

Energy sufficiency: key messages for policy makers | February 2018

Energy sufficiency in Buildings

Why, where, and how?

Ideas from the concept paper on energy sufficiency in buildings

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What does energy sufficiency in buildings mean?

adequate space **thoughtfully** constructed and **sufficiently** equipped for **reasonable** use

- **adequate:** e.g. EU adequate housing, UK bedroom standard, German definition of adequate space in the living space usage regulation for persons receive housing allowances
- **thoughtfully:** with attention to detail of material, adaptation to changing use and needs, deconstruction instead of demolition
- **sufficiently:** equipment for specific needs and use, without equipment not used or needed
- **reasonable:** use of rooms / space, use of equipment, heating and ventilation practices

Areas for energy sufficiency actions in buildings: space, construction, equipment, use

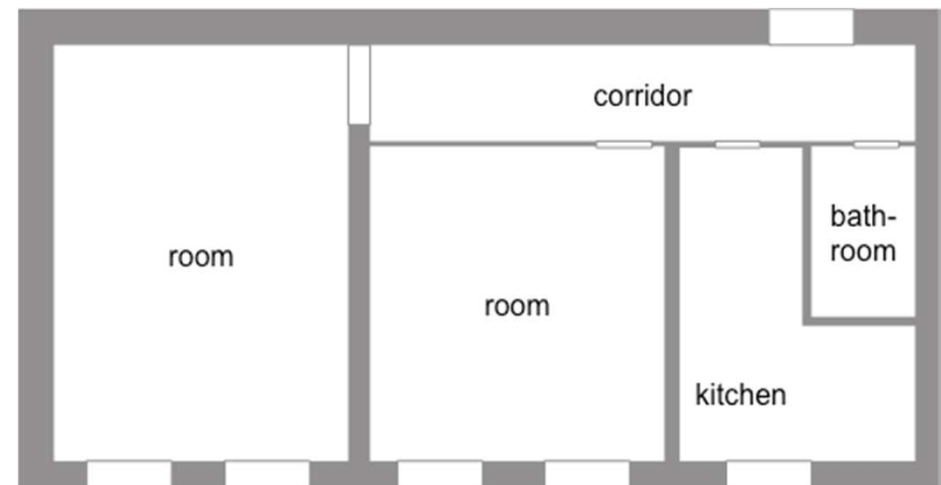
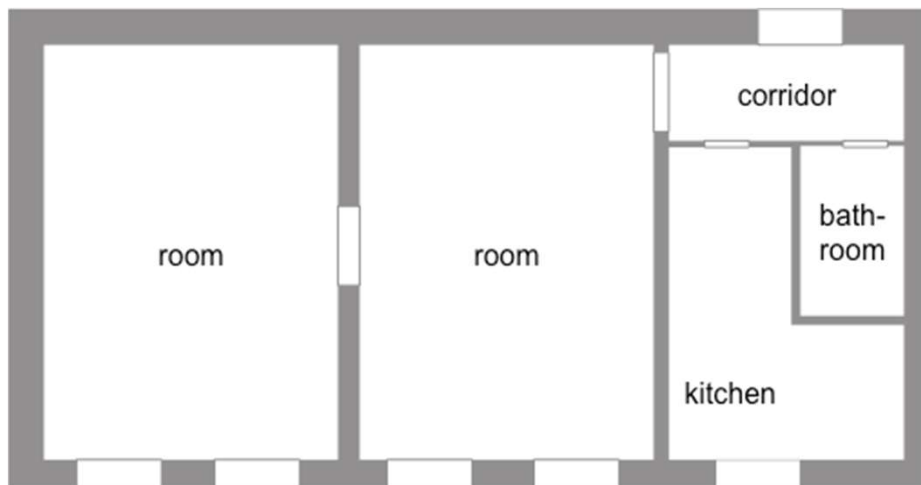
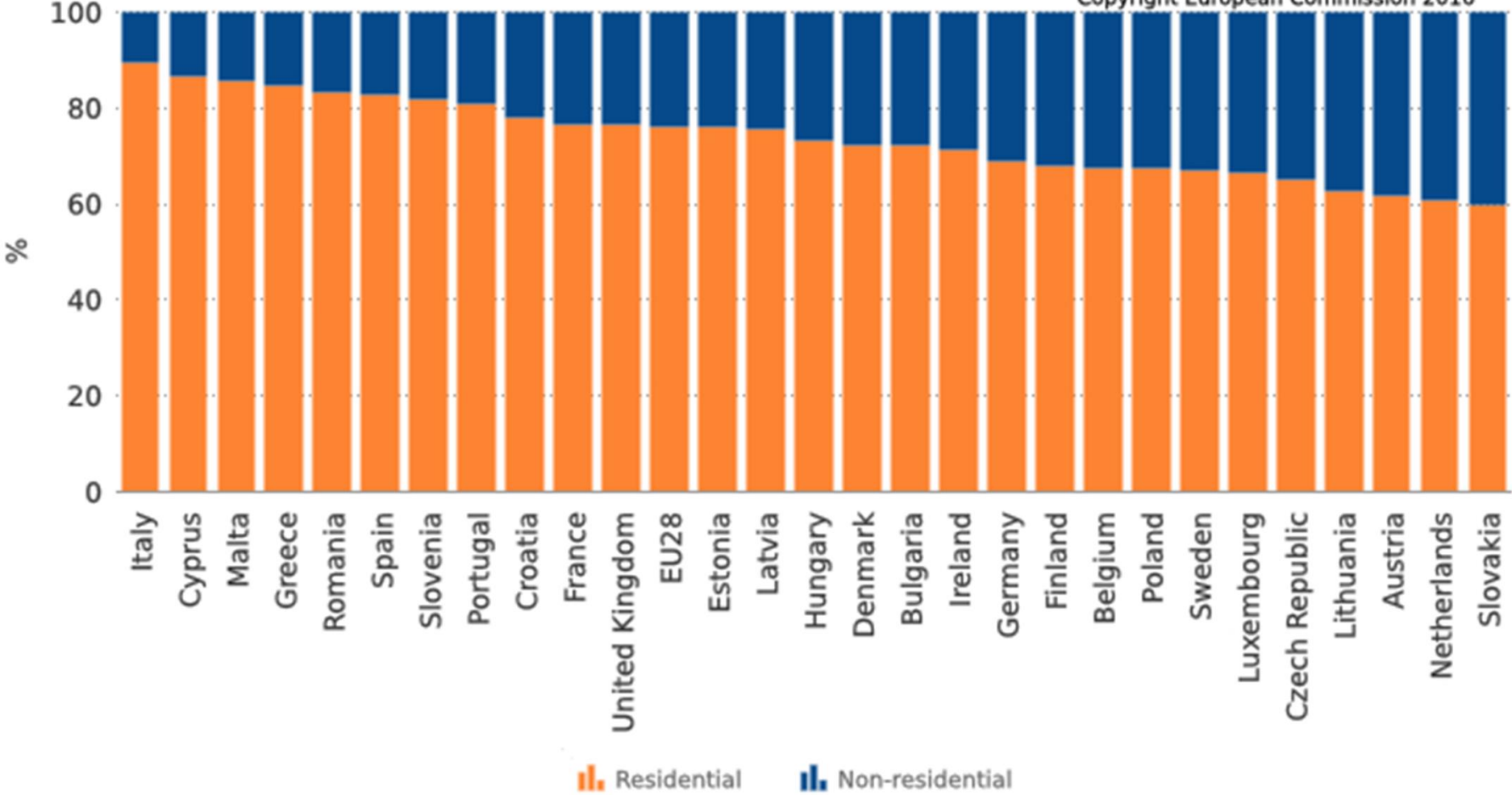


Figure 1: Breakdown of building floor area (2013)

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Living space per person in EU countries (may include holiday residences)

Country	m ² /cap	Country	m ² /cap
Romania	18,1	Germany	46,6
Poland	27,1	France	46,9
Lithuania	29,8	Sweden	48,5
Estonia	31,5	Italy	49,1
Slovakia	31,6	Luxembourg	51,1
Croatia	33,0	Spain	52,4
Latvia	34,6	Netherlands	52,4
Slovenia	34,6	Finland	52,6
Czech Rep.	35,6	Greece	53,8
Belgium	38,3	Austria	55,0
UK	42,0	Cyprus	59,0
Ireland	45,5	Malta	62,2
Hungary	45,7	Denmark	62,7
Bulgaria	46,1	Portugal	63,7

Living space per person in EU countries

	2008	2009	2010	2011	2012	2013	2014
Romania	15,58	16,05	16,38	17,17	17,45	17,71	17,99
Poland	24,22	24,59	25,61	25,92	26,25	26,60	27,05
Lithuania	25,60	26,06	26,64	27,90	28,58	29,00	29,53
Estonia	29,36	29,80	30,05	30,34	30,67	31,06	31,44
Slovakia	30,48	30,70	30,92	31,14	31,32	31,53	31,67
Croatia	31,39	34,04	34,76	35,39	36,24	37,19	38,23
Latvia	28,57	29,00	29,81	30,98	31,76	33,14	34,30
Slovenia	33,19	33,31	33,49	33,79	33,99	34,17	34,61
Czech Rep.	34,05	34,40	34,78	34,64	35,09	35,13	35,70
Belgium	38,06	38,11	38,14	37,91	37,94	38,07	38,35
UK	40,08	40,03	40,24	39,97	40,37	41,62	42,37
Ireland	40,62	41,29	42,15	43,06	43,27	44,42	45,76
Hungary	38,26	38,18	39,79	43,97	44,24	44,87	45,61
Bulgaria	32,02	32,45	32,80	38,50	38,99	44,17	45,83
Germany	42,10	42,44	43,69	44,82	45,00	46,48	46,87
France	45,61	45,84	46,09	46,35	46,63	46,90	47,24
Sweden	49,22	49,45	49,51	49,79	49,69	49,57	49,05
Italy	48,95	49,17	49,56	49,57	49,69	49,57	49,14
Luxembourg	52,69	52,75	52,78	52,93	52,76	52,64	52,34
Spain	49,72	50,03	50,35	50,59	50,79	51,10	52,33
Netherlands	48,42	49,17	49,79	50,37	50,99	51,92	52,66
Finland	50,73	51,16	51,21	51,74	52,22	52,60	52,82
Greece	50,80	51,12	51,40	51,61	51,55	52,41	53,44
Austria	48,50	48,87	49,42	52,50	49,97	51,80	52,57
Cyprus	72,08	73,39	73,69	74,03	73,41	73,95	77,59
Malta	43,79	44,44	45,05	57,40	59,08	60,83	62,81
Denmark			59,13	62,08	62,42	62,62	63,10
Portugal	51,52	51,85	59,22	60,66	61,12	61,65	63,39

≤ 30 m²/cap
 30 m²/cap < < 50 m²/cap
 ≥ 50 m²/cap

Approach to analyse a sufficiency potential

Space reduction target: 35 m² / cap

Country	Reduction		Country	Reduction	
Belgium	8,3%	1	Lithuania	-17,6%	0
Bulgaria	24,1%	3	Luxembourg	31,5%	3
Czech Rep.	1,7%	1	Hungary	23,4%	3
Denmark	44,2%	4	Malta	43,8%	4
Germany	24,9%	3	Netherlands	33,3%	3
Estonia	-11,2%	0	Austria	36,4%	3
Ireland	23,1%	3	Poland	-29,3%	0
Greece	34,9%	3	Portugal	45,1%	4
Spain	33,2%	3	Romania	-93,8%	0
France	25,3%	3	Slovenia	-1,2%	0
Croatia	-6,1%	0	Slovakia	-10,6%	0
Italy	28,8%	3	Finland	33,5%	3
Cyprus	40,7%	4	Sweden	27,9%	3
Latvia	-1,3%	0	United Kingdom	16,7%	2

Rating		
0	very low	≤ 0%
1	low	0,1-10%
2	average	10,1-20%
3	high	20,1-40%
4	very high	> 40%

Under-occupation and overcrowding rate

- High overcrowding rate and low under-occupation rate => less potential for sufficiency

Population without bath, shower, indoor flushing toilet in household

- High share of population => less potential for sufficiency
- Hints at more space needed

Dwelling not comfortably warm during winter time

- High share of population => less potential for sufficiency
- Hints at need for efficiency and / or heating system

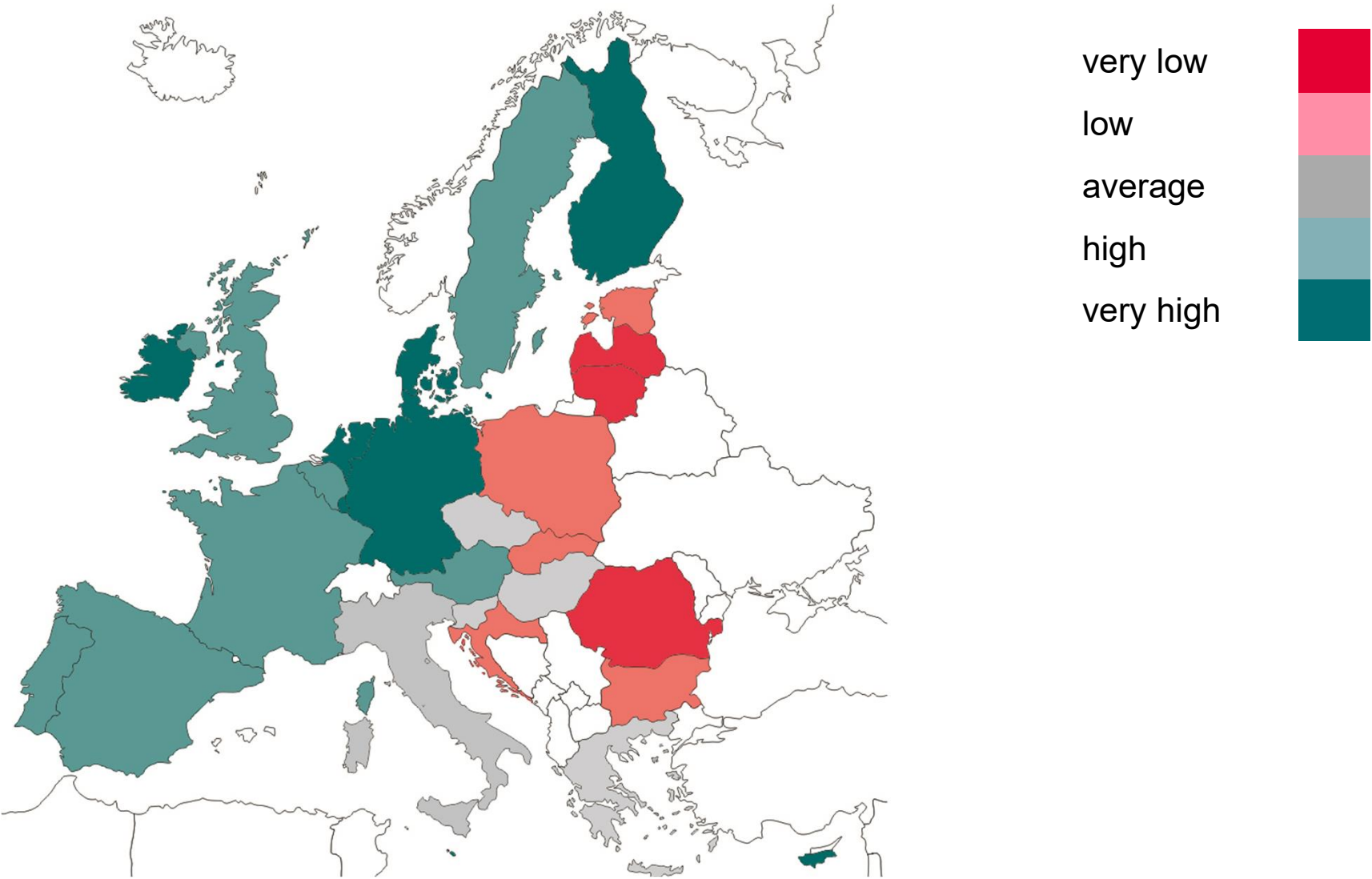
Indicator	Rating	
Space reduction	8,3%	1
Under-occupation / Overcrowding	70%	4
Sanitary equipment	0,2%	3
Warm in winter	12,6%	3
$1+4+3+3 = 11$ $11:4 = 2,75$	Overall rating:	2,8

Sufficiency potential in EU countries

Country	Overall rating	Country	Overall rating
Luxembourg	3,8	Portugal	2,5
Germany	3,5	Italy	2,3
Ireland	3,5	Czech Republic	2,0
Netherlands	3,5	Slovenia	2,0
Denmark	3,3	Greece	1,8
Cyprus	3,3	Hungary	1,8
Malta	3,3	Estonia	1,5
Finland	3,3	Slovakia	1,5
Spain	3,0	Croatia	1,3
Austria	3,0	Bulgaria	1,0
Sweden	3,0	Poland	1,0
United Kingdom	3,0	Latvia	0,8
Belgium	2,8	Lithuania	0,8
France	2,8	Romania	0,8

very low	0 - 0,8
low	0,9 - 1,6
average	1,7 - 2,4
high	2,5 - 3,0
very high	3,1 - 4

Sufficiency potential in EU countries



Overarching instruments

- set targets
- develop strategic policy roadmaps

Address specific areas for sufficiency

- support energy sufficiency actions
- mandate energy sufficiency actions



Instruments mitigating the
macro drivers of energy consumption

Instruments advancing
energy sufficiency at the micro and meso level

Buildings:
construction, equipment, use

Target: climate-neutral stock
+ efficiency and sufficiency funds

Integrated buildings policy for
energy efficiency and
energy sufficiency

Dwelling floor area (size)

Cap on floor area per person:
Legally binding or policy target?

Instruments to support and inform
for new forms of housing, moving
to smaller dwellings, sharing flats

Elements of the package for energy sufficiency policy for buildings

Instruments on building floor area

- cap on average dwelling floor area per person as an overarching instrument
- municipal living space agencies: living space advice, practical support for moving, and the provision of financial support
- financial incentives for alternative forms of housing with smaller per capita area
- securing and creating energy-sufficient building infrastructure, e.g. clothes drying or cool storage rooms

Instruments on construction, equipment, use

- targets for a climate-neutral building stock
- energy pricing instruments
- energy efficiency and sufficiency funds, financial incentives
- sufficiency-oriented product and buildings policy targeting building and equipment use (Minimum Energy Performance Standard, labelling)
- Energy sufficiency advice
- Promotion of energy sufficiency services

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Thank you
for your attention!

See our website for further information
www.wupperinst.org

Theoretical potential: under-occupation minus overcrowding

Share of population

Country	Reduction		Country	Reduction	
Belgium	70%	4	Lithuania	-6%	0
Bulgaria	-31%	0	Luxembourg	49%	4
Czech Rep.	3%	1	Hungary	-33%	0
Denmark	37%	3	Malta	65%	4
Germany	29%	3	Netherlands	49%	4
Estonia	16%	2	Austria	16%	2
Ireland	68%	4	Poland	-31%	0
Greece	-18%	0	Portugal	27%	3
Spain	52%	4	Romania	-44%	0
France	36%	3	Slovenia	16%	2
Croatia	-32%	0	Slovakia	-27%	0
Italy	-12%	0	Finland	42%	4
Cyprus	70%	4	Sweden	32%	3
Latvia	-30%	0	United Kingdom	44%	4

Rating		
0	very low	≤ 0%
1	low	0,1-10%
2	average	10,1-20%
3	high	20,1-40%
4	very high	> 40%

Population without bath, shower, indoor flushing toilet in household

Share of population

Country	Reduction		Country	Reduction	
Belgium	0,2%	3	Lithuania	10,6%	1
Bulgaria	11,1%	1	Luxembourg	0,0%	4
Czech Rep.	0,2%	3	Hungary	3,4%	2
Denmark	0,5%	3	Malta	0,0%	4
Germany	0,0%	4	Netherlands	0,0%	4
Estonia	4,9%	2	Austria	0,3%	3
Ireland	0,0%	4	Poland	2,6%	2
Greece	0,4%	3	Portugal	0,9%	3
Spain	0,1%	3	Romania	30,5%	0
France	0,3%	3	Slovenia	0,3%	3
Croatia	1,5%	2	Slovakia	0,7%	3
Italy	0,0%	4	Finland	0,3%	3
Cyprus	0,8%	3	Sweden	0,5%	3
Latvia	12,3%	1	United Kingdom	0,4%	3

Rating		
0	very low	> 20%
1	low	10,1-20%
2	average	3,1-10%
3	high	0,6-3,0%
4	very high	< 0,5%

Dwelling not comfortably warm during winter time

Share of population

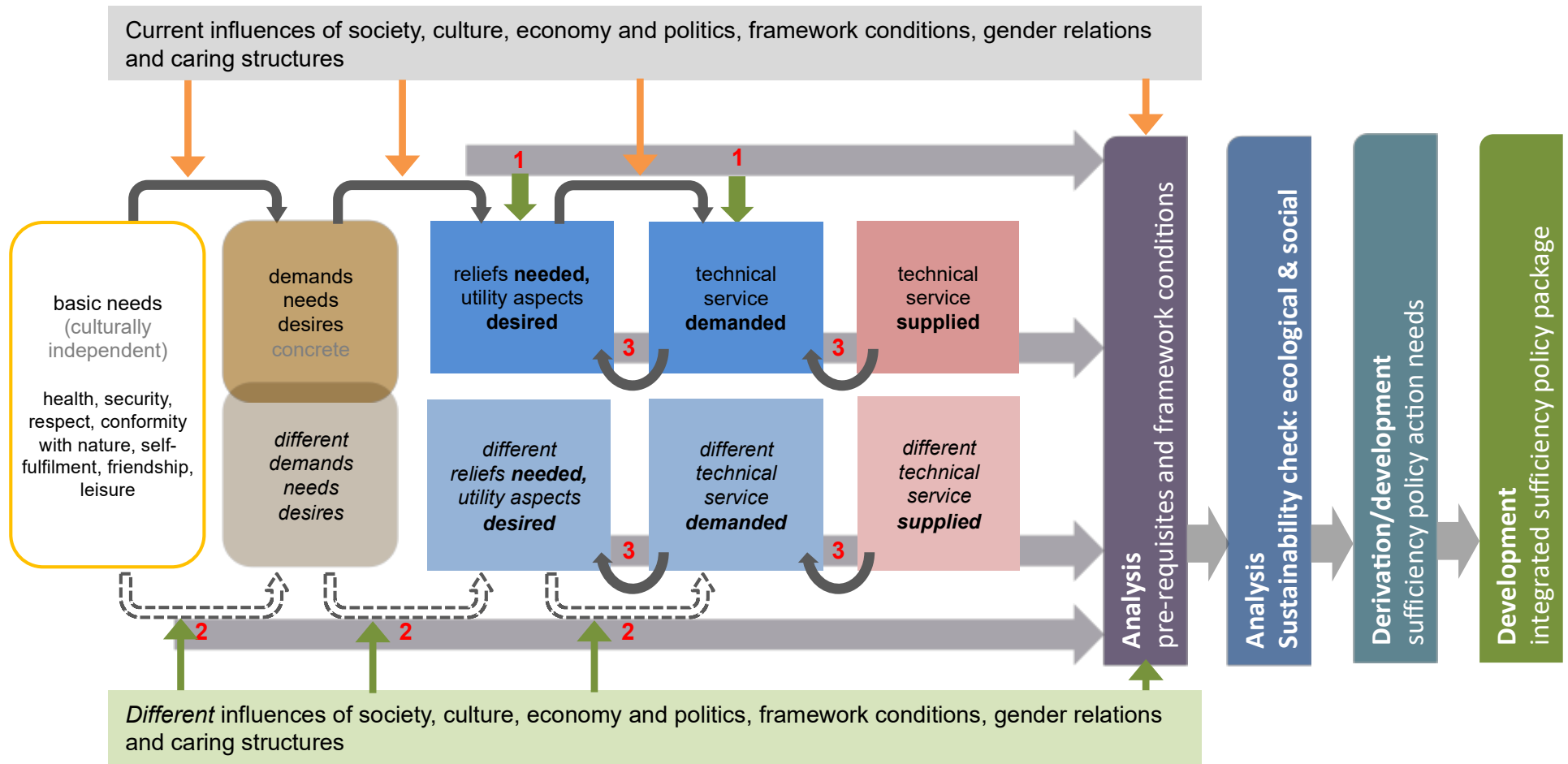
Country	Reduction		Country	Reduction	
Belgium	12,6%	3	Lithuania	17,1%	2
Bulgaria	41,1%	0	Luxembourg	4,2%	4
Czech Rep.	8,5%	3	Hungary	19,2%	2
Denmark	12,9%	3	Malta	28,8%	1
Germany	3,6%	4	Netherlands	6,2%	3
Estonia	17,2%	2	Austria	4,5%	4
Ireland	12,8%	3	Poland	15,5%	2
Greece	26,2%	1	Portugal	46,6%	0
Spain	17,7%	2	Romania	13,0%	3
France	17,7%	2	Slovenia	5,1%	3
Croatia	7,8%	3	Slovakia	6,8%	3
Italy	16,0%	2	Finland	8,5%	3
Cyprus	21,9%	2	Sweden	5,6%	3
Latvia	20,3%	2	United Kingdom	5,1%	3

Rating		
0	sehr gering	> 20%
1	gering	10,1-20%
2	mittel	3,1-10%
3	hoch	0,6-3,0%
4	sehr hoch	< 0,5%

Living space – would people move to smaller apartments?

- Out of those, who think their apartments is just right or too big,
 - 5 % would like to move to a smaller one directly
 - 34 % under certain conditions (not leaving neighbourhood, no cost/rent increase, policy support)
 - => equals 4 and 27 % of all respondents, respectively
- If number of people reduces in the future:
 - 22 % would like to move to a smaller one directly
 - 34 % under certain conditions
 - 22 % (i.e. 13 % of all) could imagine living in a shared apartment,
 - 29 % (i.e. 17 % of all) in a multi-generation house
- => **policy** induction **potential** overall:
 - **10 to 15 %** already now
 - **17 to 23 %** with fewer persons in the household in the future

The energy service transformation chain and the steps of energy sufficiency policy analysis



standard transmission
(status quo)

sufficiency interventions

1 reduction
quantitative
change in utility

2 substitution
different transmission

3 adjustment
tailored-fit solutions for
adequate technologic
service provision



Set targets

- 2000 Watt target

Develop strategic policy roadmaps

- integrated planning (efficiency, sufficiency, energy supply, material)

Support energy sufficiency actions

- reception for organisational requests
- mobility station
- common washing rooms
- guesthouse

Mandate sufficiency actions

- limited parking space
- limited room per person

