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PRACTITIONER'S GUIDE

TO STRATEGIC GREEN INDUSTRIAL POLICY

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SGiP
STRATEGIC GREEN INDUSTRIAL POLICY

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ABBREVIATIONS

AfDB	African Development Bank
APEC	Asia-Pacific Economic Cooperation
COMFAR	Computer Model for Feasibility Analysis and Reporting (UNIDO)
DE	domestic extraction
DMC	domestic material consumption
DMI	domestic material input
DMO	direct material output
DPO	domestic processed output
EC	European Commission
ECLA	Economic Commission for Latin America
EEA	European Environmental Agency
EEIO	environmentally-extended input-output analysis
EGS	environmental goods and services
EIO	Eco-Innovation Observatory
EMA	Export Market Access
EMC	environmentally weighted material consumption
EPP	environmentally preferable goods
EU	European Union
EUR	Euro
FDI	foreign direct investment
GDP	gross domestic product
GHG	greenhouse gas
GTAP	Global Trade Analysis Project
IEA	International Energy Agency
ICT	information and communications technology
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
ISIC	International Standard Industrial Classification
LCA	life cycle assessment
LCU	local currency unit
MCDA	multiple-criteria decision analysis
MFA	material flow accountings and analysis
OECD	Organisation for Economic Co-operation and Development
PPD	public-private dialogue
PPP	purchasing power parity
PV	photovoltaics
SCE	standard coal equivalents
SEK	Swedish Krona
SGIP	Strategic Green Industrial Policy
SME	small and medium-sized enterprise
SWB	subjective well-being
TMC	total material consumption
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNESCWA	United Nations Economic and Social Commission for Western Asia
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USD	United States Dollar
WHO	World Health Organization
WTO	World Trade Organization

HOW TO USE THIS GUIDE

The United Nations Industrial Development Organization (UNIDO) has developed this guide to provide practical advice on the evolving concept of Strategic Green Industrial Policy (SGIP) for policy practitioners. The guide details tools that can be applied to what some industrial policymakers may consider to be relatively under-explored territory. And indeed, some of the changes required for a transition to a green economy imply significant restructuring (if not disruption of technological paths). However, this guide also aims to ease this transition by providing detailed guidance, highlighting a number of changes that are relatively easy to implement.

We assume that most industrial policymakers are already informed regarding the economic theories that have, to date, underpinned industrial development. Therefore, most of the tools discussed and presented in the guide originate from other disciplines without adhering to any one theoretical approach. For example, we draw on tools and methodologies from disciplines such as industrial ecology and ecological economics, with other tools rooted in systems thinking, theory of change, or other fields of research and practice.

When working with this guide, policymakers can:

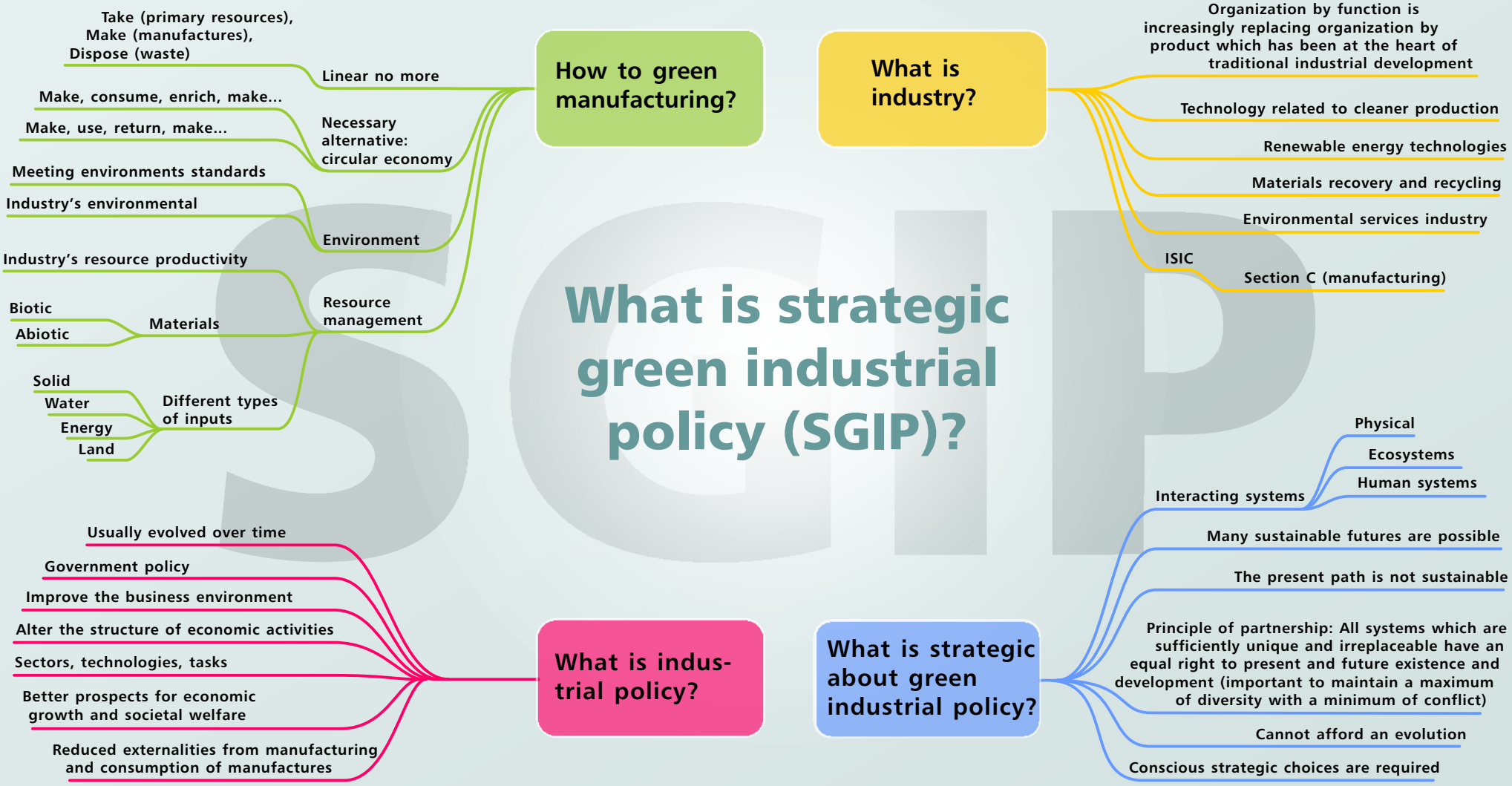
- Browse: section by section – the main issues associated with the phases of SGIP policy development are presented in Chapter 3, with more detailed sections following in Chapter 4 and the Supplement;
- Look for boxes that contain information relevant to the situation – these are presented as stand-alones whose purpose is to provide inspiration for key tasks;
- Review the mindmaps for each chapter to gain a better overview of issues;
- Consult the supplement to this guide for further detail on the information presented in Chapters 3 & 4.

Any transformation of a country's industrial sectors has to be based on a holistic and coherent strategy, aimed at an overall transformation of markets and consumer behaviour by replacing resource intensive production, as well as consumption patterns with more resource efficient ones (see European Parliament, 2009). Thus, greening will require multiple interventions to be developed and agreed upon by affected stakeholders.

Hence, this guide aims to provide decision makers with the necessary tools and information to steer through this very necessary transition, and develop a SGIP that reflects their country's own unique ecological, economic and social context as well as aspirations.

CHAPTER 1

CHAPTER 1


What is strategic green industrial policy (SGIP)?
How to green manufacturing?
Linear no more
Take (primary resources), Make (manufactures), Dispose (waste)
Necessary alternative: circular economy
Make, consume, enrich, make...
Make, use, return, make...
Environment
Meeting environments standards
Industry's environmental
Resource management
Industry's resource productivity
Materials
Biotic
Abiotic
Different types of inputs
Solid
Water
Energy
Land
What is industry?
Organization by function is increasingly replacing organization by product which has been at the heart of traditional industrial development
Technology related to cleaner production
Renewable energy technologies
Materials recovery and recycling
Environmental services industry
ISIC
Section C (manufacturing)
What is indus-trial policy?
Usually evolved over time
Government policy
Improve the business environment
Alter the structure of economic activities
Sectors, technologies, tasks
Better prospects for economic growth and societal welfare
Reduced externalities from manufacturing and consumption of manufactures
What is strategic about green industrial policy?
Interacting systems
Physical
Ecosystems
Human systems
Many sustainable futures are possible
The present path is not sustainable
Principle of partnership: All systems which are sufficiently unique and irreplaceable have an equal right to present and future existence and development (important to maintain a maximum of diversity with a minimum of conflict)
Cannot afford an evolution
Conscious strategic choices are required

WHAT IS STRATEGIC GREEN INDUSTRIAL POLICY (SGIP) AND WHY IS IT NEEDED?

1

Introduction

1.1

Two centuries of scientific, industrial, and economic development have led to tremendous changes in the ways in which humans interact with their environment. In combination with other factors, such as improvements in health, population growth and changes in lifestyle, mankind is currently stretching the limits of sustainability on "spaceship earth" (Boulding, 1966).

Climate change - the impacts of which are already being experienced around the world - is signalling some of the most profound changes that human systems are ever likely to face. It needs to be addressed as a matter of great urgency. Despite being a contributor to global climate change, the manufacturing industry offers enormous potential for improving the livelihood of humans across the globe and for making major contributions to the sustainability revolution that is currently required. It is this potential that policymakers for Strategic Green Industrial Policy (SGIP) need to harness.

The manufacturing industry is traditionally distinguished from other economic sectors by the fact that it transforms biotic and abiotic primary inputs (sourced from the activities of agriculture, forestry or fishing; or from extractive activities such as mining and quarrying) into new products. It is an economic sector focused on making products. These transformative processes often employ labour and capital and typically depend on a number of auxiliary inputs such as energy and water.

Over a few hundred years, the manufacturing industry has, in some regions of the world, evolved into highly complex industrial structures whereby many primary products and intermediate manufactures are converted into final products. This has all been made possible by utilizing the natural resources provided by the planet. As a result, manufacturing has induced tremendous structural changes in the regions of the planet where it has gained a foothold and in areas from which it draws its supplies. Hence, there are very few places on earth where its impacts have not been felt.

Increases in manufacturing productivity have enabled humanity to produce more affordable goods in larger quantities. Technological developments in manufacturing have improved the livelihoods for many and have significantly contributed to rising incomes, while

creating more jobs. It is for these reasons that many governments are interested in influencing the structures of their economies in such a way that a manufacturing industry may emerge, or, if it already exists, that it may continue to be relevant and provide jobs. While the approaches may vary from country to country, there are few countries that have not developed industrial policies.

The manufacturing industry is arguably the sector where three general types of systems (physical systems, ecosystems, and human systems) interact in the most intensive and complex of ways. Human systems (including economic systems) essentially depend on a sustainable interaction with the other two types of systems. In order to ensure a future sustainable coexistence, there is a need for fundamental changes in human institutions, technology, behaviour, and ethics. Therefore, SGIP implies a conscious choice of new industrial development paths which address these elements and a "leapfrogging" of the traditionally linear path of industrialization and industrial policy development.

SGIP is an emerging concept that involves a significant amount of input from a variety of disciplines and stakeholders representing a wide spectrum of interests. Hence, your country's SGIP should not be developed along traditional policy lines. In order for it to be effective, SGIP must be utilized to enable industrial policymakers to build bridges to other disciplines, to facilitate the greening of the manufacturing sector and to embed it in a green economy. Similarly, this guide should not be followed in a linear fashion, rather it should be used to provide guidance and a basis for dynamic collaboration with multiple classes of stakeholders in order to address the immediacy of the task that is before us.

1.2 The evolution of industrial policy

Theories of economic development of all colors - capitalist and socialist - in the 20th century have often emphasized that economic development implies a shift from primary production - notably agriculture to the production of industrial goods. Different industrial strategies and policy instruments have been conceived in order to accelerate this process. Enhancing manufacturing output, the share of manufacturing output in the economy, or the manufacturing share in exports, has often been the driving force behind industrial policies. For example, the Economic Commission for Latin America (ECLA) in its 1971 analyses of countries (ECLA, 1971), found there were generally accepted motivations for encouraging the establishment of industries, of which they distinguished three main drivers: the protection of industry; the promotion of industry; and the channeling of financial resources to the industrial sector.

The definition of what constitutes industrial policy has broadened over time to reflect shifting priorities in the economy and in global discourse. Initially, and almost exclusively in the immediate post-war period, the objective of industrial policies was the structural transformation of the economy. These policies focused more narrowly on specific manufacturing subsectors with greater productivity, something that continues to remain relevant in many developing countries even today. Over time, policymakers increasingly recognized that structural transformation reaches well beyond the boundaries of the manufacturing industry and hence has implications not only for economic, but for environmental and societal development as well. This, however, has not changed the recognition that industrial policy is essentially aimed at influencing economic structures with flow-on effects for a broad range of non-economic

areas. Modern definitions of industrial policy (also known as structural transformation policies) have therefore become more encompassing, removing sectoral barriers to the organization of economic processes, amongst others.

Industrial policy now encompasses "any type of intervention or government policy that attempts to improve the business environment or to alter the structure of economic activity toward sectors, technologies or tasks that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention." (See Warwick, 2013; UNIDO, 2013.) From this perspective, modern industrial policy has now evolved to gain a foothold in the former administrative territory of other disciplines, in particular, economic and development policies. Beyond the semantics and the country-specific definitions of administrative territories, this is also a reflection of an increasingly changing view of what industrial policy consists of and what it needs to achieve. [1]

Hence, organizations specializing in the manufacturing industry will most likely continue to focus their efforts on their respective segment of manufacturing, but will also now need to ensure that their interventions help to facilitate positive outcomes in a wider range of areas not immediately recognisable as industrial policy.

Externalities from manufacturing and consumption of consumer products 1.3

Manufacturing-whether supported by industrial policy or not-is not without adverse impacts. Since its early beginnings, the manufacturing industry has relied heavily on converting carbon, into carbon dioxide (CO2) in order to release the energy required to power industrial equipment. This mode of operation has expanded into the transportation sector which relies on combustion engines, also produced by the manufacturing industry. This development, in systemic terms, has created a reinforcing feedback loop that is difficult to control.

The entire life cycle of product manufacture-from extraction, to production, consumption and then disposal-typically results in negative externalities, whether they be environmental, human health or welfare related. And whilst GHG emissions-a driver of global climate change- are certainly not limited to the manufacturing industry, it has become apparent that a continuing conversion of fossil fuels for a variety of uses in the manufacturing process, pose a serious threat to global gains made in poverty alleviation.

An increase in the use of consumer products around the world, has accelerated the depletion of many non-renewable resources and put pressure on renewable resources. For example, in many regions of the world, population growth, environmental conditions and/or the mismanagement of resources have increased water scarcities. Given that water is essential to human life, as well as

[1] In this context, it is to be expected that the differences between industrial and environmental policies will become increasingly "blurred" during the implementation of SGIP. This is unavoidable inasmuch it reflects the present shift from environmental economics to ecological economics. (For a contrast between traditional economics and ecological economics see T1 P26.)

For practical purposes, governments will typically try to define and distribute responsibilities in line with their specific situation, including the size of the national manufacturing industry, the role of government in supporting manufacturing industry development, existing and future environmental risks, available resources, and decision-making procedures.

being an important input into many manufacturing subsectors, it is essential to consider ways to reduce water usage in these manufacturing processes.

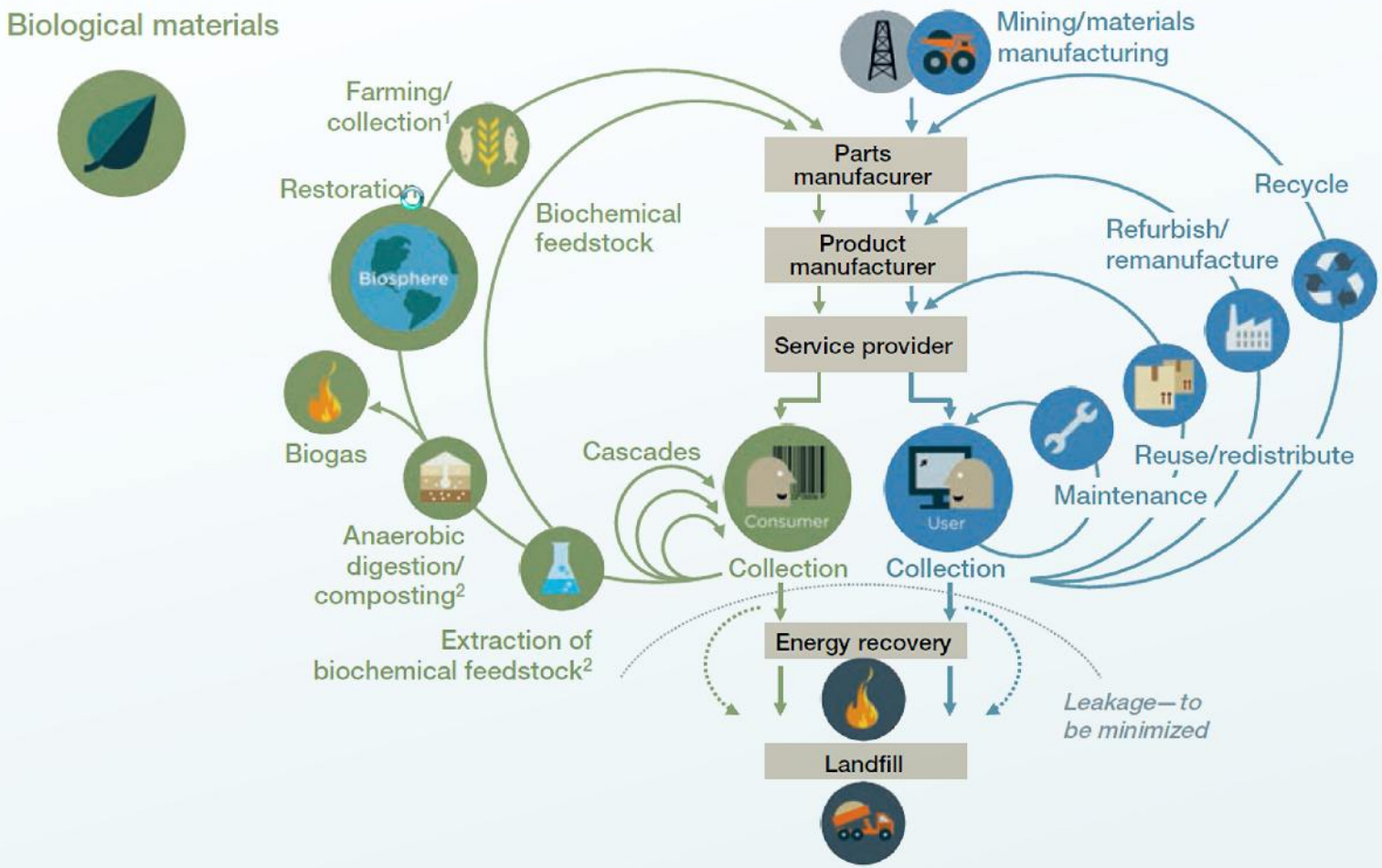
Hence, it is evident that all economic sectors need to play an urgent part in mitigating their impact on the environment, not only because of their role as a net contributor to global GHGs, but because it also makes good business sense. This needs to occur through pursuing a dramatic and systemic shift to more sustainable modes of production in order to keep world development within safe planetary boundaries. This also needs to occur in parallel with changes in consumption so that supply and demand can be balanced. A holistic "remedy" needs to be sought, whereby policy responses shift beyond sectoral silos to encompass the wide range of areas needed to be addressed in order to drastically mitigate manufacturing's contribution to environmental degradation and instead promote a circular economy based on green industry and green economy principles.

1.4 A new way forward: Green industry policy, the green economy, and the circular economy as necessary alternatives to conventional modes of manufacturing

The manufacturing industry is one key element in a world economy that has been characterized as linear: extract (primary resources), produce (manufactures) and dispose (waste). The interrelated challenges of avoiding pollution; improving resource efficiency; achieving major reductions in the emission of GHGs; and altering industrial structures in order to mitigate negative impacts on the environment, need to be addressed by the manufacturing industry.

The material limits of the planet pose specific difficulties for product-focussed economic sectors. Focussing on functions instead of products is likely to open up new opportunities for breaking out of linear economy concepts. The circular economy offers something new to address these challenges with two types of economic models; one for biotic, whereby the circular process is defined by production, consumption, enrich and then a repetition of the same process. The other for abiotic materials, where the circular economy process is expounded as production, use, return and then remake, etc.

The circular economy F1

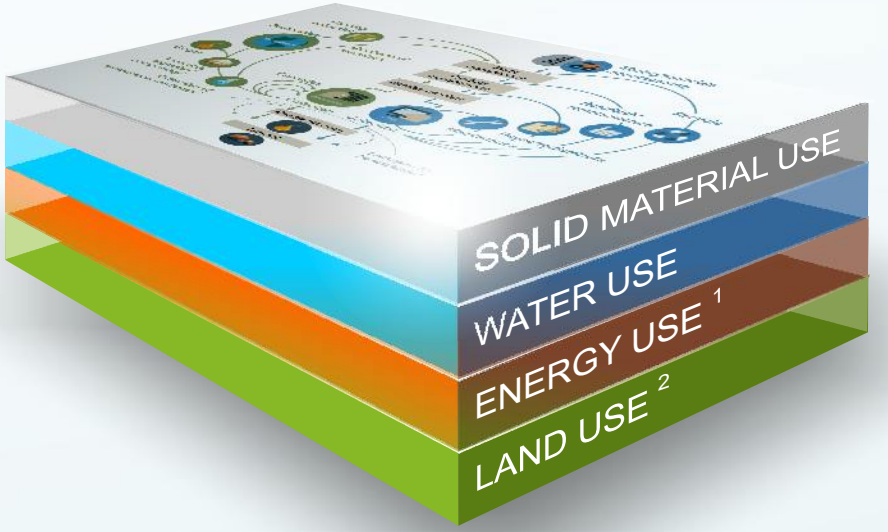


[1] Hunting and fishing

[2] Can take both postharvest and postconsumer waste as an input

Source: Ellen MacArthur Foundation circular economy team drawing from Braungart & Mc Donough and Cradle to Cradle (C2C)

F2 The impact of circular production processes accumulated across several layers of inputs



Source: Towards the Circular Economy: Opportunities for the consumer goods sector: Ellen Macarthur Foundation (2013)

[1] Including greenhouse gases

[2] Including impact on soil health/fertility, biodiversity, and ecosystem services

A green industrial policy is an industrial policy that is meant to trigger and facilitate structural changes as entailed, or required, both to respond to environmental conditions or situations, and to develop a green, circular economy. It is meant to embed the manufacturing industry in a green economy concept.

UNEP has defined the green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP, 2011a, p. 16). Developing and implementing strategic green industrial policy (SGIP), acknowledges that the manufacturing industry cannot be viewed in isolation from other policies and sectors. SGIP, therefore, by definition, needs to break out of the silo of manufacturing and recognize the deep interrelationships that exist between manufacturing and other development factors.

It is acknowledged that even the green economy concept has already been criticized for being too optimistic with regards to, inter alia, the potential economic solutions on offer for what essentially constitutes a host of market failures; the fact that decarbonization is not the sole greening target humanity needs to strive for; and that solving the ecological crisis of the planet will not be achieved by putting the right price on natural capital. In particular, it has been argued that there is no feasible solution to the current planetary overshoot that dovetails with continued economic growth (see Fatheuer, Fuhr and Unmüßig, 2015). From this more critical perspective, the transition to a green economy can at best constitute the least common denominator on which the restructuring of economic activities, in line with planetary boundaries, needs to occur. Such reasoning certainly underlines the urgency of the structural shifts required.

ISIC and Green Industry

B1

Both "green" and "industry" are rather generic terms that could mean many different things to many different people.

Industry: "Industry" are those activities which are described in Section C (manufacturing) of the International Standard Industrial Classification (ISIC) of All Economic Activities, Revision 4, of the Statistics Division of the United Nations Department of Economic and Social Affairs.

Green: "Green" describes any activity or concept that seeks to increase the degree by which the processes of the manufacturing industry meet environmental standards and deepen their integration within a circular economy. "Greening" contributes to increasing welfare by improving the manufacturing industry's resource productivity and environmental performance.

As for categorizing specific activities and technologies within green industry, the following should be noted:

- The **environmental services industry.** According to ISIC Revision 4, such services are not a direct part of industry, and are therefore classified either as services or as waste management and remediation. Yet, such services can contribute strongly to industry greening, and therefore must be considered as within reach of a green industrial policy.
- **Materials recovery and recycling.** To the extent that these activities include some form of transformation during production, they are part of the manufacturing sectors where this transformation occurs (e.g. transforming scrap metals into new metals, remanufacturing car engines). If they mainly refer to sorting activities, they are classified under waste management activities or wholesale of waste and scrap. Recycling was previously classified under manufacturing in ISIC 3, but this did not reflect its production process well. Given their importance, recovery and recycling merit particular attention in green industrial policy.
- **Renewable energy technologies.** If these technologies (e.g. solar panels, wind turbines) are being produced, they belong to industry. Their use is not classified as an "industry" despite it being an excellent way to reduce GHG emissions which may provide some "breathing space" in manufacturing sectors where energy intensity needs to be urgently reduced.
- **Technology related to cleaner production.** Equipment manufacturing, cleaner technology and measurement equipment all belong to industry.

However, the development of a green economy will increasingly require breaking out of the traditional ISIC classifications. Organization by function is increasingly replacing organization by product which has been at the heart of traditional industrial development.

B2 What is strategic about Green Industrial Policy? SGIP Guiding principles

There is an urgent need for a new paradigm of industrial policy making that works across disciplines, across sectors, which integrates all levels of government, working with a dynamic cross-section of stakeholders. This will ensure that the groups that have typically been excluded from these processes - women and youth in particular - get to play a central and decisive role.

SGIP needs to be innovative as it is occurring in the context of an ever-shifting and ever complex globalized world, facing the challenges of climate change, resource scarcity, growing numbers of the global middle classes and the determined mandate of governments to lift their populations out of poverty. Therefore, SGIP has no choice but to be strategic and innovative. The challenge is immense, but no action, or simply following the well-trodden path of development to date is not an option in this landscape. As such, SGIP should be guided by the following principles:

- **Sustainable development is possible**, but it requires a departure from the present unsustainable path. There are many possible sustainable futures and paths to achieve this.
- The choice requires the adoption of an ethical principle, the **Principle of Partnership** which states that:

> All systems which are sufficiently unique and irreplaceable have an equal right to present and future existence and development.

The Principle of Partnership is important to maintain a maximum of diversity with a minimum amount of conflict.

- Society (and the environment) **cannot afford an evolution** of human systems to a sustainable path by trial and error. **Conscious strategic choices are required**.
- Strategic choices must conform with general system principles and ecosystem principles to be successful in the long run.

Following Bossel, 2007, pp. 241-242, 262. (Emphases added.)

CHAPTER 2

SGiP

CHAPTER 2

What is the key issue SGIP addresses ?

Co-benefits are mutually reinforcing

- Resource productivity
  - Enhanced air, water and soil
  - Agricultural productivity
- Innovation
- Energy efficiency
- Food security
- Labour productivity
- New economy
- Green jobs
- Sustainable jobs
- Climate protection
- Competitiveness
- Energy security
- Stabilizing ecosystems
- Better health
- Jobs creation
- etc...

Decoupling

- Economic growth
  - Environmental impacts
- Key to reconciling
  - Manufacturing growth
  - Green economy
- Absolute
  - Relative
- Governments can play a key role in driving and facilitating the decoupling process
- Examples: Yes, it is possible

Opportunities for LDCs

- Leapfrog specific industrial development stages
- Avoid unsustainable technological paths
- Inclusive and sustainable industrial development
- Sustainable development goals

Tall order

- Significant challenges are posed by decoupling
  - Energy
  - Water
  - Material

Risks

- Global problems require global cooperation
- Properly managing transition
  - Repositioning industries for the future
  - Managing rents
    - Resistance to change
    - Political capture
  - Dealing with uncertainly

Manage the unavoidable transition to green manufacturing

- Bridge the apparent gaps between the different technical disciplines
  - Engineering
  - Environmental management
  - Economics
  - Ecological economics
- Minimize negative impacts on the economy and the poorer strata of the population
- Opening up new channels and patterns of production that will be...
  - Inclusive
  - Increase sustainable economic benefits and well-being

STRATEGIC GREEN INDUSTRIAL POLICY - THE KEY ISSUES

2

A relatively significant share of the global manufacturing sector over the past few decades has only reluctantly engaged with the necessity of greening, this is in spite of the increasing urgency to repair the relationship between human systems and the global ecosystem (see Rockström and others, 2009). This can, in part, be explained by protectionist policies or the pressures of the global marketplace, and the perception that market survival does not allow for the cost increases that are often associated with greening. Despite noteworthy exceptions, consumer demand in major markets has not sufficiently revealed a willingness to pay a premium for greener manufactures, with competition typically remaining fierce, based on achieving the lowest price for most manufacturing sector products.

Ministries and agencies tasked with supporting industrial development have primarily focused on increasing manufacturing value added (MVA) in order to enhance economic growth of the national economy. After all, a substantial portion of economic growth over the last century can be attributed to the manufacturing industry. It is therefore understandable why developing countries have sought to reap their share of industrial production, instead of leaving the processing of their primary resources and agricultural produce to industrialized countries.

Even in industrialized high-income economies, many governments have only reluctantly engaged with greening their industries. Based on their own trajectory of development, they share the same perception as developing countries regarding the importance of manufacturing for national economic growth. Moreover, given the strong share of manufacturing in their economies, governments of industrialized countries are acutely aware of the effects that deindustrialization can have on employment.

It should be noted that empirical evidence suggests that the predicted costs of environmental policy measures are often overestimated, and that delayed action is likely to lead to even higher costs due to natural disasters and/or biodiversity losses (see Ekins, McDowall and Zenghelis, 2014; Stern, 2006).

It is in this context that the discipline of economics, which provides major criteria for making investments in industrial development, has presented policymakers with a double-edged sword.

2.1 The role of economics

Economics is a very important tool with which to improve resource use efficiency (input-output ratios), with the net present value determining investment decisions both in the private and public sectors (see also the classic UNIDO, 1986, feasibility study manual, and the long-standing COMFAR program). The longer the return on investments, the less "viable" the investment becomes. At prevailing discount rates, any net present value for benefits or costs accruing 20 years from now is close to zero. While discount rate variations over time may significantly change some of the calculations (see, for example, Pearce and others, 2003), such variations remain insufficient to reflect the values attributable to centennial or millennial processes, which should normally impact the behaviour of human systems regarding the exploitation of age-old physical and ecosystems, i.e. natural capital that has accumulated over long periods of time.

Economists have not yet found a unified, reliable and practical way to properly account for the value of natural capital contained in natural resources that human systems are exploiting. To date, environmental disasters tend to increase, rather than reduce, gross domestic product (GDP) as long as they trigger economic activities that lead to the mitigation of environmental damages. At the same time there is no parallel mechanism to properly deduct the damage inflicted on natural capital assets (stocks). From this perspective, arguably, environmental disasters may even appear to be "beneficial" because they can create green jobs (specifically, jobs tasked with environmental damage mitigation).

Moreover, competition in global markets does not take place on equal terms. For example, producers in some countries are forced to internalize environmental costs, by way of regulation and taxation, while producers in other countries do not internalize such externalities and operate based on mere financial criteria.

In other words, policymakers cannot only look to economists when it comes to greening their industries. Neither can they expect the business sector to take the lead in greening if businesses are engaged in cut-throat competition in domestic and international markets, especially where environmental externalities are not systematically internalized.

The key policy issue for SGIP is to politically and administratively manage the unavoidable transition to green manufacturing in a way that bridges the apparent gaps between the different technical disciplines (engineering, economics, environmental management, etc.) while minimizing negative impacts on the economy and the poorer strata of the population, as well as opening up new channels and patterns of production that will be inclusive and increase sustainable economic benefits and well-being.

This policy issue, admittedly, constitutes a tall order. Yet countries which tackle this policy issue early, and with persistence are likely to be more successful in repositioning themselves for the future. Moreover, countries which have not yet developed complex manufacturing industry systems may find that as they are less locked into unsustainable production patterns than other countries, they

may even be able to leapfrog specific industrial development stages, or avoid specific technological paths, just as the introduction of mobile phone networks has allowed many low income countries to leapfrog or save on cable networks, and the decentralized installation of small renewable energy equipment may reduce the requirements on power grid dimensions.

SGIP derives its mandate directly from the concept of inclusive and sustainable industrial development (ISID) as adopted at the fifteenth General Conference of the United Nations Industrial Development Organization (UNIDO) in Lima, Peru in 2013, and as integrated and coordinated with the follow-up of the outcomes of the United Nations Conference on Sustainable Development of 2012, which agreed on Sustainable Development Goals (SDGs).

The task of greening industry and value chains often transcends national boundaries and will require cross-border and international cooperation. There are many important interrelationships with other fields of policy (environment, agriculture and fisheries, energy, mining, water management, international trade, etc.) that need to be engaged with in order to address the modern day challenge of ecological, social and economic objectives within a rapidly changing and complex world.

The task for modern industrial economists 2.2

The economics profession has long dominated the discourse of industrial development and manufacturing strategies and continues to be a very important element in SGIP development. However, economics itself is undergoing changes and is bound to increasingly develop new emphases. Examples of this are shown in the box below (T1) where the left column describes new approaches and the right column the traditional approaches.

The task for modern industrial economists is to embrace the new approaches and assist policymakers in their implementation.

In this context, it may be useful to be reminded that the etymological root of the term "economics" is "oikos", the ancient Greek term for "household". Both of the terms "ecology" and "economics" share the same origin. It is therefore conceivable that economic and ecological thinking may eventually converge.

T1 Beyond environmental economics: the current shift towards ecological economics

	Criteria for ecological economics	Criteria for environmental and resource economics
1	Optimal scale	Optimal allocation and externalities
2	Priority is sustainability	Priority is efficiency
3	Needs fulfilled and equitable distribution	Optimal welfare or Pareto efficiency
4	Sustainable development, globally and North/South	Sustainable growth in abstract models
5	Growth pessimism and difficult choices	Growth optimism and "win-win" options
6	Unpredictable co-evolution	Deterministic optimization of intertemporal welfare
7	Long-term focus	Short- to medium-term focus
8	Complete, integrative and descriptive	Partial, monodisciplinary and analytical
9	Concrete and specific	Abstract and general
10	Physical and biological indicators	Monetary indicators
11	Systems analysis	External costs and economic valuation
12	Multidimensional evaluation	Cost-benefit analysis
13	Integrated models with cause-effect relationships	Applied general equilibrium models with external costs
14	Bounded individual rationality and uncertainty	Maximization of utility or profit
15	Local communities	Global market and isolated individuals
16	Environmental ethics	Utilitarianism and functionalism

Source: Bergh, 2000, p. 9.

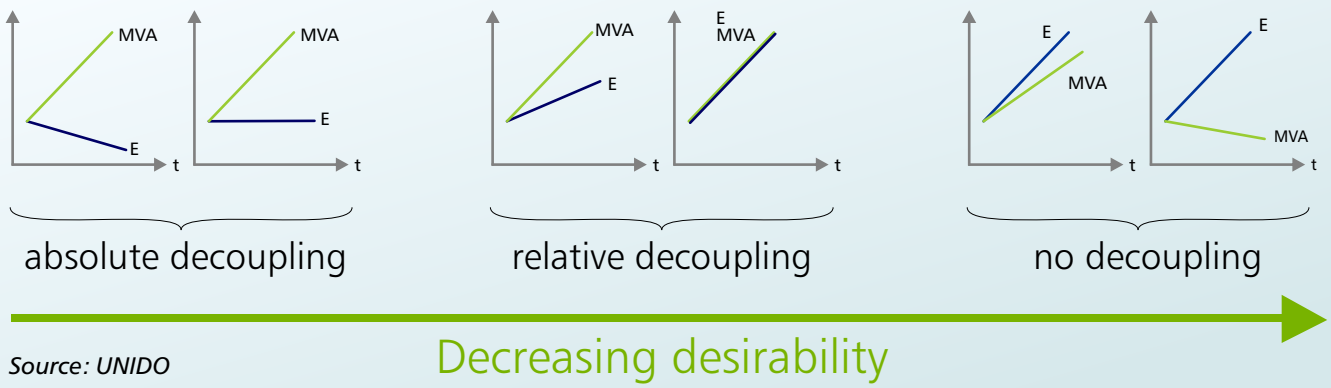
2.3 Decoupling of manufacturing – the key SGIP target

It is important to ask the question: Is a lower environmental impact possible without sacrificing some degree of economic prosperity in regards to the manufacturing industry? The concept of green industry (sustainable manufacturing) affirms that economic output (MVA) can be increased, and at the same time the resources used for manufacturing activities and its polluting effects can, to some extent, be reduced. This condition has been defined as decoupling, originally called delinkage, and is considered the most significant concept for successfully integrating the concepts of economy and environment (see Enevoldsen, Ryelund and Andersen, 2007). The decoupling of environmental impacts from economic growth is key to reconciling manufacturing growth with a green economy.

> "*Sooner or later, the industrial revolution will be followed by the sustainability revolution.*" *(Randers, 2012, p. 12)*

The figure below (F3) illustrates the classifications of decoupling resulting from various possible combinations of MVA and environmental impacts (e.g. energy). Traditionally, these have been grouped into two main categories: absolute or relative. From the perspective of environmentally sustainable development, it is crucial to distinguish between the two.

Desirable levels of decoupling F3



Source: UNIDO

Absolute decoupling is said to occur when the environmental impacts from manufacturing activity are stable in a growing economy, or decrease at a higher rate than the economic growth rate (see OECD, 2002; Spangenberg, Omann and Hinterberger, 2002), i.e. when MVA displays positive growth and the growth rate from the environmental impacts of manufacturing is zero or negative. In this case, more MVA is being created from either the same or a lower environmental impact. Absolute decoupling is highly desirable for environmentally sustainable development.

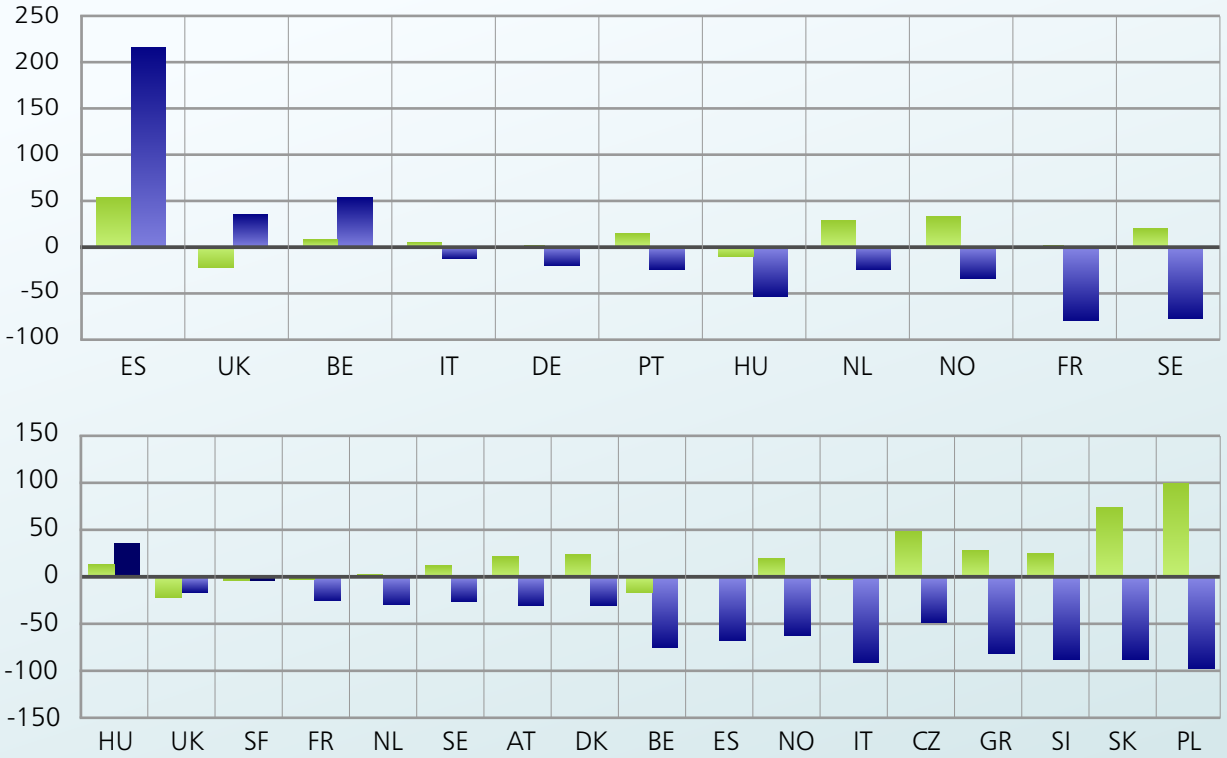
Relative decoupling is said to occur when economic growth is accompanied with an equal or lower growth in environmental impacts, i.e. when both MVA and the environmental impacts from manufacturing follow the same positive growth, or when the growth rate of MVA is higher than that of the environmental impacts. In this case, more MVA is being created, but at the expense of higher environmental impacts. Relative decoupling is less desirable for environmentally sustainable development than absolute decoupling.

When the growth rate of industrial environmental impacts surpasses that of MVA, the term decoupling is not used. In this case, the same amount, or less MVA is being created by causing higher environmental impacts. This is completely undesirable from a sustainable manufacturing perspective.

Although the task of decoupling poses tremendous challenges, decoupling is not only possible, it is already a work in progress. Countries and firms that do not decouple can be expected to lose their competitive edge. In addition, those who move ahead are likely to reap first-mover advantages.

As displayed in the figure (F4) below, European countries are achieving decoupling from pollutants with varying degrees of success (including some apparent failures). From this perspective, there are already emerging decoupling trends. Decoupling is even possible when economic growth is negative, stagnant or sluggish. In other words, absolute decoupling is becoming technically feasible and will therefore be a measure of the successful implementation of SGIP.

F4 Examples of current decoupling processes in the European Union



The two graphs display decoupling trends (in per cent) for various European countries.

(a) The first graph shows decoupling of economic growth from **nutrients emission** in water in the food industry between 2004 and 2012. The blue bars display the change in the gross value added of the food industry and the green bars display the respective changes in nutrient emissions (effluents) of the food industry.

(b) In the second graph, blue bars represent the change in the gross value added between 2004 and 2012 for the metal industry and the green bars represent the respective changes in **heavy metals emission** (effluents).

Source: Based on EEA (2015)

The technological feasibility and the financial viability of decoupling varies between countries and industries, and it is evolving as new technologies and organizational patterns develop. Governments can play a key role in driving and facilitating the decoupling process.

The challenge for SGIP: Decoupling energy, water and material flows from growth in manufacturing

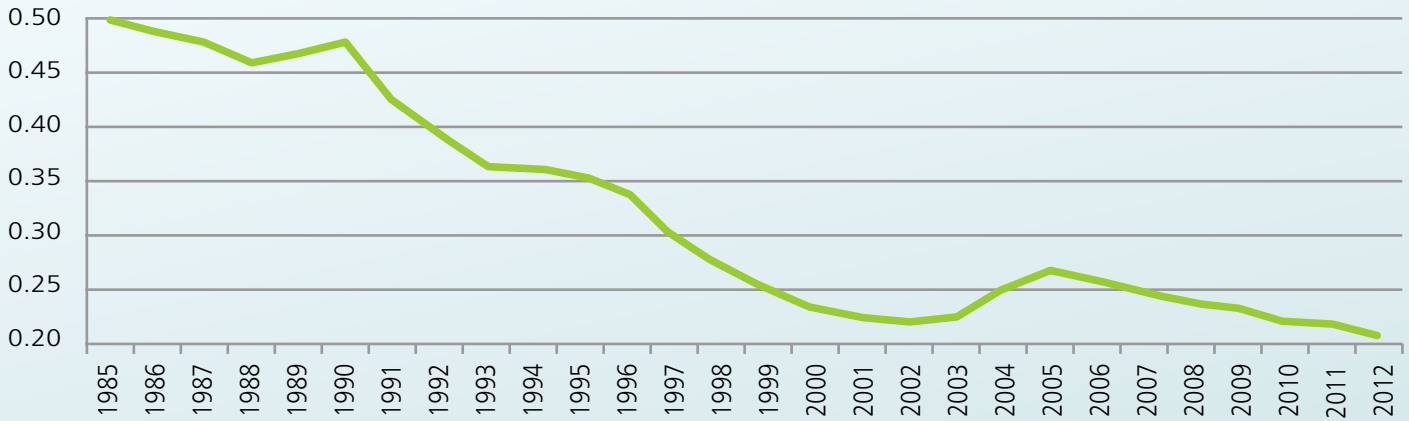
2.4

The biggest challenges for SGIP are posed by decoupling energy, water, and material flows from manufacturing growth. The energy intensity of manufacturing products not only depends on the specific energy usage in terms of their production or assembly (for which technical and organizational solutions can often be found – measures for improving energy efficiency), but also on the carbon content embodied in the transportation of raw materials, intermediate goods and final products (which can be reduced by shifting to renewable energies). This improves future perspectives for localized production and consumption cycles. It furthermore highlights the interrelatedness of the transport and manufacturing systems which cannot be addressed by a single government department. The shift to renewable energies and the proper pricing of energy sources (including carbon taxes) in both manufacturing and transport can significantly alleviate some of the existing pressure from human systems on the global ecosystem.

Decoupling energy use from growth in a growing manufacturing industry in China

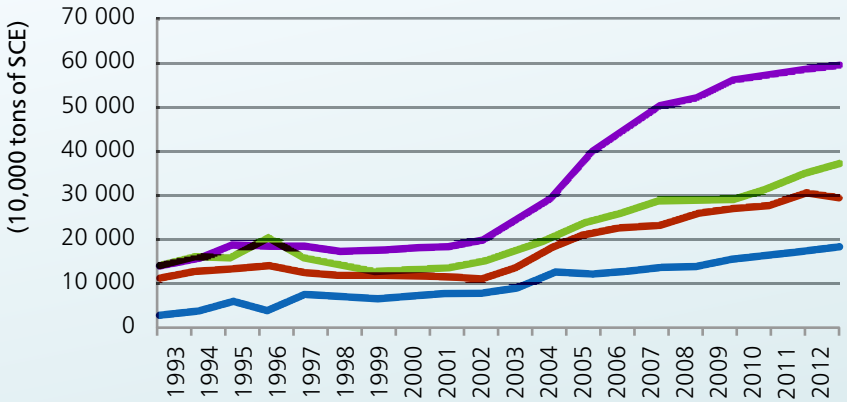
F5

This chart presents energy intensity in manufacturing by displaying how many tons of standard coal equivalents (SCE) were used to produce 1,000 local currency units (LCU) of MVA. It uses published figures from the China Energy Statistical Yearbook and World Development indicators. Energy use is measured in SCE in China. The data for MVA were converted to constant LCU using a GDP deflator.



Source: UNIDO calculations.

F6 The four manufacturing industry subsectors with the highest energy use



There is pressure to significantly increase energy efficiency despite the improvements already made. While China's energy intensity in manufacturing is decreasing, manufacturing growth is so strong that overall energy use in manufacturing is still on the rise.

Source: UNIDO calculations.

Fresh water is already becoming a scarce commodity in many regions. This is not exclusively a result of manufacturing processes, but rather a multitude of factors, including household consumption, agricultural use, deforestation and climatic factors. This interrelatedness needs to be taken into account. Changing water prices to reflect the full cost of sustainable water production and enforcing environmental regulation will go a long way towards improving water use efficiency in manufacturing.

Material manufacturing throughput is strongly related to the volume of output, which is itself strongly linked to the consumptive demand of a growing global population; one that is already overshooting the planet's limits. It is here where the confines of physical systems make themselves felt most strongly for the manufacturing industry. Producing more material output with less material input is a task that prima facie would seem to defy the laws of physics, although both waste and weight reduction may contribute significantly to this objective. Shifting the focus of manufacturing from delivering specific products to delivering the function fulfilled by these products, will provide new opportunities for economic growth. Such a systemic shift will have far-reaching implications for industrial structures.

Even in these challenging fields, significant advances are already possible given existing technologies. For example, simulations have shown that gas consumption in Iran's iron and steel industry can be reduced by 15 per cent through subsidy reform, another 33 per cent in the long run through the implementation of an energy savings plan and industrial renovation, and a further 10-15 per cent by the adoption of other technologies (Ansari and Seifi 2012). The steep fall in the production cost of photovoltaics (PV), bodes well for the future as well.

Brazil's textile manufacturers have managed to reduce water usage by 90 per cent over the last decade by using a variety of measures, including proper influent and effluent management and treatment, as well as technological innovations. Companies that embraced the greening challenge saw their businesses become more competitive, while companies that did not adapt, ended up going out of business (DCI, 2014).

Collaboration between enterprises organized jointly in local industrial production networks offer significant potential for managing, and thereby reducing, material throughput (see Simboli, Taddeo and Morgante, 2014). A whole new field of science, industrial ecology, has emerged over the last few decades to support such processes. There are increasing numbers of examples of business models which propound a shift from providing products to fulfilling functions, e.g. from supplying air conditioning equipment to providing thermal comfort.

More general benefits of SGIP 2.5

Green industrial policies can serve a multitude of objectives: e.g. competitiveness, job creation, a reduction in air pollution and improved energy security. Combining these aims through green industrial policies provides a number of opportunities, or co-benefits (see Intergovernmental Panel on Climate Change [IPCC], 2014). Many of these co-benefits are mutually reinforcing. Where properly coordinated and implemented, green industrial policies can bring about economic, social and environmental benefits.

Green industrial policies can benefit the economy by inducing firms to become more resource efficient and innovative, by developing and providing access to new technologies and by creating new industries and markets, such as organic agriculture, renewable energy and ecotourism. New opportunities and value chains may arise, especially in environmental technologies such as green chemistry, bio-based products, and waste management and recycling, or in the field of eco-design. Where green industrial policies strengthen the resource efficiency of the economy, they can also stabilize working conditions for industry and mitigate resource-import dependency. The economic benefits can in turn lead to social benefits, such as the creation of decent jobs and rising incomes.

Eight major economic sectors are particularly prone to the effects of green industrial policy and environmental damage because they strongly depend on (natural) resource consumption and a stable climate, or because they are significant polluters: agriculture, forestry, fisheries, energy, resource-intensive manufacturing, recycling, building and transport (see International Labour Organization [ILO], 2013). As with all structural changes, the number of jobs will decrease in some sectors and increase in others. Net job gains are more likely where green industrial policies improve the resource efficiency of enterprises. Many of the potential improvements are already cost-effective with existing technologies.

The environment itself benefits from green industrial policies since they can contribute to climate protection, and stabilize ecosystems through enhanced air, water and soil quality. This in turn safeguards agricultural productivity and thus food security, as well as having positive impacts on health.

Some of these benefits are particularly relevant for lower-income countries. These countries can use SGIPs to develop their industries, upgrade domestic capabilities, reduce dependence on finite resources such as fossil fuels, and improve access to basic services and the livelihoods of lower-income groups. Through international support mechanisms they can benefit from technology transfer, capacity building and financial support. While some of these effects are difficult to quantify at this point in time, their long-term impacts and their economic spillover open up new corridors for development.

In addition, SGIP can contribute to reducing the pollution patterns of established technologies, particularly those that have considerable economic and social costs. Pollution, for example, has very immediate impacts on health: The World Health Organization (WHO) estimates that outdoor air pollution caused 3.7 million premature deaths in 2012 (see WHO, 2014). In China and India, the economic cost of such health impacts amounted to USD 1.9 trillion in 2010 (see OECD, 2014). Similarly, the results of the Millennium Ecosystem Assessment show that "the degradation of ecosystem services … is a barrier to achieving the Millennium Development Goals" (Millennium Ecosystem Assessment, 2005, p. 1).

2.6 Understanding and addressing risks associated with SGIP

If there were no risks associated with SGIP development, there would be no policy issue, and no need for governments to act. Understanding and continuously addressing these risks from the outset will go a long way to ensuring the success of SGIP. Likewise, it is vital to have an awareness of limits and trade-offs, i.e. the possible impacts of resource scarcities on the development of new technologies, and negotiating approaches for dealing with them can raise the level of acceptance of SGIP from the outset.

The amount of co-benefits depends on a variety of factors, such as resource endowments, existing technological capabilities and government capacity to develop and implement coherent long-term strategies.[2] If these factors are unfavorable, the above opportunities can turn into social, environmental and economic risks.

- Rising prices for goods and services may have adverse impacts on the livelihoods of the poor, and the environment may suffer from unintended consequences, e.g. if the support for renewable energies leads to deforestation for palm oil plantations.
- Industries may face a loss of competitiveness, rather than innovating and enhancing their resource productivity, if forced to comply with strict regulations too quickly. This may lead to job losses or even to the relocation of industries to countries with lower levels of regulation.
- An enabling policy framework can improve the business climate and competitiveness, and can include complementary measures such as infrastructure, education and domestic skills development and support for research and development (R&D).
- Protection and support for domestic industries have to be designed carefully and usually in accordance with international standards, including World Trade Organization (WTO) agreements. Due to the different levels of integration in global value chains, an amount of uncertainty will remain.
- Previous decades have seen examples of some free-riding by high-income countries, particularly in the area of climate change. This provides strong disincentives to low and medium income countries to implement the necessary changes related to greening. Such issues need to best be dealt with at the international level, although they could be addressed by national policies, e.g. by imposing carbon taxes on imports from countries that use high levels of carbon per capita or products with high carbon content.

[2] It is often argued that some countries find it difficult to implement long-term strategies because democratic election processes often lead to concessions to specific interest groups and entail substantial policy shifts that are incompatible with maintaining a long-term vision and policy. Such questions cannot be addressed within the framework of this Guide. Section 2.7 and M5 (p. 56) discusses the techncical risk of political capture of policy processes independent of political systems.

It should be highlighted that at the political level, any policy change may be captured by interest groups. It is an issue that needs to be addressed in developing SGIPs, just as it would in any other policymaking process, even if there is available evidence of unequivocal benefits.

- When profit opportunities are created or shifted, the risk of political capture and rent-seeking is high. This phenomenon is not unique to SGIP. However, it is exacerbated by the scale of the task of a green transition, the significant uncertainties surrounding it and the long time horizons.

- Managing rents, i.e. influencing the flow of benefits to different stakeholders, will be crucial when developing and implementing green industrial policies at all levels. Governments may not be able to induce the required structural changes without understanding and tackling resistance to them. Resistance to change might occur, for example, within government departments or industrial organizations. One important measure in responding to this challenge is to maintain transparency when selecting industries with future potential and when developing support criteria. Furthermore, compensation for any stakeholders who may lose out in the transition may have to be part of a government's agenda (see Pegels, ed., 2014).

Rigorous policy design based on stakeholder involvement, constant monitoring and evaluation and subsequently institutionalized policy learning loops are crucial for the effective implementation of policies, and are particularly important in SGIP due to the scope and the level of its ambition. Here, capacity building in governmental institutions to strengthen the capacities of government officials, as well as active policies against corruption, can be helpful.

Mistakes will not be completely averted, but their costs can be reduced. Above all, the fear of failure must not prevent governments from taking action.

Turning risks into opportunities 2.7

Sustainable development requires deep structural changes or transitions. Any systemic transition management approach aims to explore long-term future visions and perspectives for sustainability. Such a long-term vision provides the basis for short-term policy measures and strategies.

Governments will play a crucial role in transition management. Firstly, by creating the appropriate market conditions and, secondly, by initiating learning and participation processes. In addition, authorities at lower levels, such as local or regional governments, must be involved and engage actively in these transition processes.

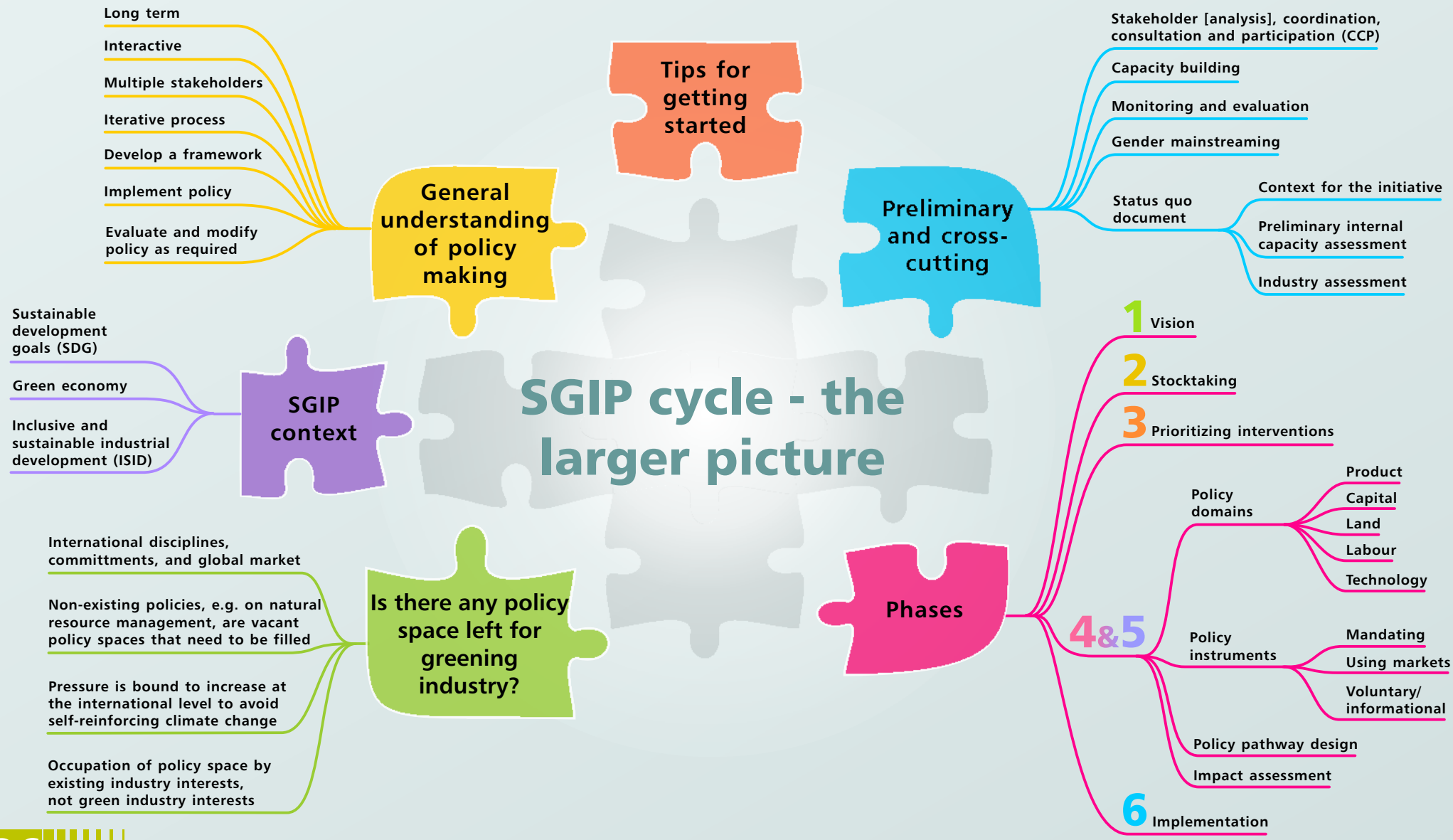
Existing frameworks for integrated sustainability assessments actively seek to address the dangers of spillover effects and policy conflicts through the reconciliation of different policy agendas, as well as possible concerns at a higher strategic level (see UNIDO, 2011; Weaver and Rotmans, 2006). SGIP is an effective means by which to address some of today's most pressing challenges concerning sustainable growth and the well-being of each country, and the planet as a whole. It is therefore advisable to begin early and act boldly in transforming industries towards sustainability by building on a SGIP.

"...were we led to wonder how the world of nature had succeeded not merely surviving for so many millennia but in constantly developing higher forms. And doing so while the quantity of biomass in existence remained virtually unchanged... This is a system with no resource worries and no unemployment, no distribution problems and no debts, a system that represents a real treasure house of specialized refinements, energy-saving wheezes, and elegant combinations of highly-developed technologies."

(Vester, 2012, pp. 115-116)

CHAPTER 3

SCiP


SGIP cycle - the larger picture
Tips for getting started
General understanding of policy making
Long term
Interactive
Multiple stakeholders
Iterative process
Develop a framework
Implement policy
Evaluate and modify policy as required
Preliminary and cross-cutting
Stakeholder [analysis], coordination, consultation and participation (CCP)
Capacity building
Monitoring and evaluation
Gender mainstreaming
Status quo document
Context for the initiative
Preliminary internal capacity assessment
Industry assessment
SGIP context
Sustainable development goals (SDG)
Green economy
Inclusive and sustainable industrial development (ISID)
Is there any policy space left for greening industry?
International disciplines, committments, and global market
Non-existing policies, e.g. on natural resource management, are vacant policy spaces that need to be filled
Pressure is bound to increase at the international level to avoid self-reinforcing climate change
Occupation of policy space by existing industry interests, not green industry interests
Phases
1 Vision
2 Stocktaking
3 Prioritizing interventions
4&5
Policy domains
Product
Capital
Land
Labour
Technology
Policy instruments
Mandating
Using markets
Voluntary/ informational
Policy pathway design
Impact assessment
6 Implementation

A STRATEGIC GREEN INDUSTRIAL POLICY CYCLE

3

Introduction

3.1

Policy making is a long-term, interactive, multi-stakeholder and iterative process to develop a framework to implement a certain policy, and to regularly evaluate and modify its implementation. Policy intervention is often needed where there is a market failure, and in this case a strategic green industrial policy is urgently required to address the market failure of current industrial policies which generally do not account for the externalities derived from manufacturing and consumption.

In the context of sustainable development, poverty eradication and the post-2015 development agenda, the concept of green economy - aimed at mainstreaming the environment into economic development - provides an opportunity for all countries to reduce pressure on the environment and natural resources. At the same time, a coherent green industry strategy could lead to the creation of new opportunities for economic growth, social welfare and worldwide development. (See OECD, 2011a and 2011b). In the long run, all countries are bound to move towards the greening of industry as an essential ingredient of any strategy to develop a green economy. It should be noted that first-movers will be in a good position to secure competitive advantage and achieve success.

SGIP forms part of any coherent policy approach towards sustainable development and the fostering of domestic capacities and competitiveness. Any inclusive green or sustainable industrial policy will have to rely on a strategic environmental assessment based on specific targets and robust indicators. Such targets relate to the sustainable use of materials, waste, energy, water or soil/land and must be adapted to the respective national and/or regional context. Each country will require some flexibility in defining appropriate targets that are feasible and realistic for its specific circumstances.

It is imperative that policymakers ensure that the relationship between government and industry remains at arm's length, and that public interest overrides the interests of industry groups or specific manufacturers. Policy space may already be occupied by

existing industry interests. For example, previous policies may have been crafted with specific industries in mind or, at times, have been influenced by these industries. Such policies may be embodied in specific legislation and regulation. They may equally be embodied in industrial standards, or in less obvious facets of regulation, e.g. exemptions for specific enterprises, or the (lax) way in which regulations are enforced, including regulations on health and safety and the environment. Such policies can be changed if the interests behind them are carefully managed.

B3 Before you get started: General tips to keep in mind when developing your country's SGIP

- Political will and institutional momentum to implement the needed changes is vital.
- Time frame: Most countries take from two to three years to draft new policies, and at least one year to revise old ones. Speed should not take precedence over quality when drafting.
- Try to generate "quick-wins" where possible to encourage continued support for the policy process. However, bear in mind that greening is not about "quick wins". It is about long-term success.
- Prioritize policies, ideally based on systemic impact (i.e. incorporating feedback effects), instead of attending to a long wish list. Be mindful of interdependencies.
- Upgrade technical capacity within government in order to be able to successfully implement the policy.
- Ensure demand for new and higher-level skills required for a successful SCGIP can be met.
- Ensure continuous monitoring and evaluation of policy development and implementation to ensure effectiveness of measures.
- Utilize "sunset clauses" where there is a risk of overreliance on support.
- Ensure policy continuity and stability and predictability of government action. For greening, continuity cannot be ensured as new technological paths need to be pursued, but predictability can provide the stability enterprises need to be able to adjust.
- Focus the use of limited government resources on factors which carry a high potential for triggering desirable changes (greening, decoupling) in the existing industrial system. It is possible to identify the strongest triggers using cross-impact analysis.
- Look for potential to stimulate other economic activities through forward and backward linkages (both within manufacturing and with the primary and services sectors) and for shifting from merely manufacturing products to providing the functions these products are meant to fulfil or assist with.
- Ensure a flow of information and promote transparency.
- Minimize/eliminate conflicts of interest.
- Prevent/eliminate state capture, corruption and rent-seeking.

Phases of SGIP development

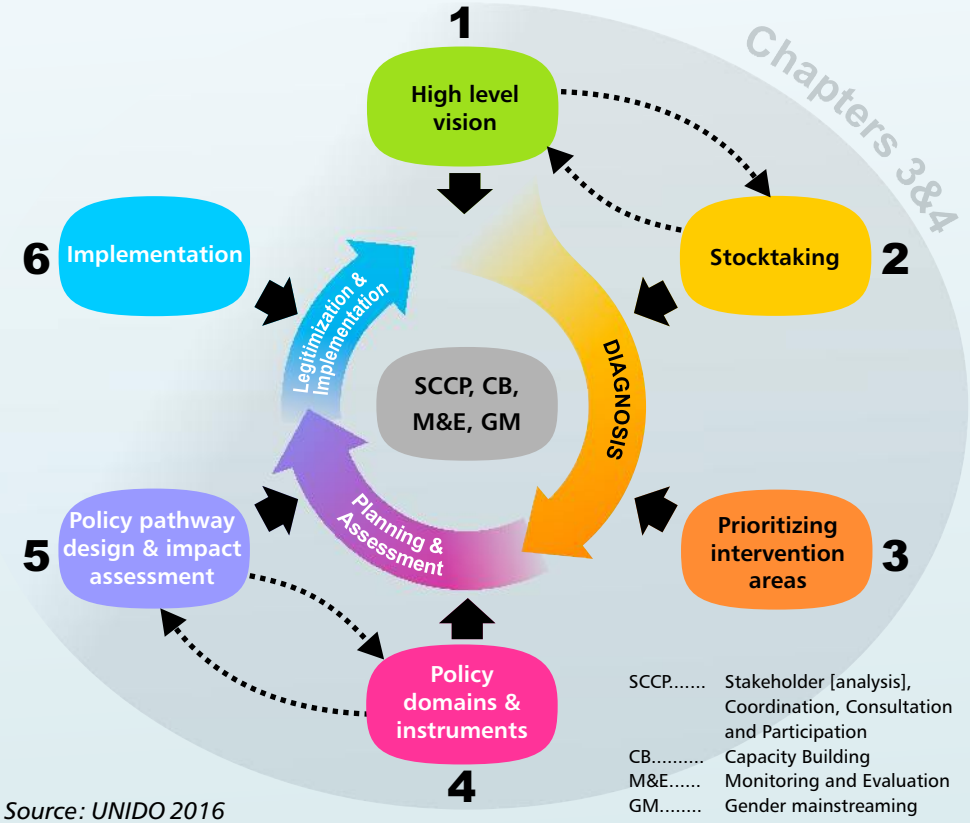
3.2

The experience of UNIDO has shown that the success of industrial policymaking lies in the processes that underscore it. A solid evidence base, participation, achieving consensus, and realism (in terms of technical, economic, financial, and social feasibility) have been identified by UNIDO as being essential factors for success. SGIP crucially adds ecological and environmental sustainability as a further element required to infuse realism into policymaking.

The diagram below outlines the phases of an ideal "policy cycle," as a heuristic instrument to develop SGIPs. The different phases of this cycle represent various focuses of policy development and implementation along the timeline. Of course, they do not always occur exactly according to the cycle described and will invariably differ between countries, according to political systems, and regarding their respective intensities. For example, some countries will have more elaborate mechanisms of policy analysis than others. Some countries may have extensive need for consultation and coordination, whereas other countries may have fewer stakeholders to consult.

Hence, the following is not designed to be a prescriptive list to be followed in a linear fashion, rather it is an indication of a cycle that could be followed with considerations and steps that may need to be taken along the way to realize a SGIP. For the purposes of this guide, we will place particular emphasis on stocktaking; that is, supporting the evidence base for the development of SGIP. It is assumed that practitioners are acquainted with the decision-making processes in their country, their countries' procedures for policy implementation, as well as their countries' monitoring and evaluation mechanisms, so these issues will not be addressed to any great extent.

Phases of a SGIP cycle F7



Source: UNIDO 2016

3.3 Overview of the SGIP cycle phases

- **PRELIMINARY & CROSS-CUTTING PHASES:**
  - Stakeholder [analysis], Coordination, consultation and participation (CCP)
  - Capacity Building (CB)
  - Monitoring and Evaluation (M&E)
  - Gender mainstreaming (GM)
  - Status quo document
- **PHASE 1**: Vision
- **PHASE 2**: Stocktaking (1 & 2 carried out concurrently)
- **PHASE 3**: Prioritizing intervention areas
- **PHASE 4**: Policy domains & instruments
- **PHASE 5**: Policy pathway design & impact assessment (4 & 5 carried out concurrently)
- **PHASE 6**: Implementation

(SC) Stakeholder consultation, M&E, Gender Mainstreaming and Capacity Building are intrinsic to every part of the policy cycle and are depicted as such in the diagram. The outer edge of the circle depicts three main segments that influence and permeate the cycle at various stages: Diagnostics; Planning and Implementation. These elements are contained within a cycle to highlight that the cycle needs to be informed by regular monitoring and evaluation which should be fed back into the system for continuous learning and strengthening of the policy.

Below is a description of the type of "ingredients" that each phase could entail and recommended considerations that can be integrated in the policy development cycle. Chapter 3 provides an overview of the phases contained within the SGIP cycle. Chapter 4 provides more detail on these phases. Further detail and tools are outlined in the Supplement.

3.4 Preliminary and cross-cutting phases

The following areas constitute areas that pervade each part of the SGIP development process.

- Stakeholder coordination, consultation and participation
- Capacity Building
- Monitoring and Evaluation
- Gender mainstreaming
- Status quo document

Stakeholder Coordination 3.5

Such large scale change as required for SGIP cannot be induced through coercion. Policies which face resistance or apathy are generally a challenge to implement; hence, SGIP should be underscored by consultation with stakeholders which comprises of both internal (within government) and external stakeholders.

The range of stakeholders to be consulted is likely to be broader for SGIPs than for traditional industrial policies. Their consultation should permeate every part of the policy development process. Furthermore, consultation can and should occur during the identification of issues, policy analysis and the development of the most suitable instruments to implement SGIP. This can be supported by consultative bodies which may include representatives from industry, trade unions, civil society and the community, amongst others.

It is contingent upon the government that all relevant stakeholders are identified, informed at the correct time and that their views are addressed to the best extent possible. This includes ensuring that all stakeholders (including women and under-represented groups) are given the opportunity to meaningfully contribute in the decision-making processes. This will ensure that the quality of SGIP will be enhanced as it will be underpinned by the active participation of relevant stakeholders with a broad spectrum of insight and experiences.

Capacity Building 3.5.1

There will be a need to develop the capacity of all relevant stakeholders to facilitate their active participation in a SGIP. For example, civil servants will need to be skilled in a number of areas as highlighted in this report, in order to be able to coordinate the development of a robust SGIP. Therefore, their education and the building of their skills base needs to occur at an early stage of the process and be on-going as the need arises.

It is recommended that there is carefully designed capacity building developed for target groups such as SMEs and under-represented groups such as women. SMEs in particular may be reluctant to change their business practices due to a belief that any greening on their behalf will increase costs and therefore make them uncompetitive. To target such perceptions, policymakers should identify and implement 'quick wins' through e.g. improved "housekeeping measures" whereby some relatively easy efficiency gains can be made through the adoption of more resource efficient techniques and uptake of green technologies. Capacity building measures may be as simple as making industries aware of more resource efficient techniques, others will require SMEs to work at the value chain level, working across different enterprises to foster resource efficiency gains.

Governments can support an industry's "absorptive capacity" through demonstrating the techniques for energy and raw material use, creating demonstration projects to reduce raw material, energy or water use, making limited funds available for small investments and providing resources to monitor and disseminate results (UNIDO, 2011).

In terms of gender mainstreaming in capacity building, policymakers need to consider whether both women and other under-represented groups, such as youth, have been given the opportunity to participate in and benefit from these

activities. Moreover, these considerations need to address whether there is a need to bridge skills or knowledge gaps, or other hindrances to participation (such as childcare or transportation needs). Such issues will need to be addressed to enable all relevant stakeholders to participate fully in any capacity building opportunities.

3.5.2 Gender Mainstreaming

In the context of UNIDO's programmes, policies and organizational practices, we define gender mainstreaming as "making women's as well as men's concerns and experiences an integral dimension of the needs assessment, design, implementation, monitoring and evaluation of all facets of our work. "Gender differences are often seen in gendered gaps in employment, wages, energy etc. Therefore, mainstreaming a gender perspective will require regular consideration of whether the SGIP assesses the implications for women and men and whether or not gender gaps are further perpetuated by the proposed policy. This should occur at every stage of the process; for example, when assessing legislation, policies or programmes, and if found to fall short, then specific targets and mitigative actions should be developed from the outset.

3.5.3 Monitoring and Evaluation (M&E)

Monitoring and evaluation (M&E) of the SGIP policy will be an on-going process, from SGIP inception to implementation. M&E entails the collation of relevant information and data which is then routinely and consistently compared (evaluated) against pre-determined criteria to assess whether the policy development is on track, and based on this assessment, whether and what kind of corrective action will be required.

Stakeholder consultation is an essential component in strengthening the outcomes of M&E through facilitating more transparent, accountable and robust decisions. Indicators also play an integral role in M&E, with differing indicators developed for each phase of the SGIP process to assess any benefits or negative outcomes. These indicators can be utilized to assess whether the policy intervention is meeting its targets.

3.5.4 Status quo document

This internally-produced document should provide enough detail from which the lead agency and its partners can guide their activities and provide enough insight into what needs to be done and approximately when. It is not meant to be a prescriptive document and cannot replace the more detailed analyses that need to occur further in the cycle, however, it should provide just enough information to get the necessary activities underway. This roadmap document should be **referred to, revised and updated** as the policy development process continues. The Status quo document should further help to identify whether or not the allocated resources for policy development and implementation will be enough and whether or not more resources-including human and financial-will be sufficient to cover the proposed work for the anticipated time frames.

Status quo document

The Status quo can inter alia address the areas such as the following:

Context for the initiative

- Context for the initiative, including economic/industrial context, social, political and environmental conditions and other actors able to influence change;
- Long-term change that the initiative seeks to support and for whose ultimate benefit;
- Process/sequence of change that is anticipated in order to create the conditions for the desired long-term outcome;
- Assumptions about how these changes might happen).

Preliminary internal capacity assessment:

- Time frames (e.g. Gantt chart).
- Budget allocation;
- Overview and initial assessment of governance structures and policies that are relevant to greening industry;
- Capacity building requirements: Overview of the government agencies and skills of the staff working on the SGIP, any knowledge/skills gaps/balanced gender representation;
- Internal reporting requirements;
- Initial cost-benefit analysis of government support;
- Potential risks and benefits of the policy and risk strategies (preliminary);
- Expert Group: Membership and consultation;
- Draft overview of a planned communications strategy: What to communicate, to whom and when.

Industry assessment

- General structure of the industrial system, of value chains and their potential for greening;
- General overview of trends in international markets, investment and technologies that may provide opportunities for greening;
- International or regional agreements (trade, environment) that may affect domestic industry;
- An overview of the sectors working in this space - strengths, weaknesses, gaps?
- Known stakeholders (both government, private sector and civil society actors working in this space);
- Preliminary assessment of intervention areas where the government can intervene in different areas to help facilitate a robust SGIP.
- Any lessons learnt from previous IP, if any.

Other

- Any other countries that have already gone down this path for guidance/mentoring;
- An outline of reference literature with which to refer to for further detail to guide the development of a SGIP.

3.6 Phase 1: High level vision-setting (in parallel with Phase 2)

It is recommended that a vision is defined which states a long term vision/goal that is easy to communicate; e.g. increasing resource productivity by a factor of X within the next five to 20 years, raising well-being and equity, etc. The vision must provide enough flexibility to adjust to any major findings that are identified at a later stage, but still be strong enough to provide enough overarching direction.

It is imperative that the SGIP work and vision is well resourced with an influential lead that can bring the relevant stakeholders together to develop a strong and well-planned policy. Furthermore, there will need to be consultation into the development of the vision, however at every stage, caution will need to be taken to avoid raising false expectations and the undue influence of vested interests.

Utilizing a "Theory of Change" methodology will also help to organize ideas as to what change is desirable (see Chapter 4.3, p.65).

3.7 Phase 2: Stocktaking (policy & data stocktaking for baseline setting and benchmarking)

When developing a SGIP, information and evidence on how elements of the current industry system interact with each other and their environment, is of the highest priority. Information is key in enabling decision makers to anticipate the next structural change to enable the necessary actions to influence green industrial growth. Hence, the policy process needs to be guided by robust evidence. While processes can be supported by research and expert opinion, there may be a need to strengthen analytical capacities in government and in the private sector to enable ownership and understanding of analyses and to empower stakeholders to develop their own policy recommendations.

The appraisal should also assess sectoral and sub-sectoral data. This step should help to reveal the most relevant sectors as well as obtain data for baselines and benchmarking in order to be able to develop short-medium term goals. Moreover, an understanding of the systems and actors at play is required (i.e. cross-impact analysis) and any trade-offs at this stage (Multiple-criteria decision analysis (MCDA). A broad overview of this step is provided in this chapter, with more detail as to evidence gathering at Chapter 4 of this document, as well as in the Supplement.

PHASE 2

Policy stocktaking 3.7.1

Stocktaking will require detailed analysis of policies that governments have been using to promote industrial development or growth, including the identification and assessments of instruments which are already in place, e.g. rules, regulations, voluntary sector-based partnerships and existing programmes, financial instruments and the government agencies that are working on these policy areas. The key question in this regard is: Are they still valid for promoting industrial development, increasing the value-added in manufacturing and are there any frictions with the concept of SGIP? Whether the specific policy should be phased out or activated, depends upon the specific circumstances of the industries affected. It usually warrants a specific assessment before a decision is made. This issue can be further addressed in Phases 4 and 5 when ascertaining which pathways and range of policy instruments are available to realize a SGIP.

Is there any policy space left for greening industry? B4

Policies are formulated within a space that contains a varying number of constraints. Among these constraints are the structure of decision-making processes, the distribution of power between different stakeholders (domestic, foreign, or international), the amount of resources available, and other existing policies. New policies may indeed conflict with long-standing, established policies already occupying (parts of) the policy space. The more policies formulated and implemented in a given country, the higher the density and, with it, the likelihood that new policies will collide with existing policies.

The ability of government actors to define an adequate mix of SGIPs with particular priorities and targets that respond to the specific national context, may therefore encounter a significant number of restrictions in the policy space left available. SGIPs may be particularly constrained by:

- Economic policy frameworks negotiated with international financial institutions for countries indebted and requiring balance of payments support;
- International trade agreements that a country is a signatory to and which have implications for industrial policies;
- Existing policies to keep fossil fuel-based energy prices below international market prices, thereby discouraging efforts to increase energy-efficiency and indirectly subsidizing the emission of C02 from fossil fuel energy sources;
- Existing policies (or "non-policies") to offer natural resources in a specific country free of charge/at price levels that neither reflect opportunity cost nor consider the ecological and environmental impact of the extraction/use of these resources, including not enforcing the polluter pays principle; and
- Previously implemented/existing industrial policies which have either set visible precedents for stakeholders and shaped their expectations or led to the creation of interest groups that lobby to maintain the existing policies.

The extent to which the policy space is restricted varies from country to country, and often the restrictions will be strongest in heavily indebted poor countries – where the manufacturing share in value added only amounts to 5 to 12 per cent of GDP,[4] and which could greatly benefit from green industrialization as a means of enhancing economic growth. While the conditions of these countries' programmes have generally changed in emphasis, there is usually little space made for any type of industrial policy, including greening industry. Given the increasing international awareness of the costs and risks associated with climate change, and the need to prevent self-reinforcing climate change at a global level, these countries may be able to negotiate investments in greening their economies. Where such countries possess manufacturing enterprises, they may eventually be able to agree and secure funding for low-carbon industrial policies and the wider greening of the economy. As pressure increases at the international level to avoid self-reinforcing climate change, it is likely that resources will be made available for low-carbon projects.

A majority of countries have signed up to international agreements that are meant to create a level playing field for trade. The United Nations Conference on Trade and Development (UNCTAD) has already advised all developing countries to take into account the need for an appropriate balance between national policy space and international disciplines and commitments (see UNCTAD, 2004, pp. 2-3). Countries concerned may find their space for conducting industrial policy has been severely restricted by these agreements (see UNCTAD, 2014; Brown and Stern, 2006; Gallagher, ed., 2005). National measures for preserving or enlarging existing policy space without opting out of existing commitments (see Mayer, 2008) essentially consist of:

- Reassessing policy targets and instrument-target relationships, from emphasizing the maximization of export market access (EMA) and foreign direct investment (FDI) inflows towards maximizing the creation of domestic value added and linkages; and
- Avoiding additional constraints from bilateral trade and investment agreements.

Countries will need to use their economic muscle and mobilize sufficient legal expertise to work around the constraints. They may form alliances in order to renegotiate terms of agreements to enable them to gain additional policy space for greening their manufacturing industries.

Appraisal of policy areas (including national strategies and legal frameworks) could include - but is not limited to - the following:

- Environmental policies & regulations;
- industry policies/strategies/regulations etc;
- socio-economic/developmental policies;
- sector-based strategies;
- labour policies;
- innovation;
- trade;
- industrial policies;
- land/planning laws;
- health;
- technology etc. as well as any industry or civil society initiatives;
- international, regional free trade/sustainable development/environmental/intellectual property laws etc;
- occupational health and safety reports;
- supranational, national, subnational or sub-sectoral and local plans and targets (if any);
- water/watershed management strategies and plans;
- energy;
- infrastructure; and
- waste management.

PHASE 2

Phase 2 continued: Data stocktaking for baseline setting, benchmarking & understanding the systems

3.7.2

The availability of appropriate tools and reliable indicators, as well as the definition of criteria for setting baselines, are crucial prerequisites for the implementation of measures to improve resource or energy efficiency at the national or sectoral levels, as well as measuring the success of the policy development and implementation. Hence, the data collected at this stage can be 'fed' into the work that will help to identify the costs and benefits associated with a SGIP.

The data obtained from this part will help to determine which industries are the best in terms of resource and/or energy productivity and the reasons why.

The evidence should also help to reveal which industrial sectors have achieved improvements over time and which show the best potential, e.g. through having applied more efficient technologies.

What to look for

Broadly, common areas where evidence relating to SGIP can emerge are the following:

- Energy, water, sewage, solid waste tariffs and (social) costs;
- taxes and subsidies influencing the throughput of energy, water and materials, including those applied in competitors' and suppliers' markets;
- recycling sector economics, including informal systems;
- export and import figures, including those for industrial refuse;
- export market requirements;
- environmental funds, facilities;
- key manufacturing plants, industrial zones, cleaner production centres, quality management organizations, industry strategies;
- health-sector information, production figures and natural resource inventories from areas affected by environmental damage;
- export and import statistics, production statistics;
- ecological studies that impact on SGIP relevant areas; and
- labour statistics.

This information clearly goes beyond the type of information we are used to collecting when developing traditional industrial policies. Chapter 4 provides more detail on this topic. The Supplement to the Practitioner's Guide provides suggestions for selected tools and analyses that will be useful for formulating SGIP in a systematic manner.

3.8 Phase 3: Prioritizing intervention areas/Goal setting

The above analyses should have facilitated a greater understanding of the actors working in this space, the issues and the sectors and sub-sectors where intervention will be required/most effective, as well as the data from which baselines and benchmarks can be established and monitoring and evaluation undertaken. This detail, concurrent with and informed by stakeholder consultation, will help to develop medium and possibly short term goals which will be communicated via carefully worded communications strategies.

Parallel phases:
Phase 4: Policy domains & policy instruments
3.9 Phase 5: Policy pathway design & impact assessment

It is important to consider Phases 4 and 5 in parallel as they provide a feedback loop (see F8 below). SGIP will require careful selection of policy domains and policy instruments (Phase 4); with Phase 5 requiring the design of policy paths that will operationalize the shortlisted policy domains and policy instruments. Lastly, it is essential that the policy domains, instruments and their pathways are assessed for any potential negative impacts (Phase 5).

The selection of policy domains and instruments should be made with reference to each country's unique context, including their ability to implement, monitor and enforce compliance if necessary.

As with the entire SGIP cycle, stakeholder consultation should play an important role in these two phases in particular, as it will help to enhance the rigour of policy outcomes, including helping to avoid adverse outcomes to stakeholders.

Phase 4 is addressed in more detail in Chapter 4. Multiple Criteria Decision Analysis, a tool which can be used for impact assessments (Phase 5), is addressed in the Supplement.

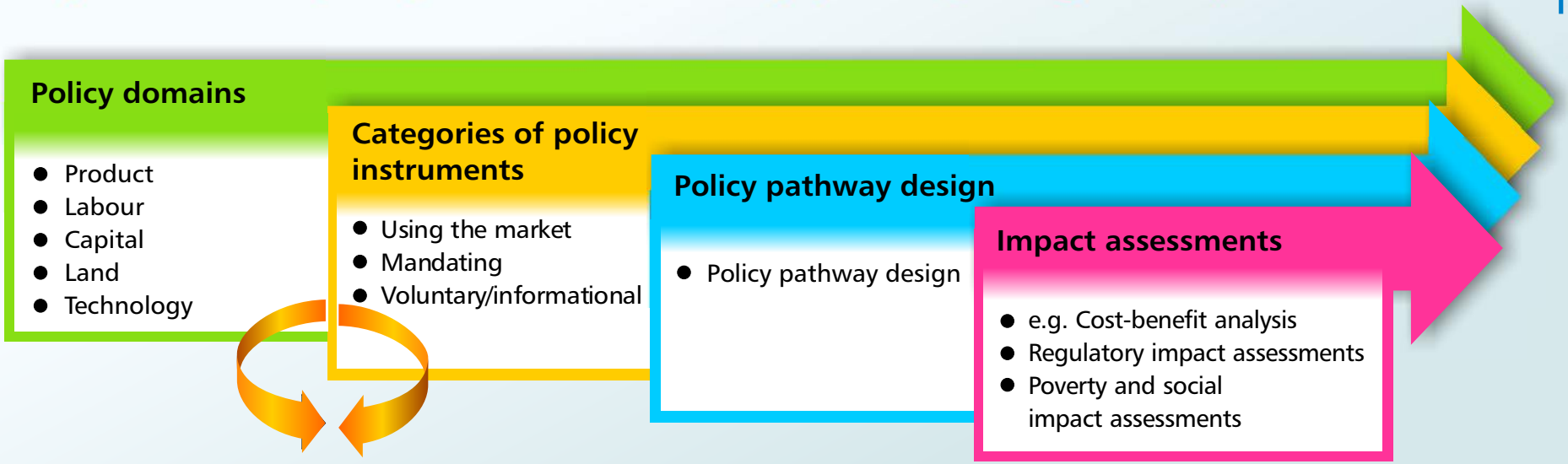
PHASES 4&5

Elements to consider when selecting policy domains and policy instruments 3.9.1

- Policymakers need to identify the key domains and instruments that can help to realize their policy objectives. They should then assess their potential impacts (Phase 5).
- The selection of policy instruments - as with the selection of policy domains to intervene in - needs to be carefully undertaken in order to identify the options that are best suited to your country's level of industrialization, environmental and socio-economic needs.
- Given that small and medium enterprises (SME) constitute the overwhelming share of all enterprises and employment, the inclusion of a coherent SME policy framework could be essential in formulating an inclusive SGIP. Therefore, the selection of domains and instruments should also take this into consideration.

More considerations are outlined at Chapter 4.

Policy domains & policy instruments: Policy pathway design & impact assessments F8



3.9.2 SGIP policy domains

The stocktaking undertaken earlier on in the process will help to identify a range of sectors and sub-sectors for which SGIP can be developed and goals set for. From here, a range of 'policy domains' (see below and at p.38 & p.62) can be targeted with a range of instruments and measures to create a conducive environment for SGIP.

These policy domains, outlined below, represent a number of broad policy areas where the government can intervene or influence change to address specific market failures and to support their economy's transition to a green economy, with a particular focus on the manufacturing sector. These policy domains often cannot be targeted in isolation with a single instrument or measure, rather in order to be more effective, a number of policy domains should be targeted using a mix of instruments.

It should be emphasized that before selecting any type of instrument or policy domain in which to intervene, that any decision made should be made with reference to environmental and resource efficiency objectives to address the over-consumption of renewable and non-renewable resources. We discuss some practical consideration to be made when targeting a number of these areas in the Supplement.

B5 Policy domains

Product market:

Is an intervention area that is market based and a means by which to increase the profitability of manufacturing, either through the impact of price, or the impact of prices received or paid, or on rates of tax.

Capital market:

Many low income countries suffer from a shortage of credit for long-term investment which places a constraint on innovative activities for borrowers seeking collateral. By targeting the capital market, governments can attract funding from banks. In the case of least developed countries, development banks can provide much needed funding by pooling risk.

Land market:

Land-related policies (planning/zoning/tenure etc.) can, inter alia, relate to ensuring access to factory sites for new locations or for the creation/expansion of eco-industries. Market-based responses to land-related policy can include measures such as creating EPZ or SEZs which are exempt from national tax rules on import duties or corporate tax. In some instances, typically with donor support, cluster policies have moved beyond the provision of physical facilities and tax incentives for locations in a geographical area by funding schemes to encourage cooperation between firms in areas like marketing, training and technology development.

Labour market:

There may be a need to upgrade skills through training, updating education policies etc. as the existing skills set in a country may be of limited use to the skills set required for the green industry.

Technology market:

Interventions in the technology market (like the other policy domains outlined above)-are highly dependent upon a country's level of industrialization. For example, countries in the early stages of industrialization can use FDI, whereby local production uses the technology and product design of a parent firm. At the lower end of industrialization, the focus will be on supporting investment agreements and technology licensing contracts with foreign firms, with public investment promotion agencies assisting in the initial search for partners.

Source: Weiss, J (UNIDO), 2015

Categories of policy instruments 3.9.3

Mandating

Regulatory instruments encompass instruments related to norms and standards, environmental liability, control and enforcement.

Using the market

Market-based instruments manipulate the elements of the market – price or quantity – to encourage a specific behaviour in market actors: e.g. subsidies or quotas for renewable electricity, but are usually defined in regulation.

Informational and voluntary instruments

Voluntary and informational instruments include a wide range of incentives for specific target groups that are focused on learning effects and the stimulation of sustainable product and business development. These can lead to further regulation.

In order to enhance the greening impact in the manufacturing industry, existing policies that either contradict or frustrate the objectives of SGIP could be either removed or modified.

Policy pathway design 3.9.4

A variety of policy paths/scenarios should be developed to aid in visualizing and anticipating how the SGIP and its respective policy instruments could be operationalized.

These pathways should be assessed for any negative impacts (see below).

Pathways should take into account the need for gradually phasing in any significant departures from existing policies in order to provide time for affected individuals and industries to adjust.

Pathway design could involve making changes to existing policies as well as identifying a set of "trigger projects" or "pilot sectors" that can help to demonstrate the potential of green innovation and accelerate stakeholder acceptance and institutional change.

Policy pathway design should include the identification of existing measures in parallel/complementary SGIP-related areas, including work at the sub-national level. Design could involve identifying how to leverage off this work and/or reconcile any major differences.

3.9.5 Impact assessments

- As noted above, it is essential that the policy domains, instruments and their pathways are assessed for any potential negative impacts over the short, medium and long term.
- Impact assessments should be underpinned by multi-stakeholder consultation.
- It is recommended that cross-impacts between different factors are analyzed as they are important for the greening of industry and of the economy (refer to Supplement).

  Impact assessments should, at the very least, be undertaken in the following areas:

  - Environment;
  - Industry and the economy at large; &
  - Social impacts (including under-represented groups in society such as women and youth).
- Mitigation strategies should be developed to address any potential negative outcomes;

  Potential guiding questions could include the following:

  What are the potential costs and benefits associated with these instruments (Cost-Benefit Analysis undertaken)?

  What are the legislative or regulatory implications/requirements associated with these options?

  Are there any potential political implications associated with these options?

  How could these options impact on stakeholders, including SMEs and under-represented groups?
- There are a number of impact assessment tools that could be used to assess the potential impacts of the proposed policy and policy instruments, including Cost-Benefit Analysis; Regulatory Impact Assessments; Poverty and Social Impact Assessments; and Multiple-Criteria Decision Analysis. The latter is addressed in the Supplement.

PHASES 4&5

PHASE 6

From the Status quo document to the finished product: What could your country's SGIP contain?

B6

The finished product of your country's SGIP could include the following:

- An analysis of the existing industrial system and its potential future state;
- The identification of the key issues for greening the industrial system and embedding these in a green economy;
- The vision agreed for the SGIP;
- The priorities and focus areas agreed;
- A definition of objectives to be reached within the specified time period for the policy (where necessary and useful, linked to national development planning periods for mutual reinforcement and consistency in planning);
- A description of the key policy instruments to be used; and
- A description of strategies for the priority areas defined, including (measurable) targets that need to be achieved.

A further breakdown into action plans and programmes, as well as specific investment projects and the respective planning for human and other resources (linked to budget processes) will make the policy ready for implementation when all of the policy development phases-particularly stocktaking-has occurred. Adjustments to the policy, programmes and projects, where necessary or useful, will occur in line with the monitoring and evaluation results.

Phase 6: Implementation

3.10

As noted earlier, SGIP is an emerging concept that involves a significant amount of input from a variety of disciplines and stakeholders representing a wide spectrum of interests. Despite the cross-cutting and, at times, challenging nature of developing a SGIP, rigorous analysis, impact assessments and consultation inter alia, should have provided a strong basis for SGIP implementation. Regular monitoring and evaluation should further strengthen its implementation.

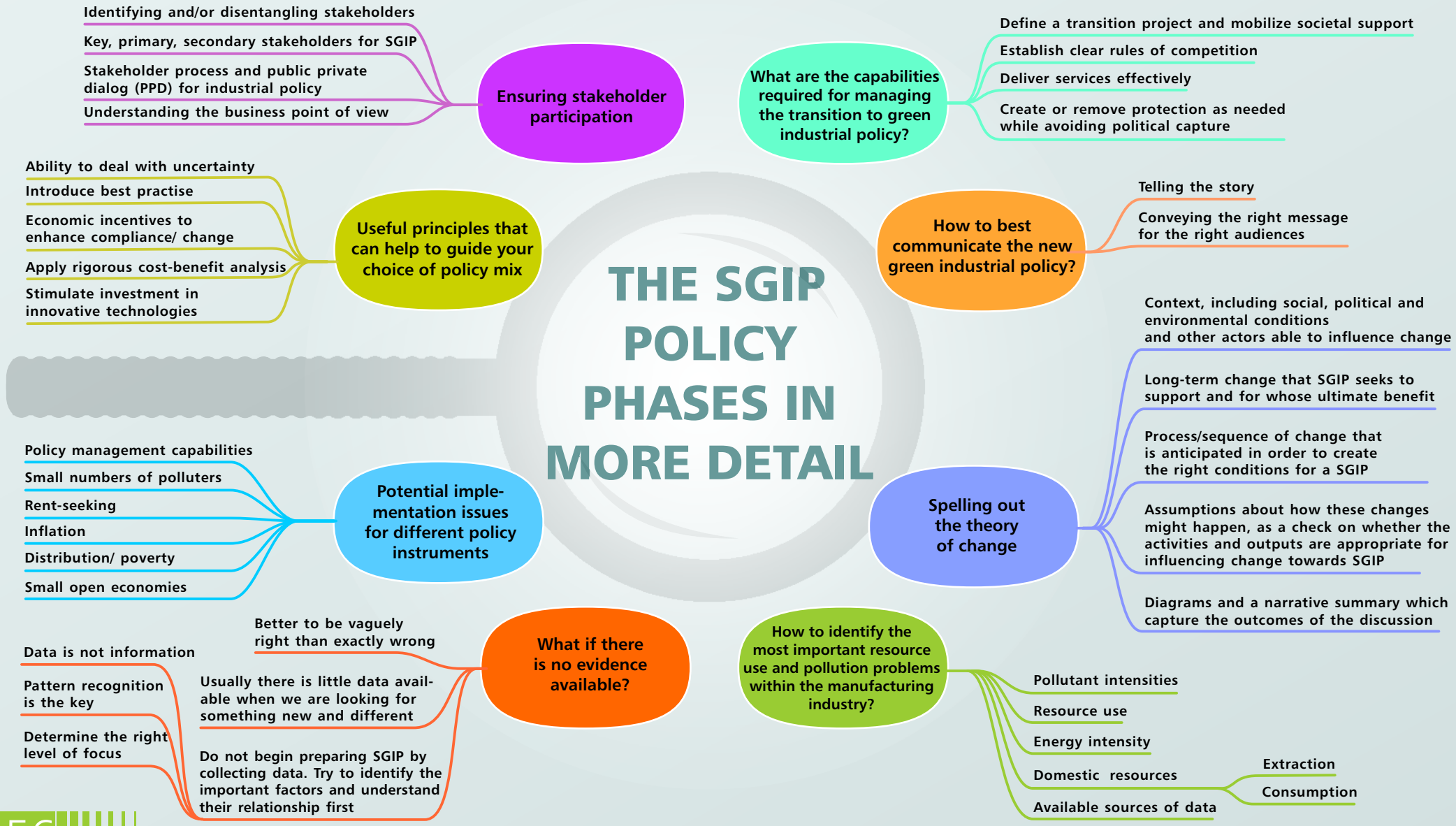
"The economic case for the circular economy is tangible. The cost of remanufacturing mobile phones could (for example) be reduced by 50% per device if the industry made handsets that were easier to take apart, improved the reverse cycle, and offered incentives to return devices that are no longer needed. High-end washing machines would be accessible for most households if they were leased instead of sold. Customers would save roughly a third per wash cycle, while manufacturers would earn roughly a third more in profits.The economic gain from materials savings alone is estimated at over a trillion dollars a year. A shift to innovatively reusing, remanufacturing and recycling products could lead to significant job creation. 500,000 jobs are created by the recycling industry in the EU alone."

(World Economic Forum [WEF], 2014, p.4.)

CHAPTER 4

SGiP

CHAPTER 4


THE SGIP POLICY PHASES IN MORE DETAIL
Ensuring stakeholder participation
Identifying and/or disentangling stakeholders
Key, primary, secondary stakeholders for SGIP
Stakeholder process and public private dialog (PPD) for industrial policy
Understanding the business point of view
What are the capabilities required for managing the transition to green industrial policy?
Define a transition project and mobilize societal support
Establish clear rules of competition
Deliver services effectively
Create or remove protection as needed while avoiding political capture
Useful principles that can help to guide your choice of policy mix
Ability to deal with uncertainty
Introduce best practise
Economic incentives to enhance compliance/ change
Apply rigorous cost-benefit analysis
Stimulate investment in innovative technologies
How to best communicate the new green industrial policy?
Telling the story
Conveying the right message for the right audiences
Potential imple-mentation issues for different policy instruments
Policy management capabilities
Small numbers of polluters
Rent-seeking
Inflation
Distribution/ poverty
Small open economies
Spelling out the theory of change
Context, including social, political and environmental conditions and other actors able to influence change
Long-term change that SGIP seeks to support and for whose ultimate benefit
Process/sequence of change that is anticipated in order to create the right conditions for a SGIP
Assumptions about how these changes might happen, as a check on whether the activities and outputs are appropriate for influencing change towards SGIP
Diagrams and a narrative summary which capture the outcomes of the discussion
What if there is no evidence available?
Better to be vaguely right than exactly wrong
Usually there is little data avail-able when we are looking for something new and different
Do not begin preparing SGIP by collecting data. Try to identify the important factors and understand their relationship first
Data is not information
Pattern recognition is the key
Determine the right level of focus
How to identify the most important resource use and pollution problems within the manufacturing industry?
Pollutant intensities
Resource use
Energy intensity
Domestic resources
Extraction
Consumption
Available sources of data

THE SGIP POLICY PHASES IN MORE DETAIL

4

Preliminary and Cross-cutting work:

- **Capacity Building (skills required for SGIP development)**
- **Coordination, stakeholder analysis, consultation and participation**
- **Monitoring and Evaluation**
- **Gender Mainstreaming**

Capabilities required for managing the transition to SGIP 4.1

Creating SGIP is a complex, dynamic and long-term undertaking, hence the need for policy management capabilities within a government is considerable.

Four particular capabilities to help manage the transition processes, as well as options for governments lacking these capabilities, are listed below (see B7).

Key policy management capabilities B7

In order to manage the transition to the green, circular economy, governments need the capabilities to

1) define a transition project and mobilize societal support
2) establish clear rules of competition
3) deliver services effectively
4) create or remove protection as needed, while avoiding political capture

If governments lack these capabilities, they may, for example,

- draw on the expertise of non-governmental entities, including think tanks and universities
- seek technical advice from consultants
- cooperate with international and donor organizations in training and capacity building

Based on Altenburg (2011).

4.1.1 Capability One: Strategic government

The first capability is closely linked to the elements of a strategic government approach. To define a national transition project and mobilize support, policymakers need to cooperate with stakeholders to collect and assess evidence, explore the policy space and understand the risks. In doing so, they need to go beyond the national context and appreciate what this entails. The global economy and international institutions can be supportive, as well as obstructive factors, as can international actors, such as foreign investors and donors. It is important to align these actors with the transformative strategy, to use international support to create political impetus, and to ease capability and funding constraints.

4.1.2 Capability Two: Establishing and enforcing clear rules of competition

The second capability, establishing and enforcing clear rules of competition, is a prerequisite for private sector engagement in terms of enabling functioning markets and creating investment security. These rules need to facilitate contract enforcement, level the playing field for newcomers, allow firms to exit in case of poor performance and prevent the formation of cartels and monopolies. They must be communicated clearly with all relevant stakeholders, and include guidelines for the adjustment of measures in the process of policy learning. Unbundling the government entities that set the rules (regulatory function) and those that provide public services (operational function) supports accountability.

4.1.3 Capability Three: Effective service delivery

The third capability, effective service delivery, relates to the operational function. Governments need to design incentives and recruitment systems that ensure that public service agencies related to SGIP - including an enabling environment for manufacturers - are performance, and client oriented. This may include verifiable performance measures, and will need to be based on meritocratic recruitment and promotion. Client orientation can be achieved by close interaction and the use of feedback loops between the service agencies and their clients.

The fourth capability, creating and removing support, requires performance orientation and "autonomous proximity" when looking at the realities of the private sector. While granting support may be useful to fostering fledgling industries and encouraging industrial diversification, it is usually very difficult to remove support when it is no longer needed, or when the industries in question fail to succeed. A sober assessment of factual needs and prospects requires a certain degree of proximity to industry, but at the same time, it also requires

sufficient autonomy to be independent and withdraw support if required. Arm's length needs to be maintained at all levels.

Checks and balances in the political system will usually strengthen the incentives for governments to maintain their autonomy and allocate support both efficiently and effectively. The specific types of checks and balances may vary according to the political system, cultural and historical factors, and the available resources. In a comparison of seven developing country cases, Altenburg (2011) found that industrial policy management capabilities do not necessarily correlate with such indicators such as the World Bank's worldwide governance indicators.

However, any shortfall in the government capabilities does not imply that SGIPs or the application of respective instruments should be dismissed. Donor-funded training can contribute to capacity building, and countries can share their experiences. Furthermore, non-governmental initiatives can play an important role in complementing government action. South African policy making, for example, benefits both from the expertise of economic and environmental think tanks, and from the technical expertise of consulting firms. Industry is often a vital source of expertise and information, but government agencies need to safeguard their independence, for example, by verifying information with the help of independent sources or experts, or by introducing competitive elements to elicit true information about cost structures.

Lastly, it should be stressed that there is no single ideal way to a successful SGIP. Every country needs to discover its own strategy, matching the government and private sector capabilities and the country's needs. In doing so, experimentation and systematic learning within policy cycles is the best way forward.

Stakeholder analysis, consultation & participation 4.2

Coordination and consultation permeate all phases of the policy cycle. Often stakeholders and decision makers need to be involved at an early stage in the issues identification and analysis process, so that there is acceptance and uptake of the final policy.

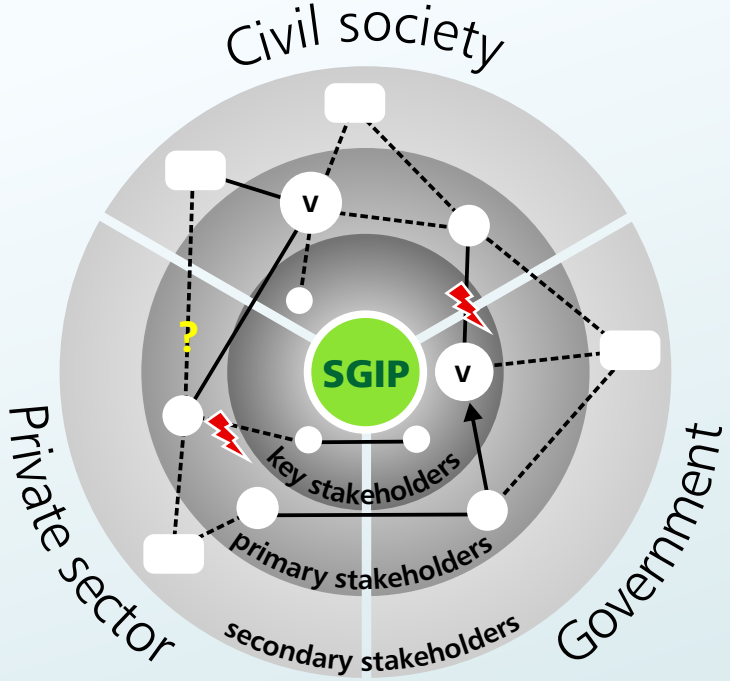
Coordination for a green economy requires a holistic government approach, this means that there is a requirement to involve all levels of government in policy design, decision making, from the national down all the way to sub-national, as well as horizontally across all sectors. In order for this to occur, there needs to be high level political ownership and clear institutional mandates from within government. e.g. a strong, high level lead agency/ies which will help to promote coherence with other policy areas. The latter, in particular is an important prerequisite for effective economic, social, environmental and technological assessments, as well as for setting priorities.

The development of SGIP cannot be organized without the support of other branches of government, including those branches responsible for water, energy and other natural resources, as well as those tasked with protecting the environment. Therefore, the role of the body responsible for the manufacturing industry changes because it will need to coordinate more intensively with the other areas. Lastly, coordination will usually involve international and foreign stakeholders, including donors for some countries.

Who needs to participate?

Stakeholder analysis is the tool used to decide who needs to participate. We can distinguish key stakeholders, including key players, primary and secondary stakeholders (see F9 below). The role, i.e. whether a stakeholder is key, primary, or secondary, will vary given the issues that become the focus of a SGIP in a specific geographic space, and possibly over time.

F9 Identifying and/or disentangling stakeholders



Classifications:

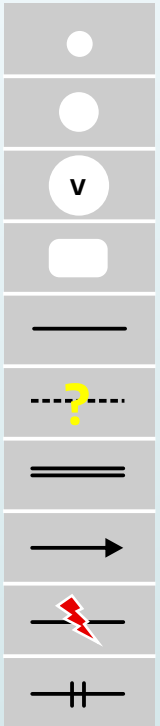
Key stakeholders: these are actors without whose support and participation the objectives of a policy cannot normally be achieved, or who may even be able to veto the policy ("veto players").

Primary stakeholders: these are actors who are directly affected by the policy, either as designated beneficiaries, because they stand to gain or lose power and privilege, or since they are negatively affected by the policy in some other way.

Secondary stakeholders: these are actors whose involvement in the project is only indirect or temporary.

Source: Based on GTZ, 2009, p. 80ff

Notations:



key or primary stakeholder with low influence

key or primary stakeholder with high influence

veto player

secondary stakeholder

Solid lines symbolise close relationship in terms of information exchange, frequency of contact, overlap of interests, coordination, mutual trust, etc.

Dotted lines symbolise weak or informal relationships. The question mark is added where the nature of the relationship is not yet clear.

Double lines symbolise alliances and cooperation that are formalised contractually or institutionally.

Arrows symbolise the direction of dominant relationships.

Lines crossed by a bolt of lightning symbolise relationships marked by tension, conflicting interests or other forms of conflict.

Cross lines symbolise relationships that have been interrupted or damaged.

Potential key stakeholders for SGIP are:

- policymaking bodies
- standard bodies, accreditation bodies
- government organizations (ministries, agencies)
- business membership organizations, labour organizations
- consumer organizations and other relevant non-governmental associations

Potential primary stakeholders for SGIP are:

- industrial polluters, industrial energy and water users
- energy producers, energy distribution systems, energy traders
- industry, energy, and mining associations
- industrial zones, industrial clusters, innovation parks
- inspection and supervision bodies, enforcing organizations
- service organizations (e.g. laboratories, certification bodies)
- supranational bodies, regional networks, subnational bodies
- individuals and organizations affected by industrial pollution
- individuals and organizations which will be affected by any measures to be developed and implemented under a SGIP

Potential secondary stakeholders for SGIP are:

- expert groups, consultants
- research bodies
- education and training organizations
- media
- international organizations, technical assistance organization

These suggestions are not an exhaustive list, rather they are meant to provide a general idea. The importance of specific stakeholders depends on the specifics of the country concerned. Moreover, the constellation of stakeholders may vary according to the industries and regions concerned.

It is useful to establish stakeholder profiles to assess the likelihood of which stakeholders can actually make significant contributions to change, or at least to be aware of the types of changes they can effectively contribute to. Their specific organizational and motivational features are a second selection criterion as policy processes need development-minded and reliable stakeholders.

Development processes may contribute to the evolution or change of function of specific stakeholders, and it is therefore possible that their profile changes over time. These changes are bound to influence their relationships with other stakeholders, and the influence they can exert in the overall system relevant for the SGIP.

The quality of the relationships between stakeholders is not the main measure of their suitability. In other words, universal harmony is not necessarily a priority goal, although a readiness for dialogue between stakeholders can usually improve the functioning of a SGIP.

If those who witness damage to the environment remain silent, or are being silenced, and do not or cannot make their voices heard, important feedback loops for sustainability will be lost. And if information from health authorities does not reach the external public, no corrective action may be introduced, or there will be delays that affect the agility of the response.

4.2.1 Stakeholder coordination

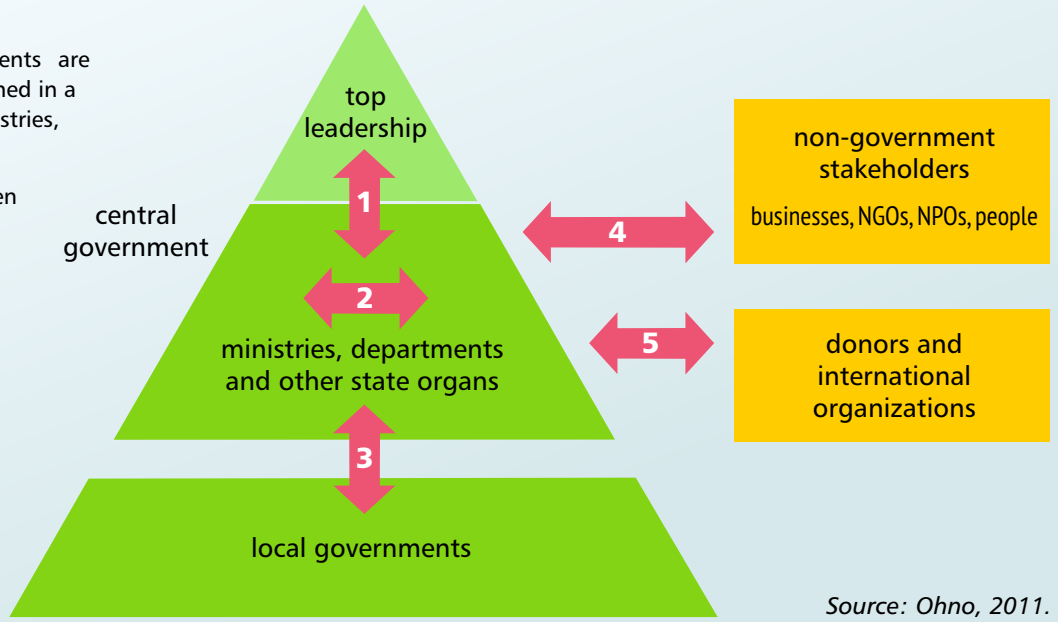
With so many stakeholders involved in the development of SGIP, it is crucial that coordination mechanisms exist to facilitate and ensure their interaction. The following figure (F10) displays four distinct groups of national stakeholders in a specific setting. The central government is made up of the top leadership and high-level advisory groups, ministries and their departments and other state entities. Local governments are made up of provinces/states and towns/villages. Foreign businesses, domestic businesses, non-governmental organizations/ non-profit organizations (NGOs/NPOs), academics, researchers and intellectuals, people (workers, residents, consumers) would constitute the non-governmental stakeholders.

F10 Stakeholder processes and public-private dialogue (PPD) for industrial policy

Coordination mechanisms for intra-ministerial and interministerial departments are required. Key personnel need to be identified and responsibilities and tasks assigned in a ministry work plan. Similarly, a government work plan would identify key ministries, specify a cooperation scheme, etc.

PPD needs to be facilitated to give the private sector an active role and to strengthen the government's function within it. Ideally the PPD would be institutionalized. Having all the stakeholders involved from the start ensures a shared ownership and responsibility for policies developed and should increase readiness to cooperate once the policy is implemented.

When engaging stakeholders in PPD, it is important that the dialogue be organized efficiently to ensure that it properly contributes to the SGIP process. If not conducted in this manner, there is a risk that the dialogue will become unproductive, without proper aims and outputs. This can lead to situations where there is no ownership of the policy, permanent brokering or even an exit by some stakeholders from the policy. The dialogue should achieve results relevant for policymaking and therefore be run on the basis of constructive workshops (avoid running "talk shops").



Source: Ohno, 2011.

Evolution of a PPD for SGIP

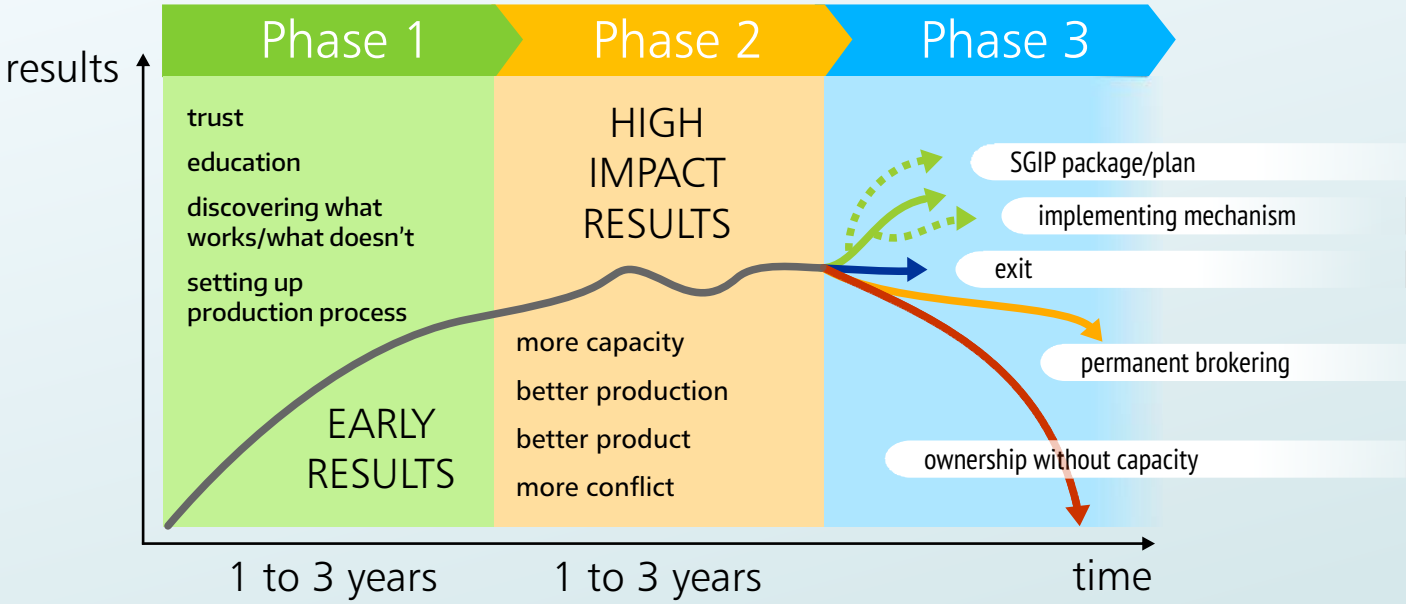
F11

At the furthest end of the figure there is interaction with international organizations and, depending on the country, with donor organizations. These are another set of stakeholders who may be consulted on developing SGIP. However, policy development, first of all, is coordinated at a national level.

Realism

In order to increase the potential for full implementation, it is important to carefully define the policy scope jointly with the stakeholders. Discussions of what should be done to move industry to a greener level, given conditions at the outset (desirability), and what can be realistically achieved (while imposing bearable stretch), given the political landscape of the country, as well as the administrative capacity of the government (feasibility), are crucial to infuse a necessary amount of realism. There is a need to ensure that the SGIP is in line with the objectives of various economic sectors (policy integration) and that it is promoted within sectoral and cross-sectoral policies (policy mainstreaming). The probability of achieving this objective is significantly increased by selecting the right stakeholders in the coordination process.

It should be noted that the view of what constitutes "realism" is somewhat dependent on perspectives. Economically feasible and politically agreeable processes have led us to overshoot planetary, and in many cases specific local, ecosystem limits. From the perspective of sustainability, many previous policies have therefore effectively lacked realism. SGIP thus needs to explicitly take into account environmental and ecological factors so that they are endowed with sufficient realism, and in many cases include corrective measures for previous policy failures.



Source: DFID and others, 2006, p. 17

B8 Understanding the business point of view

SGIP cannot be crafted without joining forces with industry, i.e. industrial enterprises.

Most manufacturers compete in the global market. This global market is both present within the national economy (in the form of imported manufactures and foreign direct investments in manufacturing) and in the international market (where national manufacturers compete by exporting their goods, and in terms of investments in other countries). In other words, even if a manufacturing firm is not exporting, it is usually exposed to international competition in its own domestic market.

In many cases, the resulting competitive pressure leads to low-cost competition traps where environmental and ecological issues, similar to labour and health and safety standards, are considered an additional cost the business needs to bear. Some of the benefits, however, may be either external to the firm, or not as immediate to justify their cost from a financial perspective. Manufacturers therefore are often interested in knowing when to expect returns from greening.

This issue is real and cannot be ignored by policymakers. At the same time, it is difficult for policymakers to assess to what extent businesses are under competitive stress and how much room for greening they really have. Thus, it is important that policymakers develop a feel for the industry and maintain dialogue – while preserving the autonomy required for crafting policies that are guided by the public's interest.

Below are some potential strategies that individual businesses may work with in order to improve their own competitiveness, i.e. green strategies that make sense from a business point of view. Policymakers should not look to force them upon businesses given they are not responsible for the management of the manufacturing firms. But they should be aware of them so as to be able to discuss how government services and policies can help businesses move towards greener production. Policymakers, for example, may create extension services or foster business development services that are able to assist manufacturers to embark on greening strategies.

- Creating green value streams by eliminating wastes e.g. from energy, water, materials, transportation, emissions and biodiversity that are creating superfluous costs (essentially, as elements of a business strategy to increase resource productivity).
- Increasing revenues and market shares by eco-branding or creating a more sustainable brand (as a strategy to obtain price premiums on the basis of differentiation), through creating new green products, and/or by increasing revenues from services or leasing.
- Increasing employee productivity by using purpose (greening) to power performance, through greening buildings, and/or as a result of technological innovations required for greening.
- Striving for compliance leadership as a strategy for building reputation or alternatively mitigating reputation risks for revenue resulting from weak energy, carbon, water, materials and solid waste management, or from ecosystem damages.
- Striving for environmental cost leadership by essentially reducing environmental impacts while also restraining financial costs.
- Sustainable value innovation whereby new value propositions are made, underpinned by new business models that open new market spaces and develop new customer bases.

Following the classification of Orsato, 2009. For practical business approaches, see, inter alia, Willard, 2012, and Wills, 2009. The reports of the Ellen MacArthur Foundation (e.g. 2013) provide inspiring business examples.

Phase 1: The Vision-Theory of change 4.3

Ultimately, the purpose of any policy consists of achieving its objectives, i.e. its implementation. Ideally, this is achieved by breaking down the policy into different steps and activities (programs and projects) that are required to achieve the objectives. These steps usually are organized based on a strategy that in turn is based on a theory of change (which explains how the policy will, realistically, be achieved). The need to thoroughly discuss and agree the SGIP and its underlying theory of change in consultation with all stakeholders, cannot be over-emphasized.

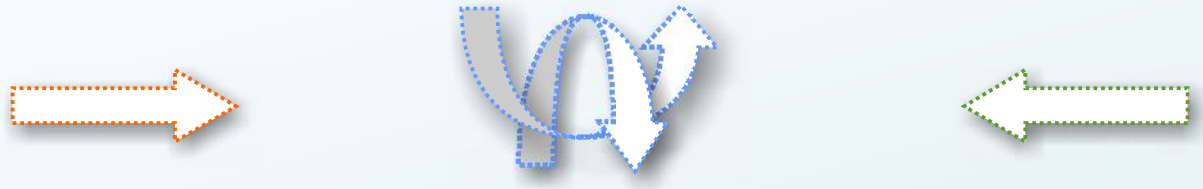
Making it Happen: Theory of Change B9

Recently, "theory of change" has been increasingly drawn on by international agencies and other organizations in order to improve the quality of implementation of programs and projects. This body of practices can also be used for improving policy design and implementation. It is rooted in streams of development and social programming practices relating to (1) evaluation and (2) informed social action. The following elements are usually employed:

- Context for the initiative, including social, political and environmental conditions and other actors able to influence change.
- Long-term change that the initiative seeks to support and for whose ultimate benefit.
- Process/sequence of change that is anticipated in order to create the conditions for the desired long-term outcome.
- Assumptions about how these changes might happen, as a check on whether the activities and outputs are appropriate for influencing change in the desired direction in this context.
- Diagram and narrative summary that captures the outcomes of the discussion.

Arguably, much of the recent interest in working with theory of change is due to an increasingly routine and, effectively, incomplete application of logical frameworks which were originally based on one of the streams mentioned above. In particular, the, by traditional standards, fairly widespread cursory, incomplete and inaccurate treatment of the assumptions column of the logical framework, often as a result of time pressure and lack of adequate training, has led to many intervention strategies (and their underlying theories of change) not being adequately spelled out. It is here that theory of change exercises will be valuable for ensuring that SGIP can effectively be implemented. The table below lists a number of theory-of-change approaches that may be selected from to reinforce the quality of the SGIP.

F12 Theory of Change



More evaluation-informed	Complexity-informed	More social change-informed
Programme theory/logic	Pathways mapping	Models of Change
Outcomes chain	-'What would it take...? approaches	Dimensions of Change
Intervention theory		How history happens
Causal pathway	Learning/evaluation	Change hypothesis
Impact Pathway	Explore/explain	Open enquiry and dialogue
Logic model	Linear/complex	Reflective theory of change practise
Causal model		Rich picture
Single programme logic	Multiple outcome pathways	Future timeline
Macro/sector theory of change	'Tippiong points'	Feedback loops
Assumptions about change	Emergent, non-linear, recursive	Road-map
	Systems thinking about change	Beliefs about change

Based on DFID (2012). Source of table: DFID, 2012, p. 17, table 2.

Phase 2: Stocktaking-Establishing the evidence base for the SGIP 4.4

What (further) evidence to collect:

When developing a SGIP, information on how elements of the current industry system interact with each other and their environment is of the highest priority. However, knowledge about the way the system works is not usually documented and has to be created with the stakeholders concerned. This knowledge is by definition multidisciplinary, and the evidence, at the outset, may be limited.

Therefore, a qualitative analysis of the system in question is the first step to take when establishing evidence. This analysis may always be supplemented by quantitative information, but it will usually be of a qualitative nature. It will seek to identify existing patterns of behaviour and the structures of relationships.

A practical method for conducting a qualitative system analysis (cross-impact analysis), and what more can be gained from simulations where quantitative data is available, is presented and explained in the Supplement to the Practitioner's Guide.

The second step in establishing evidence is to run through simulations of the model in order to identify the most sensitive relationships and parameters of the system, i.e. those which are likely to change the system's behaviour or performance over a short time or which will have a very strong impact on change once certain thresholds are reached.

A practical method for conducting a qualitative system analysis (cross-impact analysis) and what more can be gained from simulations where quantitative data is available, is presented and explained in the Supplement to the Practitioner's Guide.

Once these important relationships and parameters are identified, searches for information can be formulated:

- *How do we best measure the development of these sensitive relationships and parameters?*
- *Are there any existing time-series data relating to the development of these sensitive relationships that we can draw on? Does this existing information truly reflect what we need? If we do use existing information for reasons of cost, where should we exercise caution and what should we remember when we apply it for our purposes?*
- *In the absence of "hard data" is there any qualitative information available that could already be used to assess or focus in on the current situation?*
- *What additional information do we need to collect in order to better understand where we stand and how should we best sequence and gauge potential interventions?*

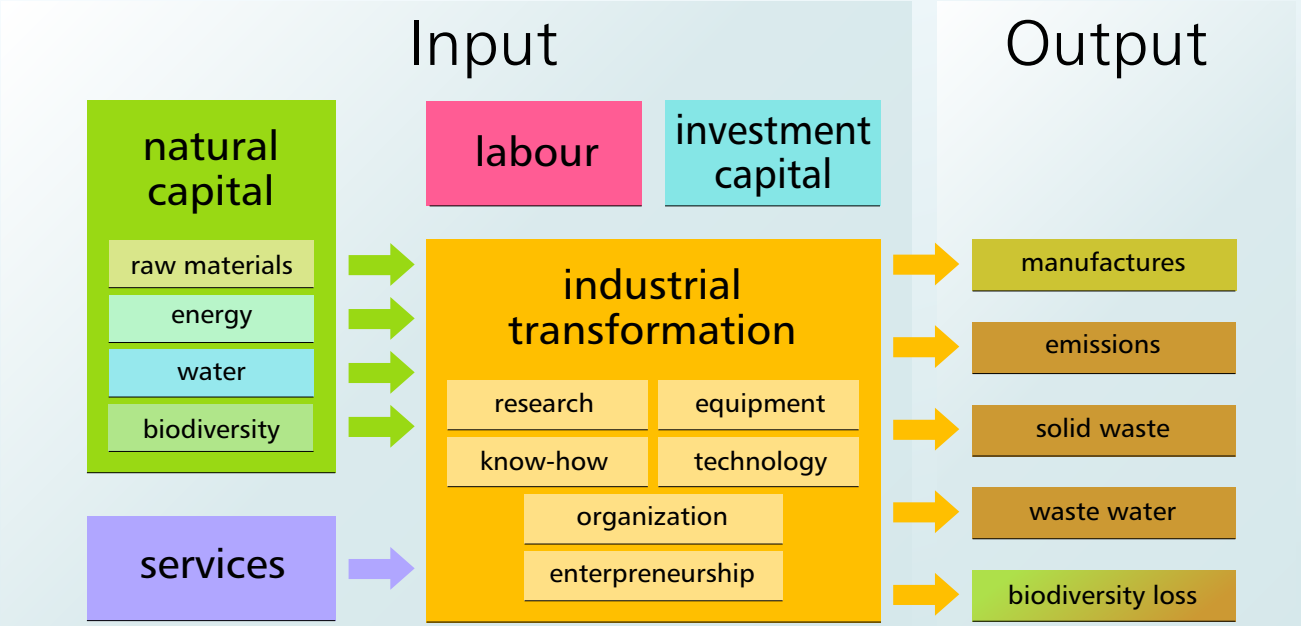
In other words, the evidence we need to collect is highly dependent on our understanding of the system we are dealing with. Without this understanding any information collected is unlikely to be useful or reflect our needs.

4.4.1 Phase 2 continued: Resource use and pollution within the manufacturing industry

Identifying the most important resource use and pollution problems in terms of the physical constraints to the greening of manufacturing industries is one key aspect in specifying the key SGIP issues in the economy. Different industrial sectors have different capacities for environmental impacts, e.g. the primary metals sector uses significant quantities of energy. Hence, the analysis seeks to understand both national resource availability, sectoral resource demands, and pollutant impact. The methodology focuses on the key environmental constraints (inputs) of energy, material and water inputs, and the air, waste and water-pollutant outputs.

F13 Transformation of natural capital into industrial goods and environmental bads

The transformation of natural capital into industrial goods and negative environmental externalities includes a wide range of incentives for specific target groups that are focused on learning effects and the stimulation of sustainable product and business development.



The assessment consists of the following major steps:

1) Obtain estimates of the current and future output of the manufacturing sector in order to focus the information search on dominant subsectors.

2) Gather as much data for each environmental dimension as possible from online databases and other internet sources such as the World Bank (1999) Pollution Prevention and Abatement Handbook 1998. These databases are studied, firstly, for data on national resource availability and, secondly, for relative subsector resource use and pollutant generation. Qualitative and descriptive data can usually be found in subsector reports prepared by international and national development agencies for specific subsectors.

3) Assemble available national data on current natural resource availability and subsector use, pollutant discharges and any significantly degraded environmental areas such as heavy concentrations of air pollutants in urban areas and noticeably polluted watercourses.

4) Prepare a first-round environmental desk analysis of subsector resource use and potential pollutant loadings using international databases from the World Bank and International Energy Agency (IEA). More guidance can be found on this step below.

5) Undertake local fieldwork to fill the gaps and improve the desk analysis. Interview relevant authorities, private-sector stakeholders, subsector associations and NGOs. Hold, where possible, individual meetings with manufacturing firms of a wide range of sizes to ensure that the variety of their views are taken into account.

6) Prepare preliminary findings of resource constraints, subsector resource-efficiency issues and pollutant impacts.

7) If possible, hold a forum of a small number of key industry and trade association representatives with interest in/knowledge of environmental issues to identify any constraints to improving resource-use efficiency and to complying with pollutant-discharge standards. Ascertain their views on where industrial policy changes could be made that would improve their performance (competitiveness).

8) Present findings focused on the following content:

- Qualitative statement of the most serious resource constraints, pollution problems and hot spot environment threats;
- Resource constraints – both from domestic sources and imports;
- Relative subsector resource intensity, and options for decoupling of resource use;
- Relative subsector pollutant loadings;
- Estimate pollutant damages using approximate values from other studies (see list of other studies in the Manual for Estimating Industrial Resource and Pollutant Loadings to be found on UNIDO's Green Industry Platform); and
- Manufacturers' perspectives on the industrial policy changes needed to improve resource efficiency and ease compliance with environmental regulations.

9) Formulate a vision establishing what the country wants to achieve, e.g. cut resource intensity by 20 per cent, reduce water pollutant discharge by 50 per cent and/or bring the highest polluting industries into compliance (see DOSTE, 1994). Include evidence why the vision is needed. For reducing resource intensity, a vision statement endorsing decoupling of resource use

and industrial output is essential. Support the decoupling commitment with evidence for increased productivity, resource security (energy primarily) and environmental benefits (reduced human health and natural resource damages). For industrial environmental management, the vision statement should endorse the polluter pays principle. Support the decoupling commitment with evidence at the macro level (e.g. environmental damages as a percentage of GDP), low annualized cost impact on the manufacturing sector and specific health and welfare benefits.

More informaton on databases and methodologies for estimation of pollution intensity and resource efficiency is available in the Supplement to this Practitioner's Guide.

4.4.2 Phase 2 continued: Integrating the manufacturing industry with the green economy

Identifying ways of moving the industrial system towards a green economy is the other key aspect of specifying the key SGIP issues in the economy. The identification of the most important resource use and pollution problems within the manufacturing industry is relatively straightforward, and evidence (as long as there is an effort made at collection) can be relatively easily obtained as a basis for developing feasible policy instruments to address these issues. However, moving from the greening of manufacturing to integrating manufacturing into a green, circular economy, invariably raises the bar for practitioners of industrial policy, and requires dealing with higher degrees of complexity.

When dealing with problems of dynamic complexity, in particular, there are certain shortcomings that evidence-based policymaking may have, depending on what actually classifies as "evidence". With this in mind, most significant is the basic assumption that extrapolating trends of the past to the future is valid and that evidence collected is able to reflect causes of problems, and not merely their symptoms. For example, if a system is close to reaching its tipping point, evidence will only exhibit the characteristics of the situation before the tipping point (e.g. exponential growth prior to collapse).

One of the reasons for the inordinate delays in dealing with climate change, arguably, is the search for and detailing of evidence. By the time it materializes and is confirmed with reasonable confidence, it may actually be too late to act upon it. Similarly, an ecological disaster, such as the tipping of a water body due to industrial pollution may already be irreversible as it becomes evident.

"*It is ironic that the biggest uncertainties about the CO2 buildup are not in predicting what the climate will do, but in predicting what people will do. The scientific community is apparently reaching some consensus about the general mechanisms of the greenhouse effect. It is considerably less agreed on how much fossil fuels mankind will burn; how fast economies will grow; what energy technologies societies will foster and when; and so how fast the buildup will occur.*" Source: David, E. E. (1984).

Therefore, if evidence-based policymaking is to serve as any basis for solving present-day and future issues, the criteria for what classifies as evidence needs to be sufficiently widened to accommodate our incomplete knowledge of the future. There is a need to take account of the fact that problems formulated today may not have a clear information trail that can be tracked to the past because the criteria for the problem (e.g. greening) and the collection of relevant information are only specified in the present.

What if there is no evidence available? 4.4.3

Though the availability and quality of statistics have improved considerably in many countries over the last decades, it is clear that evidence for new or emerging policies is difficult to establish. Our existing reporting systems are usually based on the priorities of the past, and therefore do not necessarily yield the information we are looking for. Moreover, when information may potentially damage powerful stakeholder interests, in many cases it is not made available. Practitioners therefore rarely find a set of data available that fully meets their purpose.

While, under such circumstances, it may seem reasonable to work with the information that is available, it is usually the information which is not available that is the most important for understanding of the factors that impact SGIP. Working with "available" information, as a matter of fact, entails a significant risk that may result in an assessment that will be "exactly wrong" as opposed to "vaguely right" (the latter being preferable). The practitioner, therefore, must often search for the information which is not available in order to be able to devise methods to improve a given situation.

It is important to remember, in this context, that the goal of any analysis is to discover relationships between different factors, in order to understand their interaction. While the thorough analysis of the perfect statistical series may provide us with hints about such relationships, at a sufficiently high level of confidence if the data collection has not suffered from any coverage, measurement and/or non-response errors, we still need to explain the underlying relationships the statistical observations seem to have yielded.

Data availability and greening B10

"The concepts of 'greening industries' and 'green industry' (or 'eco-industries') can be useful starting points. Both concepts outline pathways to achieve such economic-environmental 'win-win scenarios', with the 'greening industries' focusing on increasing (resource, energy, etc.) efficiency and reducing waste (but also pollution) while the 'green industry' concept puts emphasis on new markets (for environmentally friendly products and/or renewable energy) and 'green jobs'. However, due to the complexity of the topic, in particular as regards the interrelations of industry activities and environmental impacts, any tool in this area would need to hold up the principle of simplicity/simplification (both in terms of conceptualization and operationalization), especially compared to existing tools. Moreover, the data required for most current environmental tools and, more generally, diagnostic exercises that feed into strategy setting are unlikely to be available in developing countries."

Source: UNIDO and GIZ, 2014, p. 71.

The situation of the practitioner is therefore similar to the situation of the researcher who develops a hypothesis which is to be tested in the field. The researcher, however, usually has more time available than the policy or decision maker. We thus need to:

- Seek to discuss and understand stakeholder perceptions of issues relating to SGIPs, in particular measures to reduce energy, water, and material flows;
- Ask stakeholders what determines their actions and decisions, and understand their motives and economic rationales; and

- Find out what constraints and difficulties stakeholders are regularly dealing with in order to get a feel for their capacity to respond to potential SGIP instruments by:
  - Focusing on the relationships between different factors of production and SGIPs; and
  - Discussing on the basis of orders of magnitude (avoiding precise figures) to sidestep unnecessary interruptions to discussions (in order to look for the right numbers) and to allay any potential fears that we are seeking information to report to tax authorities or competitors.

In order to develop our evidence, we do not need any valid random sample of industrial establishments or respective stakeholders. A small number of "typical" enterprises and stakeholders should be sufficient for us to develop a thorough understanding of the potentials and limitations for designing a SGIP.

B11 What numbers can tell us, or not

"Putting different hands on the faucets may change the rate at which the faucets turn, but if they're the same old faucets, plumbed into the same old system, turned according to the same old information and goals and rules, the system behavior isn't going to change much. ...Numbers, the sizes of flows, are dead last on my list of powerful interventions. Diddling with the details, arranging the deck chairs on the Titanic. Probably 90 –no 95, no 99 percent– of our attention goes to parameters, but there's not a lot of leverage in them. ... It's not that parameters aren't important – they can be, especially in the short term and to the individual who's standing directly in the flow. ...But changing these variables rarely changes the behavior of the national economy system."

See Meadows, 2011, p. 148. (Emphasis as in the original.)

If there are substantial variations between different regions in our country, we need to ensure that we approach stakeholders from different regions. Where the dynamics or production functions of industry subsectors are substantially different, we need to make sure to include this variety in the (non-random) samples.

Once we are able to describe the existing flows in the different industry sectors and have identified the potentials and limitations of an SGIP, we can validate the findings using focus-group discussions or a stakeholder workshop (or both).

- Focus-group discussions are led by a professional facilitator to test the validity of specific statements or to explore participants' opinions on a specific topic. They are useful to determine their standpoint, the categories they are thinking in and how they may potentially respond to certain measures.
- Stakeholder workshops are more formal in nature and are not as effective a tool for exploring participants' opinions. However, they signal to participants that they are recognized as valid discussion partners on a topic of common concern and thus build positive relationships with green industrial policy target groups.

After validating our understanding of the factors at work and their relationships, we may reassess whether any of the existing data, information and evidence is useful for developing a SGIP. The probability of finding relevant information that was gathered prior to drawing up a SGIP tends to be low because it may have been impractical or costly to collect, definitions used then are now unsuitable, only aggregated data are available, etc. However, given increasing international interest in greening, there is nevertheless a chance that researchers may have produced quantitative studies which could be useful for the drawing up of policy.

How much detail is needed before deciding what to do?

B12

Human interest in collecting data seems to be infinite. Indeed, the belief is widely held that the more detail we know, the better decisions we will make, however, there are two reasons why detail may not be as important as we have been led to believe:

- Having information is not the same as having data. Data by itself is not significant and needs to be organized in a meaningful way before it can be used as information. Information is significant by itself, independent of whether it is generated using data. Generating information usually requires analysis.
- Patterns can be recognized even if detail is sketchy. The low-resolution image below shows a well-known personality who changed the world. How much better can the person be identified by bringing the picture closer? How much will studying a specific detail of the image (i.e. increasing the resolution for any of the squares that make up the picture) help in correctly identifying the person? What happens if the image is moved further away?

For understanding the way in which a system works, we need to select the correct focus. Looking from a distance, we can, in most cases, perceive the structure of the system more easily than if we probe deeply into specific elements of the system. Pattern recognition is, therefore, more relevant when dealing with complex systems than a detailed view. This is not to discard detail, but to remind us of what can be missed by having too detailed a focus.

Observation: This type of low-resolution analogy was first presented by Vester (1988).

The lesson to be learned from the above analogy is not to begin preparing SGIP by collecting data. As this is, indeed, a generally costly and time-consuming exercise, we should attempt, instead, to identify the factors at play for an SGIP and understand their relationships first. When we are able to explain these relationships, we can subsequently decide what data is to be collected in order to statistically falsify (or verify) our explanations.

Focus group discussions and stakeholder workshops are cost-efficient means to obtain valid information. Their exploratory nature allows us to identify factors that a detailed survey may not be able to yield.

In this context, it should be noted that it is possible to assess existing systems on the basis of qualitative information found. The Supplement to this Guide introduces one practical method (cross-impact analysis) which will considerably improve the design of SGIP even if there is no or very little quantitative information available.

Observing these principles should go a long way in designing feasible and effective SGIPs. Such strategies will not only be based on key principles of greening, such as the polluter pays principle, but seek to create the conditions for such principles to be applied in a specific country context. For example, they may include interventions which, inter alia, fit with the legal tradition of the country concerned, with typical behaviour patterns, with education levels, or implementation capacities.

4.4.4 Phase 2 continued: Indicators for setting SGIP targets (leading into Phase 3-Goal setting)

Independent of how a SGIP is developed, using a systems-thinking based cross-impact analysis or resorting to our traditional linear planning methods, it is essential to decide what targets need to be set and how to measure success in terms of implementing the SGIP. This will help to meet the designated objectives in a systematic way and assist in identifying any shortcomings or failures so that these can be corrected sooner rather than later. It will allow the performance to be benchmarked against other countries so that strategies can be tailored accordingly. There are specific indicators available that have been, or are being developed to measure the ecosystem performance or eco-efficiency of a whole country, its industry, or a certain industrial subsector.

Other than traditional industrial policy which can often be assessed on the basis of contributions to GDP, exports or foreign exchange generated, and possibly employment,[3] assessing the success of implementing a SGIP will require a somewhat broader set of indicators because SGIP addresses a more complex process than traditional industrial policy. At the very least, it will require weighting traditional measures of success against the most important (or the most measurable) factors representing ecosystem services.

Quantitative methodological approaches will need to be complemented by qualitative analyses of the specific national legal and policy frameworks, economic structures, as well as issues related to technological development. Qualitative assessments will be important where basic data are currently lacking or are difficult to obtain.

[3] Of course, there are other indicators for industrial development that can also serve to measure the more complex results of traditional industrial strategies, such as the diffusion of technological capabilities, etc. However, the accent has traditionally been on aggregate-level economic success indicators.

The key factors for green growth and green industrial performance are resource, carbon and energy productivity. The European Commission (2011), for example, proposed using GDP/domestic material consumption (DMC), measured in EUR per ton, in order to measure resource productivity, i.e. the volume of output per unit of services from natural assets that are used in production.

A useful starting point for defining indicators measuring the progress towards a green economy is the sphere of production. If relevant ecosystem services such as the absorption of CO2 were recognized as an input to production, the amount of ecosystem services consumed by a particular manufacturing subsector during production could be measured and compared. Alternatively, by comparing the ratios of industrial output to emissions, the overall efficiency of manufacturing processes, as well as the degrees of substitution between labour, capital and ecosystem inputs may be reviewed.

Comparing the pollution intensities of a particular industry across countries would imply measuring emissions per unit of monetary value of output. Industry-specific purchasing power parities (PPPs) are used to convert values into volumes in order to avoid biases due to differences in relative price levels (see OECD, 2011b, p. 22, Box 2). With industry-specific PPPs, a comparison of relative ecosystem productivity across countries is technically feasible. Further work is planned to enhance their availability. Similar to economic analysis for non-tradable factors, it is more difficult to develop accurate measures for manufactures that are country-specific (see OECD, 2011b). However, manufactures are usually more tradable than other goods and services so this problem should be less of a concern.

Both carbon intensity and energy productivity provide information about the results of policies that promote low carbon technologies and cleaner energy. Thus, they should be part of the set of indicators that measures SGIP performance. Energy use in the manufacturing industry needs to be decoupled from economic growth. The highest priority should be accorded to the most energy-intensive industries, those with the most cost-effective options for reducing energy use and those which have the highest overall energy use. Tracking progress will require governments to collect improved data on material productivity and industrial resource efficiency. (See United Nations Environment Programme [UNEP], 2011b).

The following three sections provide an outline of the basic indicators that can be used for specifying SGIP targets and measuring success. They represent the most readily developed and measured indicators that are in current use, and are predominantly used at different levels of analysis.

GDP per capita is the most common indicator to measure economic prosperity at the national level. GDP generated by the manufacturing sector of a country is referred to as MVA. Respective data can be derived from various international data sources, such as those provided by the World Bank, the OECD and United Nations Statistics Division (UNSD) and from national statistics offices in most countries.

GDP generally represents economic performance, usually measured in per capita terms for this purpose. However, this "frontpage indicator" misses out on other aspects that are central to a strategy aimed at green growth or green industrial development.

If green growth focuses on overarching policies to ensure sustainable and inclusive growth that promotes a high quality of life through reduced natural resource consumption, indicators which measure the social and environmental dimensions have to complement GDP. For monitoring the quality of life, subjective well-being (SWB) can serve as a social frontpage indicator, while total material consumption (TMC) per capita is an appropriate environmental frontpage indicator.

Factors determining different levels of resource productivity

B13

- **Energy mix**
  In general terms, a high share of fossil energy sources coincides with low CO2 productivity.
- **Use of energy-efficient or resource-efficient technologies in production**
  Mature developed countries generally show higher efficiencies due to advanced technology levels.
- **Sector-specific vertical integration**
  The higher value-added parts of production chains are often less resource intensive and frequently located in mature developed countries or regions.
- **Commodity prices**
  Higher price levels and stronger price fluctuation are two trends which are likely to persist over the coming decades due to different factors such as resource scarcities and expected supply crunches. (See Lee and others, 2012.)
- **National price levels**
  These levels vary by up to a factor of four (!) and influence the economic value of products.

(See Giljum and others, 2013.).

These three indicators combined provide a more complete picture of the economy.

- higher GDP generally implies higher economic performance
- higher SWB implies a higher social performance
- lower TMC implies reduced pressures on the natural environment

To monitor the success or failure of greening the economy, it is important to support political decision processes with more comprehensive information of this type. The OECD regards the role of environmental services (e.g. the absorption capacity of the atmosphere) and material well-being as the two complementary aspects of the economy (see OECD, 2011b).

The most frequently used input indicator in material flow analysis (MFA) is DMC, measured in tons per year. DMC measures the total quantity of materials which are of economic value and are used within an economic system. It is calculated by subtracting exports from domestic material input (DMI), the latter being defined as the sum of domestic extraction used and (direct) imports. DMC is the closest equivalent to aggregate income in the conventional system of national accounts (see Ecologic Institute/SERI, 2010).

Since DMC does not cover specific environmental impacts associated with material use, indicators like the Environmentally weighted Material Consumption (EMC) have been developed. EMC provides an aggregate measure of life-cycle-wide environmental impacts (focusing on cradle-to-gate and recycling stages) associated with DMC for selected materials using a weighting factor. To date there are impact factors for 13 impact categories, covering a selection of roughly 30 materials. To date, EMC has mainly been obtained for the EU member countries (see Bringezu and Schütz, 2010).

Other indicators measuring resource input at the macro level are the water footprint and gross inland energy consumption (representing the quantity of energy necessary to satisfy domestic consumption). GHG emissions intensity relates GDP to CO2 equivalents (macro level) or carbon productivity at the sectoral level. If the indicator is related to the value of the corresponding product (factory gate price) the intensity of GHGs relative to production can be demonstrated. GHG intensity can be decreased by improving energy efficiency, conservation or substitution with low-carbon energy sources.

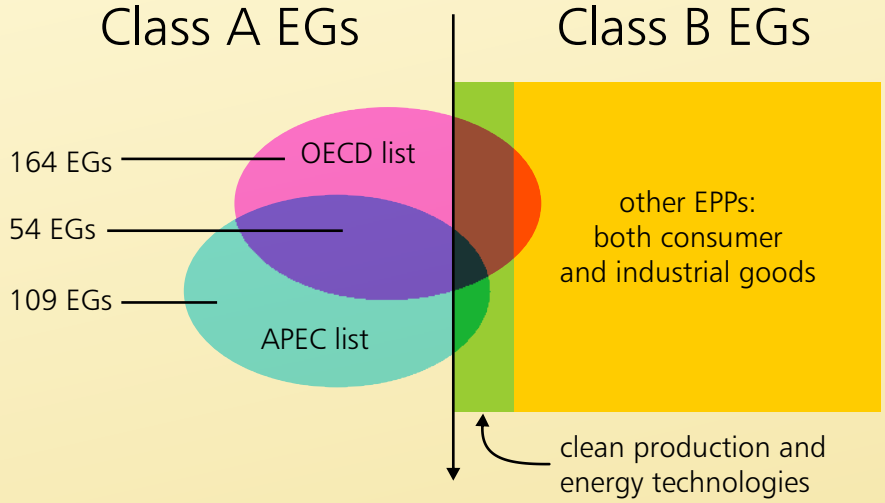
At the sectoral level, environmental data are still scarce. Statistical data on energy consumption and emissions aggregated by industry are available. For energy use and CO2 emissions, data can be derived from the Global Trade Analysis Project (GTAP) database https://www.gtap.agecon.purdue.edu/databases/default.asp GTAP data on energy is based on country energy balances provided by the IEA for 129 countries. These data are adjusted in order to accommodate missing data, and are recalibrated in order to achieve domestic and global flow consistency. The adjustments are integrated in a data set referred to as GTAP-E which is incorporated within GTAP. GTAP data on CO2 compiles carbon emissions from fossil fuel combustion by user or sector for all countries covered in the GTAP database. The combustion-based CO2 emissions are calculated from the GTAP energy volume data ensuring an internal consistency in terms of classification of uses, as well as consistency between values and volumes. In addition, available local databases provided by national statistical offices, ministries etc. should be consulted, and regular and systematic collection of data at the national level should be encouraged.

Emphasizing the importance of environmental and resource efficiency of production and consumption for the development of green growth policies, the OECD (2011b) proposes a set of indicators to evaluate potentials and monitor progress in this area. Besides indicators depicting the socioeconomic context and characteristics of growth, and those measuring environmental and resource productivity, indicators assessing the economic opportunities and possible policy

Setting targets for and measuring the share of environmental goods and services (EGS) B14

Currently, there is no established international standard for what constitutes EGS. The manufacturing perspective on green industries has already been discussed in chapter 1 (Box 1). The international debate, however, is much more influenced by discussions in the field of trade. Indeed, greening our economies may justify preferential treatment or the trade liberalization of EGS, which will accelerate the trade in these goods and services to benefit the environment and preserve ecosystems .

Different lists have been collated for EGS, based on different approaches. When setting indicators and formulating targets, it is therefore important to know what the numbers reported for a country are based on. This is particularly the case if indicators are intended as a benchmark for other countries, or where exports and imports of EGS play an influential role in the economy, or will do so in the future.



Source: UNESCWA, 2010, p. 19.

At WTO discussions, manufactured goods and chemicals used directly in the provision of environmental services are the main EGS (Class A). The other category (Class B) is environmentally preferable goods (EPP). For a more detailed breakdown of lists, see Sugathan (2013). As UNCTAD is also involved in these discussions, and as they are also within the remit of UNEP, the status of EGS is bound to evolve.

This somewhat unsatisfactory status quo should not prevent countries from developing capabilities to extract the shares of EGS from their production and employment statistics. This will not only be useful for reporting purposes, but may help to identify new opportunities for benefiting from participation in a greener world economy, and designing strategies so that EGS can penetrate markets.

The United Kingdom Government's Department for Business, Innovation and Skills (BIS) (2013) gives a practical example, where the explicit purpose is to create an ongoing analytical baseline for the UK regarding the Low Carbon Environmental Goods and Services (LCEGS) sector and its performance.

responses are valuable in the context of developing strategies on green industrial policies. Indicators can measure research expenditures in technology development and innovation (renewable energies, environmental technologies etc.), as well as the production of environmental goods and services (EGS). Examples of indicators are gross value added in the EGS sector as a percentage of GDP or employment in the EGS sector (as a percentage of total employment).

International financial flows such as official development assistance, carbon market financing and FDI, whose purpose is to strengthen green industrial development, could be quantified and monitored using these indicators. Finally, prices and financial transfers into green industry, quantified by indicators such as the level of environmentally related tax revenues, as well as energy and water pricing, would provide the right information to manufacturers regarding green growth and to consumers regarding greener consumption patterns.

The Supplement to this Practitioner's Guide provides further information on the collection and calculation of indicators recommended for SGIP at different levels (national/regional, sector, and industrial establishment/product).

4.5 Phase 4: Policy domains and policy instruments

As outlined at Chapter 3, your SGIP development will require the identification of policy domains to target, utilizing a range of policy tools and measures (Phase Four). Phase 5 requires the design of policy paths that will operationalize the shortlisted policy domains and policy instruments, as well as an assessment of their potential impacts. However, we shall only focus on Phase 4 below. Elements of Phase 5 (such as Multiple Criteria Decision Analysis used to assess the impact of proposed policy domains and instruments) are addressed in the Supplement.

4.5.1 Background: Stages of industrialization & their influence on the selection of policy mix

Countries around the world are at differing stages of industrialization (broadly categorized as 'early', 'middle' and 'late'). 'Early' stage industrialization refers to countries that are seeking to transition low skilled workers out of agriculture into relatively labour intensive activities using relatively simple technologies. 'Middle' stage industrialization sees the industrialization process decline in relative roles of labour-intensive and resource-based manufactures, and a shift into medium technology activities or into the labour-intensive segments of relatively high technology goods. Lastly, late stage industrialization is principally about supporting the development of activities using frontier technologies and education-and science-based infrastructure and the creation of new technologies (Weiss, J & UNIDO, 2015). Hence, different policy mixes will be selected based on their compatibility with a country's stage of industrialization, as well as its developmental, ecological, economic and social priorities.

Factors to consider before selecting a policy domain, policy instrument/mix of policy instruments

4.5.2

A particular type of policy instrument, or mix of instruments, may appear appropriate on paper, however, policymakers should be aware that this may not always translate well into public acceptance, and to be prepared with a number of options in order to address this possibility. For example, a particular instrument may provide the best results consistent with the objectives of a SGIP, however it may face resistance from the public or business due to a number of reasons, such as perceived high costs to implement, and ultimately lead to resistance. The policy pathway design and impact assessment (Phase 5) and stakeholder consultation processes, should help to illuminate any issues.

The government should be realistic in terms of options that it can develop and then implement and, if necessary, enforce. The overwhelming size of the informal sector in some economies is a reflection of some countries' lack of ability to enforce their policies. Therefore, prior to deciding on any mix of instruments, it is necessary to appraise the 'on-the-ground' constraints to these areas to understand the issues that the SGIP will be facing and what pitfalls to avoid.

Some useful principles that can help to guide your choice of policy mix include choosing instruments which are:

- Able to deal with uncertainty
- Based on best practice
- Provide an economic incentive to enhance compliance
- Based on rigorous cost-benefit analysis & which
- Stimulate investment in innovative technologies

Furthermore, consistency in policies in areas that impact on SGIP will need to be addressed to ensure that all relevant areas are non-contradictory in their approach. This may require governments to update outdated and inconsistent policies, legislation or regulations in order to address any inconsistencies or contradictions. Improved regulations may lead to the formalization of more informal sector enterprises, thereby opening new channels for these enterprises to become competitive players in a modern and greener economy.

A number of countries lack strong monitoring, compliance and enforcement regimes, which is often due to a lack of resources. Hence, the entities that are identified as being the body/bodies responsible for monitoring, compliance and enforcement must have the requisite technical and financial means in order to carry out their duties in an effective manner. Additionally, they need to be sufficiently independent and equipped to resist political pressure and corruption (UNIDO, 2011). Therefore, government and business capacity should factor into the decision-making process when considering a range of policy instruments.

4.5.3 Policy domains

For this discussion of policy domains we are attempting to rely on and contribute to an analytical framework-UNIDO's Taxonomy of Industrial Policy, by John Weiss - which is useful for a practical discussion on the application of industrial policy across countries at different stages of industrial development. The taxonomy distinguishes between five areas or policy domains (namely product, labour, capital, land and technology markets). These policy domains often cannot be targeted in isolation rather there is a great amount of synergy and cross-over between them. It should be emphasized that not all measures and policy domains will be relevant for every country, nor is the list below at Table 2 exhaustive. Again, the choice of domain and instrument/measure employed will be based on each country's respective idiosyncratic needs and level of industrialization and development goals.

At Table 2 we highlight the policy domains/market failure being addressed, highlighting alongside them a range of tools that can be employed to attempt to address each policy domain/market failure.

T2 Policy domains/market failure being addressed and a number of policy tools that can be employed

Policy domain/market failure addressed	Intervention tools/measures/instrument
Product	Import tariffs, export subsidies; subsidy reforms; tax credits, investment/FDI incentives; green procurement policy; export market information/trade fairs; linkage programmes; FDI country marketing; investment promotion agencies.
Labour	Wage tax credits/subsidies; training grants; training institutes; skills councils.
Capital	Direct credit; interest rate subsidies; loan guarantees; development bank lending; finance targeting infrastructure improvements.
Land	Subsidized rental; EPZs/SEZs; factory shells; infrastructure; legislative change; incubator programmes.
Technology	Technology transfer support; technology extension programmes.

Categories of policy instruments 4.5.4

SGIP offers a range of instruments to achieve transformational change. Such change is not always voluntary, and will therefore need to be triggered using policy instruments. These instruments are constantly evolving: countries adapt and refine them according to their backgrounds, learn lessons in the process and manage interactions between instruments.

Regulation, provided it is strictly enforced, has a strong steering impulse; the steering impulse of voluntary/informational instruments is soft; and market-based instruments lie somewhere in between. Their steering impulse depends on the scale of market manipulation and on the responsiveness (i.e. elasticity) of supply and demand curves. Innovative green industry policy instruments have mainly evolved in the category of market-based instruments.

In practice, the boundaries between instrument categories are not always clearly defined, and instruments may have the features of more than one category. For example, governments may mandate emission quotas, but introduce tradable permits to enhance efficiency, and voluntary standards may be part of the gradual introduction of regulation with increasing degrees of compulsion over time. Furthermore, governments will employ instruments not only from one category, but with a coordinated mix of several instrument types. The specific design will depend on the environmental issue to be addressed and on country circumstances.

Below at B15 we provide examples of each of the broad categories of instruments that can be used to implement your country's SGIP. At Table 3 we discuss some practical consideration to be made with these kinds of instruments.

Examples of regulatory, economic and voluntary instruments for SGIP B15

1. **Regulatory instruments** ('mandating') encompass instruments related to norms and standards, environmental liability, control and enforcement.

Example: Disposal and recycling of waste electrical and electronic equipment (WEEE) in China:

China is the world's leading nation in terms of the volumes of e-waste collection, recycling and reuse in the supply chain. Several environmental laws contribute to the regulation of the national electronics industry, such as the Clean Production Promotion Law which encourages eco-design and a life-cycle approach and the Solid Waste Pollution Control Law that addresses reduction, recycling and reuse. In 2011, China approved legislation which regulates the disposal and recycling of waste electrical and electronic equipment. It includes several requirements for producers and importers, such as new label and management requirements and penalties for illegal WEEE-related activities. Furthermore, producers are required to contribute to a fund designed to compensate the costs of WEEE disposal and recycling. These measures aim to reduce the negative environmental impacts from the informal and inefficient character of the existing e-waste system and have started to influence the production standards of the Chinese electronics industry (see State Council, 2009).

B15 Examples of regulatory, economic and voluntary instruments for SGIP (cont'd)

2. **Economic instruments** include those which influence environmental impacts by changing the costs and benefits of different options for the economic actors, such as ecological taxes, duties, or fees (including on GHG emissions, energy, transport, pollution and resources), subsidies or tradable permits. Reducing negative environmental impacts may, then, become financially more attractive.

Example: Natural gravel tax in Sweden

Fiscal instruments such as material taxes can be an important tool in providing economic incentives to increase resource efficiency (Behrens and others, 2005). Naturally, these have to be designed carefully in order to each the desired effect and so they do not to lead to undesired resource substitutions. Emissions into the atmosphere should ideally be charged at the same level in all countries because they are not confined to specific location or country. The proceeds from such taxes can be used to cross-subsidize the damage mitigation required as a result of environmental impacts.

Material taxes have been introduced in various countries, for example in Sweden, Latvia, the United Kingdom (UK) and Estonia for the extraction of sand and gravel. They are charged per weight or volume of the extracted material. Sweden adopted a law imposing a tax on the extraction/sale of natural gravel in 1996. In 2013 it generated SEK 146 million (approximately USD 22 million). In 2014, the Swedish Government increased the gravel tax from 13 SEK to 15 SEK per ton.

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3. **Voluntary and informational instruments-The Indian Green Building Council Green New Buildings Rating System**

Non-governmental participation is a pertinent example of non-regulatory options to support a green industry. Action on green industry is not the exclusive domain of governments. Industry groups and civil society have also been active partners in the push towards a green economy. Of course, voluntary and informational instruments are not exclusively the domain of industry, but nevertheless it is a notable contrast to the traditional "command and control" options of regulation. In some instances, these kind of instruments can offer more ambitious goals than regulation and, at the same time, require less administrative costs.

There are a range of voluntary and informational instruments that can be employed by both governments, business and civil society to inter alia raise awareness about sustainability issues; incentivize more sustainable behavior and stimulate sustainable product and business development. The Indian Green Building Council Green New Buildings Rating System is an example of this. The Indian Green Building Council introduced the measurable ratings programme tool to aid and incentivize property developers to apply green concepts and to reduce negative environmental impacts beyond those that are prescribed by law. Different levels of green building certification are awarded based on the credits earned. Certification levels range from "good practice" all the way up to "national excellence" to "global leadership."

Environment Management Systems (EMS')

Environment Management Systems are another example of voluntary measures that can be used by both government and business to achieve improved environmental outcomes and help companies to comply with environmental regulations, amongst others. EMS' are a type of management system which allows for external assessments against a common standard. In terms of environmental management and energy use, the ISO14000 and ISO50001 have been developed as standards that have become important management tools for manufacturing enterprises to green their existing industrial processes. Benefits of the standards include enhancing buyer-supplier relationships and improving industrial competitiveness. They can be stand-alone activities, or included in a package of programmes for subsectors or SMEs. Other business-level tools such as cleaner production or the leasing of chemicals, also fall into this category. They are, ideally, combined with other measures to form more powerful packages for greening industry.

Categories of policy instruments and associated implementation issues

T3

implementation issue	Using the market			Cap and trade	Mandating	Voluntary/ informational instruments
	Taxes/charges	Deposit-refund schemes	Subsidies			
Policy management capabilities	Political aspects of monitoring and enforcement need attention; corruption complicates market-based policies. Subsidies may be subject to lobbying, information on their appropriate level may be obtained by competitive processes, for instance, public tendering of renewable energy feed-in tariffs. "Sunset clauses" should be introduced and communicated from the beginning.			Possible if number of polluters is sufficient and pollution sources can be monitored, but requires relatively high technical capacity. Mandating may be preferable if technical capacity to manage the market is lacking.	Regulation is useful if compliance is observable, the number of regulated agents is small and enforcement can be safeguarded. Requires less technical capacity than many market-based instruments, such as cap and trade systems.	Voluntary/informational instruments are natural starting points for information disclosure.
Small number of polluters	Smaller numbers of actors can coordinate more easily and thus exert pressure to achieve favourable design for market-based instruments.			Risk of price manipulation when the number of market participants is too small.	Can be the most effective solution when the number of polluters is small. Risk of non-compliance if regulated entities are powerful.	May be suitable.
Rent-seeking	Engender opposition.	May be suitable.	May trigger rent-seeking and related wasteful activities, need "sunset clauses".	May be used as an entry barrier, polluters will lobby for free allocation of permits.	Individual negotiation entails risks.	Low risk of rent-seeking.
Inflation	Inflation complicates price-based policies.			Unaffected by inflation.		
Distribution/ poverty	Regressive effects of taxes can be mitigated by revenue use. Charges may be politically more palatable.	May provide people living in poverty with income opportunities.	Distributional effects depend on who receives and who pays for the subsidies.	Tradable permits are popular with polluters if allocated freely ("grandfathering"), but can lead to price changes (e.g. energy prices).	Can have indirect effects on distribution when costs are passed on to the consumer.	Unlikely to have negative distributive effects.
Competitiveness in a small, open economy	Global coordination or compensation of taxpayer needed if global competition is strong.	May be suitable.	Compatibility with trade rules needs to be considered.	Trading instruments may fit into framework of international treaties.	Global coordination or compensation needed if global competition is strong, but may also open up new export markets, e.g. organic food.	Can be used as a signal to environmentally conscious export markets when their standards are adhered to.

Observations: "Cap and trade" ... emissions trading where a maximum (cap) of emissions is set for specific pollutants and manufacturers are required to hold a number of (tradable) permits (from a limited total) that is equivalent to their emissions; "grandfathering" ... allowing some activities or former rights to continue even though not allowed under present conditions, for example, allocating of emission rights to manufacturers without charge (in relation to past emissions); "sunset clause" ...

Source: Adapted from Sterner and Coria, 2012, pp. 256-257.

4.4.6 Communicating the SGIP

B16 Key elements of a successful communications strategy

1. **Find a simple way to tell the story by**
   - limiting the amount of information conveyed to the most relevant aspects
   - making numbers accessible by rounding and avoiding ranges
2. **Find an attractive way to tell the story by**
   - creating a positive message on the transformational benefits
   - illustrating by examples, stories and pictures
   - helping the target audience relate to the story personally
   - creating an emotional connection between the target audience and the issue at hand
3. **Shape the message according to the target audience.**
4. **Repeat the message and use multiple channels.**
5. **In the case of trade-offs, craft and communicate a policy package that helps those who are seen to lose out in the process.**

Based on Maxwell (2014) and African Development Bank (AfDB) and others (2013).

The sections above have stressed that creating societal support and forging actor coalitions is one success element of green industrial policies. The way in which a transformation strategy towards green industry is communicated plays a crucial role in this context. The important elements of the communication strategy are listed in the box above.

The economic and environmental evidence on which SGIPs should be based is often difficult to understand, even for scientific experts. This complexity needs to be broken down to a degree that is palatable to a wider public so that societal support for a green transformation is generated. Scientific experts certainly have a role to play here in terms of ensuring the accuracy and validity of the evidence. Communication experts can also play an important role by developing clear messages, for instance, by limiting the amount of information conveyed. Science shows that human capacity to process information is limited. This is why governments also need to highlight the most significant aspects of the issue. Secondly, where numbers are involved, they should be made intelligible to the average citizen.

Making the message intelligible, however, is not enough. To generate support, the message should be attractive. A positive message is more attractive than a negative one, and in the case of green transition it can focus on several elements, such as the fostering of economic growth and innovation. Additional benefits to be highlighted include: improved air quality, less traffic congestion and enhanced energy access through renewable energy. The message should always emphasize that green transition will serve to avoid natural disasters, thus saving lives and investments.

In addition to the content of the message, form matters. Messages become more tangible when illustrated by examples, stories or pictures. People are more likely to support a policy or take action themselves when they can personally relate to the project of transition. Tools accessible to a wider public, such as online carbon footprint calculators, can be a way to personalize an otherwise anonymous challenge such as decarbonization.

Finally, messages are more powerful when they create an emotional connection between the issue at hand and the audience. The emotion may be negative, such as evoked by the story of a child dying in an extreme weather event, but should leave the audience with a feeling of empowerment, not powerlessness."Martin Luther King didn't stir people to action by proclaiming, 'I have a nightmare!'." (Giddens, 2009, p. 12). All these elements combined with a sense of individual empowerment can create a vision of a future which is both desirable and achievable.

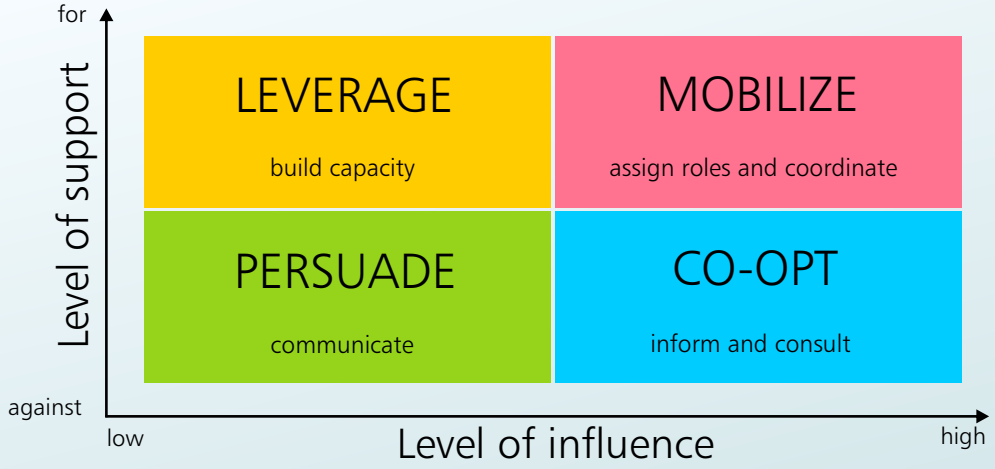
For illustration, two examples of empowering messages:

"*Given their superior resource performance, it seems likely that investments in circular businesses will be systematically rewarded over the 'take-make-dispose' ones.*"

"*...we now possess the information technology that will allow us to shift [to the circular economy]. We can trace material through the supply chain ..., identify products and material fractions (using the breathtaking computing power of modern sorting technology), and track the product status and costs during its use period (as already practiced by some car manufacturers).*"

Objectives of communication and different audiences

F14



Source: DFID and others, 2006, p. 40

Helping the audience connect to the message may require different messages for different audiences. Understanding the intrinsic values, beliefs and motivations of the target groups can help to establish content and form. Once the target groups and messages are identified, the messages need to be repeatedly delivered through multiple channels in order not to be obscured by the plethora of news and advertising messages omnipresent in our daily lives.

Audiences can also be differentiated according to the levels of influence they have and the level of support they give to SGIP. The graph above (F14) juxtaposes

different types of audiences according to the criteria highlighted and specifies the purpose of, and the respective forms communication may take for different groups. Communication strategies need to take account of such differences and tailor both messages and tools of communication accordingly.

Finally, where economic transitions take place, there are bound to be those who lose out. In order to prevent them from becoming veto players, but also to ensure the transition remains a socially fair exercise, it may be necessary to assist behaviour. Such compensation schemes need to also be clearly communicated in order to mitigate any opposition. Social programmes to compensate industry/individuals not benefiting from fossil fuel subsidy reform would be an example, as are lifeline tariffs for people living in poverty when electricity prices include a premium for renewable energy. If questions of those who benefit and those who do not are not considered, and respective communication strategies do not address them, transitional policies are more likely to fall victim to lobbying, populism or public protest.

5.0 CONCLUSION

The nature of SGIP is bound to be eclectic. This is natural in times of change where emerging new concepts are still in the process of acquiring shape, and where awareness in the general public needs to be raised to greater levels.

This Practitioner's Guide and its Supplement have highlighted a number of options so that important new industrial policymaking pathways can be developed with the urgency required.

The shape of SGIP will differ from country to country, and, in fact, may require differentiated approaches for different regions and sub-national governments. Local circular economic development will gain increasing importance. Moreover, there is significant potential for cross-border cooperation between neighbouring countries in developing SGIP.

GLOSSARY

Decoupling:

Breaking the link between economic growth and concomitant growth of environmental degradation and/or resource use.

Circular economy:

A circular economy is an economic (industrial) system that is restorative by intention and design. It minimizes material use and waste generation, recycles or remanufactures any unavoidable waste, and any remaining waste is treated in a manner least harmful to the environment and human health, or even in a way which generates new value such as energy recovered from waste.

Environmentally sound technology:

Technologies that have the potential for significantly improved environmental performance relative to other technologies. They protect the environment, are less polluting, use resources in a sustainable manner, recycle more of their wastes and products, and handle all residual wastes in a more environmentally acceptable way than the technologies for which they are substitutes.

Green economy:

A green economy is one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. (UNEP 2011a.)

Green jobs:

In green industries, all the employment in the sector contributes to environmental sustainability. In non-green sectors, there are workers in green occupations, responsible for monitoring and limiting negative environmental impacts. Examples are operators of waste water treatment plants in pulp mills, or logistics and facilities managers reducing energy consumption of transport fleets and buildings. Both the employees of green industries and those in green occupations directly reduce environmental impacts. These are therefore considered green jobs. (ILO 2013.)

Eco-innovation:

The introduction of any new or significantly improved product (good or service) and process, and organizational changes or marketing solutions that reduce the use of natural resources (including materials, energy, water and land) and decrease the release of harmful substances across the life cycle.

Industrial ecology:

An approach to the design of manufacturing processes and products that explicitly considers environmental interaction in the assessment of competitiveness.

Industrial policy (modern definition):

Any type of intervention or government policy that attempts to improve the business environment, or to alter the structure of economic activity toward sectors, technologies or tasks that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention.

Industrial symbiosis:

Engages industries that are traditionally separated in a collective approach that aims to advance competitive advantage, e.g. by involving the physical exchanges of materials, energy, water and/ or by-products. The keys to industrial symbiosis are collaboration and the synergistic possibilities offered by geographic proximity.

Mandating:

Using regulatory instruments to specify the use of uniform technologies or prescribe performance standards.

Market-based mechanisms:

Influencing elements of the market (price or quantity) to encourage a specific behaviour in market actors.

Voluntary and informational instruments:

Voluntary and informational instruments include a wide range of incentives for specific target groups that are focused on learning effects and the stimulation of sustainable product and business development. These can lead to further regulation

Resource productivity:

Resource productivity is equal to GDP divided by domestic material consumption (DMC).

Strategic green industrial policy (SGIP):

A green industrial policy is one that is meant to trigger and facilitate structural changes that are required to respond to environmental conditions or situations and to the development of a green, circular economy. It is strategic because it implies a conscious choice of new industrial development paths.

Systems approach, systems thinking:

Describes an approach or a way of thinking that is rooted in general systems theory. In this approach, systems are made up of elements that interact with each other to form a structure which produces a characteristic set of behaviours. This approach allows for the assessment of feedback effects, which is not possible with prevalent approaches that are rooted in mechanics, and enables us to better deal with the dynamic complexity we are confronted with in developing SGIP.

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