

Lavery/pennell

New Industrial Model

Supporting Calculations for the New Industrial Model Report

Contents

Interface Improvements

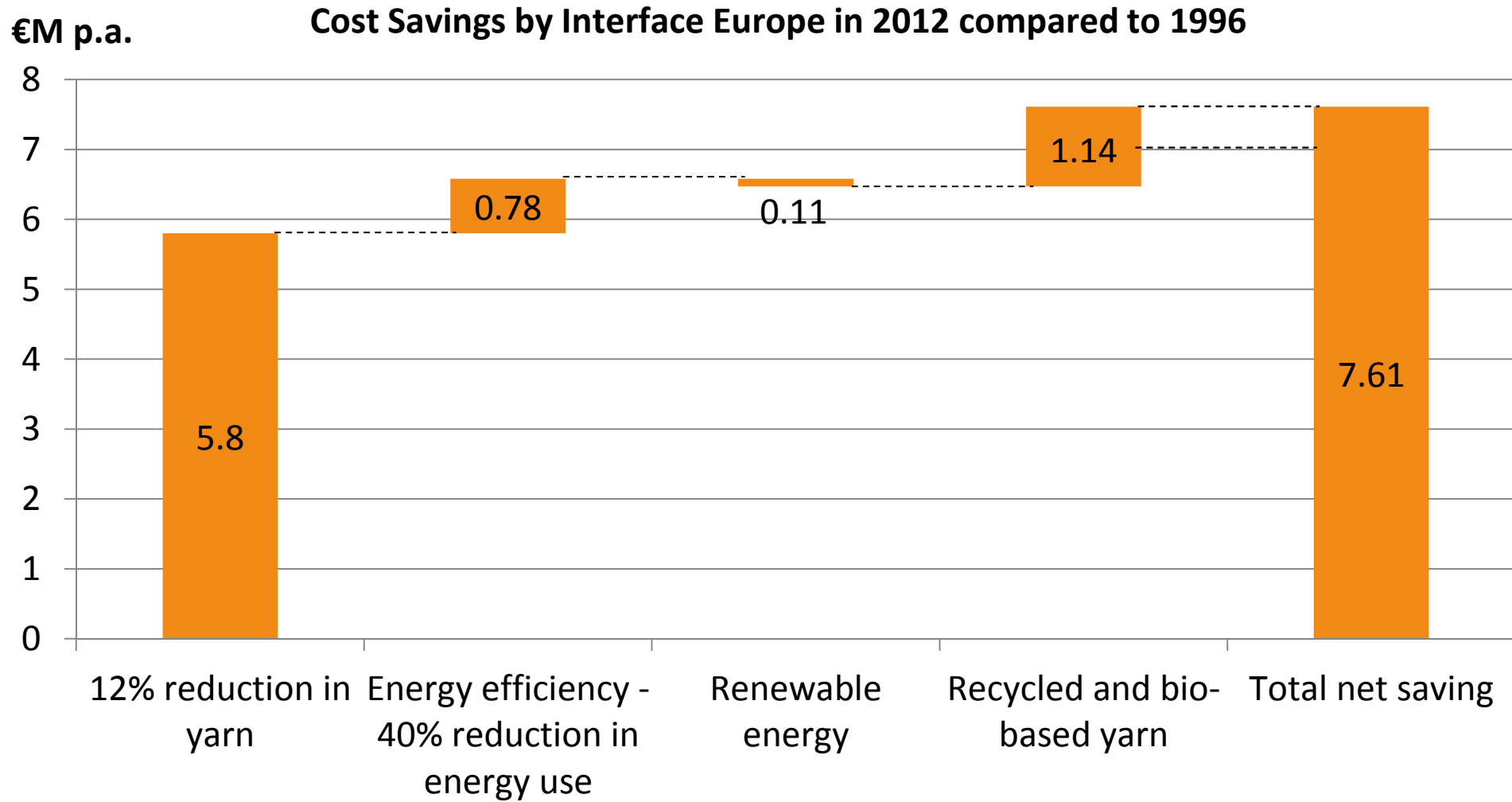
Potential for Europe

Potential for Top 20 European Manufacturers

Methodology for Interface Calculations

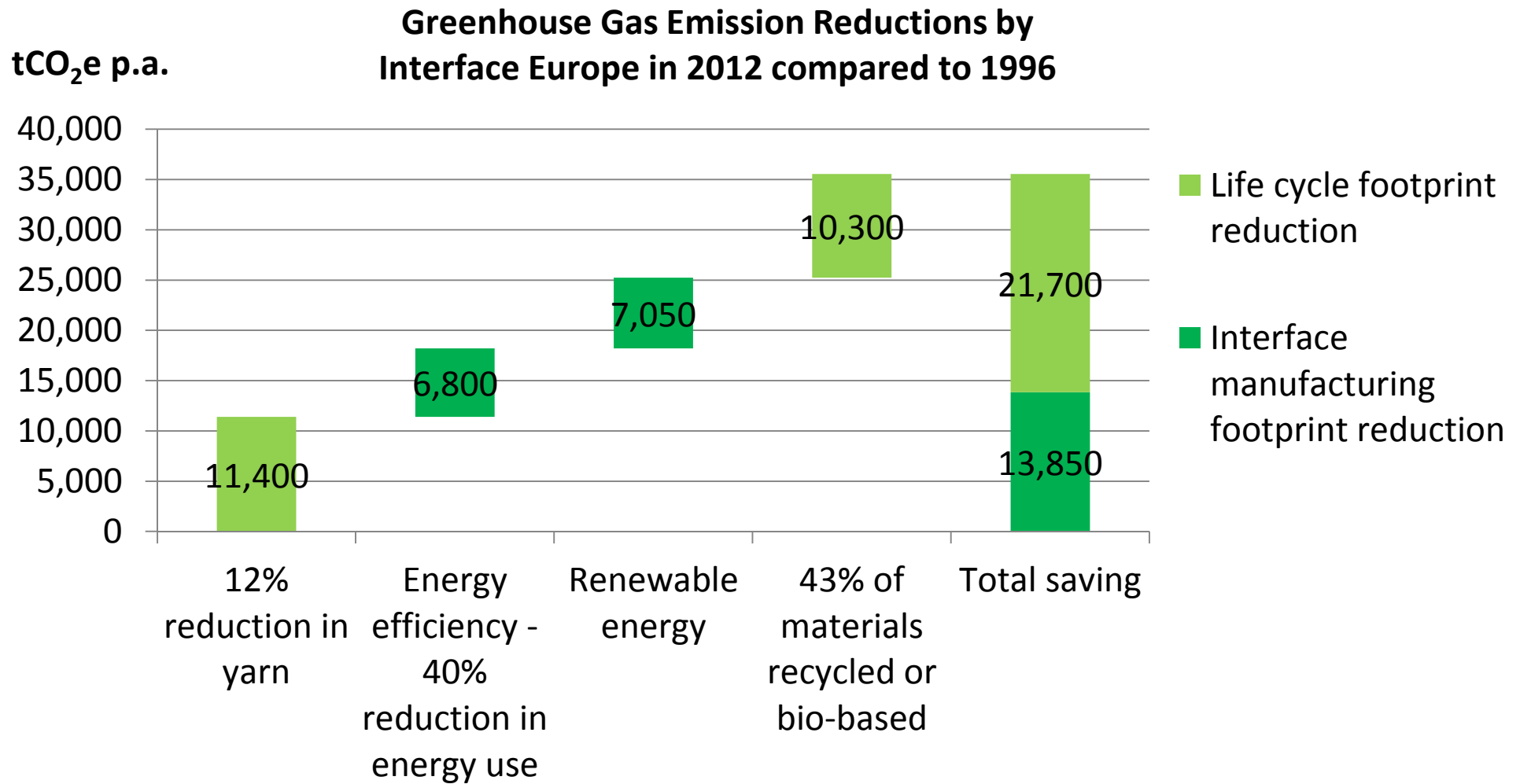
- European manufacturing operations examined
- Actual data used:
 - 2012 full year costs and quantities
 - Adjusted to include renewable energy contracted for 2014
 - 1996 quantities (for baseline and to normalise for changes in production volumes)
- Figures cross-checked against company total figures
- Renewable energy costs compared with industry figures

€7.6M annual cost savings were achieved in 2012 by Interface Europe using the New Industrial Model



Sources: Interface data; Lavery Pennell analysis

35,500 tCO₂e were also saved in 2012 compared to 1996

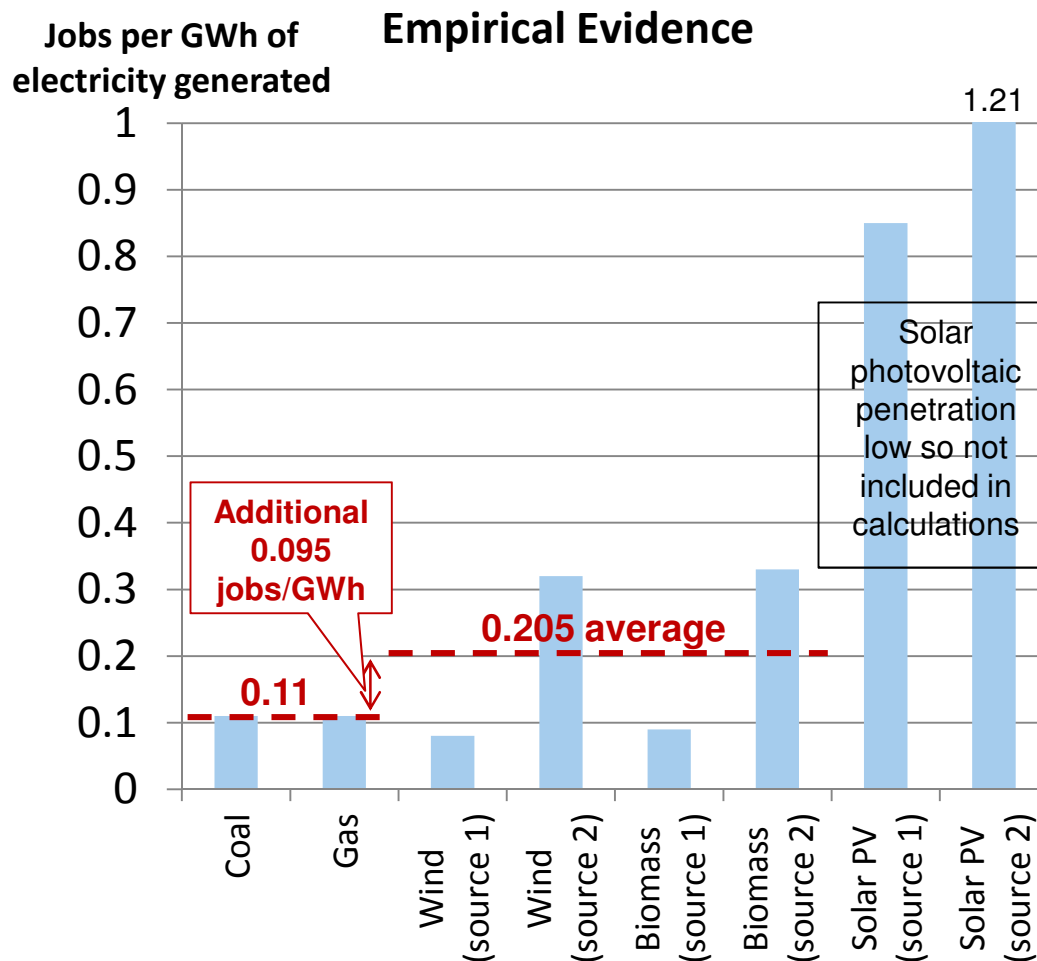


Sources: Interface data; Lavery Pennell analysis

3 jobs were created through Interface Europe’s switch to renewable energy

Approach

- Fossil fuel (coal and gas) employment rate of 0.11 jobs/GWh
– Also assumed to apply for nuclear
- Average figure for wind and biomass employment of 0.205 jobs/GWh
- Difference (i.e. uplift of 0.095 jobs/GWh) used in calculations
- E.g. for Interface, jobs = electricity use of 32.7GWh p.a. x 0.095 jobs/GWh = 3 jobs



Source: Kammen, D.M., Kapadia, K., Fripp, M., 2006. Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?, RAEI Report, University of California Berkeley. Available at <http://rael.berkeley.edu/sites/default/files/very-old-site/renewables.jobs.2006.pdf>

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Methodology for Europe Calculations

- World Bank statistics used
 - 2012 figures or most recent available used
 - Statistics used were GHG emissions, GDP, manufacturing GVA, energy use
- Energy spend of 1.9% of revenue found for the UK in the Next Manufacturing Revolution study* and used for all European countries
- Empirical evidence from around the world of savings achieved were researched
 - This included drawing on the resource efficiency data contained within the 2013 Next Manufacturing report* co-authored by the University of Cambridge's Institute for Manufacturing
- Renewable energy jobs calculated as done for Interface using uplift of 0.095 jobs/GWh

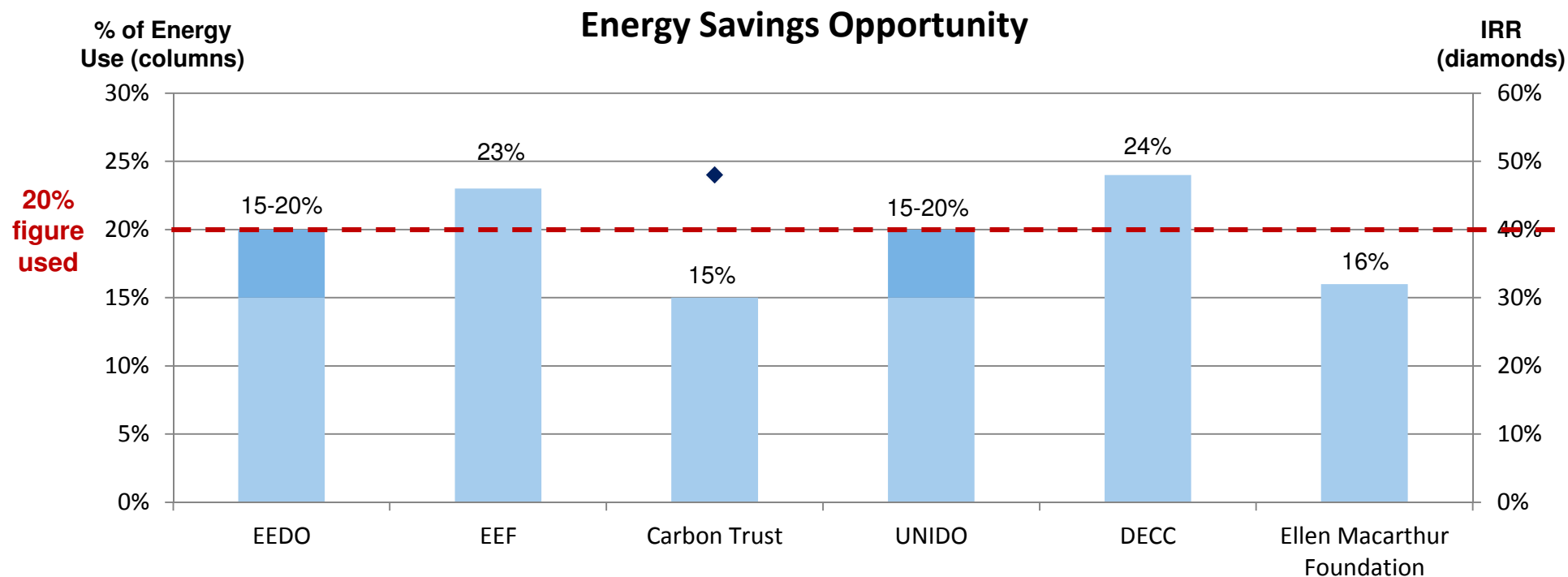
* Lavery, G., Pennell, N., Brown, S., Evans, S., 2013. The Next Manufacturing Revolution: Non-Labour Resource Productivity and its Potential for UK Manufacturing. Available at <http://www.nextmanufacturingrevolution.org/nmr-report-download/>

Europe was defined as the 51 countries in the continent

Countries Included in Europe Figures

Albania	France	Montenegro
Andorra	Georgia	Netherlands
Armenia	Germany	Norway
Austria	Greece	Poland
Azerbaijan	Hungary	Portugal
Belarus	Iceland	Romania
Belgium	Ireland	Russian Federation
Bosnia and Herzegovina	Isle of Man	San Marino
Bulgaria	Italy	Serbia
Channel Islands	Kazakhstan	Slovak Republic
Croatia	Latvia	Slovenia
Cyprus	Liechtenstein	Spain
Czech Republic	Lithuania	Sweden
Denmark	Luxembourg	Switzerland
Estonia	Macedonia, FYR	Turkey
Faeroe Islands	Moldova	Ukraine
Finland	Monaco	United Kingdom

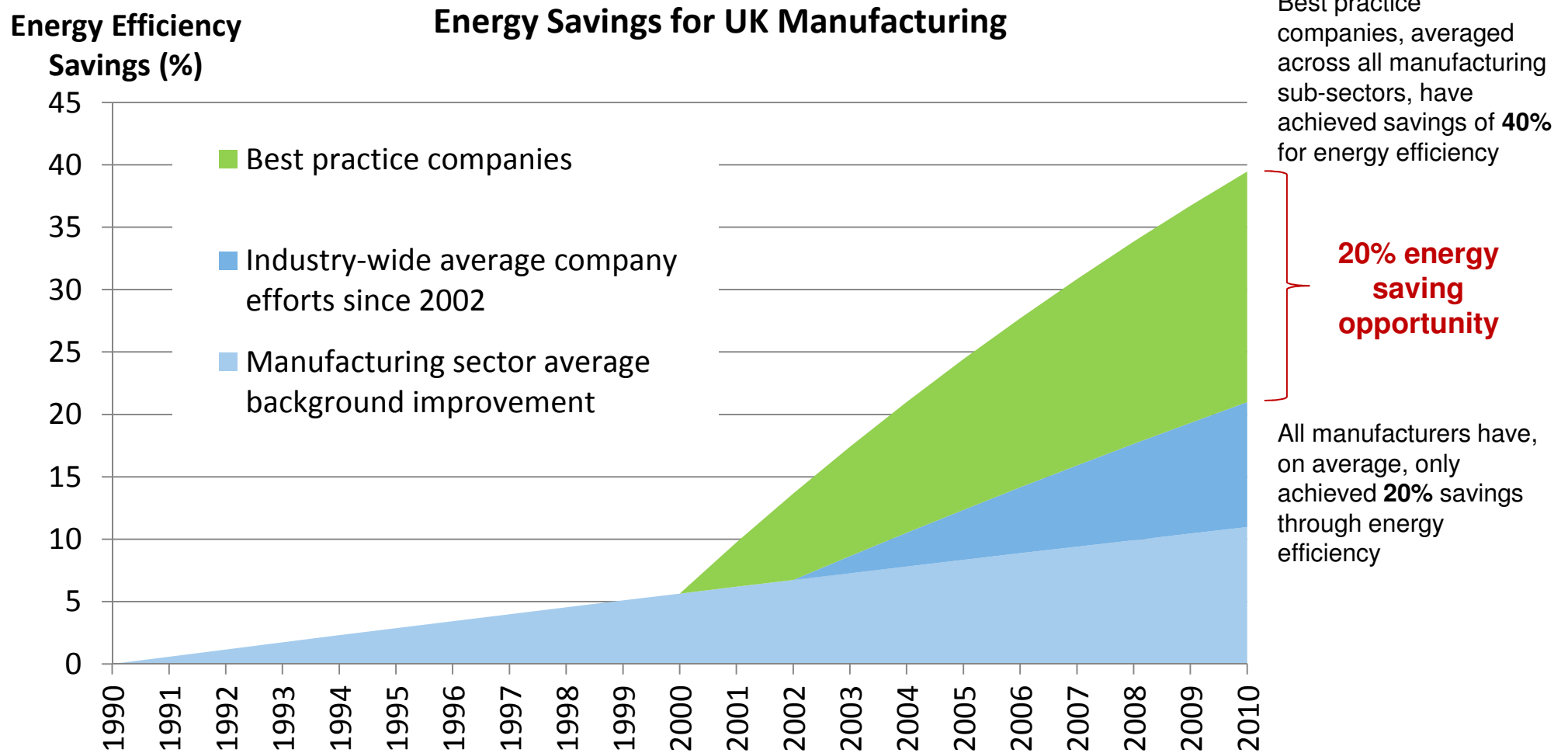
A 20% energy efficiency improvement opportunity was used – consistent with the literature



Report date:	2012	2013	c. 2010	2010	2012	2012
Geography:	UK	UK	UK	Global	UK	Global
Scope:	Industry	Industry	Large organisations	Energy intensive industrial sectors	Industrial sector, Electricity only	Mobile phone manufacturers

Source: Lavery, G., Pennell, N., Brown, S., Evans, S., 2013. The Next Manufacturing Revolution: Non-Labour Resource Productivity and its Potential for UK Manufacturing, p. 34. Available at <http://www.nextmanufacturingrevolution.org/nmr-report-download/>

Sub-sectoral analysis by the Next Manufacturing Revolution also found a 20% saving opportunity in the UK



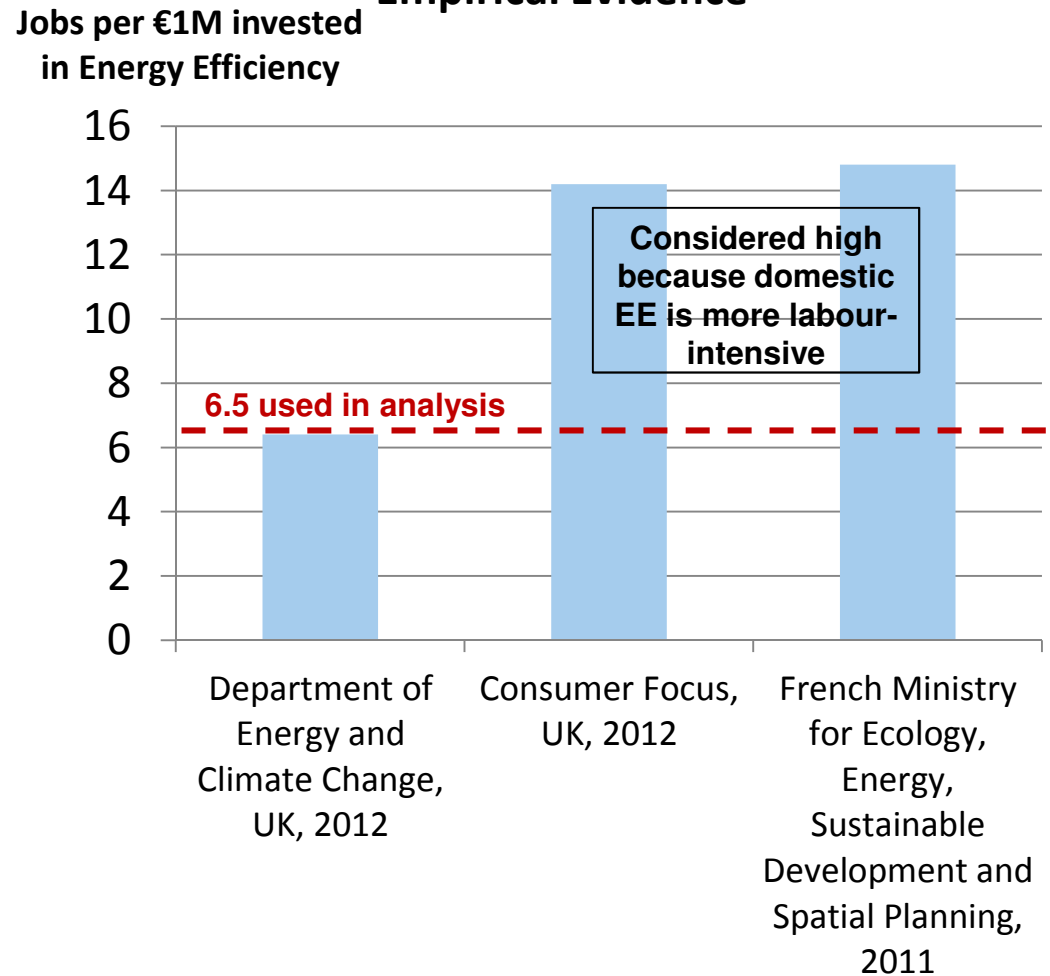
Sources: Department of Energy and Climate Change, Energy Consumption UK 2010, 2012; Office of National Statistics, Detailed Indices of Production, 2011; Next Manufacturing Revolution Survey responses; Literature review

The number of energy efficiency jobs was based on empirical evidence

Approach

- 6.5 jobs per €1M investment in energy efficiency used (see graph) – conservative figure used
- Energy equipment assumed to last for 10 years, after which it is replaced at further capital cost
- Therefore $6.5/10 = 0.65$ ongoing full-time jobs per €1M investment in energy efficiency
- This 0.65 figure used for the calculation of energy efficiency jobs

Empirical Evidence

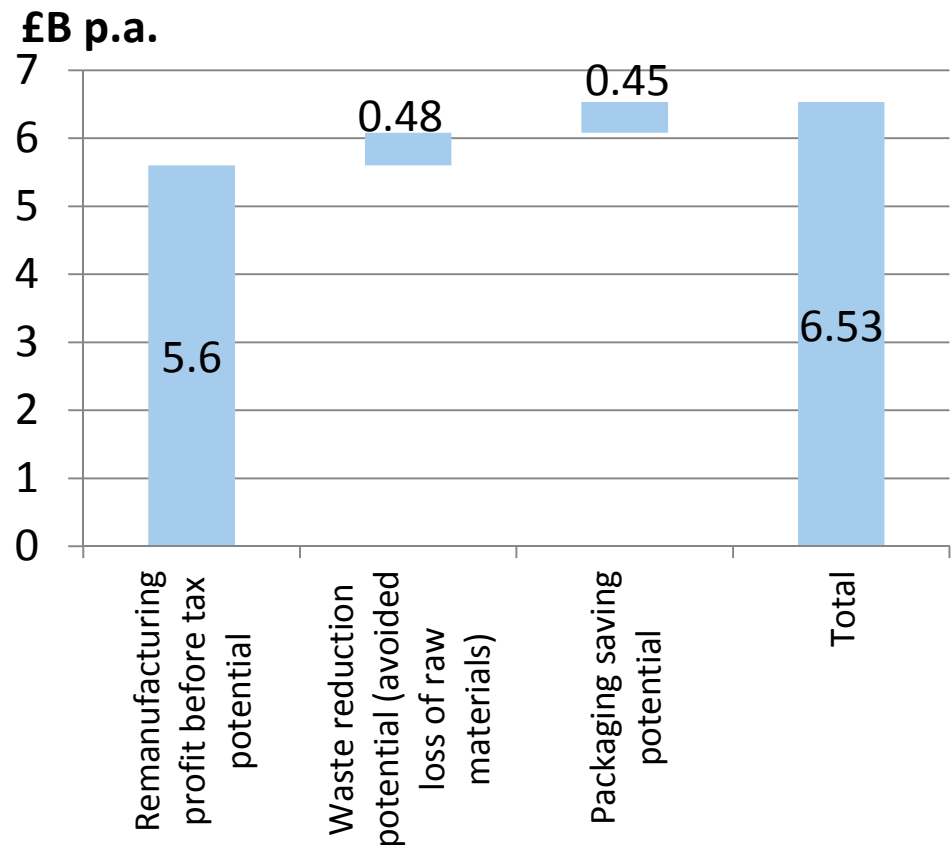


Materials efficiency opportunities were calculated using the research findings of the Next Manufacturing Revolution for the UK

Approach

- The Next Manufacturing Revolution study found £6.53B p.a. in materials savings opportunity between average and good practice on a sub-sector basis for UK manufacturing (see graph)
- Total UK manufacturing sector revenue in 2011 was £511.9B in 2011
- £6.53B represents 1.28% of UK manufacturing revenue
- For comparison, 1.28% of revenue is less than half of the saving achieved by Interface by reducing yarn use by 12%
- This 1.28% saving was used to calculate the materials efficiency opportunity across European manufacturers

Materials Efficiency Savings Identified in the Next Manufacturing Revolution Study for the UK



Sources: Lavery, G., Pennell, N., Brown, S., Evans, S., 2013. The Next Manufacturing Revolution: Non-Labour Resource Productivity and its Potential for UK Manufacturing, p. 35. Available at <http://www.nextmanufacturingrevolution.org/nmr-report-download/>; Office for National Statistics, 2012. Annual Business Survey, Section C Manufacturing, release date 15 November.

A renewable energy cost premium of 20% was used

Approach

- Governments set support levels for renewables to provide a modest return on investment, thereby ensuring value for the taxpayer and avoiding profiteering
 - This is usually of the order of a 7 year payback period (i.e. 14% IRR)
- However, renewable energy project developers often find this level of return inadequate to cover the level of risk involved
- A 20% price premium for the renewable energy produced increases the IRR to a more commercial 17%
- Therefore a 20% price premium for renewable energy is assumed
- 20% is more conservative than the 10% premium being paid by Interface for its renewable energy in Europe

To be conservative, renewable energy GHG emission savings were not counted where countries have >80% low emission generation

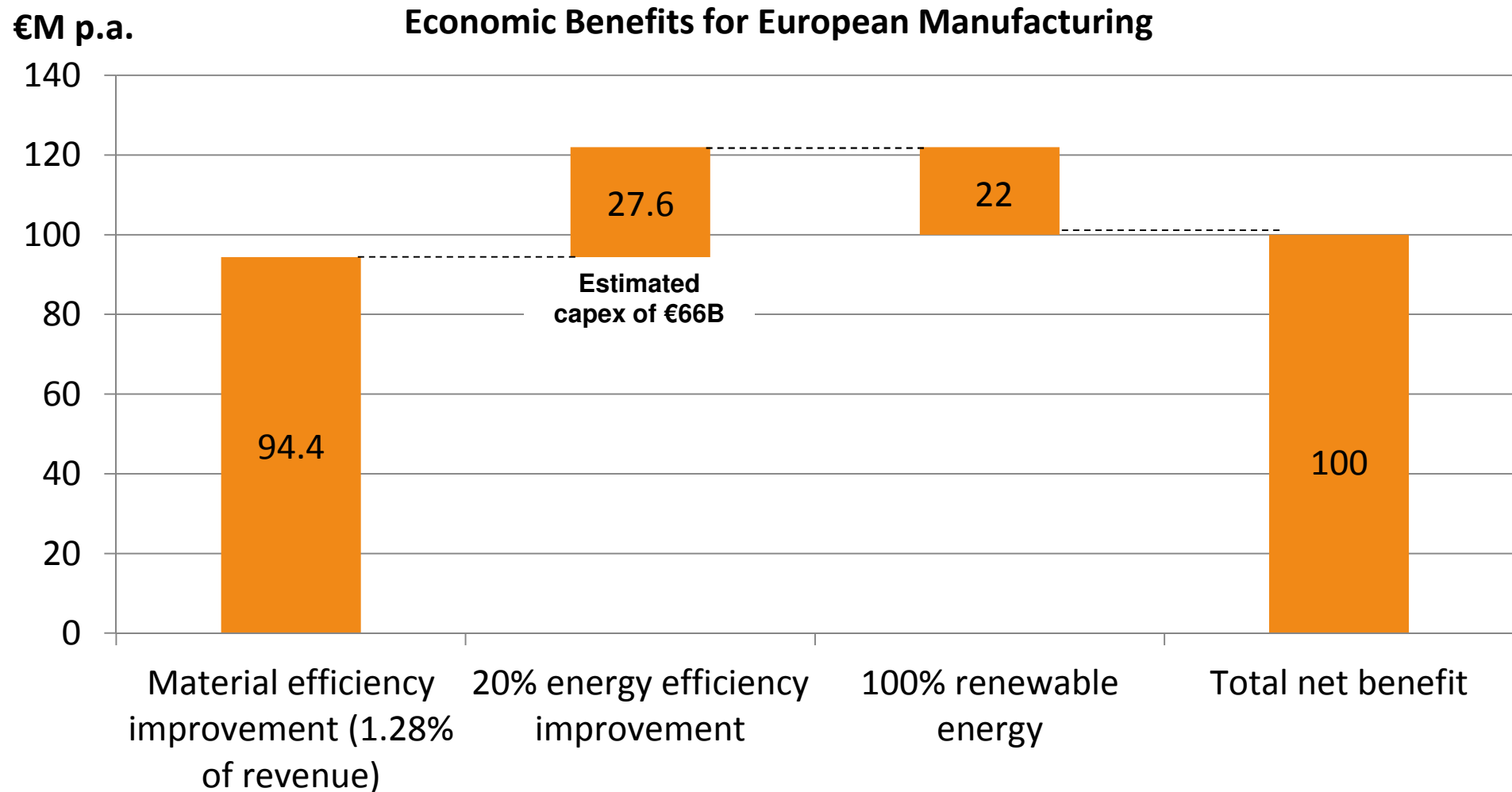
Approach

- Where countries had less than 20% of their electricity generated from coal, natural gas or oil in 2011, no greenhouse gas emission savings were counted
- Note: France, Sweden and Switzerland have significant nuclear generation so the cost of switching to renewable energy was included in the cost calculations for these countries – but not the GHG savings

Countries with <20% Generation from Coal, Gas or Oil in 2011

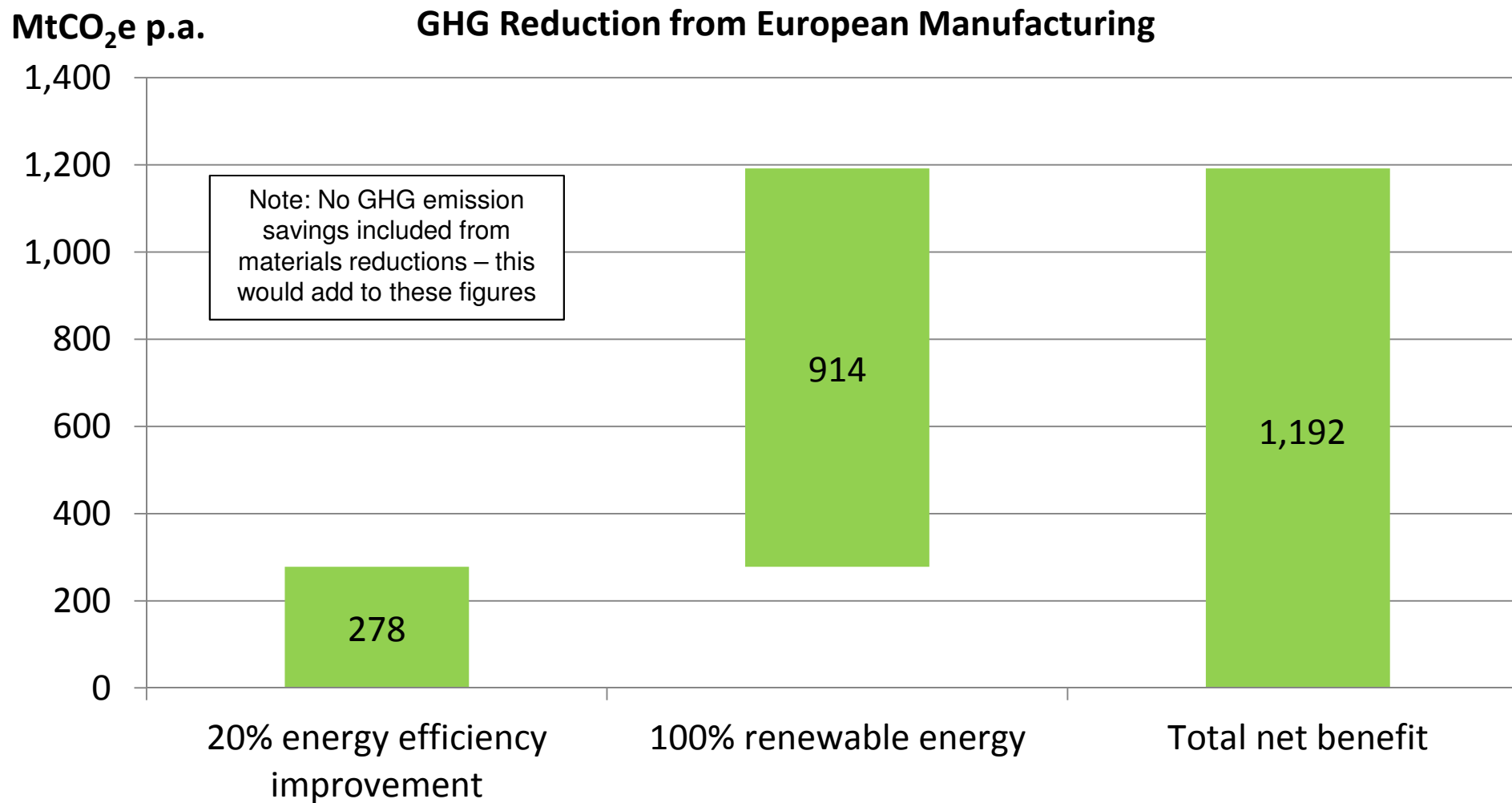
- Albania
- France
- Iceland
- Norway
- Sweden
- Switzerland

For European manufacturing, a potential €100B p.a. of economic benefits could be created by the New Industrial Model

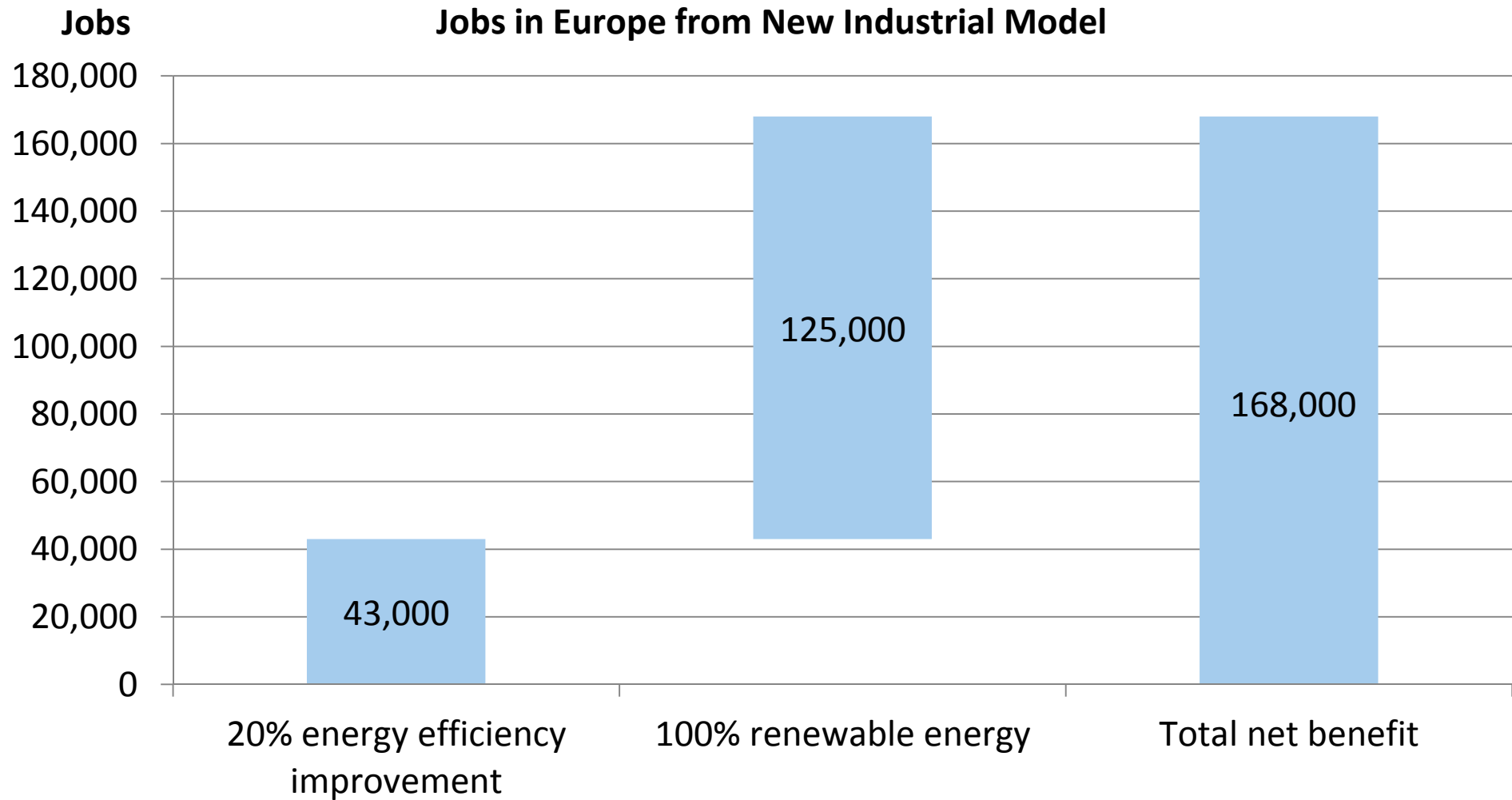


Source: Lavery Pennell analysis

1,188 MtCO₂e p.a. saving in the European manufacturing sector, or 14.6% of Europe's total GHG emissions, is possible



168,000 skilled jobs could be created in Europe



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Potential for Top 20 European Manufacturers

Methodology for top 20 European Manufacturer Calculations

Approach

- Examined top 20 manufacturers based in Europe by revenues
- Data gathered from annual and sustainability reports for most recent years available
- Energy spend per company was calculated using the average energy spend as a % of revenue for the relevant manufacturing sub-sector determined in the Next Manufacturing Revolution analysis
- Assumed that 32% of energy use is electricity
 - 32% is the figure for the UK manufacturing sector according to DECC statistics for 2010
- Examined the potential of the New Industrial Model for each company separately, taking into account the progress of each on energy efficiency, uptake of renewable energy and sources of electricity in their home countries
- Energy efficiency jobs, RE jobs RE cost premium, and material efficiency opportunity were calculated using the methodology used for the whole-of-Europe figures
- No GHG savings from RE assumed for companies headquartered in countries with <20% generation from coal, gas or oil

Top 20 European Manufacturers

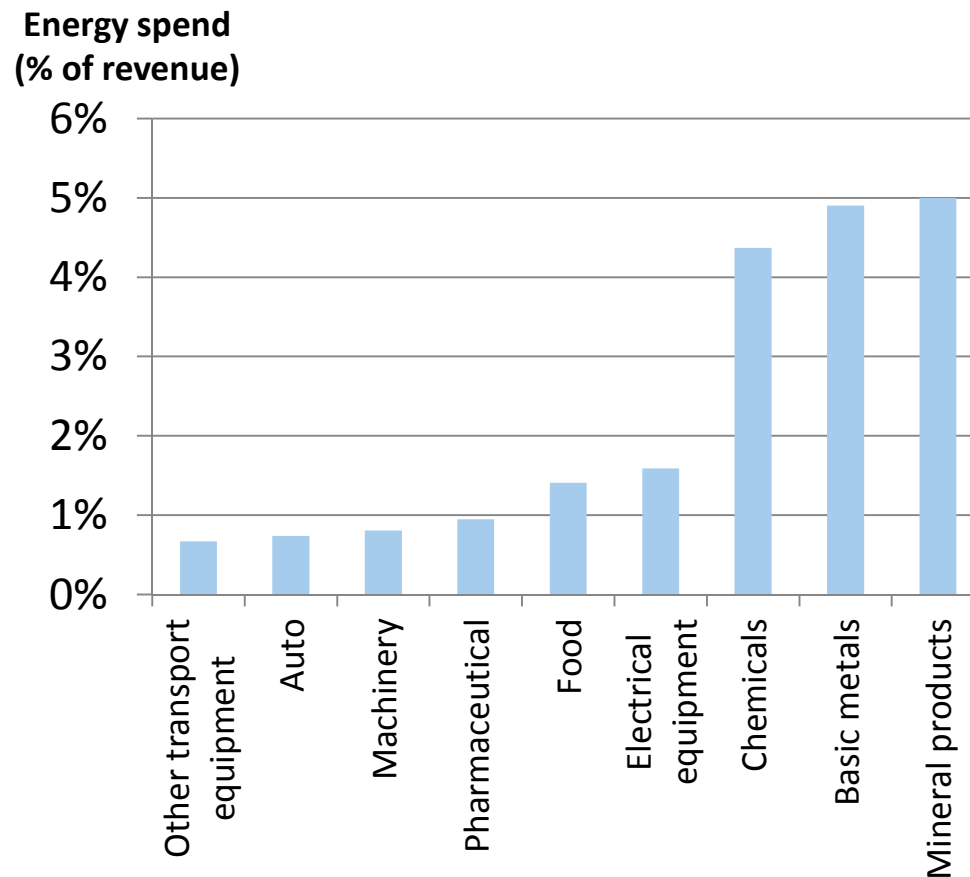
Volkswagen	EADS
Daimler	Unilever
Siemens	Novartis
BASF	Renault
BMW	Saint-Gobain
ArceloMittal	Nokia
Nestle	LyondellBasell
Peugeot	Bayer
Bosch	Hoffmann-La Roche
ThyssenKrupp	Sanofi

Energy spend for each country was calculated based on sub-sector average figures for the UK

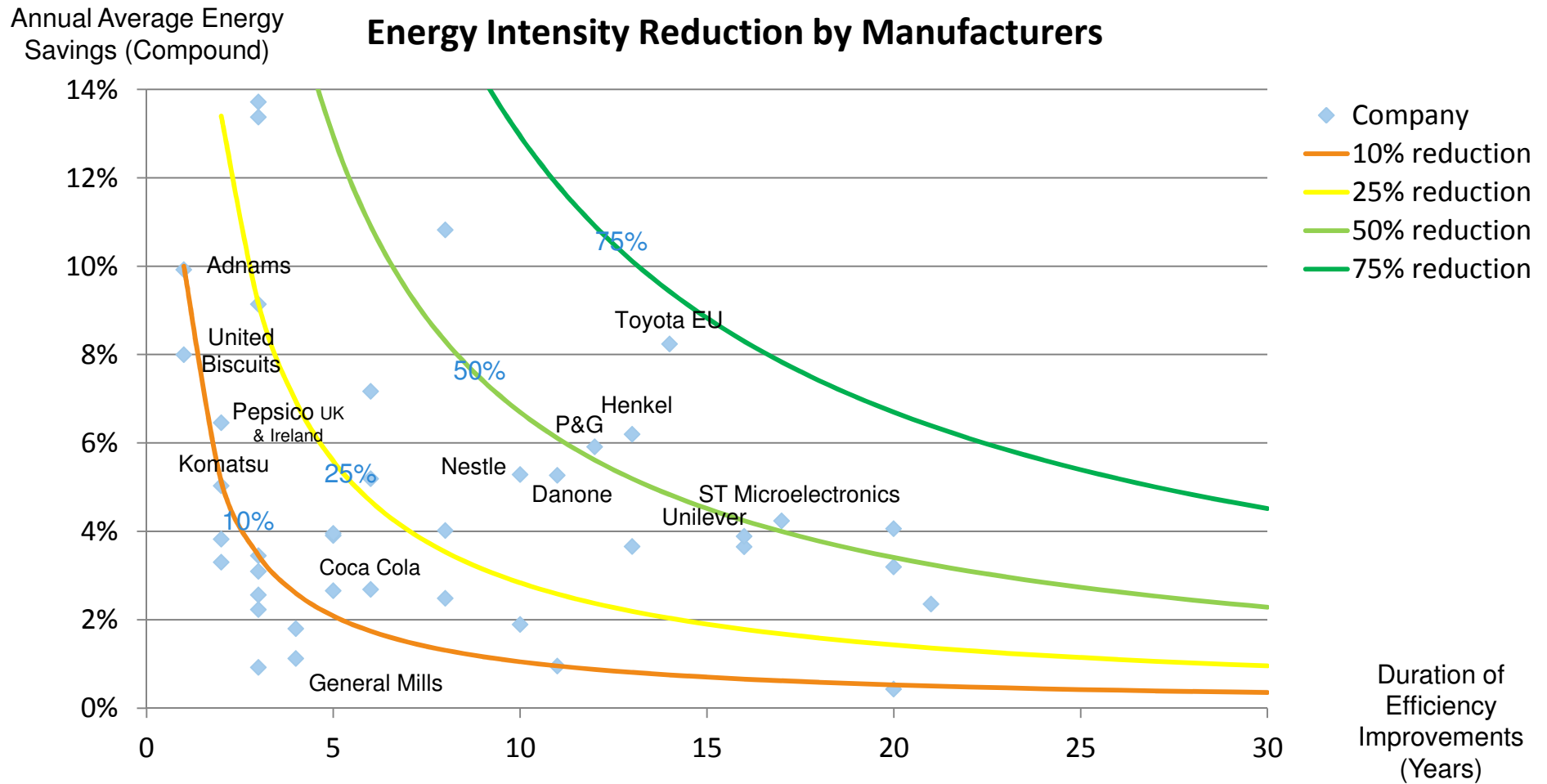
Approach

- The Next Manufacturing Revolution study examined the energy spend for each manufacturing sub-sector for the UK
- These figures were used for European-headquartered manufacturers on the basis that their technology mix and uptake of energy efficiency is likely to be similar to that of companies within the UK
- Figures applied as appropriate for the primary business of the individual company

Energy Spend by Sub-Sector



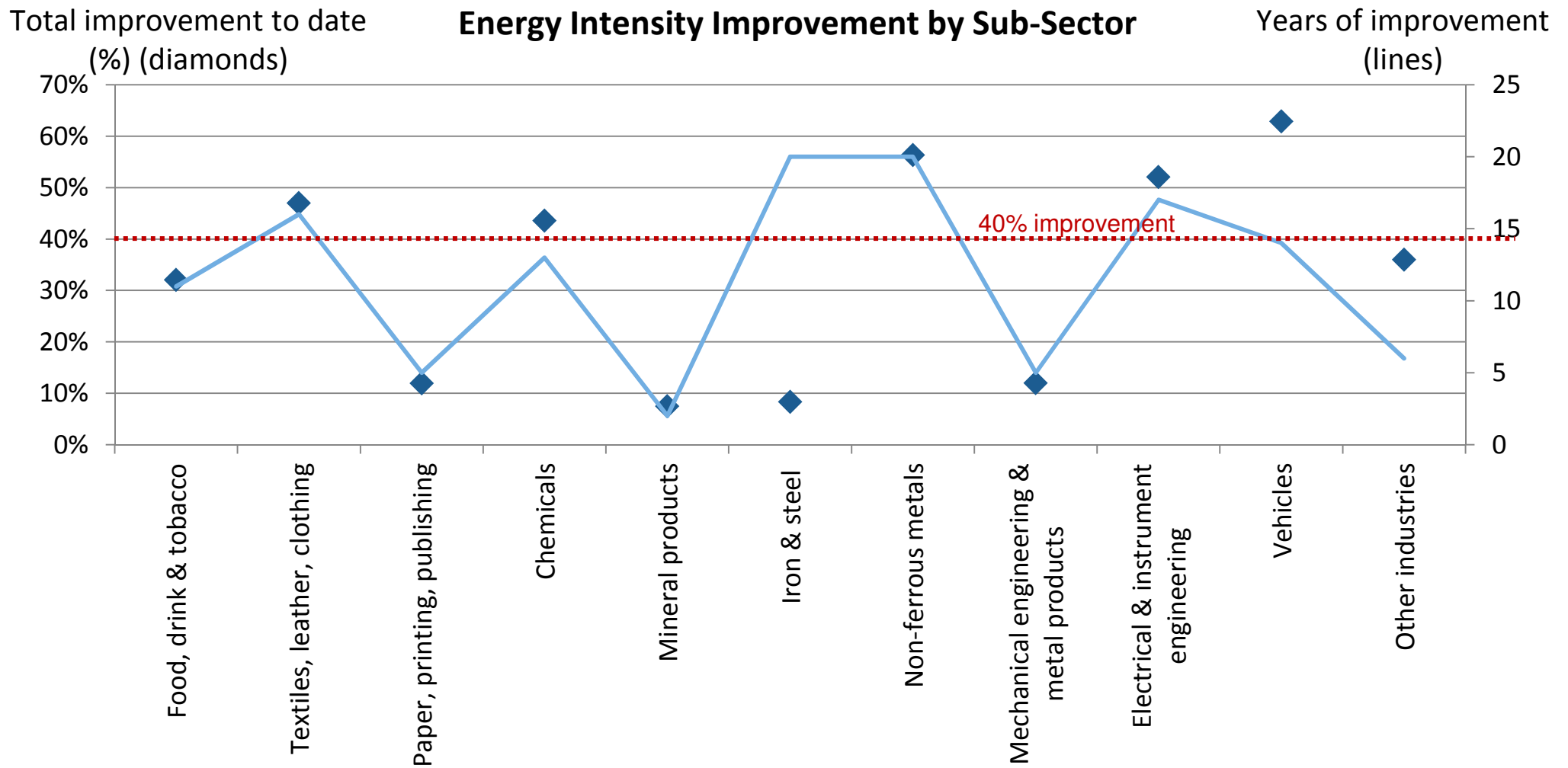
The Next Manufacturing Revolution study showed the range of energy savings achieved historically by blue chip companies



Note: Un-named datapoints are companies who provided data confidentially or are not named for other reasons; all named companies are plotted based on publicly available information.

Sources: Next Manufacturing Revolution Survey; Next Manufacturing Revolution literature review; Department of Energy and Climate Change, 2012. Energy Consumption UK 2010; Office of National Statistics, 2011. Detailed Indices of Production.

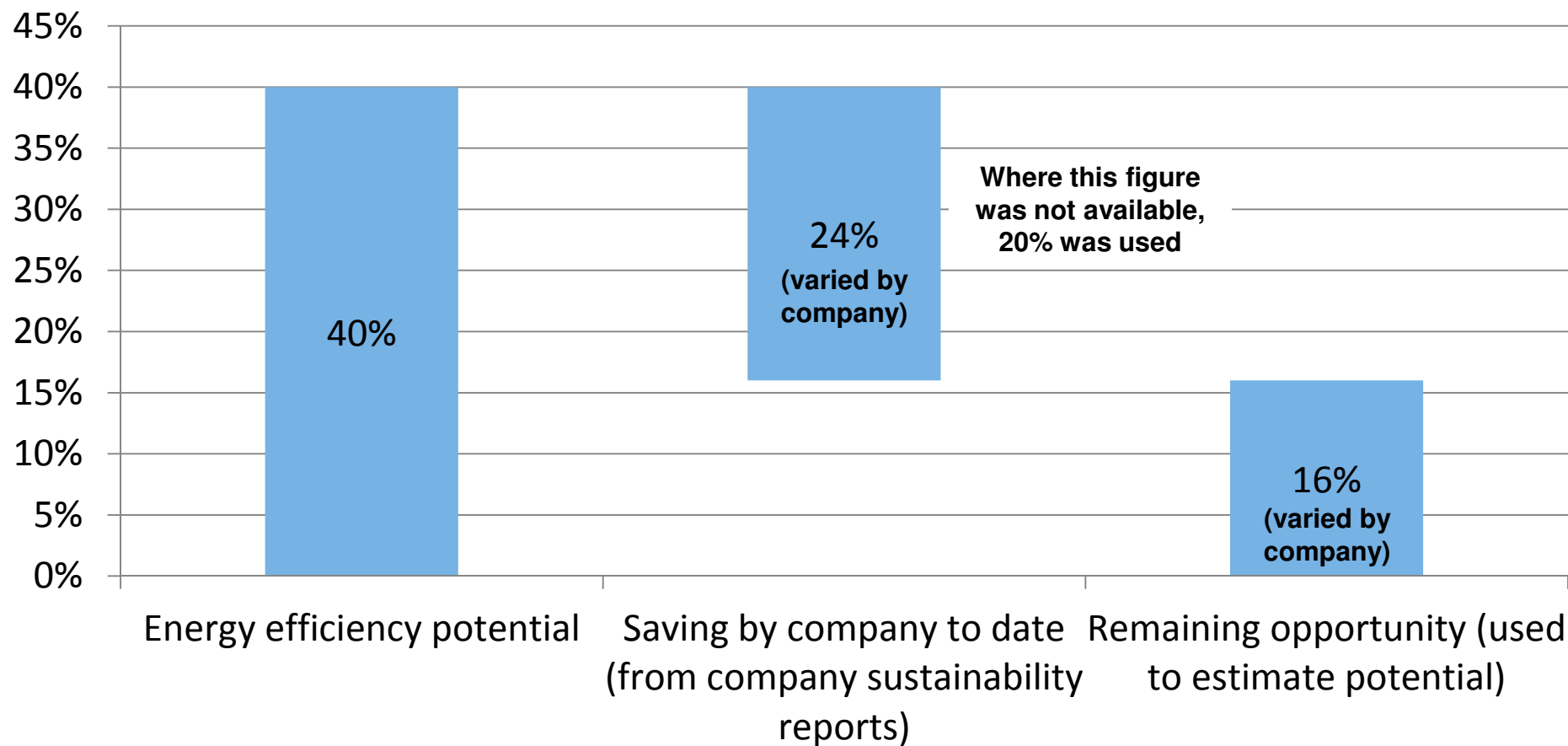
Good practice companies in many sub-sectors were found to have achieved over 40% savings over time horizons of 10 to 20 years



Source: Lavery, G., Pennell, N., Brown, S., Evans, S., 2013. The Next Manufacturing Revolution: Non-Labour Resource Productivity and its Potential for UK Manufacturing, p. 29. Available at <http://www.nextmanufacturingrevolution.org/nmr-report-download/>

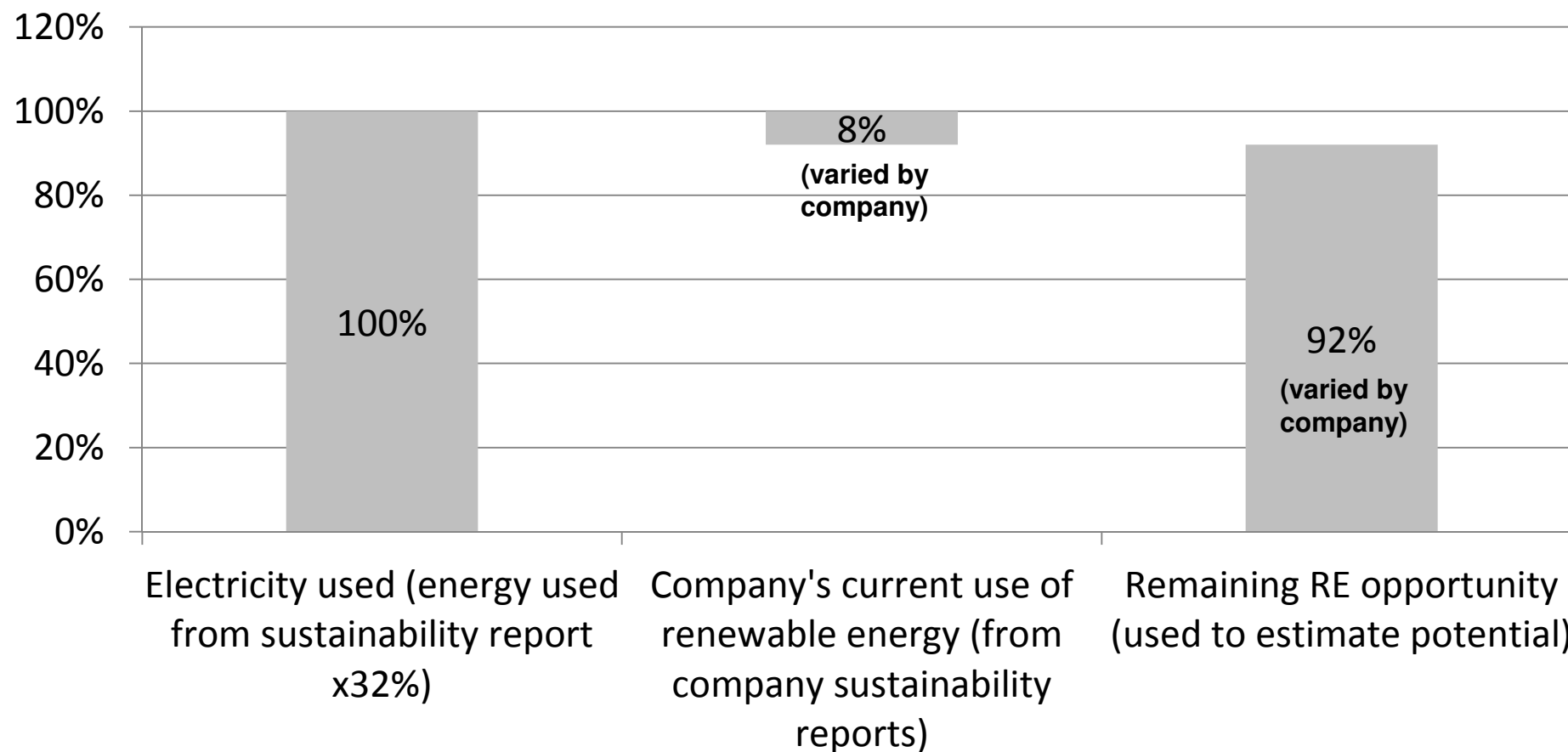
Energy efficiency opportunity calculations were done by company to allow for their historical improvements

Example Calculation of Energy Efficiency Opportunity for a Top 20 European Manufacturer

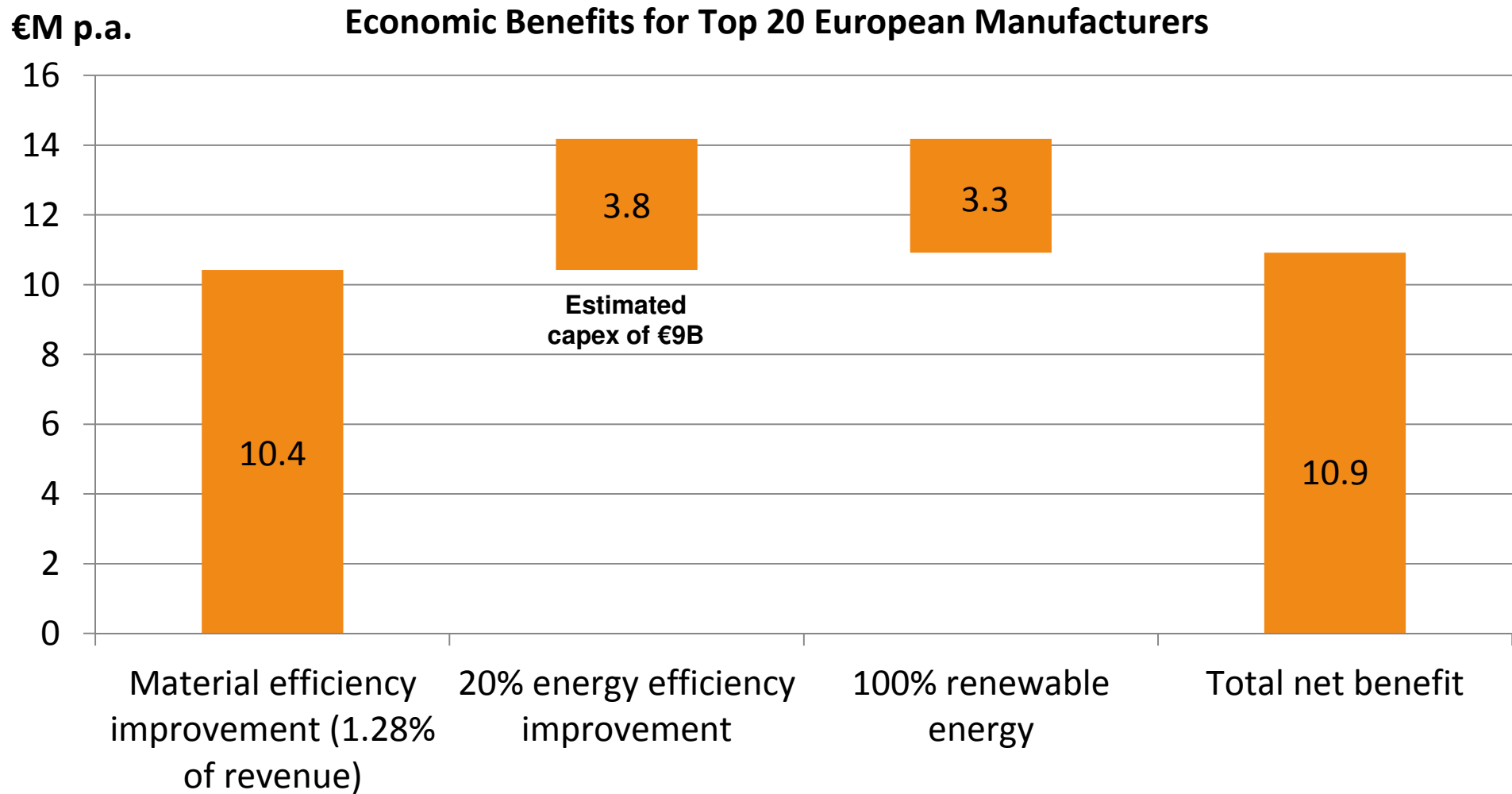


Renewable energy opportunity calculations similarly incorporated renewable energy already being used by each company

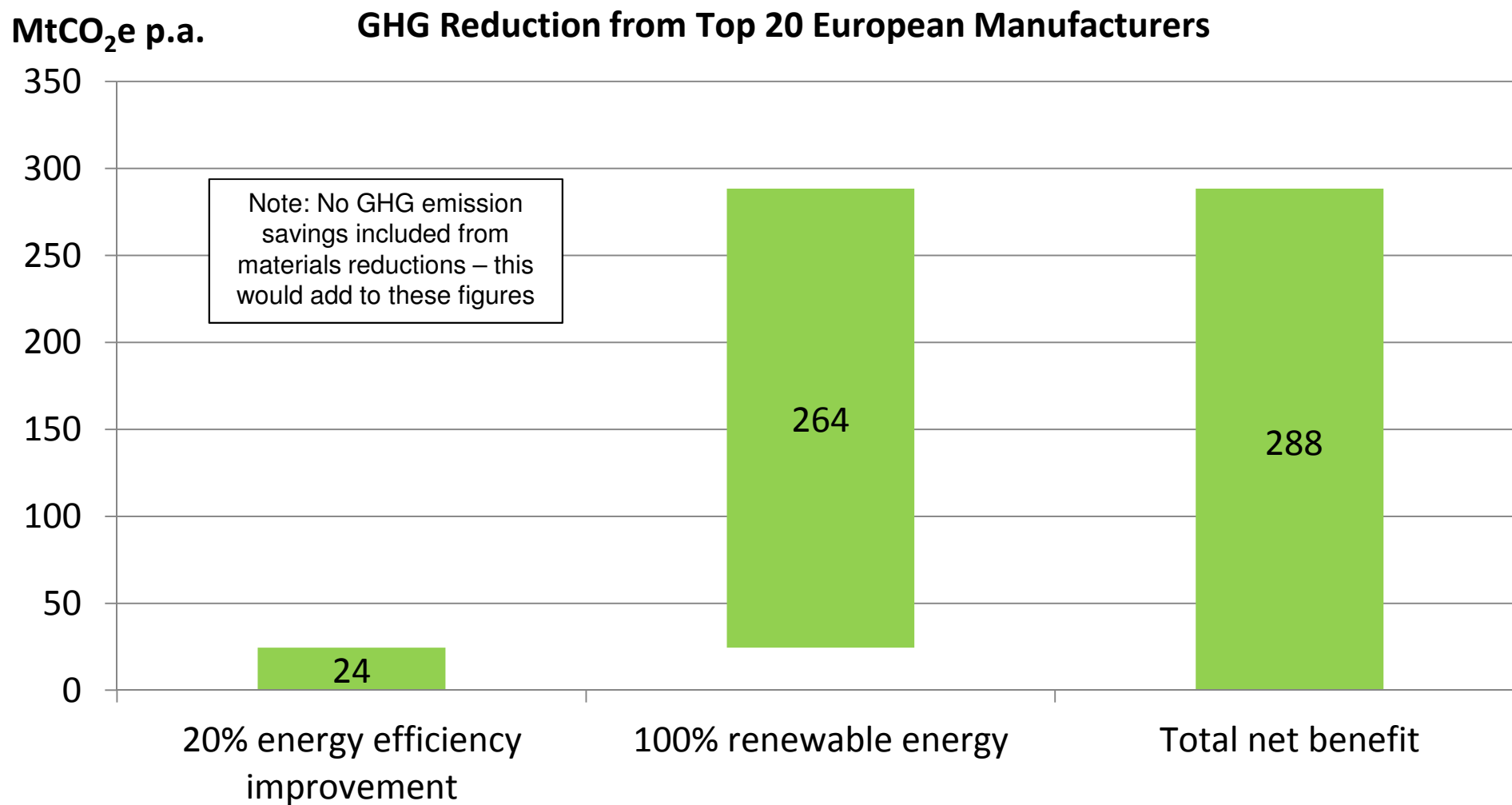
**Example Calculation of Renewable Energy Opportunity
for a Top 20 European Manufacturer**



€10.9B p.a. of economic benefits were identified for the top 20 European manufacturers from the New Industrial Model

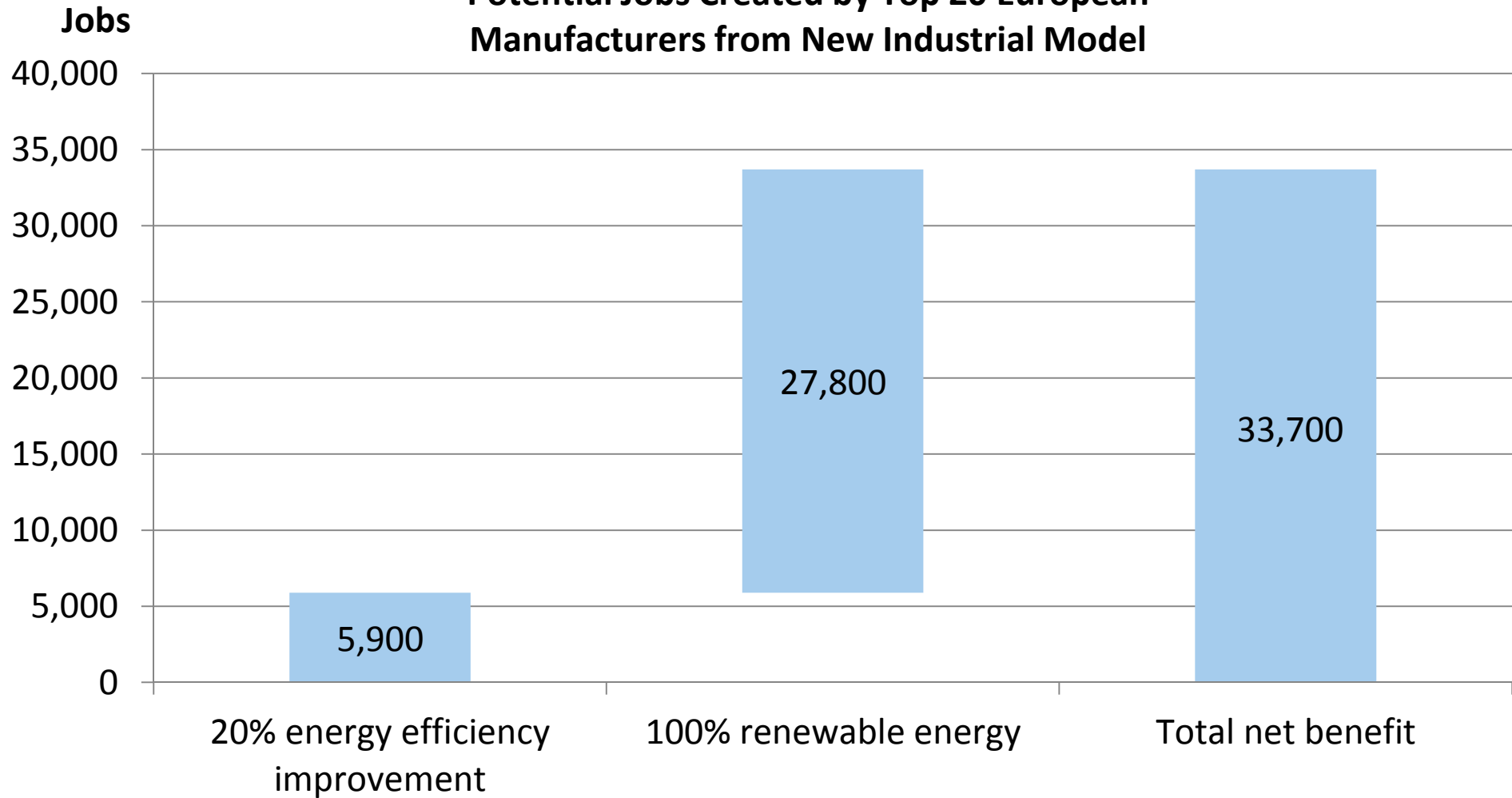


288 MtCO₂e p.a. could be saved by the top 20 European manufacturers, which is 3.5% of Europe's annual GHG emissions



33,700 skilled jobs could be created by Europe's top 20 manufacturers

Potential Jobs Created by Top 20 European Manufacturers from New Industrial Model



Further Resources

- The New Industrial Model report can be accessed at <http://www.interfaceflor.co.uk/web/sustainability/newindustrialmodel>
- The full Next Manufacturing Revolution report can be downloaded from <http://www.nextmanufacturingrevolution.org/nmr-report-download/>
- More information on Interface is available at <http://interfaceglobal.com/>