden, and Adjunct Professor of Mineral Economics at Pennsylvania State University. He was a founder of the Centre for the Management of Environmental Resources (CMER) at INSEAD.
Dr. Stephen Farber	Director of Environmental Policy Studies, Director of the Public and Urban Affairs programme, and a Professor in the Graduate School of Public and International Affairs at the University of Pittsburgh. He has been a contributor to the World Bank's Green National Accounting workshop and the US Forest Service's Ecological Stewardship programme.
Dr. Robert Goodland	Independent Environmental Commissioner for the EIR, a World Mining Commission, for the 2002 UN World Summit on Sustainable Development. He is advising H.E. Emil Salim, Chairman of the Summit's PrepCom. Previously Environmental Advisor to the World Bank for 25 years.
Dr. Glenn-Marie Lange	Senior Research Scientist at the Institute of Economic Analysis, Robert F. Wagner Graduate School of Public Service at New York University. Her research focuses on economic input-output modeling and the pricing of, and accounting for, environmental resources.
Dr. John Proops	Professor of Ecological Economics at the School of Politics, International Relations and the Environment at the University of Keele, and the President of the International Society of Ecological Economics. He is Head of the Environmental Management Programme at the University of Keele.
Dr. Robert Repetto	Professor in Economics of Sustainable Development at the Yale School of Forestry and Environmental Studies, his area of expertise is environmental and resource economics. Until 1998 he was vice president and senior economist at the World Resources Institute in Washington, DC, he has served on EPA's Science Advisory Board and National Advisory Council on Environmental Policy and Technology, on the National Research Council's Board on Sustainable Development and on many NRC committees. His work has been honoured by the Society for Conservation Biology and the British Medical Association. His recent work on environment and finance was awarded the Moskowitz Prize for 2000.
Dr. Hamid Sabourian	Reader in Economics and Game Theory at the University of Cambridge, a Fellow of King's College Cambridge and a part-time visiting Professor of Economics at Birkbeck College, University of London.
Dr. Kerry Turner CBE	Director of CSERGE (Centre for Social and Economic Research on the Global Environment) and Professor in the School of Environmental Sciences at the University of East Anglia (UEA). Previously a member of the UK Climate Change Impacts Review Group for the former UK Department of the Environment (now DEFRA).
Dr. Peter Victor	Professor of Environmental Studies at York University, Toronto, Vice-President of the Council of the Royal Canadian Institute for the Advancement of Science and Chair of Environment Canada's Science and Technology Advisory Board. Previously the Assistant Deputy Minister of the Environmental Sciences and Standards Division with the Ontario Ministry of Environment and Energy.



## About Trucost ([www.trucost.com](http://www.trucost.com))

Trucost plc is an environmental research organisation that was founded in 2000 to help companies and investors understand the environmental impacts of business activities and to develop a platform that would facilitate more disclosure. Trucost provides data and analysis on company emissions and natural resource usage and presents these in financial as well as quantity terms. By presenting environmental performance in financial terms, Trucost research provides the basis for improved dialogue between the companies and investors or other stakeholders.

The external cost methodology employed by Trucost ranks a company's environmental impacts in order of significance, enabling directors and auditors to focus their efforts on those impacts that are likely to be material to their business. This also forms a transparent process with which a company and its auditors can assess whether it should make a public disclosure under the EU Accounts Modernisation Directive.

Trucost provides research to fund managers, analysts and other commentators on over 3,000 companies worldwide, including the entire FTSE All Share. Trucost has the support of an International Advisory panel of leading academics in the fields of economics and the environment who lend their considerable experience to the specialist research staff located in London.

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