Analysis of a target for Resource Productivity

The European Resource Efficiency Platform recommended in June 2013 that:

"Targets are essential for guiding action, for making sure that we are moving in the right direction, while indicators are needed to measure progress. The EU should set ambitious, credible targets as soon as possible to improve the overall resource productivity of the EU economy, with a view to achieving the EU 2020 objective of overall decoupling of resource use and its environmental impacts from economic growth. Indicators to measure progress towards these targets should, in addition to carbon, include three key resources: materials (material productivity, as measured by GDP/Raw Material Consumption), water and land. This approach will be further refined and accompanied by the Platform with a view to being integrated into the Europe 2020 Strategy and monitored in the European Semester process."

The Commission services have appraised the suitability of Resource Productivity, as measured by GDP/Raw Material Consumption to be used as an indicator for target setting, and to better understand:

- The trends observed in the past for Raw Material Consumption (RMC) in EU and in each Member State;
- The trends likely to be observed by 2030 if no extra effort is made (baseline);
- The impacts of various scenarios for improving Resource Productivity.

A) Past trends

Resource Productivity (measured as GDP/RMC) has increased over time at the rate of 1.9% per annum at EU level, showing a relative decoupling of GDP growth from RMC, with RMC growing less than GDP.

Figure 1 shows a steady increase of RMC between 2001 and 2007 with a total increase of 8%. This upward trend ended with the recession and total RMC dropped by 11% over the following few years. In 2010 total RMC began to increase again. Broadly speaking, RMC tends to increase during periods of economic growth but at a slower pace than GDP growth.

Figure 1: Evolution of GDP, RMC and Resource Productivity (RP) in the EU between 2001 and 2011
The trend is mainly driven by the evolution of RMC for non-metallic minerals (construction materials), which showed a significant increase of 19% between 2002 and 2007, followed by a strong decrease of 23% between 2008 and 2010 during the economic crisis. The RMC of biomass, metal ores and fossil energy resources remained relatively stable over this period.

Figure 2: Evolution of EU RMC (billions of tonnes RME) between 2001 and 2011

Table 1 shows the change in GDP, RMC and Resource Productivity over time. The trend rate of improvement for resource productivity is 1.9% per annum for the period 2001-11. During the period before the economic crisis the trend rate was lower at around 0.7% per annum, because of the high level of growth in the construction sector, resulting in a significant increase in use of low value non-metallic minerals. Looking at the period before the crisis, there was partial decoupling of RMC from economic growth: including the period of the crisis gives absolute decoupling over the fuller period. Using trend figures over a full business cycle is more relevant for use in predicting future trend rates.

Table 1: Composition changes for Resource Productivity, between 2001 and 2011

<table>
<thead>
<tr>
<th></th>
<th>Average annual change during period 2001-2011</th>
<th>Absolute change during period 2001-2011</th>
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<tbody>
<tr>
<td>RMC</td>
<td>-0.5%</td>
<td>-5%</td>
</tr>
<tr>
<td>GDP</td>
<td>1.3%</td>
<td>14%</td>
</tr>
<tr>
<td>Resource productivity (GDP/RMC)</td>
<td>1.9%</td>
<td>20%</td>
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B) Future trends

Projections of future trends (the baseline or business as usual scenario) suggest that Resource Productivity will continue to increase, but at a slower rate than in the past.

Crucial to any estimate of how resource consumption will evolve is the assumptions on GDP growth. GDP is forecast to increase by around 30% between 2014 and 2030. RMC is forecast to increase by around half that level, or by around 14% by 2030. This means that by 2030 the baseline projection is that Resource Productivity will have improved by around 15% (and by 7% by 2020) at a trend rate of 0.9% per annum.

To sum up, there will be relative decoupling in the future with Resource Productivity increasing more slowly than it did in the past (0.9 per cent per annum compared to 1.9 per
cent per annum since 2001). Resource Productivity will continue to improve because of a mixture of technological improvements and business efficiencies driven by rising resource prices.

C) Scenarios for Resource Productivity Targets

The baseline analysis shows that the rate of improvement for Resource Productivity will decline in the future. A target to drive policy could help to keep Resource Productivity improving at its current rate.

As the 7th Environment Action Programme¹ says "A long-term and predictable policy framework ... will help to stimulate the level of investments and action needed to fully develop markets for greener technologies and promote sustainable business solutions. Resource efficiency indicators and targets underpinned by robust data collection would provide the necessary guidance for public and private decision-makers in transforming the economy. Once agreed at Union level, such indicators and targets will become an integral part of the 7th EAP."

Figure 3 shows the projections up to 2030 based on past trends, and future projections for GDP from 2014 onwards (in turn based on projections for population growth and other factors).

- The **Business as Usual scenario**: improvement of Resource Productivity is forecast to be 15% between 2014 and 2030 (an improvement rate of just under 1% per annum), a slowdown from the current improvement rate.

- The **transition scenario**: If the same annual rate of increase as in the past was to be maintained in the future (around 2% per annum) then this would result in a 30% improvement in Resource Productivity by 2030.

- The **rapid acceleration scenario**: a faster rate of improvement than in the past: under this scenario it is an improvement rate of 2.5% per annum, which leads to a 40% improvement in Resource Productivity by 2030.

Figure 3: Historical trend and Projection of EU Resource Productivity (GDP/RMC) and possible scenarios of between 2001 and 2030.

D) Analysis of different Scenarios for Resource Productivity Targets

Bottom-up analysis provides confidence in the main message of the macroeconomic modelling that smart policies can deliver Resource Productivity improvements at a faster rate than business as usual would allow, and that this would deliver additional growth and jobs.

A wide range of studies have shown that resources make up a significant part of the cost base for business: for example, recent studies on the steel and aluminium sectors show that raw materials make up around 30 to 40 per cent of the sectors’ cost structures (not including energy costs)\(^2\). Rising prices for these resources mean that improved resource efficiency is needed to improve the competitiveness of EU firms. The EU is also not self-sufficient in many resources and imports six times more materials and resources than it exports.

Bottom-up analysis has shown a wide range of existing policies available that could help deliver a resource efficiency target in a way that would be economically and environmentally beneficial. A range of analysis and studies show this potential, for example:

- An analysis of bottom-up industry data and case studies found economic opportunities from improved resource efficiency that could deliver net benefits for industry in the range of between 3% and 8% of annual turnover.

- Programmes to support industry, and especially SMEs, such as knowledge transfer and industrial symbiosis, are a proven way to help businesses to use less resources and improve their profitability.

- Existing EU policy on waste management has already reduced material consumption by between 5 and 14 per cent. The proposals in the Circular Economy package, would deliver additional cuts in a way that produces financial savings, and create new business opportunities.

- The energy and climate package will lead to a decrease in consumption of fossil fuels. The additional investments will be largely compensated for by fuel savings.

The evidence from bottom-up analysis is that improving resource efficiency boosts growth and jobs. Macroeconomic analysis of the linkages between RMC and the economy and the environment is in line with the bottom-up analysis, also suggesting scope for improving resource efficiency in a way which boosts the economy. However, at a certain point, policies aiming to improve resource efficiency would stop being economically advantageous.

Figure 4 shows the impacts of different scenarios compared to the Business as Usual scenario (a 15% improvement in Resource Productivity by 2030, at an annual rate of improvement of 0.9% per annum). Relative to the Business as Usual scenario:

- **Slow Transition Scenario**: S2, which is not shown in Figure 3 above, (a 20% improvement in Resource Productivity by 2030, at an annual rate of improvement of 1% per annum) delivers an increase in GDP of 0.6% by 2030, and an additional 1.5

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\(^2\) "Assessment of cumulative cost impact for the steel and aluminium sectors" (2013), CEPS for DG Enterprise and Industry. This is a fairly consistent finding across industrial sectors, that resources (and their associated processing) is a dominant element of costs and often outweighs labour etc.
million jobs. This growth and jobs is delivered by focusing on low hanging fruits, where resource efficiency can be improved most easily.

- **Transition Scenario**: S3 (a 30% improvement in Resource Productivity by 2030, at an annual rate of improvement of 2% per annum) delivers an increase in GDP of 0.8% by 2030, and more than 2 million additional jobs. This additional growth and jobs is delivered by taking up more resource efficiency improvements than are found in S2, but with the additional improvements being less beneficial.

- **Rapid Acceleration Scenario**: S4 (a 40% improvement in Resource Productivity by 2030, at an annual rate of improvement of 2.5% per annum) delivers a decrease in GDP of 0.1% by 2030, although it still creates additional jobs. The reason why S4 is not positive for growth is that the scope for resource efficiency policies that are delivered at no net cost is exhausted, and instead each additional improvement comes at a cost to the economy.

These model runs are based on existing evidence about the scope for resource efficiency technical improvements at different costs, but it needs to be recognised that there is uncertainty over the unit costs of these improvements.

**Figure 4: EU GDP impacts, % difference from baseline**

Sensitivity analysis of increasing manufacturing in the EU suggests that such an increase will have only a marginal impact on resource use as measured by RMC. This may appear surprising, as manufacturing is considered to be resource intensive. One of the explicit reasons for using RMC and not DMC was however to account for resource use outside the EU, and capture some of the hidden resource use associated with services. Therefore a target on Resource Efficiency is consistent with meeting the goal set by the European Commission that industry's share of GDP should be around 20% by 2020.
E) Summary

Recent trends suggest that further progress on resource efficiency is possible and can bring economic benefits. Looking ahead, the Business as Usual scenario would result in an improvement of Resource Productivity of 15% between 2014 and 2030 (an improvement rate of under 1% per annum).

If the same annual rate of increase as in the past was to be kept in the future (around 2% per annum) as occurred over the last economic business cycle, then this transition scenario would result in a 30% improvement in Resource Productivity by 2030. Estimates suggest that maintaining the current rate of improvement could boost GDP by nearly 1%, and create over 2 million jobs, compared to the baseline. This would also help improve security of resource supply and bring environmental benefits such as reductions in greenhouse gas emissions.

The optimal policy mix of 'no regrets' actions would require a combination of EU and national policies. These policies should be designed to not just reduce the weight of resource use, but also ensure that reductions are economically and environmentally as advantageous as possible.