

**GROWTH WITHIN:  
A CIRCULAR ECONOMY  
VISION FOR A  
COMPETITIVE EUROPE**



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Madrid, November 13, 2015

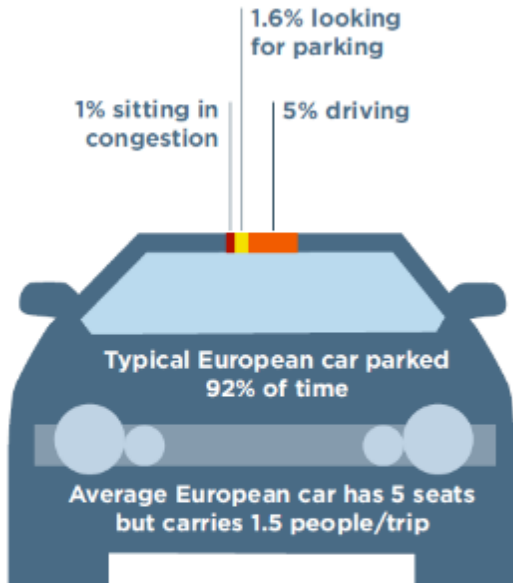
# 4 questions

- 1. Wasteful today?**
- 2. Possible to address?**
- 3. Impact?**
- 4. How?**

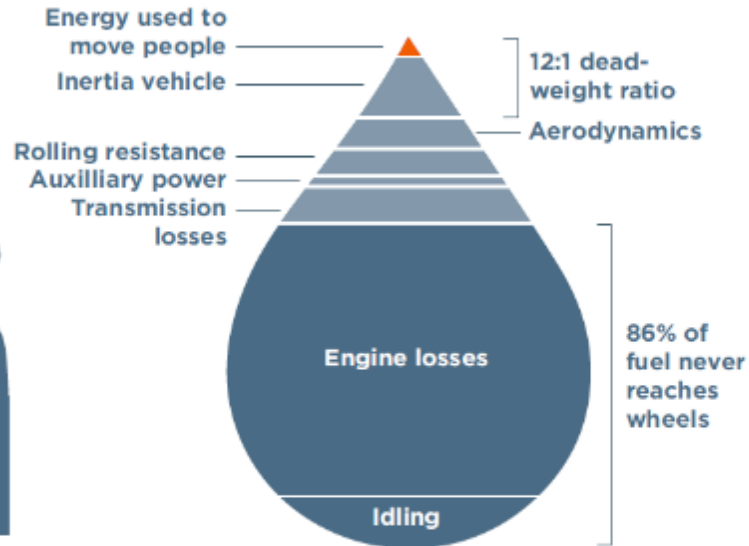


# Structural waste in mobility

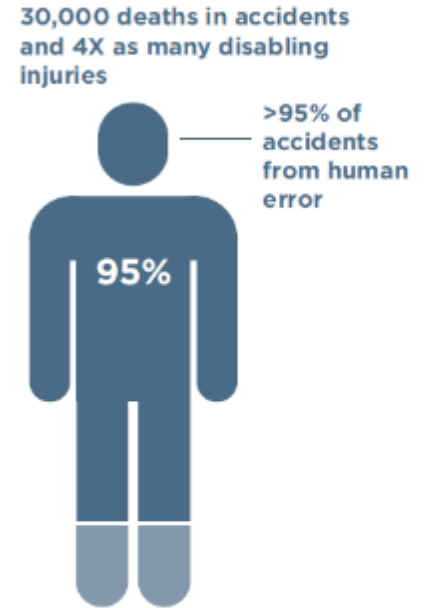
## CAR UTILISATION



## TANK-TO-WHEEL ENERGY FLOW - PETROL



## DEATHS AND INJURIES/ YEAR ON ROAD



## LAND UTILISATION:

**5%**

Road reaches peak throughput only 5% of time and only 10% covered with cars then

**50%**

50% of most city land dedicated to streets and roads, parking, service stations, driveways, signals, and traffic signs

# Take > Make > Dump

**55-60%** of EU end-of-use materials not recycled or composted (i.e. burned or landfilled)

**5%** of the material value recaptured after first use cycle

**30-40%** of material value recaptured in recycling 'success cases'

# Comprehensive business toolbox for a circular economy

## EXAMPLES

### REGENERATE



- Shift to renewable energy and materials
- Reclaim, retain, and restore health of ecosystems
- Return recovered biological resources to the biosphere



### SHARE



- Share assets (e.g. cars, rooms, appliances)
- Reuse/secondhand
- Prolong life through maintenance, design for durability, upgradability, etc.



### OPTIMISE



- Increase performance/efficiency of product
- Remove waste in production and supply chain
- Leverage big data, automation, remote sensing and steering



### LOOP



- Remanufacture products or components
- Recycle materials
- Digest anaerobic
- Extract biochemicals from organic waste



### VIRTUALISE



- Books, music, travel, online shopping, autonomous vehicles etc.



### EXCHANGE



- Replace old with advanced non-renewable materials
- Apply new technologies (e.g. 3D printing)
- Choose new product/service (e.g. multimodal transport)



# Massive improvement opportunity for all three systems

Total annual cash-out costs per household; EU average 2012, €  
Improvement potential for 2050



SOURCE: Company and expert interviews; Web search; Eurostat household expenditure data; ACEA, *The Automobile Industry Pocket Guide*, 2015; Todd Alexander Litman, *Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications*, Victoria Transport Policy Institute, 2009; Udo Jürgen Becker et al., *The True Costs of Automobility: External Costs of Cars: Overview on existing estimates in EU-27*, TU Dresden, 2012; ICCT, *European Vehicle Market Statistics Pocketbook*, 2013; ICE database of CO2 embedded in material; Frances Moore and Delavane Diaz, *Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy*, Nature Climate Change, 2015; MGI, *Overcoming obesity: An initial economic analysis*, 2014; FAO, *Global food losses and food waste – Extent, Causes and Prevention*, 2011; EEA, *Towards efficient use of water resources in Europe*, 2012; EU Commission, *Official journal of the EU, Commission Agriculture and Rural Development, 2012 budget*, 2012; FAOSTAT; Kimo van Dijk, *Present and future phosphorus use in Europe: food system scenario analyses*, Wageningen University, 2014; Josef Schmidhuber, *The EU Diet – Evolution, Evaluation and Impacts of the CAP*, FAO, 2008; Gregor Zupančič and Viktor Grlc, *Anaerobic Treatment and Biogas Production from Organic Waste*, 2012; Joint Research Centre (JRC) of the European Commission et al., *Precision agriculture: an opportunity for EU farmers – potential support with the CAP 2014-2020*, 2014; Laure Itard et al., *Building Renovation and Modernisation in Europe: State of the art review*, TU Delft, 2008; BPIE, *Europe's buildings under the microscope: A country-by-country review of the energy performance of buildings*, 2011; Per-Erik Josephson and Lasse Saukkoripi, *Waste in construction projects: call for a new approach*, Chalmers University of Technology, 2007; Mark Hogan, *The Real Costs of Building Housing*, SPUR, 2014; Cushman & Wakefield Research Publication, *Office space across the world*, 2013; Ellen MacArthur Foundation, *Delivering the circular economy toolkit for policymakers*, 2015.

# Comparison of potential development paths: impact on economy...

EU-27, indexed (2012 = 100)

- Current development scenario
- Circular economy scenario

Household disposable income



GDP



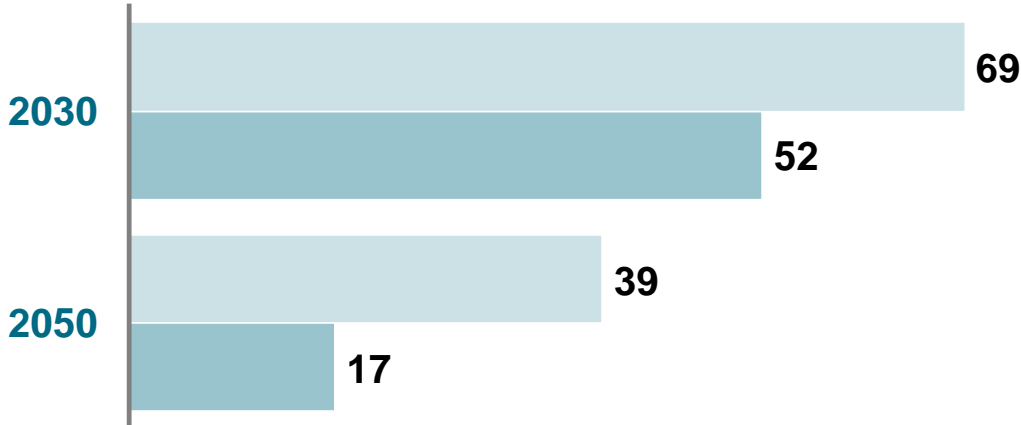
SOURCE: Economic modelling expertise provided by Professor Christoph Bühringer, University of Oldenburg, and Professor Thomas F. Rutherford, University of Wisconsin; Company and expert interviews; Web search; Eurostat household expenditure data; ACEA, The Automobile Industry Pocket Guide, 2015; Todd Alexander Litman, Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications, Victoria Transport Policy Institute, 2009; Udo Jürgen Becker et al., The True Costs of Automobility: External Costs of Cars: Overview on existing estimates in EU-27, TU Dresden, 2012; ICCT, European Vehicle Market Statistics Pocketbook, 2013; ICE database of CO2 embedded in material; Frances Moore and Delavane Diaz, Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy, Nature Climate Change, 2015; MGI, Overcoming obesity: An initial economic analysis, 2014; FAO, Global food losses and food waste – Extent, Causes and Prevention, 2011; EEA, Towards efficient use of water resources in Europe, 2012; EU Commission, Official journal of the EU, Commission Agriculture and Rural Development, 2012 budget, 2012; FAOSTAT; Kimo van Dijk, Present and future phosphorus use in Europe: food system scenario analyses, Wageningen University, 2014; Josef Schmidhuber, The EU Diet – Evolution, Evaluation and Impacts of the CAP, FAO, 2008; Gregor Zupančič and Viktor Grlic, Anaerobic Treatment and Biogas Production from Organic Waste, 2012; Joint Research Centre (JRC) of the European Commission et al., Precision agriculture: an opportunity for EU farmers – potential support with the CAP 2014-2020, 2014; Laure Itard et al., Building Renovation and Modernisation in Europe: State of the art review, TU Delft, 2008; BPIE, Europe's buildings under the microscope: A country-by-country review of the energy performance of buildings, 2011; Per-Erik Josephson and Lasse Saukkoripi, Waste in construction projects: call for a new approach, Chalmers University of Technology, 2007; Mark Hogan, The Real Costs of Building Housing, SPUR, 2014; Cushman & Wakefield Research Publication, Office space across the world, 2013; Ellen MacArthur Foundation, Delivering the circular economy toolkit for policymakers, 2015.

# Comparison of potential development paths: impact on the environment

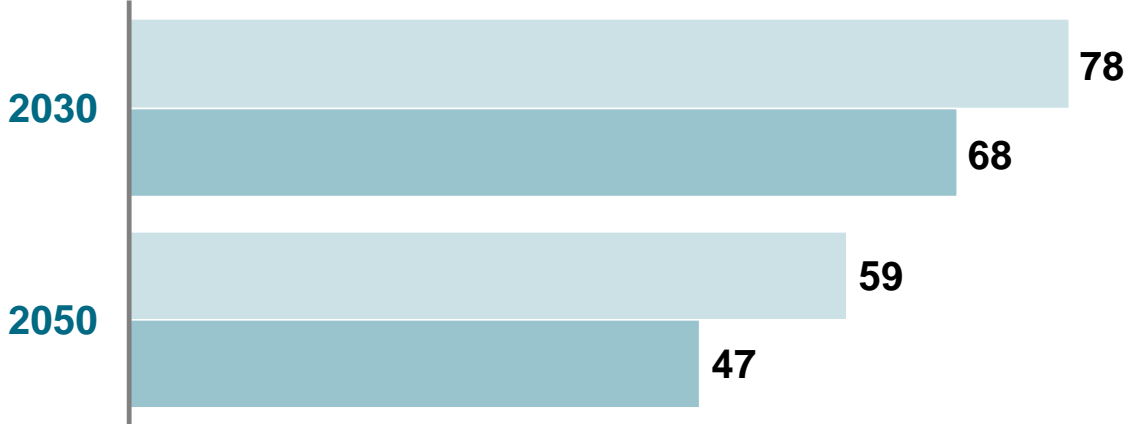
EU-27, indexed (2012 = 100)

Current development scenario  
Circular economy scenario

CO2 emissions

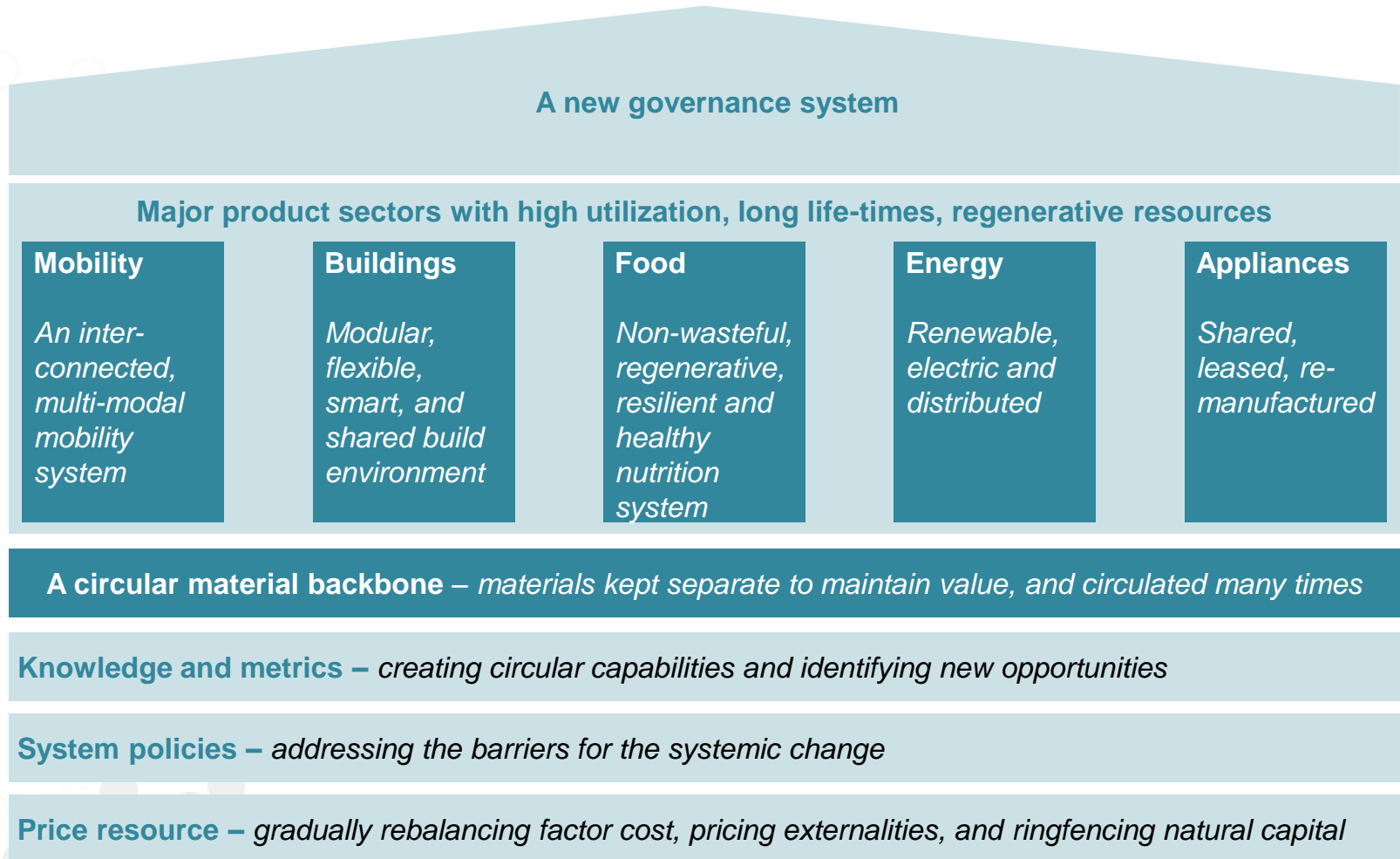


Primary material consumption





# Structure of a circular European economy



## Key messages – summing up

**Huge amount of waste today**, in our largest sectors, and in how we use materials

**The waste can now be addressed** – much of it could not 10-15 years ago

**Huge economic growth potential** - enough to feed Europe for 1-2 decades

Should get more attention in **climate** discussions

If policy makers want to go after these opportunities, it will need waste and materials type of regulation, but also sector regulation (**energy efficiency-type of regulation**)



**Thank you!**

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