

Supplementary File S3: Indicator exclusion justifications

This supplementary file provides concise reasons for every GRI G4 indicator excluded from the proposed framework.

A.1. Economic indicators

Indicator ID	Indicator Name	Measured impact
G4-EC3	Benefit plan coverage	Economic performance
Indicator not generalisable: Within the scope of the present study, organisational benefit plan coverage cannot be generalised for an entire industry as specific organisations offer different benefit plans and manage these in different ways.		

Indicator ID	Indicator Name	Measured impact
G4-EC5	Ratio of entry level wage to local minimum wage	Market presence
Indicator not generalisable: Due to different business models, -strategies and -management styles, the entry level wage paid to employees by organisations can vary widely within an industry and cannot be generalised with reasonable certainty for an industry.		

Indicator ID	Indicator Name	Measured impact
G4-EC6	Proportion of senior management hired from the local community	Market presence
Indicator not generalisable: Due to different business models, -strategies and -management styles, the composition of senior management of organisations can vary widely within an industry and cannot be generalised with reasonable certainty for an industry.		

A.2. Environmental indicators

Indicator ID	Indicator Name	Measured impact
G4-EN2	Recycled input materials	Materials
Indicator not generalisable: The portion of recycled input material used varies between different organisations in an industry and cannot be generalised with certainty for an entire industry.		

Indicator ID	Indicator Name	Measured impact
G4-EN5	Energy intensity	Energy
Indicator excessive: This indicator will not be used as it only presents the information presented by G4-EN3 and G4-EN4 in a different form and is therefore deemed excessive for the present framework.		

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Indicator ID	Indicator Name	Measured impact
G4-EN6	Energy reductions	Energy
<p><i>Indicator not generalisable:</i> Reduction in energy use is dependent on specific energy saving steps implemented by an organisation and can therefore not be generalised for an industry.</p> <p><i>Indicator not applicable to a new industry:</i> Reduction in energy use cannot be calculated for an industry that is yet to be established.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN7	Energy reductions in products and services	Energy
<p><i>Indicator not generalisable:</i> Reduction in energy use by products and services is dependent on specific energy saving steps implemented by an organisation and can therefore not be generalised for an industry.</p> <p><i>Indicator not applicable to a new industry:</i> Reduction in energy use by products and services cannot be calculated for an industry that is yet to be established.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN9	Water sources affected by withdrawals	Water
<p><i>Indicator not generalisable:</i> Specific water sources affected by operations of different organisations will differ and cannot be assumed to be similar throughout an industry.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN10	Water recycled and reused	Water
<p><i>Indicator not generalisable:</i> The amount of water recycled and reused by different organisations will differ and this indicator can therefore not be generalised for an industry.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN11	Facilities in or near areas of high biodiversity	Biodiversity
<p><i>Indicator not generalisable:</i> The location of facilities is organisation specific and can therefore not be assumed to be similar throughout an industry.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN12	Impacts on biodiversity	Biodiversity
<p><i>Indicator not generalisable:</i></p>		

The organisation-dependent size, location and management of operations will influence the impact on biodiversity and this indicator can therefore not be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-EN13	Habitats protected or restored	Biodiversity

Indicator not generalisable:

The organisation-dependent size, location and management of operations will influence the protection and restoration of habitat and this indicator can therefore not be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-EN14	IUCN Red List species	Biodiversity

Indicator not generalisable:

Red list species affected depends on location of operations and cannot be generalised for an entire industry.

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Indicator ID	Indicator Name	Measured impact
G4-MM1	Land disturbed or rehabilitated	Biodiversity

Indicator not generalisable:

The typical size of land required for conventional production processes used to produce a specific product can be approximated to some extent, but the specific design of operations and utilities will differ between organisations. Due to the inherent uncertainty regarding the typical amount of land used, this indicator will not be included in the present framework. Note that this indicator also requires the amount of newly disturbed land and rehabilitation of land, which cannot be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-MM2	Biodiversity management	Biodiversity

Indicator not generalisable:

Requirements for biodiversity management is dependent on the location, size and management of operations and can therefore not be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-MM3	Amounts of overburden, rock, tailings and sludges	Effluents and waste

Indicator excessive:

This indicator will not be used, as this framework specifically aims to evaluate the sustainability implications of beneficiating a metal by manufacturing a specific product and comparing these implications to that of other products that can be manufactured with the metal. The source of the metal is therefore assumed to be similar for all the products, implying that theoretically the amount of mining and mineral processing waste generated to produce that metal is the same or similar for all products that can be manufactured with the metal and it is therefore not sensible to include this indicator in the present framework. Note that the material use (including the amount of metal used) is captured in indicator EN1.

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Indicator ID	Indicator Name	Measured impact
G4-EN16	GHG emissions (Scope 2)	Emissions
<p><i>Indicator not generalisable:</i> Indirect greenhouse gas emissions will differ for different organisations, as each organisation will have a unique distribution of own generation and purchased energy. Indirect emissions is therefore not generalisable, but will be included in indicator G4-EN15 (as explained in the scope statement for G4-EN15).</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN18	GHG emissions intensity	Emissions
<p><i>Indicator excessive:</i> This indicator will not be used as it only presents the information presented by G4-EN15 and G4-EN17 in a different form and is therefore deemed excessive for the present framework.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN19	Reduction of GHG emissions	Emissions
<p><i>Indicator not generalisable:</i> Reductions in greenhouse gas emissions due to organisation-specific initiatives to reduce emissions cannot be generalised for an industry as different organisations implement different initiatives resulting in different reductions.</p> <p><i>Indicator not applicable to a new industry:</i> Reduction in greenhouse gas emissions cannot be calculated for an industry that is yet to be established.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN24	Significant spills	Effluents & waste
<p><i>Indicator not generalisable:</i> Spills are organisation specific and depend on management of individual operations. This indicator can therefore not be generalised with reasonable certainty for an industry.</p> <p><i>Indicator not applicable to a new industry:</i> Spills cannot be used for an industry that is yet to be established.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN25	Hazardous waste	Effluents & waste
<p><i>Indicator not generalisable:</i> The mass of hazardous waste generated is included in EN23, above. This indicator specifically refers to the transport, import, export and treatment of hazardous waste. These actions will be organisation-specific and cannot be generalised for all organisations in an industry.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-EN26	Biodiversity affected by runoff	Effluents & waste
<p><i>Indicator not generalisable:</i></p>		

Habitats affected by run-off is dependent on the location, nature and waste management of individual operations and this indicator can therefore not be generalised for an industry.

Indicator ID	Indicator Name	Measured impact
G4-EN27	Mitigation of environmental impacts of products and services	Products & services
<p><i>Indicator not generalisable:</i> Mitigation of impacts depend on organisation-specific initiatives and can therefore not be generalised for an industry.</p> <p><i>Indicator not applicable to a new industry:</i> Mitigation of environmental impacts of products and services cannot be used for an industry that is yet to be established.</p>		

Indicator ID	Indicator Name	Measured impact
G4-EN29	Environmental fines & sanctions	Compliance
<p><i>Indicator not generalisable:</i> Fines and sanctions are organisation-specific and cannot be generalised for an industry.</p> <p><i>Indicator not applicable to a new industry:</i> Fines and sanctions cannot be used for an industry that is yet to be established.</p>		

Indicator ID	Indicator Name	Measured impact
G4-EN30	Environmental impacts from product distribution and employee travel	Transport
<p><i>Indicator not generalisable:</i> Material, product and employee transport is highly dependent on the location of operations and the management of an organisation. This indicator can therefore not be generalised for an industry.</p>		

Indicator ID	Indicator Name	Measured impact
G4-EN31	Environmental investments	Environmental investments
<p><i>Indicator not generalisable:</i> Environmental protection expenditure is organisation-specific and cannot be generalised for an industry.</p>		

Indicator ID	Indicator Name	Measured impact
G4-EN32	New suppliers screened using environmental criteria	Supplier environmental
<p><i>Indicator not generalisable:</i> Contracting and screening of suppliers is organisation-specific and cannot be generalised for an industry.</p>		

Indicator ID	Indicator Name	Measured impact
G4-EN34	Environmental grievances	Environmental grievance mechanisms

Indicator not generalisable:

Grievances result from organisation-specific action or lack of action and can therefore not be generalised for an industry.

Indicator not applicable to a new industry:

Grievances cannot be used for an industry that is yet to be established.

A.3. Social indicators

Indicator ID	Indicator Name	Measured impact
G4-LA2	Benefits provided to full-time employees	Employment

Indicator not generalisable:

Benefits provided to full-time employees that are not provided to temporary or part-time employees cannot be generalised for an entire sector (similar to G4-EC3).

Indicator ID	Indicator Name	Measured impact
G4-LA3	Return to work and retention rates after parental leave	Employment

Indicator not generalisable:

Retention rates after parental leave depends on the organisation-specific work environment and can therefore not be generalised for an industry.

Indicator ID	Indicator Name	Measured impact
G4-LA4	Notice periods regarding operational changes	Labour/Management relations

Indicator not generalisable:

Notice periods regarding operational changes depend on specific organisation policy and cannot be generalised for an industry.

Indicator ID	Indicator Name	Measured impact
G4-MM4	Notice periods regarding operational changes	Labour/Management relations

Indicator not generalisable:

The number of strikes and lock-outs are dependent on organisation-specific factors and cannot be generalised for an industry.

Indicator not applicable to a new industry:

Strikes and lock-outs cannot have taken place if the industry is yet to be established and this indicator is therefore not applicable for the present project.

Indicator ID	Indicator Name	Measured impact
G4-LA5	Workforce represented in health and safety committees	Occupational health & safety

Indicator not generalisable:

Workforce representation in health and safety committees will differ for different organisations and cannot be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-LA7	Workers with high incidence of risk of diseases	Occupational health & safety

Indicator excessive:

This indicator aims to reflect whether there are workers who are involved in occupational activities who have a high incidence or high risk of specific diseases. This information is already captured in the occupational disease rate in indicator G4-LA6. Further, this indicator is qualitative, with no specific rate that is reported. Quantification and summation with G4-LA6 is therefore problematic and subsequently this indicator is not included in the present framework.

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Indicator ID	Indicator Name	Measured impact
G4-LA8	Health & safety topics covered in agreements with trade unions	Occupational health & safety

Indicator not generalisable:

Health and safety agreements with trade unions are organisation-specific and cannot be generalised with certainty for an entire industry.

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Indicator ID	Indicator Name	Measured impact
G4-LA10	Programs for skills management managing career endings	Training & education

Indicator not generalisable:

Skills management programs depend on organisation-specific policy and cannot be generalised for an industry consisting of different organisations.

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Indicator ID	Indicator Name	Measured impact
G4-LA11	Employees receiving performance and career development reviews	Training & education

Indicator not generalisable:

Employee performance and career reviews depend on organisation-specific policy regarding employee development and may differ substantially between organisations in a specific industry, therefore making accurate generalisation impossible.

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Indicator ID	Indicator Name	Measured impact
G4-LA12	Composition of governance bodies and employees	Diversity

Indicator not generalisable:

Diversity of governance bodies and employees within an industry depend on the diversity of the organisations the industry is composed of and the diversity of the industry can therefore not be generalised with certainty without an assessment of the individual organisations.

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Indicator ID	Indicator Name	Measured impact
G4-LA13	Ratio of basic salary & remuneration of women to men	Equal pay for women & men

Indicator not generalisable:

The ratio of basic salary and remuneration of women to men depend on organisation-specific efforts to ensure equal payment for work of equal value. This indicator can therefore not be sensibly generalised for an entire industry.

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Indicator ID	Indicator Name	Measured impact
G4-LA14	New suppliers that were screened using labour practices criteria	Supplier assessment for labour practices

Indicator not generalisable:

Contracting and screening of suppliers is organisation-specific and cannot be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-LA16	Grievances about labour practices	Labour practices grievances mechanisms

Indicator not generalisable:

Grievances result from organisation-specific action or lack of action and can therefore not be generalised for an industry.

Indicator not applicable to a new industry:

Grievances cannot be used for an industry that is yet to be established.

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Indicator ID	Indicator Name	Measured impact
G4-HR1	Investment agreements and contracts that include human rights clauses and underwent screening	Human rights investments

Indicator not generalisable:

Investment agreements and its inclusions are organisation-specific and cannot be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-HR2	Employee training on human rights	Human rights investments

Indicator not generalisable:

Time spent on employee training on human rights is dependent on organisation-specific policy and can therefore not be generalised for an industry, unless specific regulations enforce specific human rights training requirements.

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Indicator ID	Indicator Name	Measured impact
G4-HR7	Security personnel trained in the organisation's human rights policies	Security practices

Indicator not generalisable:

Training of security personnel in human rights is dependent on organisation-specific policy and can therefore not be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-HR8	Incidents of violations involving rights of indigenous peoples	Indigenous rights

Indicator not generalisable:

Incidents of violation involving rights of indigenous peoples depend on the location, nature and size of operations and organisation policy. This indicator can therefore not be generalised for an industry.

Indicator not applicable to a new industry:

Incidents of violation of rights of indigenous people cannot have taken place if an industry is yet to be established and this indicator can therefore not be used in the framework.

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Indicator ID	Indicator Name	Measured impact
G4-HR9	Operations that have been subject to human rights assessments	Human rights assessments

Indicator excessive:

In the GRI G4 framework, this indicator seeks to reflect the extent to which an organization takes human rights considerations into account in its decision-making. This cannot be reported in the present framework, due to its prospective nature. This indicator will therefore have to be modified to reflect the perceived risk of human rights violations, however, this information is already captured in the modified indicators G4-LA15, G4-HR3, G4-HR4, G4-HR5 and G4-HR6. This indicator is therefore excluded from this framework.

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Indicator ID	Indicator Name	Measured impact
G4-MM5	Operations taking place in or adjacent to indigenous peoples' territories	Indigenous rights

Indicator not generalisable:

The number of operations taking place in or adjacent to indigenous peoples' territories cannot be generalised for an industry as the location of operations differ according to the organisations of which the industry is composed.

Indicator not applicable to a new industry:

The location of operations cannot be used as the industry and its operations is not yet established.

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Indicator ID	Indicator Name	Measured impact
G4-HR10	New suppliers screened for human rights	Supplier human rights assessment
<i>Indicator not generalisable:</i> Contracting and screening of suppliers is organisation-specific and cannot be generalised for an industry.		

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Indicator ID	Indicator Name	Measured impact
G4-HR12	Grievances about human rights	Human rights grievances mechanisms
<i>Indicator not generalisable:</i> Grievances result from organisation-specific action or lack of action and can therefore not be generalised for an industry.		
<i>Indicator not applicable to a new industry:</i> Grievances cannot be used for an industry that is yet to be established.		

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Indicator ID	Indicator Name	Measured impact
G4-SO1	Local community engagement, impact assessments and development programs	Local communities
<i>Indicator not generalisable:</i> Implementation of local community engagement, impact assessments and development programs are dependent on organisation-specific policy and strategy and cannot be generalised for an industry consisting of different organisations with different policies and strategies.		

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Indicator ID	Indicator Name	Measured impact
G4-MM6	Disputes relating to land use, customary rights of local communities and indigenous peoples	Local communities
<i>Indicator not generalisable:</i> Disputes relating to land use, customary rights of local communities and indigenous peoples are dependent on the location, size and nature of operations and are therefore organisation-specific and not generalisable.		

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Indicator ID	Indicator Name	Measured impact
G4-MM7	Grievance mechanisms used to resolve disputes	Local communities
<i>Indicator not generalisable:</i> Grievances result from organisation-specific action or lack of action and can therefore not be generalised for an industry.		
<i>Indicator not applicable to a new industry:</i> Grievances cannot be used for an industry that is yet to be established.		

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Indicator ID	Indicator Name	Measured impact
G4-SO4	Communications & training on anticorruption	Anti-corruption

Indicator not generalisable:

Communications and training on anti-corruption is organisation-specific and cannot be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-SO5	Confirmed incidents of corruption	Anti-corruption

Indicator not generalisable:

Incidents of corruption are inherently organisation-specific and can therefore not be generalised for an industry. Risk of corruption is captured in SO3.

Indicator not applicable to a new industry:

Incidents of corruption cannot have taken place if an industry is yet to be established and this indicator can therefore not be used in the framework.

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Indicator ID	Indicator Name	Measured impact
G4-SO6	Political contributions	Public policy

Indicator not generalisable:

Political contributions made by organisations depend on organisation-specific political affiliations and cannot be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-SO7	Anti-competitive behaviour	Anti-competitive behaviour

Indicator not generalisable:

Legal action regarding anti-competitive behaviour result from organisation-specific action or lack of action and can therefore not be generalised.

Indicator not applicable to a new industry:

Anti-competitive behaviour, anti-trust and monopoly practices, and the subsequent legal action, cannot have taken place an industry that is yet to be established.

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Indicator ID	Indicator Name	Measured impact
G4-SO8	Fines for non-compliance with laws	Compliance

Indicator not generalisable:

Fines and sanctions are organisation-specific and cannot be generalised for an industry.

Indicator not applicable to a new industry:

Fines and sanctions cannot be used for an industry that is yet to be established.

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Indicator ID	Indicator Name	Measured impact
G4-SO9	New suppliers screened for impacts on society	Supplier assessment for impacts on society

Indicator not generalisable:

Contracting and screening of suppliers is organisation-specific and cannot be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-SO11	Grievances about impacts on society	Grievance mechanisms for impacts on society
<p><i>Indicator not generalisable:</i> Grievances result from organisation-specific action or lack of action and can therefore not be generalised for an industry.</p> <p><i>Indicator not applicable to a new industry:</i> Grievances cannot be used for an industry that is yet to be established.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-MM8	Operating sites where artisanal or small-scale mining takes place on or adjacent to	Artisanal & small-scale mining
<p><i>Indicator not generalisable:</i> Operating sites close to artisanal or small-scale mining and the risks related to this proximity are dependent on the location, size and nature of operations and are therefore organisation-specific and not generalisable.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-MM9	Sites where resettlements took place	Resettlement
<p><i>Indicator not generalisable:</i> Sites where resettlements took place and the impacts the resettlement had on the livelihoods of the affected parties are dependent on the location of operations and are therefore organisation-specific and not generalisable.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-MM10	Operations with closure plans	Closure planning
<p><i>Indicator not generalisable:</i> Whether closure plans are in place for operations depend on organisation-specific strategy, policy and initiative and cannot be generalised for an industry.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-PR2	Non-compliance concerning the health & safety impacts of products & services	Customer health & safety
<p><i>Indicator not generalisable:</i> Incidents of non-compliance with regulations result from inadequate internal management systems and procedures, or ineffective implementation. This indicator is therefore organisation-specific and not generalisable for an industry.</p> <p><i>Indicator not applicable to a new industry:</i> Incidents of non-compliance with regulations cannot have taken place if an industry is yet to be established and this indicator can therefore not be used.</p>		

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Indicator ID	Indicator Name	Measured impact
G4-PR3	Product & service information required for labelling	Product & service labelling

Indicator not generalisable:

Product and service information and labelling is based on organisation-specific policy, but may be enforced by regulations for specific industries and can only in such cases be generalised for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-PR4	Non-compliance with regulations concerning product & service labelling	Product & service labelling

Indicator not generalisable:

Non-compliance with regulations results from inadequate internal management systems and procedures and is organisation-specific and is therefore not generalisable.

Indicator not applicable to a new industry:

Incidents of non-compliance with regulations cannot have taken place if an industry is yet to be established and this indicator can therefore not be used.

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Indicator ID	Indicator Name	Measured impact
G4-PR5	Surveys measuring customer satisfaction	Product & service labelling

Indicator not generalisable:

Customer satisfaction surveys are conducted by some organisations only and depend on the relationship between the specific organisation and its stakeholders. This indicator can therefore not be generalised sensibly for an industry.

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Indicator ID	Indicator Name	Measured impact
G4-PR7	Non-compliance with regulations concerning marketing communications	Marketing & communications

Indicator not generalisable:

Non-compliance with regulations results from inadequate internal management systems and procedures and is organisation-specific and is therefore not generalisable.

Indicator not applicable to a new industry:

Incidents of non-compliance with regulations cannot have taken place if an industry is yet to be established and this indicator can therefore not be used.

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Indicator ID	Indicator Name	Measured impact
G4-PR8	Complaints regarding breaches of customer privacy & losses of customer data	Customer privacy

Indicator not generalisable:

Complaints regarding breaches of customer privacy and non-compliance with regulations results from inadequate internal management systems and procedures and is organisation-specific and is therefore not generalisable.

Indicator not applicable to a new industry:

Complaints regarding breaches of customer privacy and losses of customer data cannot be used for an industry that is yet to be established.

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Indicator ID	Indicator Name	Measured impact
G4-PR9	Fines for non-compliance with laws and regulations concerning products & services	Product compliance

Indicator not generalisable:

Fines and sanctions are organisation-specific and cannot be generalised for an industry.

Indicator not applicable to a new industry:

Fines and sanctions cannot be used for an industry that is yet to be established.

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