DECOUPLING 2

Technologies, opportunities and policy options

Current patterns of resource use are leading to soaring resource prices, increased price volatility, entrenched resource scarcity and the disruption of environmental systems:

- Since 2000, metal prices have risen by 176 per cent, rubber by 350 per cent, and energy by an average of 260 per cent.
- Volatile food prices increased by 22.4 per cent from 2000 to 2012 compared to 7.7 per cent from 1990 to 1999. Some predictions point to a potential rise of global food prices of 120-180 per cent by 2030.
- A shortage of some of the world's key metals may be felt within the next 50 years, potentially affecting many industries; and world phosphorus production appears likely to peak within a relatively short time frame with limited alternatives available to the use of phosphate as a fertilizer.
- Approximately 60 per cent of the ecosystem services that support life on Earth have been seriously degraded as a result of overexploitation and unsustainable use of natural resources.
- Unstainable use of natural resources and associated environmental impacts are exerting direct and adverse effects on people, particularly the poor, through, e.g., damage to health, water shortages and contamination, air pollution and loss of fish stocks.

But there are alternatives to these scary patterns. Many decoupling technologies and techniques that deliver 5- to 10-fold improvements in resource productivity are already available, allowing countries to pursue their development strategies while significantly reducing resource use and negative environmental impacts.

This report shows that much of the policy design "know-how" needed to achieve decoupling is present in terms of legislation, incentive systems, and institutional reform. Many countries have tried them out with tangible results, encouraging others to study and, where appropriate, replicate and scale up such practices and successes.

Addressing current resource use trends through decoupling and increased resource productivity

Current trends in global consumption of natural resources and in the deterioration of environmental systems are pointing to the need to **decouple economic growth from escalating resource use. Decoupling must be pursued to ensure sustained economic growth and equitable social progress**.

Decoupling is increasingly important to make economies and businesses more competitive. Many resource-efficient technologies and techniques **are commercially available and widely used in developing and developed economies**. They allow economic output to be achieved with fewer resource inputs so reducing waste, savings costs and mitigating risks of resource scarcity and price volatility:

- The technical potential to reduce energy demand through improved efficiency is **in the order of 50-80 per cent** for most production and utility systems.
- Solar thermal cookers have achieved five-fold efficiency improvements, making it possible and cost-effective to cook food by sunlight instead of biomass and fossil fuels.
- **60-80 per cent improvements in energy and water efficiency are technically possible and commercially viable** in sectors such as construction, agriculture, hospitality, industry and transport.
- By adopting decoupling technologies, **developing countries could cut the increase in annual energy demand by more than half** over the next 12 years while realizing their development goals.
- Advanced furnace technology with co-generation could achieve up to a **40 per cent reduction in energy intensity for** zinc, tin, copper, and lead smelting and processing.
- Use of higher-strength steel achieves a **32 per cent reduction** in the weight of steel columns and a **19 per cent reduction in beams.**

- Farmers in India, Israel, Jordan, Spain and the USA have shown that in sub-surface drip irrigation systems, directly watering crop roots **can reduce water use by 30-70 per cent** and raise crop **yields by 20-90 per cent.**

- Decoupling technologies give an opportunity for **resource savings of US$2.9 to $3.7 trillion each year until 2030**.

Intentional decoupling: benefiting from the opportunities of increased resource productivity

There are three different types of decoupling:

1. **Decoupling through maturation**
   This type of decoupling refers to a "natural" process of overcoming clumsy and inefficient techniques, building up infrastructure and reducing environmental pollution. This is a maturation process as countries shift from extraction-and-production-based economies towards service economies.

2. **Decoupling through shifting the material-intensive stages of development to other countries**
   If the extraction and production of resources in a country is replaced by imports of materials and products, resource use may decline domestically but still occur elsewhere in the world where more material-intensive, and often more polluting, stages of the product's life cycle may be taking place. This type of decoupling is often labelled as burden-shifting, where resource-intensive activities and associated environmental impacts are relocated offshore.

3. **Decoupling through intentional resource productivity increase**
   Genuine decoupling is one that is designed and adopted as a new paradigm shift in development paths. It requires technological and institutional innovations, resource-efficient infrastructure, low-material-intensity manufacturing, public awareness, and appropriate attitudes and behaviours for more sustainable consumption patterns.

Decoupling that is specifically designed to increase resource productivity is the focus of this report.

What holds back the deployment of decoupling technologies and policies?

A well-functioning economy is supposed to adjust to changes in resource availability by directing investments to those economic activities that bring patterns of resource use in line with society's goals (e.g., through innovation in resource productivity). In practice, we see that few economies can naturally work in this way and **many economies suffer from blocks that "lock-in" existing patterns of resource use**. These obstacles to decoupling can be categorized as arising from:

- the **legacy of past policy decisions** (including those made before information on resource trends was available); and

- technological, behavioural, organizational and institutional **biases against innovation** in resource productivity.

Facilitating decoupling and removing the "lock-in"

Facilitating decoupling **will involve removing these obstacles and** creating the conditions that enable investments in resource productivity to become widespread. **Developing countries may have a relative advantage in this aspect** because they are not so strongly locked in by resource-intensive consumption and productions patterns, infrastructure and institutions.

A wealth of experience exists across the world in policymaking to intentionally facilitate the decoupling of resource use, or impacts of resource use, from economic growth. Some demonstrates **that absolute decoupling of economic growth from resource use is possible**.

The chances of success appear higher where policymakers look at the institutional framework in which the political decision is made. This means **being aware of the set of actors** who are able to influence the decision, their interests, relative power and the norms and assumptions that are shaping the decision.

Leadership will be needed to break out of resistance to policy changes. Leaders within the public and private sectors can draw on past experiences with policy for guidance on how to take forward decoupling.

Considerations for policies aimed at promoting decoupling and resource productivity increase

There are forms of policy available to promote decoupling that combine several of these considerations. This report mentions two that illustrate the policy mix needed:

One proposal uses **taxation or subsidy reduction to move resource prices upwards in line with documented increases in resource productivity**. Another looks to shift revenue-raising onto resource prices through **taxation of resources or in relation to product imports, with recycling of revenues back to the economy**.

Putting decoupling into practice: linking resource price rises to resource productivity gains

Economic instruments to push technologies and markets towards higher resource productivity typically run into one difficulty: if price signals are strong, industries may just give up or emigrate, and consumers tend to contest the government imposing painful pricing measures; but if price signals are weak, there is a high likelihood of effects remaining insignificant.

A potential way out is **a price signal that steadily increases at the pace of decoupling successes**.

A policy option could be the use of a taxation or subsidy reduction to **move the price of a chosen resource upwards in line with documented increases of energy or resource productivity** creating a "corridor" within which prices could fluctuate a little. Interventions would only be made when such fluctuations would leave the corridor, **creating predictability** for investors as well as for manufacturers and consumers.

The International Resource Panel was established in 2007 to provide independent, coherent and authoritative scientific assessments of the sustainable use of natural resources and the environmental impacts of resource use over the full life cycle.

By providing up-to-date information and the best science available, the International Resource Panel contributes to a better understanding of how to decouple human development and economic growth from environmental degradation. The information contained in the International Resource Panel's reports is intended to be policy-relevant and support policy framing, policy and programme planning, and enable evaluation and monitoring of policy effectiveness.

For more information, contact:

International Resource Panel Secretariat

UNEP DTIE

Sustainable Consumption and Production Branch

15, rue de Milan, 75441, Paris CEDEX 09, France

Tel: +33 1 4437 1450

Fax: +33 1 4437 1474

Email: resourcepanel@unep.org

www.unep.org/resourcepanel