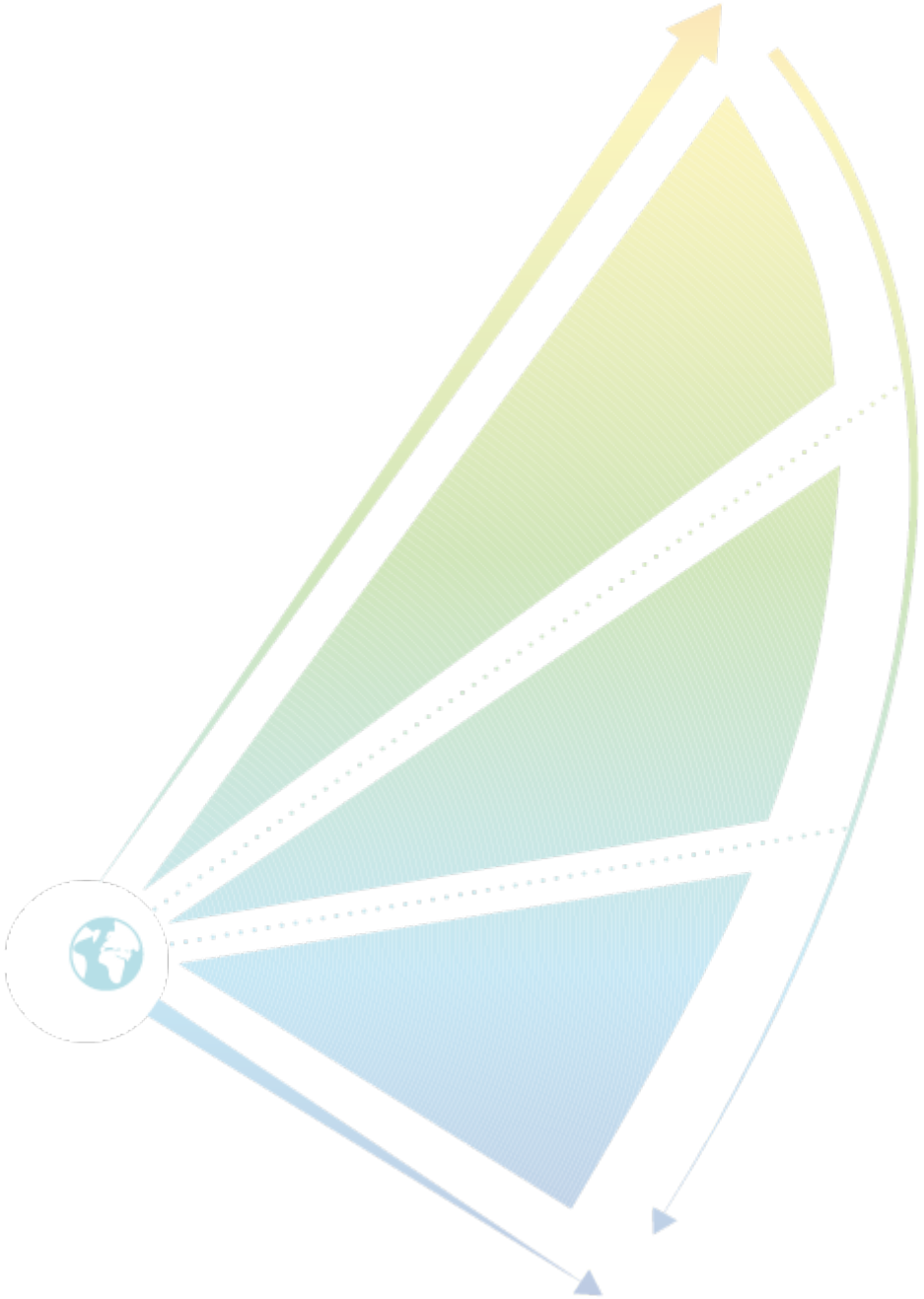


PIK PEP1.5 Final Symposium

Archetypes of decarbonization pathways and climate policy entry points to raise ambition

Demand-led transition scenario for France & EU

Sufficiency in the négaWatt 2017-2050 scenario and beyond

Yves MARIGNAC
Spokesperson,
Association négaWatt

Building A56, Telegrafenberg – Potsdam
4 September 2019

The négaWatt association

ASSOCIATION négaWatt

- A think tank on energy 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

Energy is a system framing our society

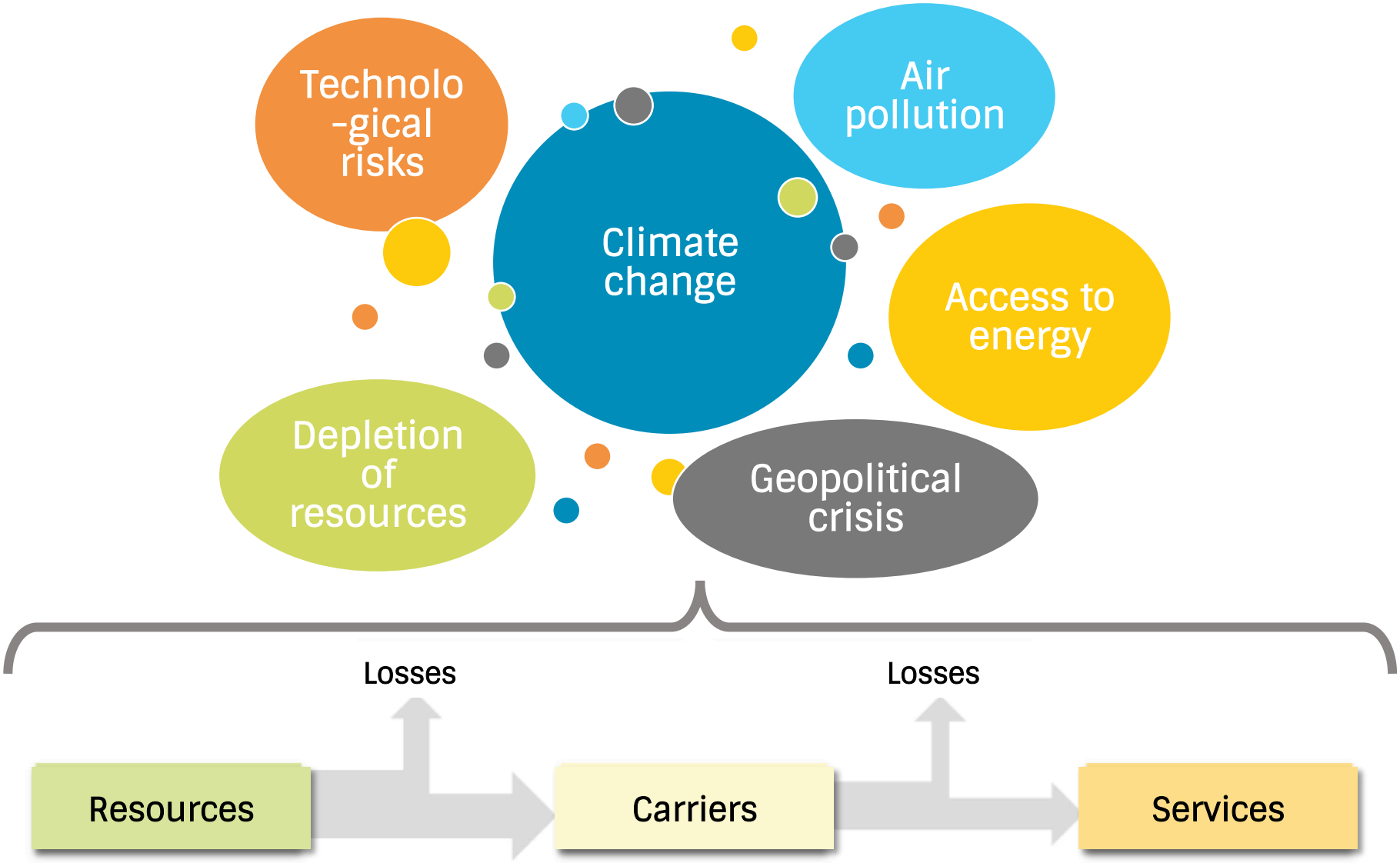
A complex system of extraction, conversion, transformation, transport and storage of energy

Resources

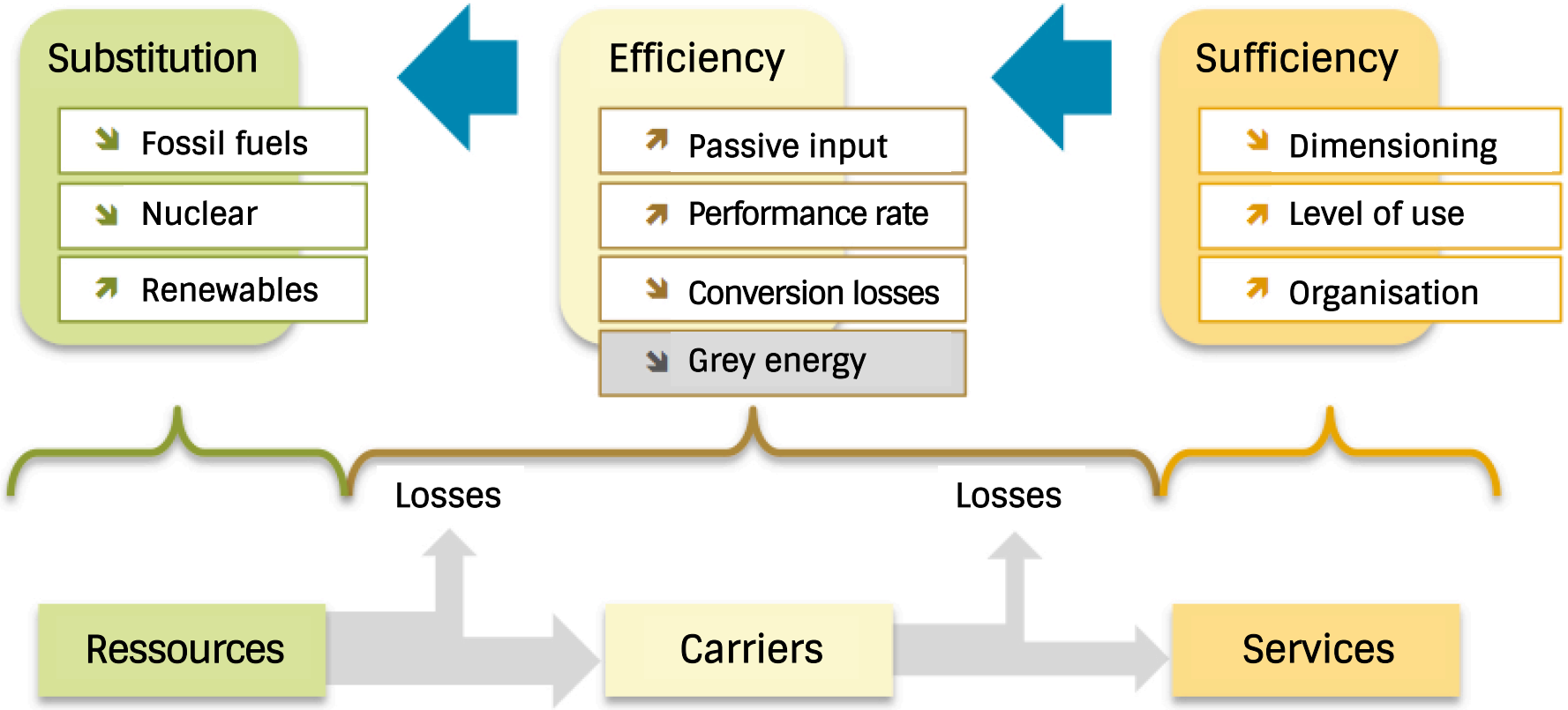
Carriers

Services

This system is not sustainable



A systemic response to unsustainability



Source: Association négaWatt - 2018

Cautious approach to the role of innovation

Readiness of new technologies

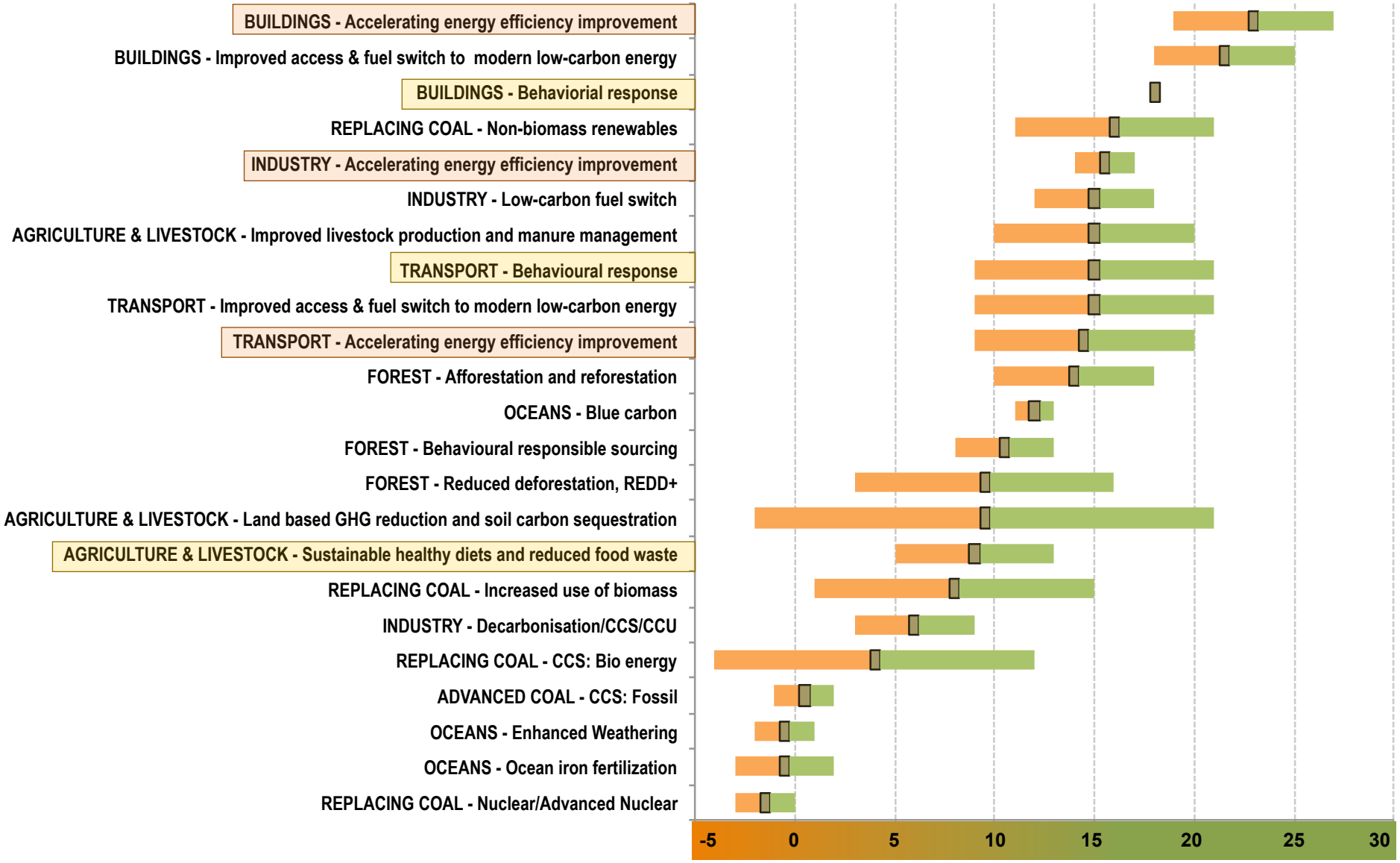
	Technological (TRL)	Industrial (MRL)	*Environnemental and social (ESRL)*
7	System demonstration	Prototype in operational conditions	*Modelisation of generic impacts*
8	Validation by tests and demonstrations	Development and demonstration of complete real scale system	*Impact assessment based on real data of a prototype*
9	Proven real system through successful operations	Implementation and manufacturing of system	*Systemic and multi-scale assessment*
10	*Optimized system*	Full scale production	*Impacts measured through real operation*
11		*Massive deployment, system integration*	*Social and environmental acceptability, indirect effects measured*

GHG emissions reduction & SDGs

Options for climate action (reduction of net GHG emissions)		Social				Social 2				Environmental				Economic					Cumulative score		
	United Nations sustainable development goals	1	2	3	4	5	10	16	17	6	12	14	15	7	8	9	11	13			
		No Poverty	Zero hunger	Good health and well-being	Quality education	Gender equality	Reduced inequalities	Peace, justice and strong institutions	Partnerships for the goals	Clean water and sanitation	Responsable consumption / production	Life below water	Life on land	Affordable and clean energy	Decent work and economic growth	Industry, innovation and infrastructure	Substainable cities and communities	Climate action	Maximum	Total (mean value)	Minimum
Industry	Accelerating energy efficiency improvement	+2		+2	+1		+1		+2	+2 -1	+1			+2	+1	+1	+2	n.d.	17	15,5	14
	Low-carbon fuel switch			+2	+1				+2	+2 -2	+2		+1 -1	+2	+2	+2	+2	n.d.	18	15	12
	Decarbonisation/CCS/CCU			-1					+2	+1 -1	+2	-1		+2 -2	+2	+2		n.d.	9	6	3
Buildings	Behaviorial response	+2		+2				+2		+2	+2			+2	+2	+2	+2	n.d.	18	18	18
	Accelerating energy efficiency improvement	+2 -1	+2	+2	+2	+1	+1 -1	+2	+2	+2	+1		+2	+2	+2 -1	+2	+2	n.d.	27	23	19
	Improved access & fuel switch to modern low-carbon energy	+2	0 -1	+2	+1	+1		+2	+2	+2 -1	+2 -1		+2	+2	+2	+2	+3	n.d.	25	21,5	18
Transport	Behavioural response	+2 -1	+2	+2 -1	+1	+1	+2	+1 -1	+2	+2	+2			+2	-2	+2 -2	+2	n.d.	21	15	9
	Accelerating energy efficiency improvement	+2 -1		+2				+2	+2	+2	+2			+2	+2 -2	+2 -2	+2	n.d.	20	14,5	9
	Improved access & fuel switch to modern low-carbon energy	+2 -1	0	+2			+2	+1 -1	+2	+2 -1	+2			+2	+2 -2	+2	+2	n.d.	21	15	9
Replacing coal	Non-biomass renewables	+2		+2	+1	+1	+1	+2	+2 0	+2 -2	+2	+2 -1	-1	+3	0	0 -1	+2	n.d.	21	16	11
	Increased use of biomass	+2 -2	+2 -2	+2						+1 -2	+2		+1 -2	+3	+1	+1		n.d.	15	8	1
	Nuclear/Advanced Nuclear			-1				-1		+2 -1			-1	+1	+1	-1		n.d.	0	-1,5	-3
	CCS: Bio energy	+2 -2	+1 -2	+2 -1						+1 -2	+1		+1 -2	+2	+1	+1		n.d.	12	4	-4
Advanced coal	CCS: Fossil			-1						+1 -2				+2	-1	+1		n.d.	2	0,5	-1
Agriculture & livestock	Sustainable healthy diets and reduced food waste	0 -1	+2	+1				+1 -1	+1 -1	+2 -1	+2		+1	+1	+1	+1		n.d.	13	9	5
	Land based GHG reduction and soil carbon sequestration	+2	+2	+2 -2	+2 -2	+2 0	+1 0	0 -1	+2	+1 -1	+1		+1 -1	+1	+2 -1	+2 -2		n.d.	21	9,5	-2
	Improved livestock production and manure management systems	+2	+2	+2 -2		+2 0	+1 0	+1	+2	+2 -1	+1		+1	+1	+1	+2		n.d.	20	15	10
Forest	Reduced deforestation, REDD+	+2	+1 -2		+1	+1 -1	+2	+2	+1 -1	+1 -1	+1		+1	+1 -1	+1	+1 -1		n.d.	16	9,5	3
	Afforestation and reforestation	+2 -2	+1 -1	+1	-1	+1	+1	+1	+2	+2 -1		+2	+2	+1	+2		+2	n.d.	18	14	10
	Behavioural responsible sourcing					0	0	+1	+1	+2 -1	+1		+1 -1	+1	+2	+2	+2	n.d.	13	10,5	8
Oceans	Ocean iron fertilization		+1 -1									+1 -2						n.d.	2	-0,5	-3
	Blue carbon	+3	+3							+2		+2 0	+3					n.d.	13	12	11
	Enhanced Weathering											+2 -1	-1					n.d.	1	-0,5	-2

Source: négaWatt, from IPCC (2018) Special report 1.5°C

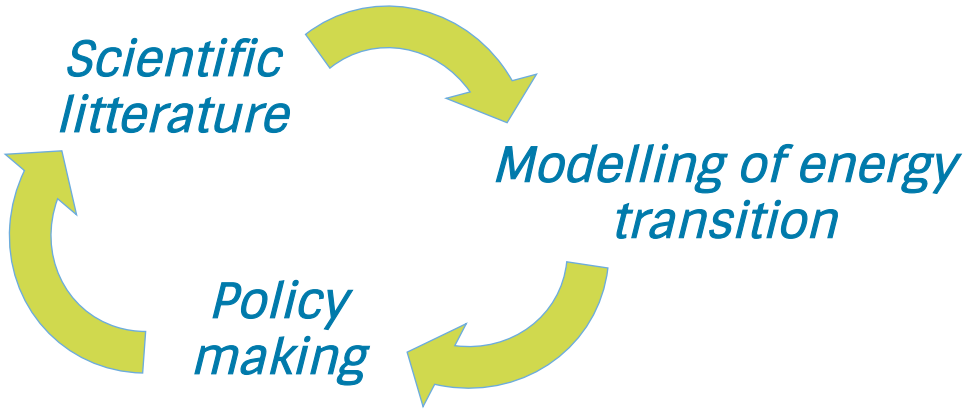
Towards a systemic merit order



Source: négaWatt, from IPCC (2018) Special report 1.5°C

Need for better accounting of sufficiency

- Growing recognition of the need for questioning energy services
- The sufficiency concept: Rethinking and redesigning individual and collective practices to favour activities and services that are intrinsically low on energy use
- Sufficiency does not receive a similar amount of attention/credit, compared to efficiency and renewables



- Lack of trust in the feasibility and applicability of sufficiency approaches that needs to be discussed and overcome

Three levels of sufficiency

1 **Dimensional sufficiency**

Size, nominal capacity of equipments

Size / adapted cars to various uses

Surfaces of houses, offices…

2 **Servicial sufficiency**

Intensity and duration of use of equipments

Turning off lights, computers…

Reducing obsolescence of appliances

3 **Organisational sufficiency**

Collective planning and sharing

Car-sharing, co-working…

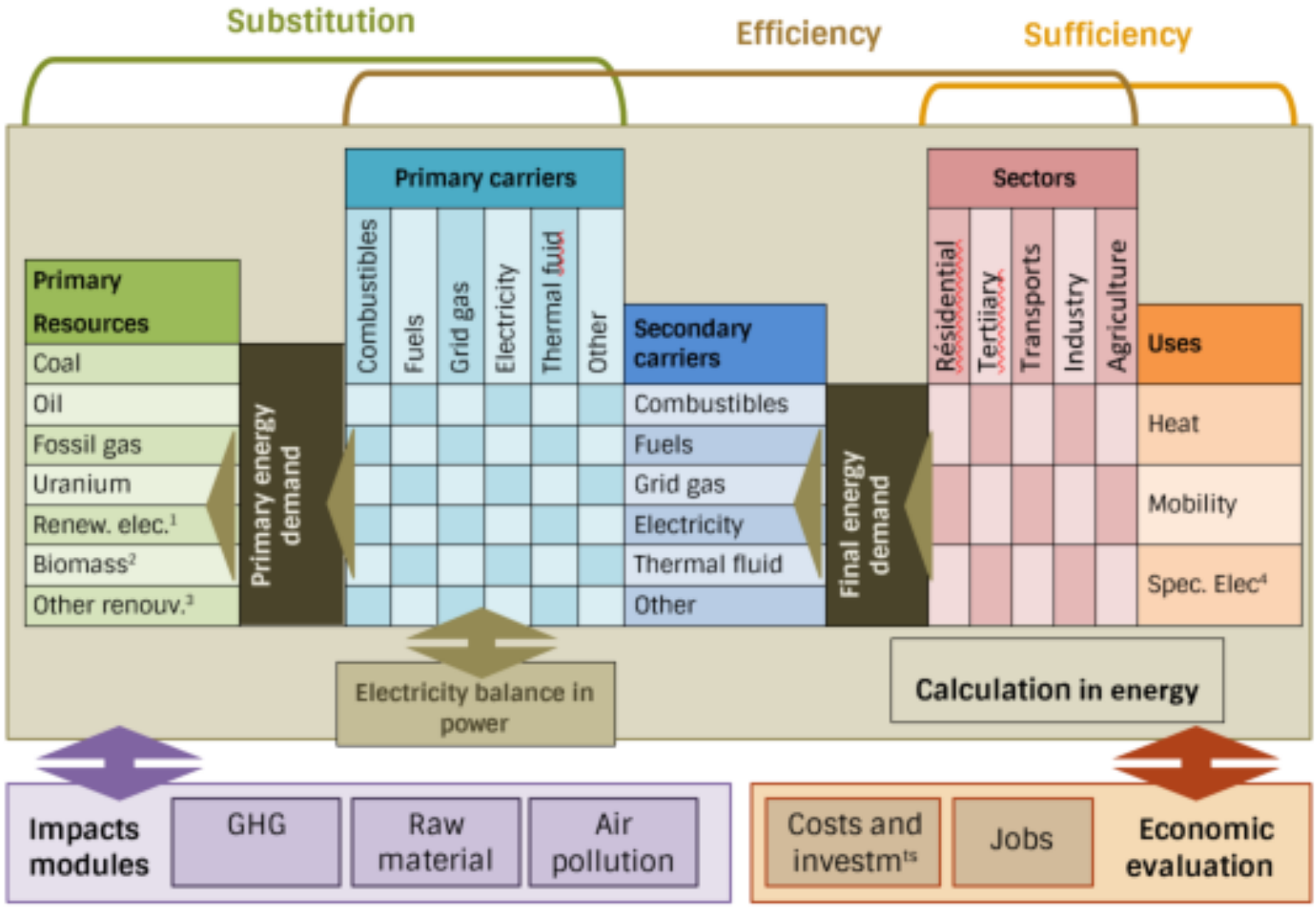
Urban planning (reducing distances)

+ Sufficiency on other goods and food

Four levels of efficiency

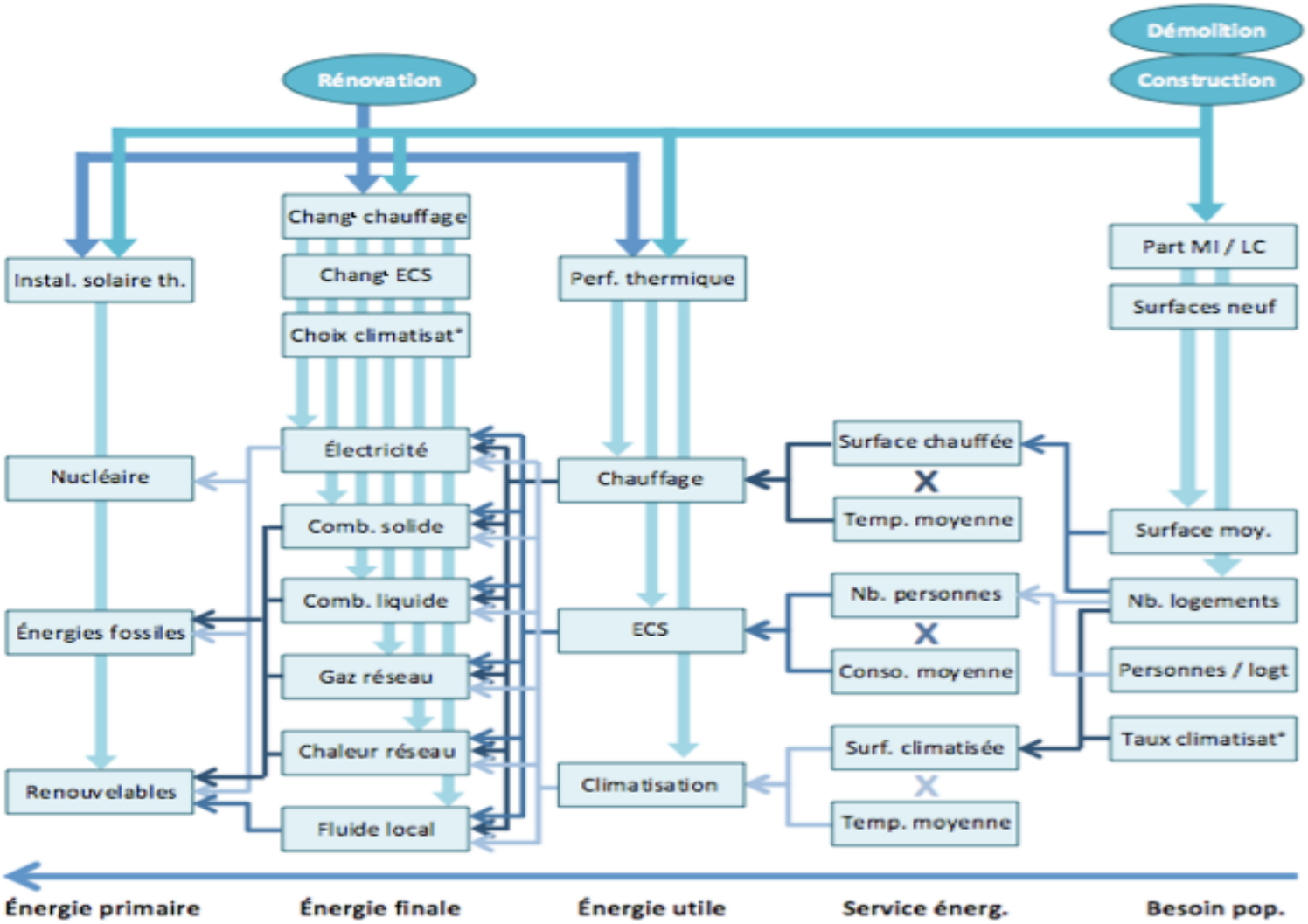
1	Efficiency of building and manufacturing	Grey energy	Life-cycle energy optimisation, upfront and after use *Recycling, use of biomaterials Building with wood…*
2	Efficiency in using and adaptating	Useful energy	Insulation, passive gains, optimisation of energy exchanges with environment *Thermal retrofitting of existing buidings*
3	Efficiency of equipments	Final energy	Reduction of losses, conversion performance of end-use equipments *Efficient lights, appliances, vehicles…*
4	Efficiency of production	Primary energy	Conversion performance of production, reuse of energy *Combined heat and power (CHP)*

Modelling approach for the négaWatt scenario



Source: Association négaWatt - 2018

Example: residential buildings



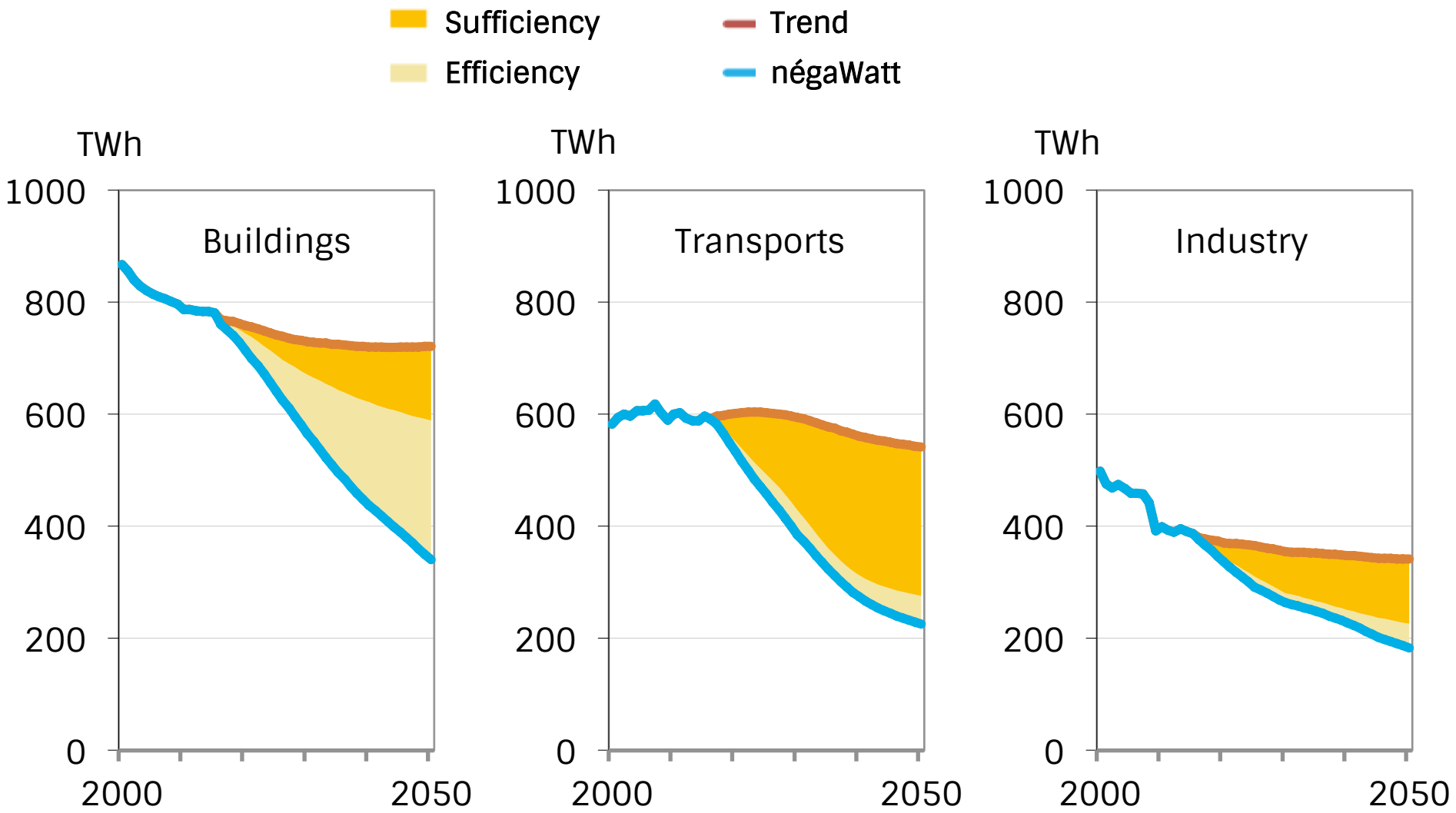
Source: Association négaWatt - 2018

Sufficiency indicators

Sector	Area of need	Parameter	Example of units	Sufficiency measure
Transport	Mobility	Registered cars	Number per year; Number of cars per household	Less demand for individual transportation; More use of public transport
	Mobility	Size of cars	Cubic capacity; Car model	Use of smaller cars
	Mobility	Distance travelled	Kilometres per person	Reduction of kilometres travelled by car (through urban planning, etc.)
	Mobility	Air travel	Number of short/medium/long haul flights per year; number of person kilometres per year	Reduction of private and business air-travel
Buildings	Dwelling & construction	Heating temperature	°C room temperature	Heat rooms less strongly
	Dwelling & construction	Floor space	m^2 per person; m^2 per unit of tertiary activity	Reduction of floor space per person; sharing of space (coworking…)
	Dwelling & construction	Warm water use	Liter per household and year	Reduction of warm water temperature
	Dwelling & construction	Electric appliances	Number per household; Size of appliances; Usage rate per hour / day	Reduction of multiple equipment; sharing of appliances; size reduction of appliances; reduction of usage rate
	Dwelling & construction	Electricity consumption	Kilowatt hours per household and year	Reduction of most consuming activities (e.g. electric drying)
Agriculture	Nutrition	Animal stock	Number of animals per hectare; Kg meat consumption per person and year	Reduction of meat consumption
	Nutrition	Food waste	Kg per household and year	Reduction of food waste; better meal planning and adapted shopping

Source: based on UBA (2018): Mit Suffizienz mehr Klimaschutz modellieren

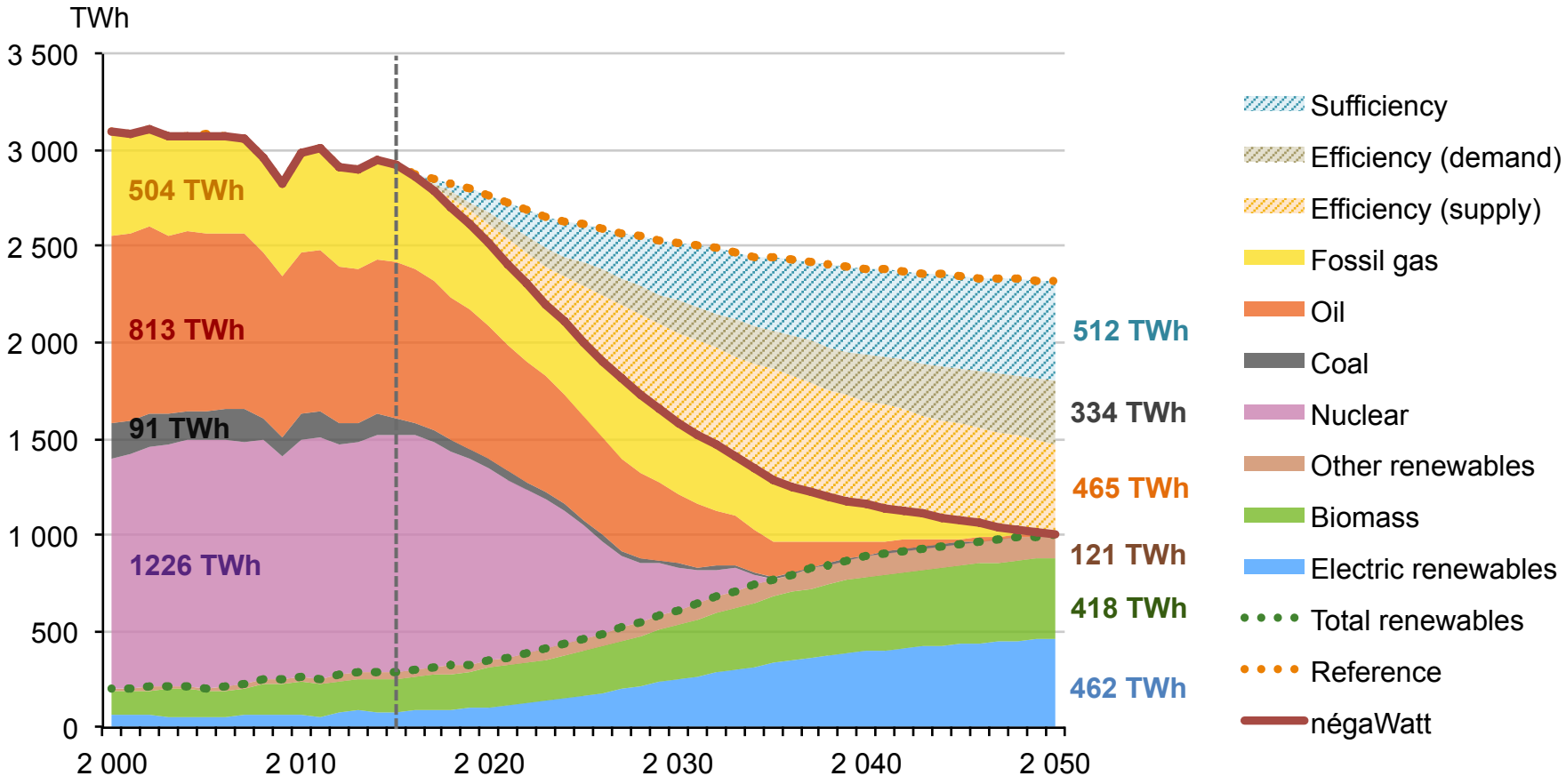
Change in energy demand



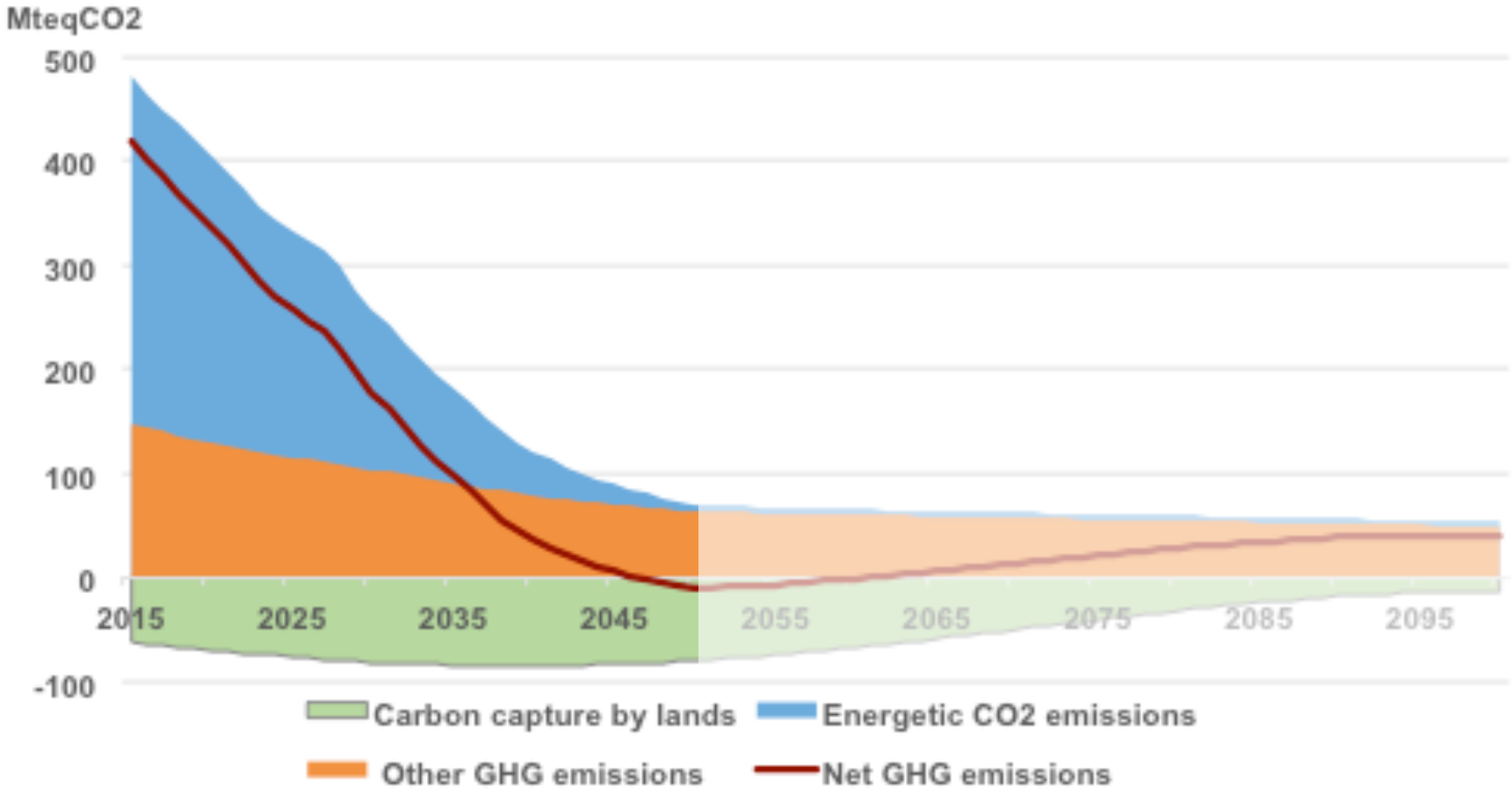
Evolution of final energy consumption in the négaWatt scenario

Primary energy consumption

Primary energy consumption in the négaWatt scenario 2017-2050 for France



Reduction of net GHG emissions



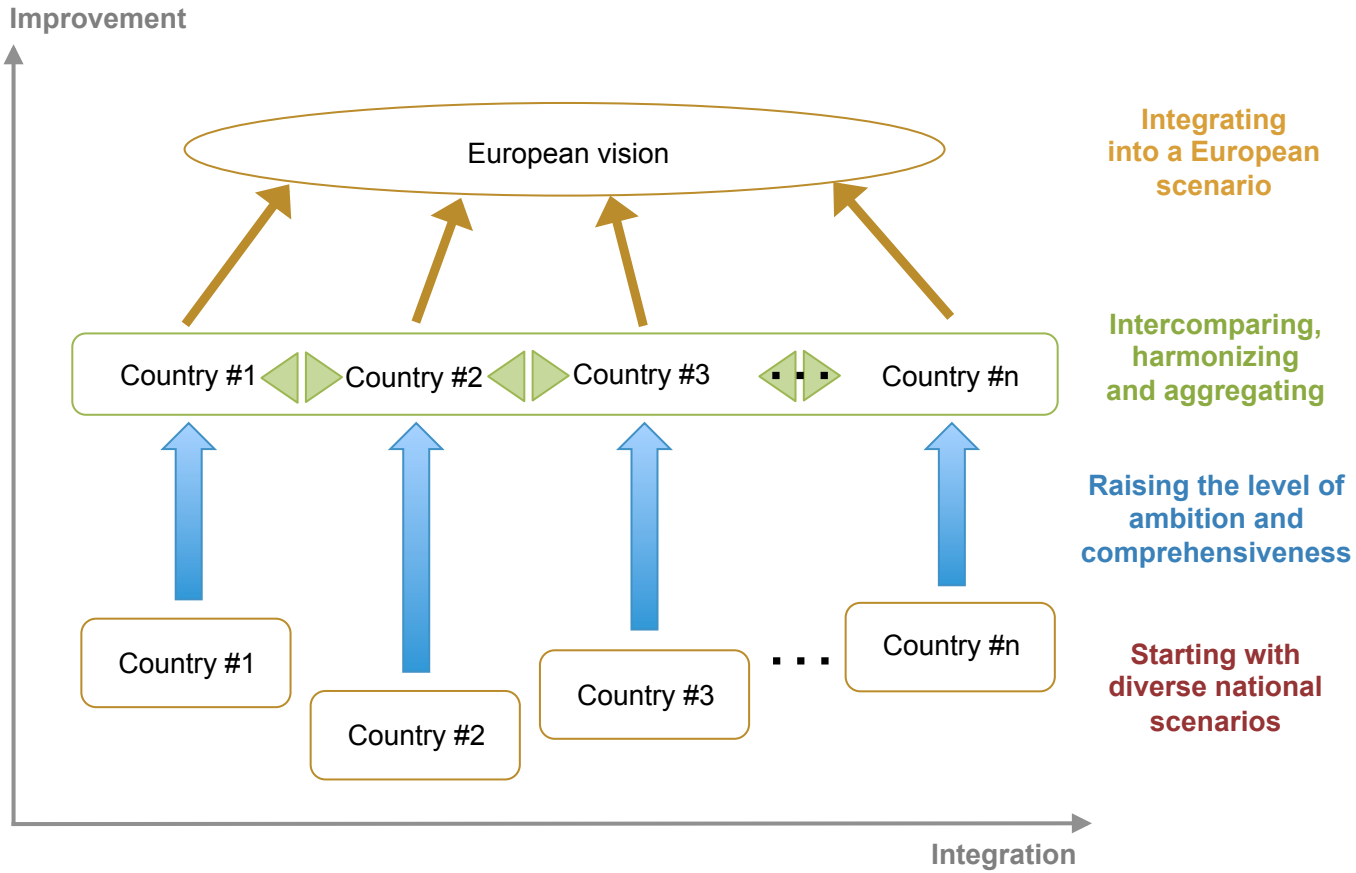
Evolution of raw and net GHG emissions by 2050 (and extension to 2100)

Conclusions

- Energy sufficiency has a key role to play as part of a demand-side policy in deep decarbonization pathways
- It has multiple systemic co-benefits,
  and reduces the burden on / risk of scaling up technological options
- Changes in lifestyle at stake are not necessarily radical
  (and not heavier than those experienced in the past 30 years)
- Behaviour change is not an individual issue,
  and can only come through appropriate collective frameworks
- Appropriate policies and measures can deliver on sufficiency
  the same way they can do on energy efficiency and fuel switch

European project

- Building a similar systemic, bottom-up approach on the European level
- Discussing the balance of sufficiency, efficiency and substitution in different national contexts
- Integrating into a cooperative European vision



More information

Contact : contact@negawatt.org

- Technical and synthetic reports
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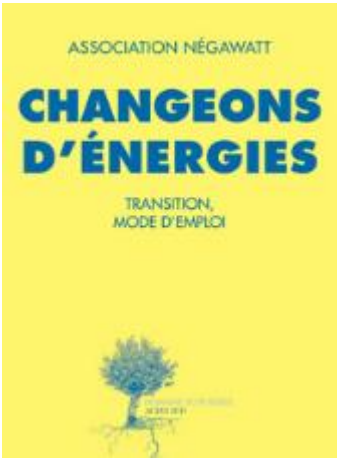
- Press coverage
- négaWatt news

www.negawatt.org

- Books



- Debunking energy issues

Décrypter l'énergie

www.decrypterlenergie.org