ASSOCIATION négaWatt

## Climate Recon 2050

*Industry Webinar*

# négaWatt scenario 2017-2050

**A sufficiency, efficiency and substitution approach, a sustainable trajectory for the French industry**

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# The négaWatt association

ASSOCIATION négaWatt

- A think tank on energy and energy policies created in 2001
- A non-profit, independent group of experts and field-practitioners
- A core of ~ 25 “companions” + 25 “ambassadors”, 1200 members
- Producing sustainable energy scenarios (latest in 2017) and proposing systemic policies and measures

INSTITUT négaWatt

- Subsidiary created in 2009
- Operational branch of the association

1. **The “negaWatt approach”**
2. **From consumption goods to raw materials**
3. **Demand reduction and circular economy**
4. **Energy efficency**

# A change of paradigm

**3. Substitution**

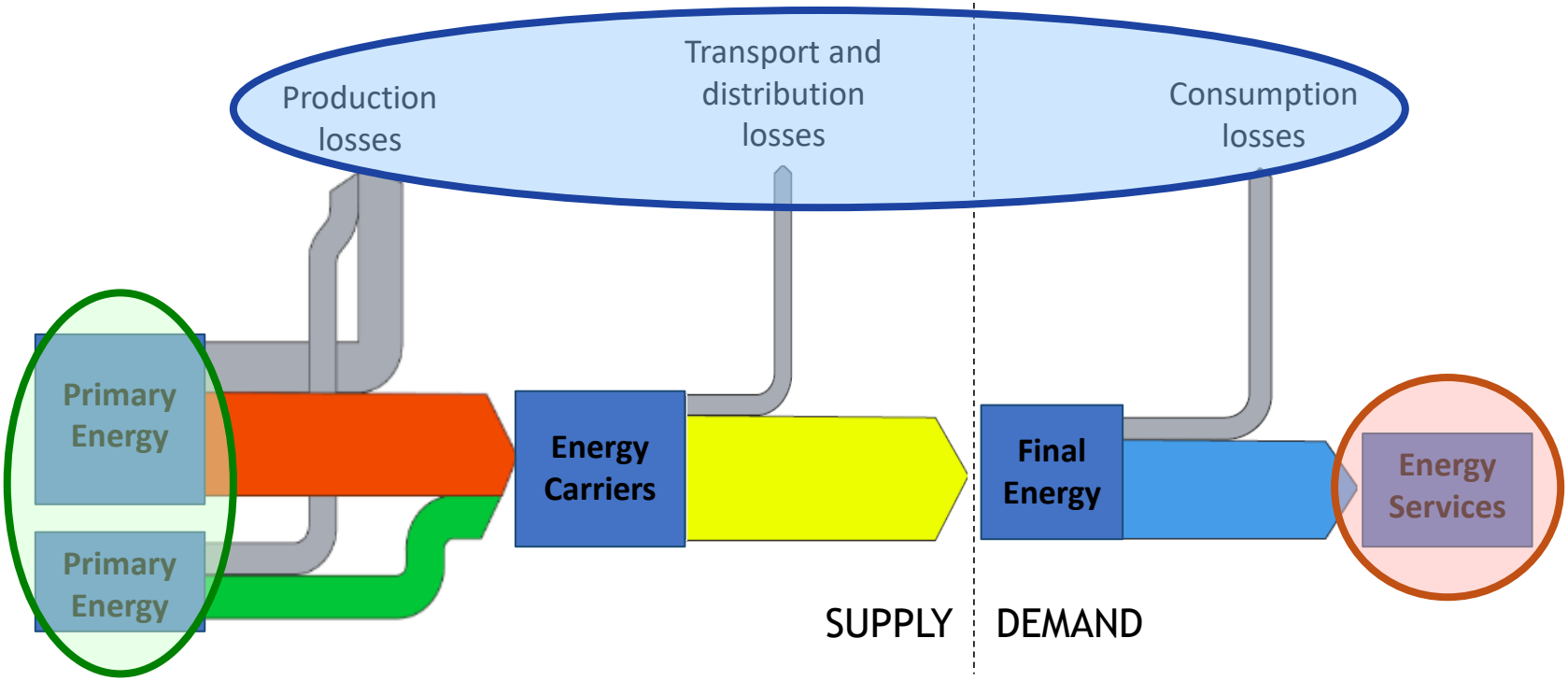
Develop **flow-based** renewables to replace **stock-based** fissile and fossils

**2. Efficiency**

Reduce the **losses**, i.e. the need of primary ressources to serve end-uses

**1. Sufficiency**

Prioritize energy end-uses in terms of individual/collective **energy services**



# The négaWatt approach applied to industry

| PRODUCTION | | ENERGY INTENSITY | | ENERGY |
|---|---|---|---|---|
| Mt | x | MWh/t | = | TWh |

**SUFFICIENCY**
- Reduction of consumption
- Robust and reparable goods
- Service economy

**RECYCLING**

**EFFICIENCY**

Improved processes :
- Combined heat and power
- Engines
- Energy recovery
- SMC, heat pumps
- Induction furnaces
- Processes
- Best available technologies

**RENEWABLES**
- Biomass
- Solar (thermal)
- Electric renewables

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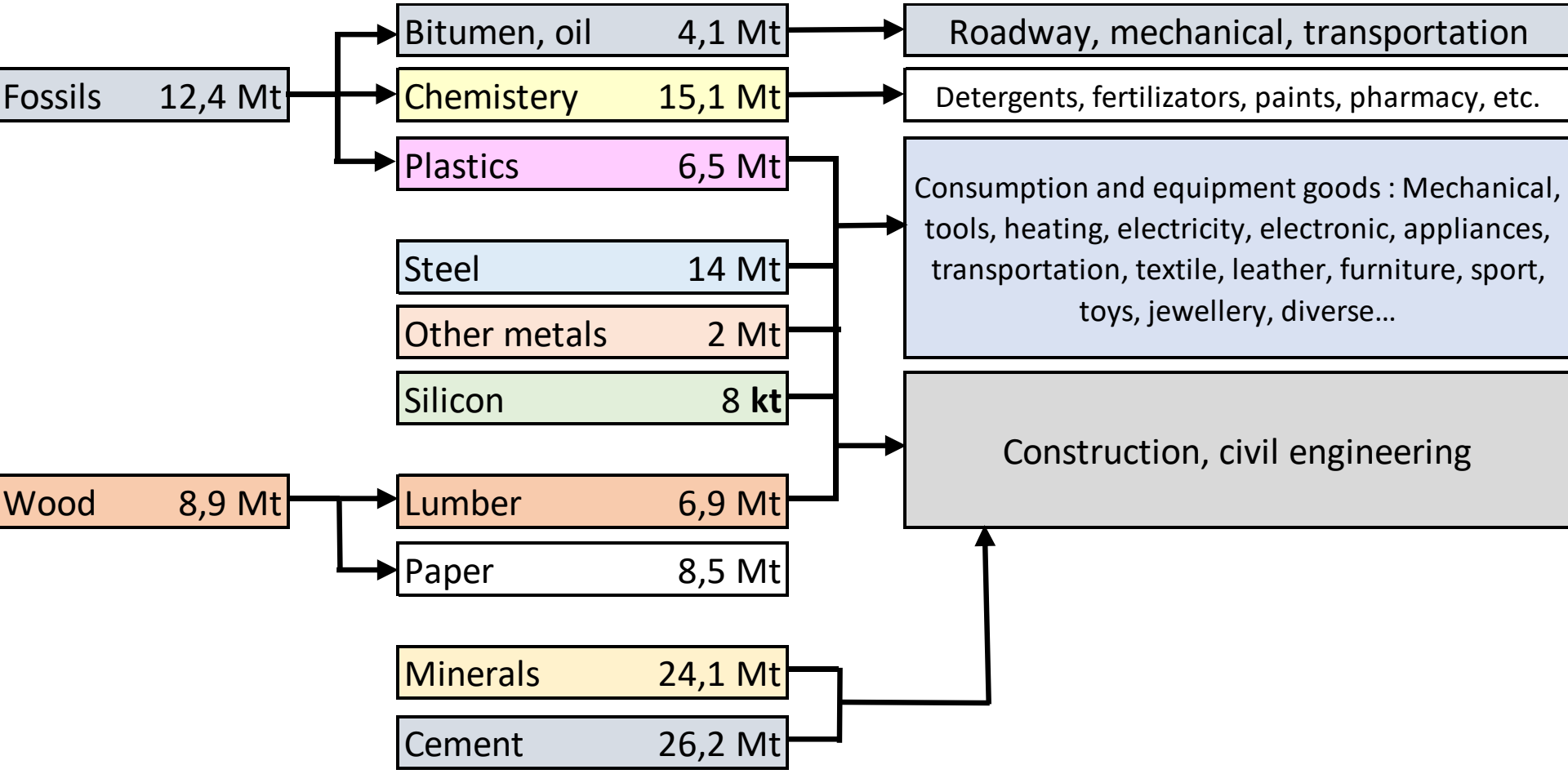
# Which and how much materials by 2050?

## Materials production in official scenarii

| Production | | | |
|---|---|---|---|
| Mtons | 2010 | 2030 | 2050 |
| Steel | 21,00 | 20,20 | 18,77 |
| Aluminium | 0,51 | 0,61 | 0,53 |
| Ethylène | 2,30 | 2,51 | 2,51 |
| Chlorine | 1,10 | 1,00 | 1,00 |
| Ammoniac | 1,03 | 0,88 | 0,88 |
| Clinker | 14,90 | 14,00 | 13,00 |
| Glass | 4,60 | 4,60 | 4,20 |
| Paper | 8,80 | 7,95 | 7,95 |
| Sugar | 4,60 | 4,54 | 4,54 |

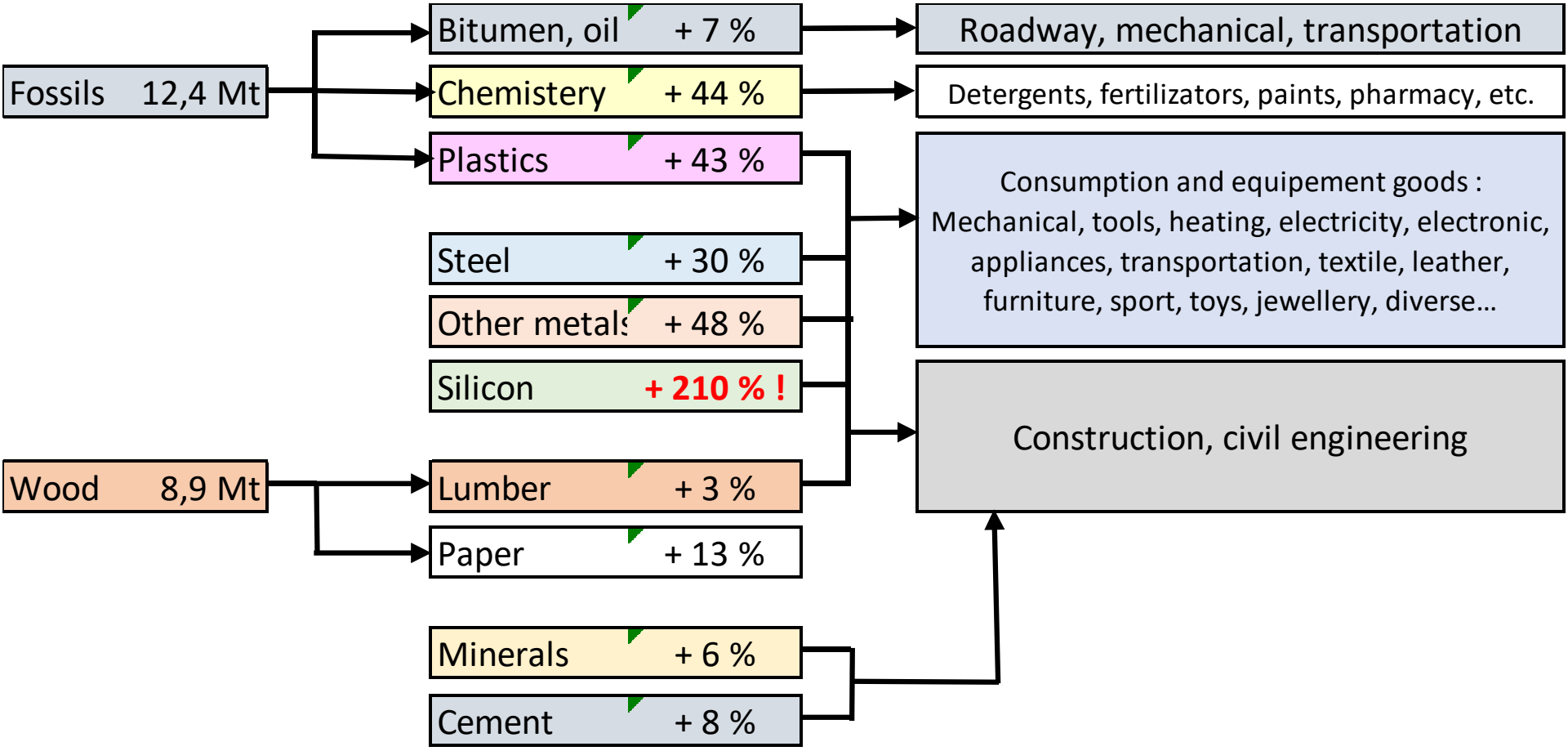
No real analysis about the amount of raw materials until 2050

# Raw materials and goods chain




Materials production in France

# National energy consumption and footprint




Raw materials consumption consummed for footprint

# Electronical industry's footprint

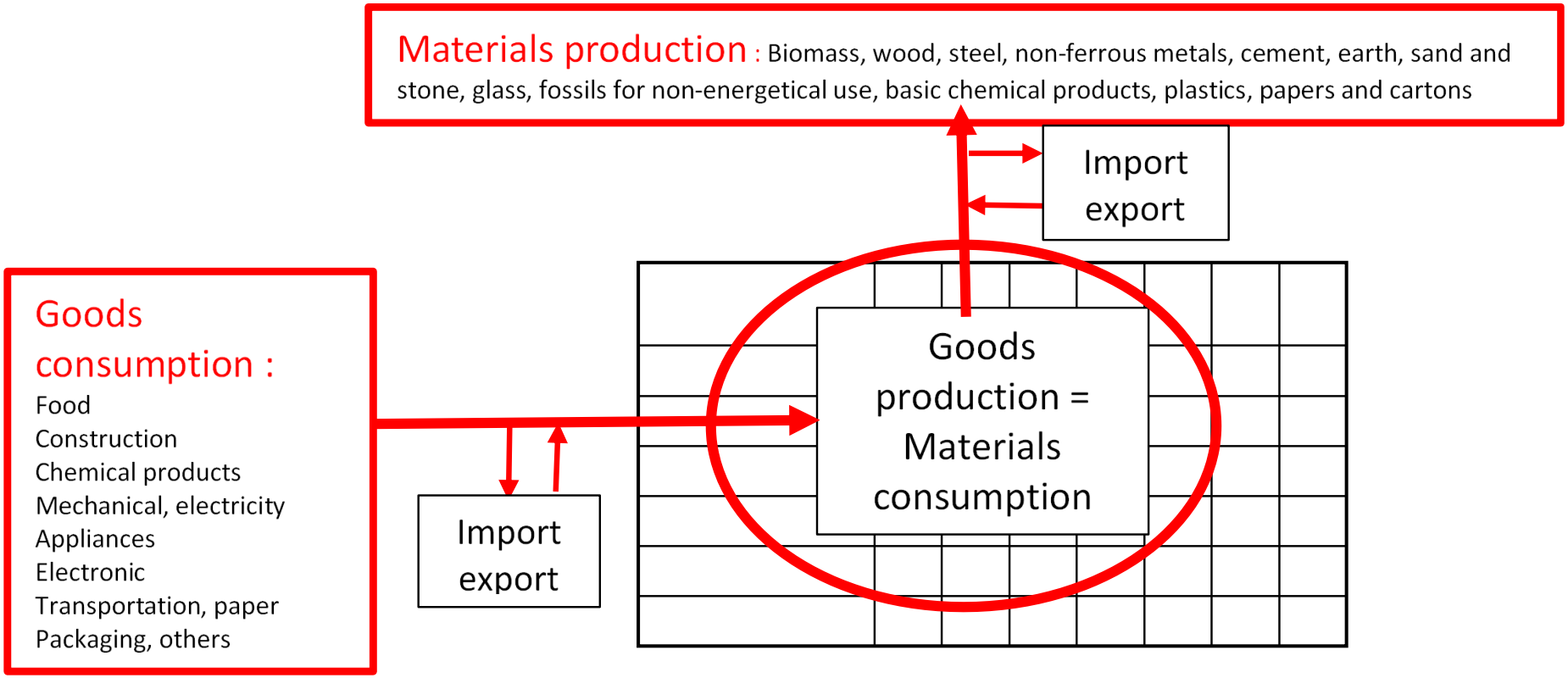
**COMPUTERS**
Production 30 000
Consumption 8 millions !

**MOBILE TELEPHONES**
Production 0
Consumption 24 millions !

**ELECTRONIC APPLIANCES**
Production 8 millions units
Consumption 79 millions units !

Manufactory energy required for :
Devices produced in France **30 TWh**
Devices consummed in France **220 TWh**

# Relation between goods and materials

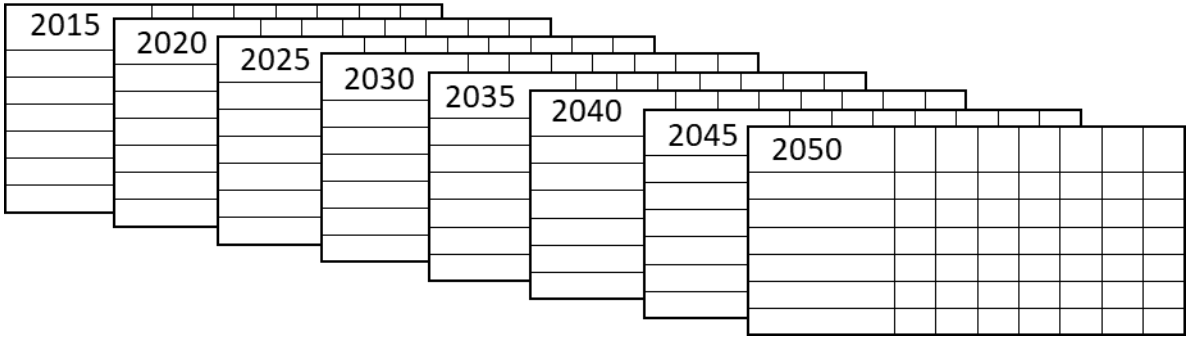



National **D**emand + **S**tock variation at year n =

**P**roduction + **I**mportations - **E**xportations

*(avalaible for goods and materials)*

# Materials and goods development




Evolutions algorithms depend on **hypothesys** for each section :

- Population growth
- **Consumption per capita** (sufficiency or growth)
- **Specific calculation modules** for construction, transportation, packaging, renewable energies
- Potential changes of **import/export rates**

# ADEME's reaserch project

ADEME

Agence de l'Environnement et de la Maîtrise de l'Energie

## Prospective energy material : scenarisation of industrial production levels until 2035 - 2050

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Solagro

ENERTECH

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# The prospective parameters for goods and materials demand

- **Population growth**
- Strong growth of **digital technologies**
- Products **Sustainability**

  End of planned obsolescence (law LTECV)

  To **Reduce** : to stop the disposable products

  To **Reuse** : second hand market development

  To **Repair :** better after sales guarantee

  To **pool** : leasing and sharing products

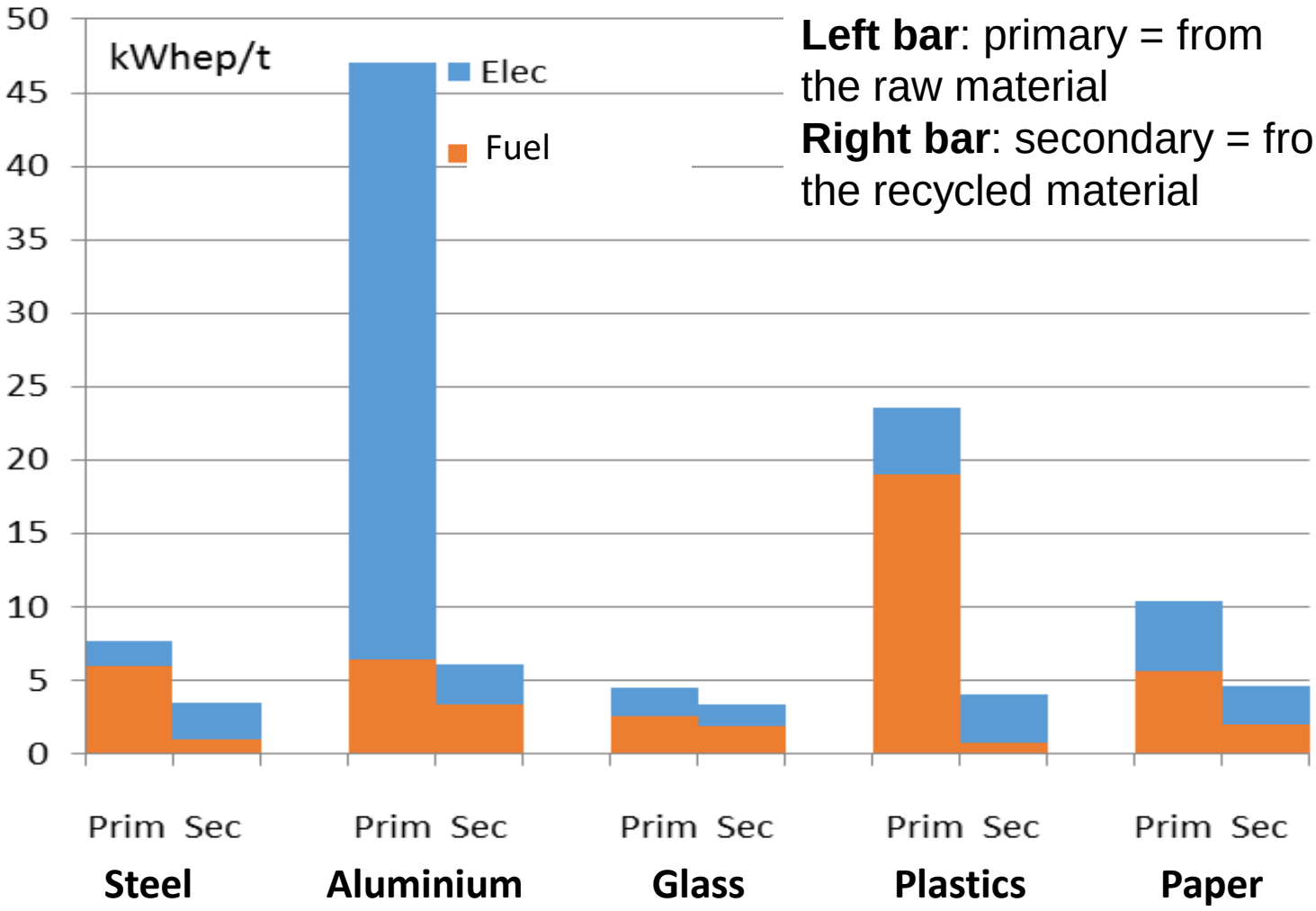
- **Recycling** materials

# An example of virtuous charter

The commitments
of company SEB

- 95% of repairable products
- 5,7 millions of spare parts
- -30% for spare parts price
- Availability for ten years

# Recycling



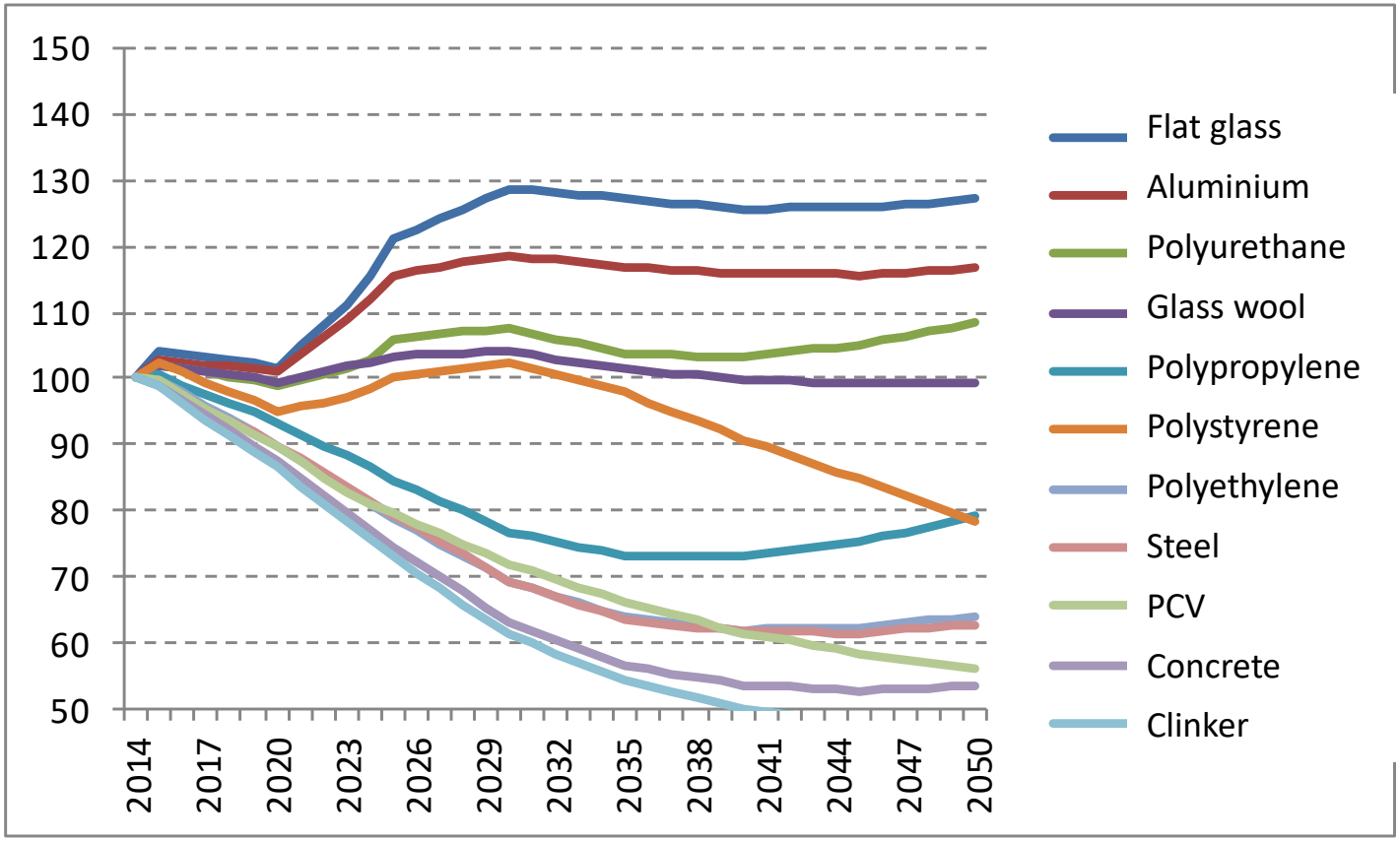

**Left bar**: primary = from the raw material
**Right bar**: secondary = from the recycled material

# Increased collecting and recycling

| Material | Collection rate | Recycling rate in France | Recycling rate in other countries | | Forecast Recycling rate |
|---|---|---|---|---|---|
| | 2015 | 2015 | 2015 | | nW 2050 |
| **Steel** | 74% | 57% | Italy | 81% | 90% |
| **Aluminium** | 26% | 53% | | | 86% |
| **Glass** | 42% | 45% | Belgium | 95% | 90% |
| **Plastics** | 15% | 10% | Germany | 38% | 40% |
| **Paper / cartons** | 74% | 59% | UK | 85% | 80% |
| **Oils** | | 30% | | | 80% |
| **Tires** | | 10% | | | 30% |
| **Bitumina** | | 4% | | | 85% |

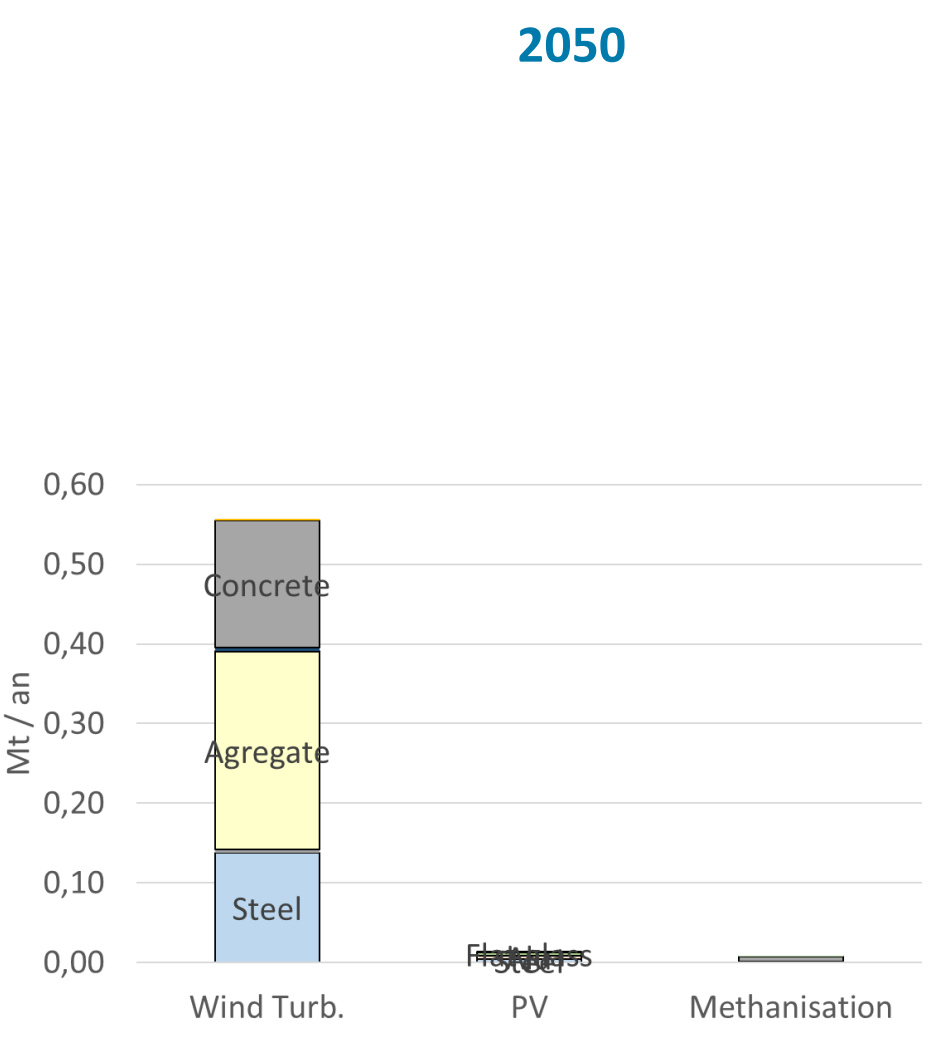
# Materials demand for construction

- Results:
  nW scenario



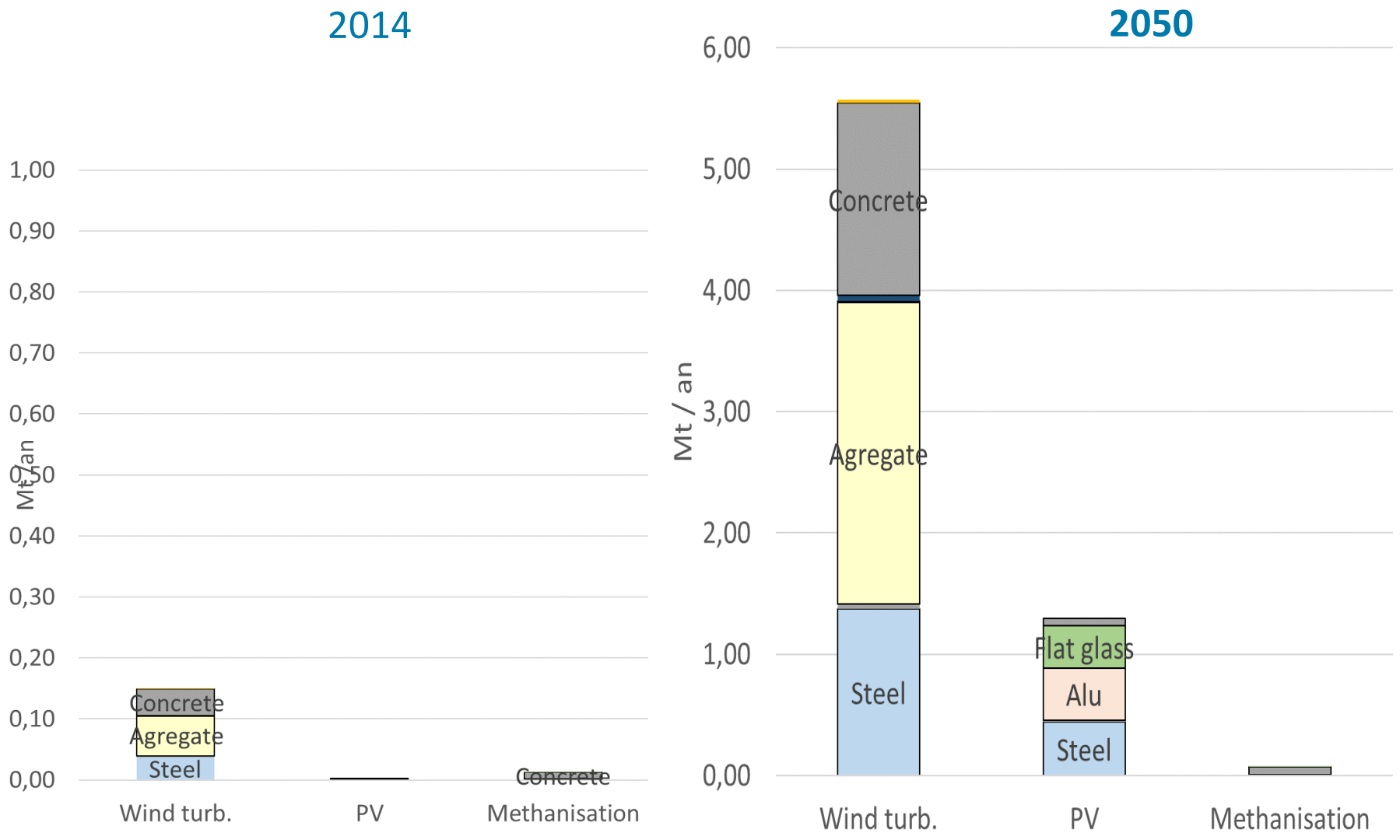

- ✓ New buildings construction with stabilised cohabitation rate
- ✓ All buildings renoved until 2050
- ✓ Roads construction reduced (-13% in 2035, -25% in 2050)
- ✓ PCV reduction and growth of biosourced materials

# Materials production for renewable energy


* Excluding foundations

# Materials footprint for renewable energy



# Materials demand for packaging

# Consumption of chemicals products

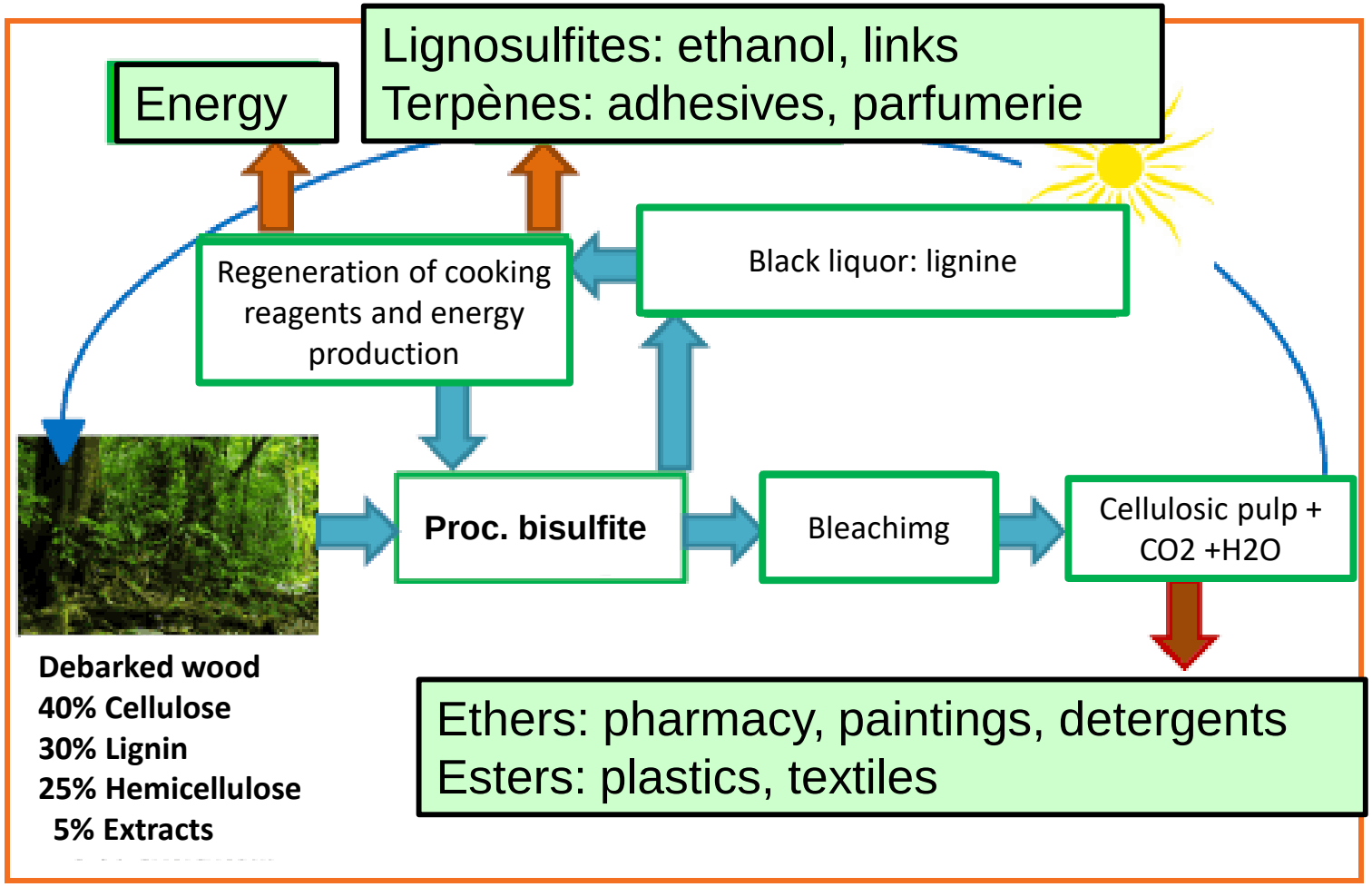
| Chemical products | PROSPECTIVE 2035 | 2050 |
|---|---|---|
| - **Nitrogenous fertilizers** | -33% | -43% |
| - **Phytosanitary products** | -20% | -30% |
| - **Cleaning products**: detergents, solvents, soaps, toiletries and perfumes | +8% | +15% |
| - **Other** products: paintings, varnishes, adhesives, inks, explosives, etc. | +8% | +15% |
| - **Pharmaceutical** products | +8% | +15% |

# Bio sourced materials

| Sector | Raw materials | Applications range | Efficency rates | Maturity | Alimentary competition |
|---|---|---|---|---|---|
| Starch | Wheat,corn,rice | Wide | | Yes | Yes |
| Sugar | Beetroot | Specific | High | Yes | Yes |
| Oil | Colza, sunflower | Wide | | Yes | Yes |
| LIgno-cellulosic | Wood | Wide | | R&D | No |
| | Myscanthus, switchgrass… | Wide | | R&D | Yes |
| Algae | | Wide | Low | R&D | No |

| Sector | Starch | Sugar | Oil | Cellulose | Algae |
|---|---|---|---|---|---|
| Plastics, rubber | X | | | X | X |
| Solvents | | X | X | | X |
| Detergents | | | X | X | X |
| Parachemistery | X | | | X | X |

# Wood chemistery



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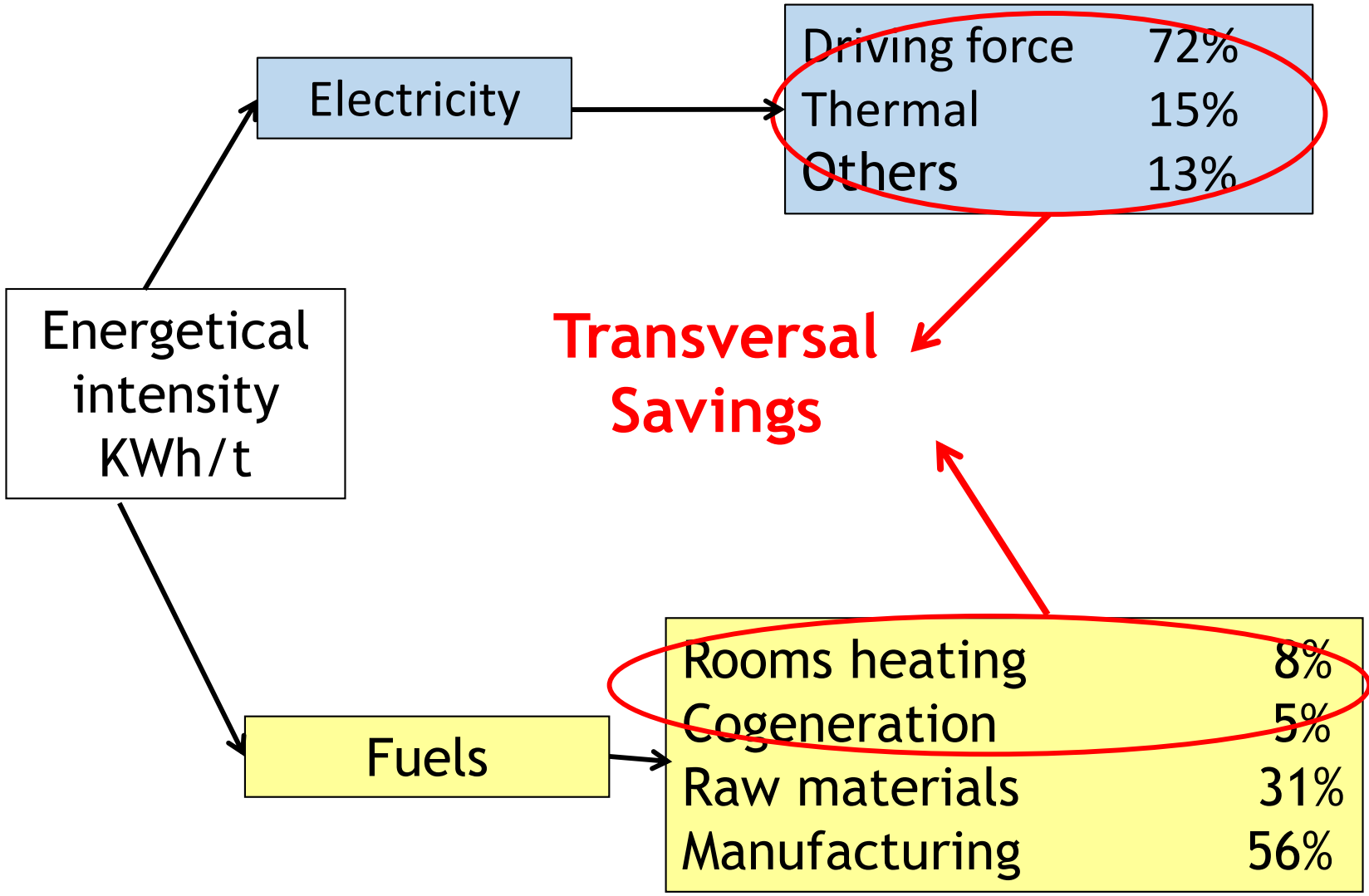
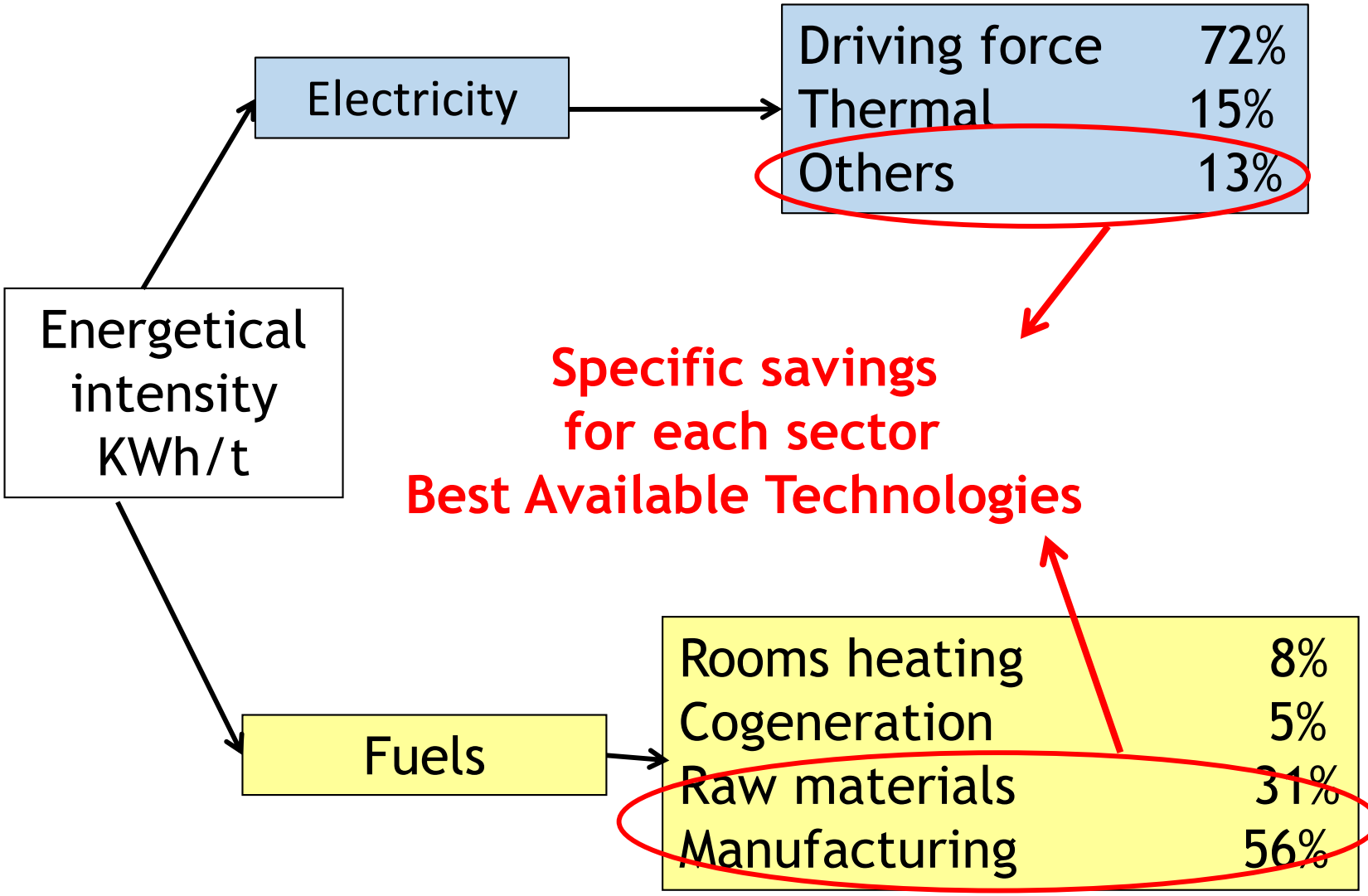
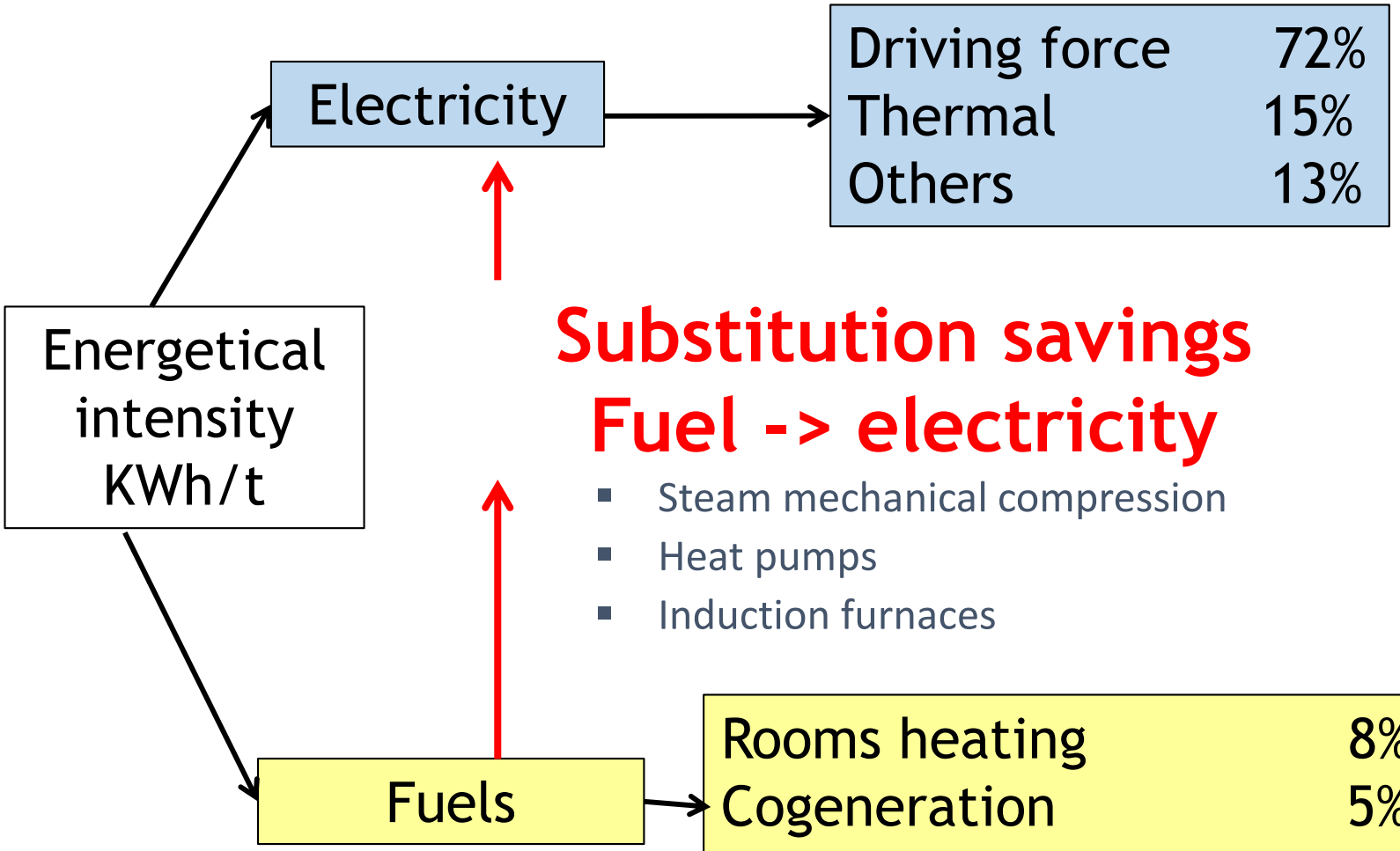
# Cross energy savings



# Sectorial energy savings

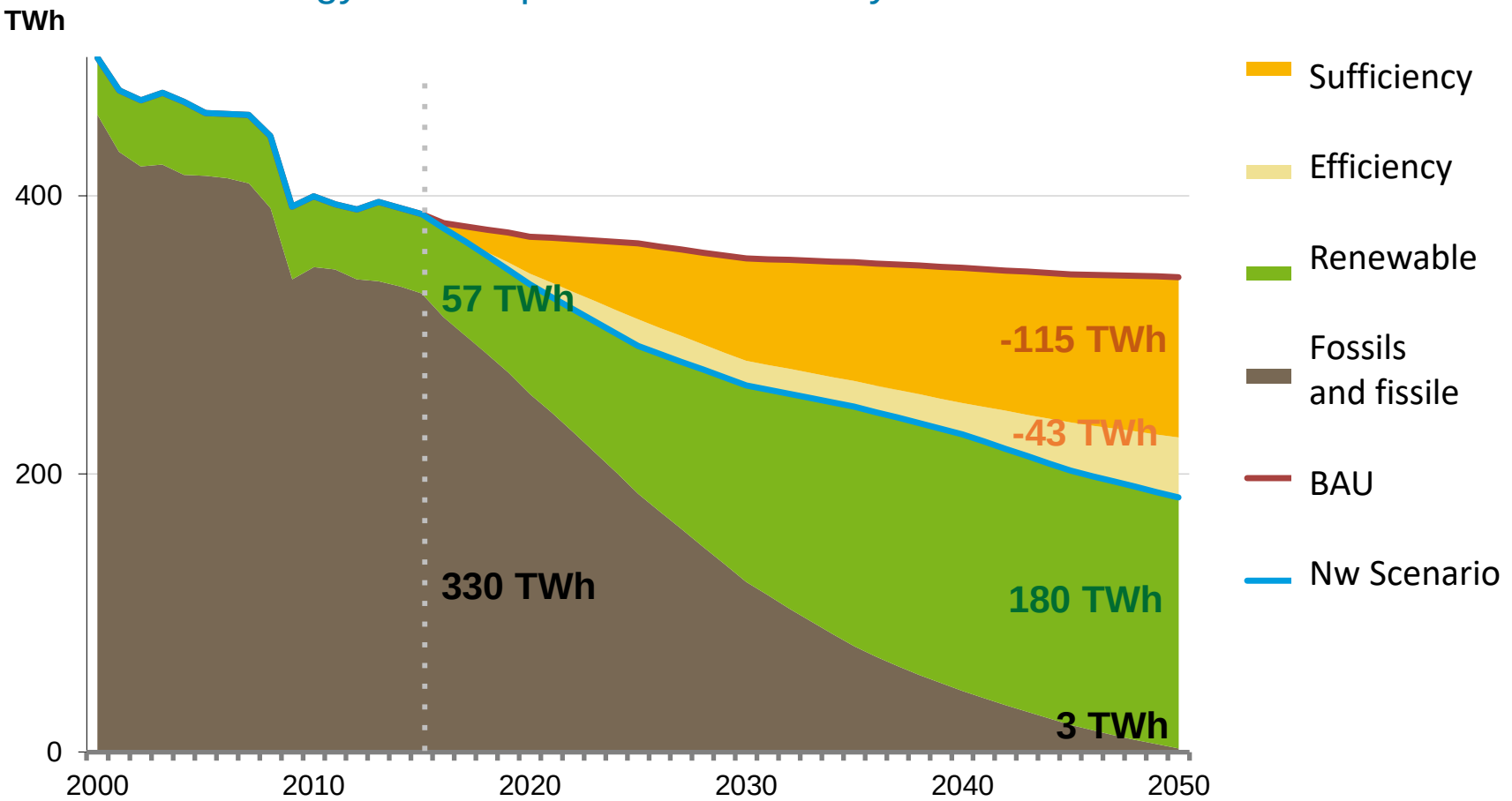


# Energy substitution



# Global results for the industry

## FInal energy consumption of the industry sector



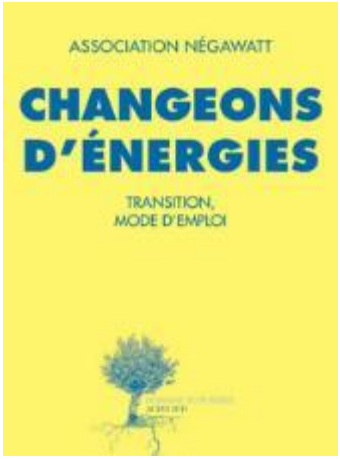
# More information

Contact : contact@negawatt.org

- Technical and synthetic reports
- Graphics and data
- Videos
- Press coverage
- négaWatt news

**www.negawatt.org**

- Books


- Debunking energy issues

Décrypter l'énergie

**www.decrypterlenergie.org**