Energy efficiency

Lukáš Lehotský

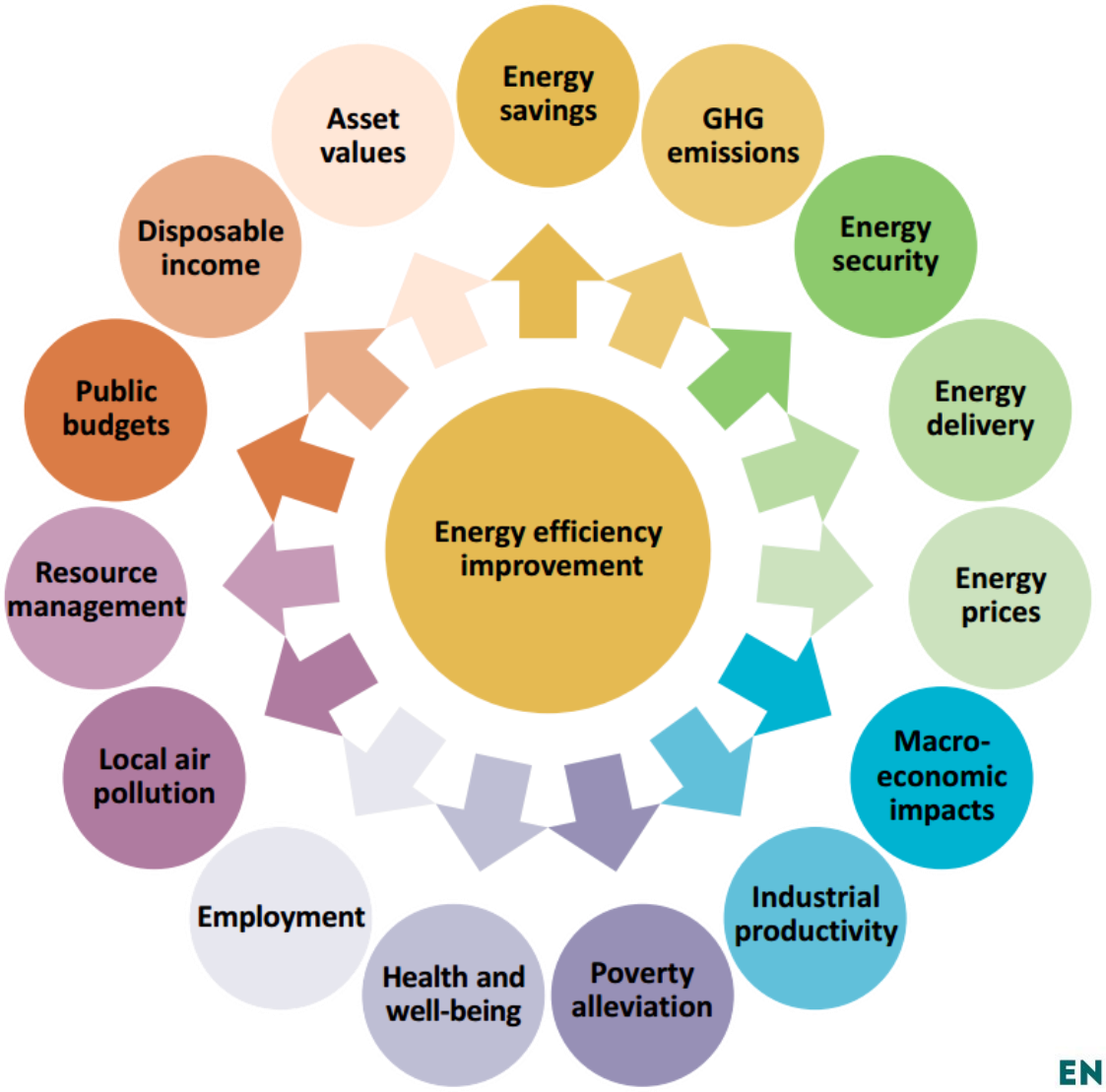
Masaryk University, Brno

Conceptual notes

What is energy efficiency?

CENTER FOR ENERGY STUDIES

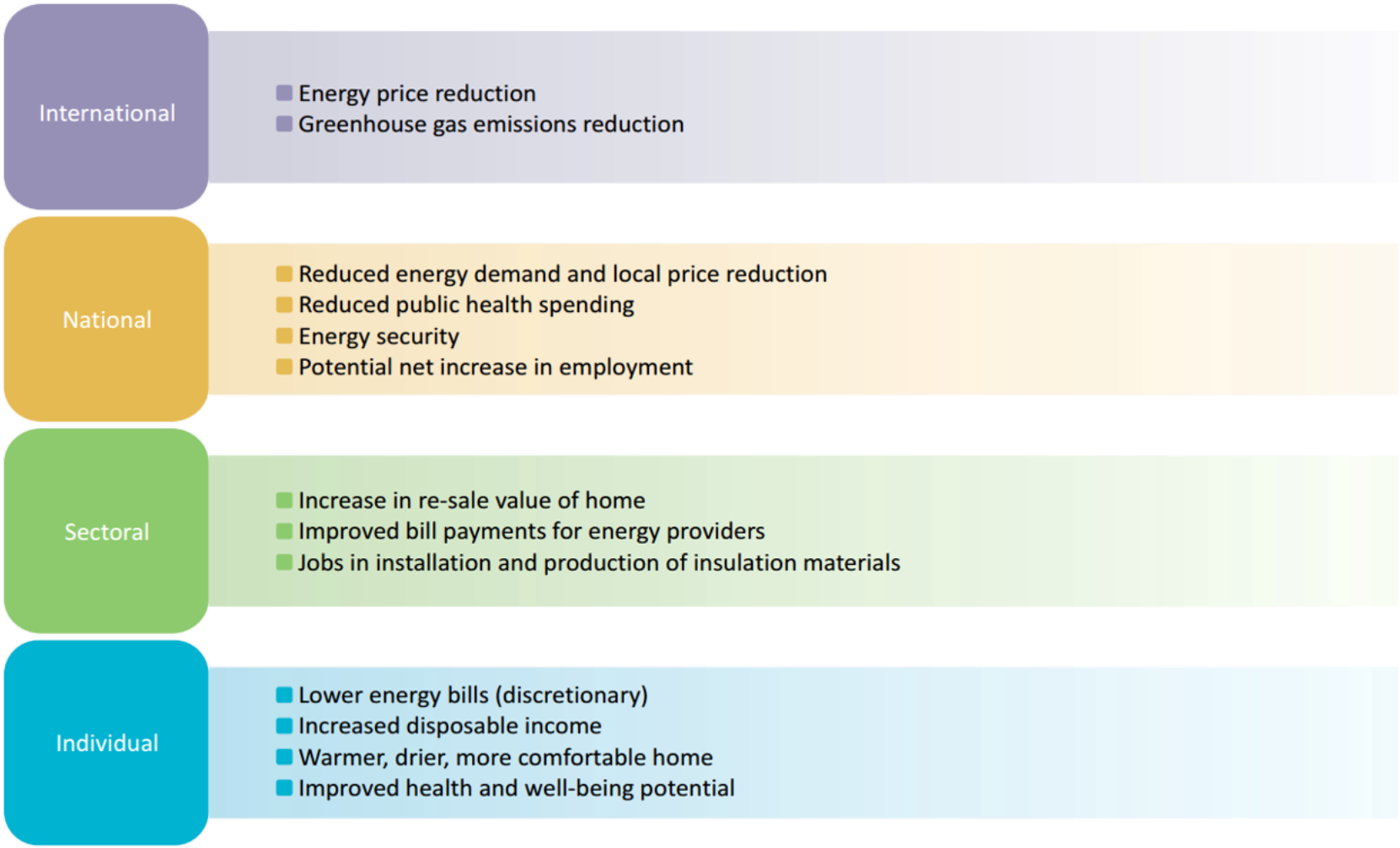
Why energy efficiency?



CENTER FOR ENERGY STUDIES

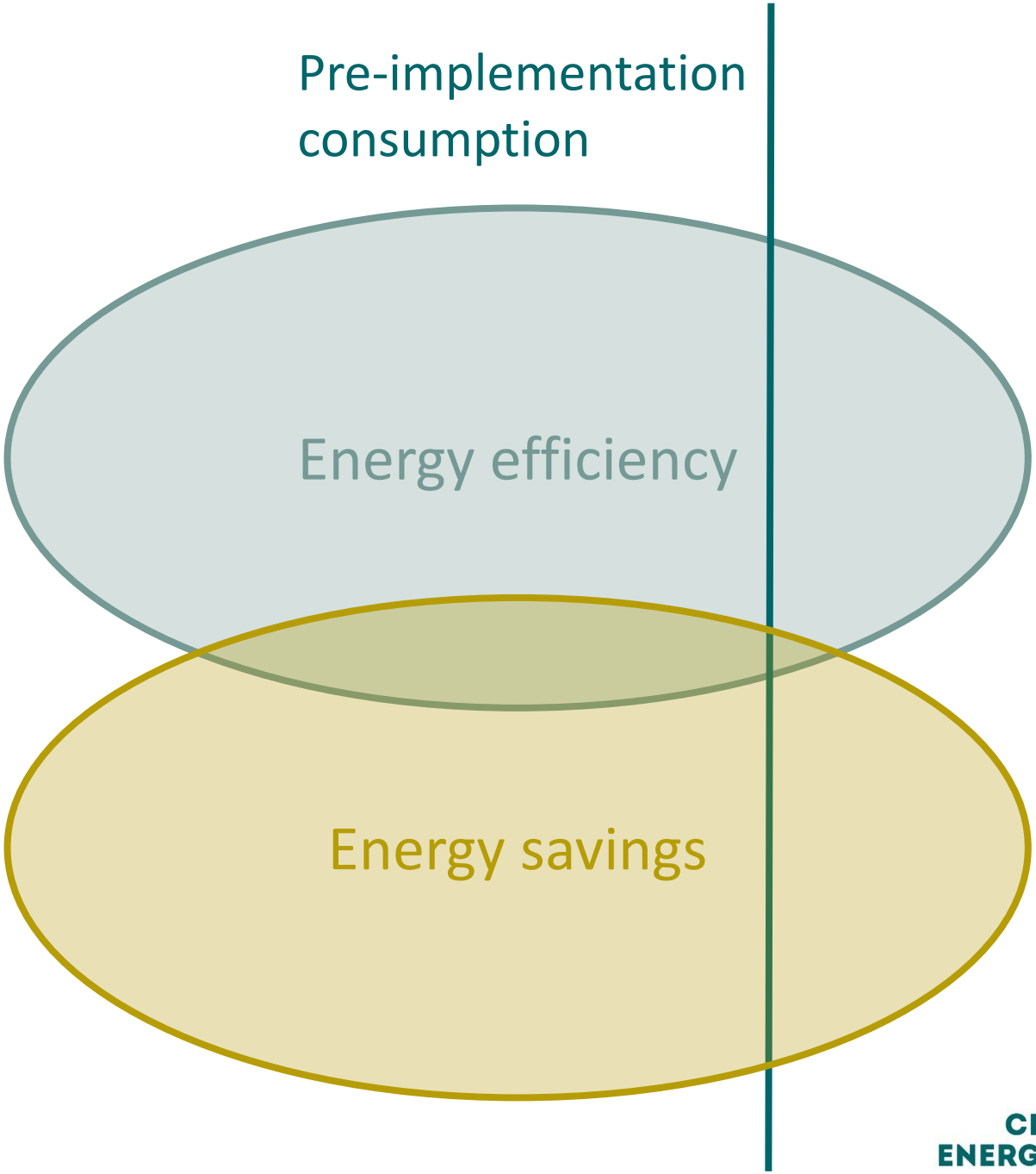
Source: IEA Capturing multiple benefits of EE

EE has impacts on multiple levels



CENTER FOR ENERGY STUDIES

Source: IEA Capturing multiple benefits of EE



CENTER FOR ENERGY STUDIES

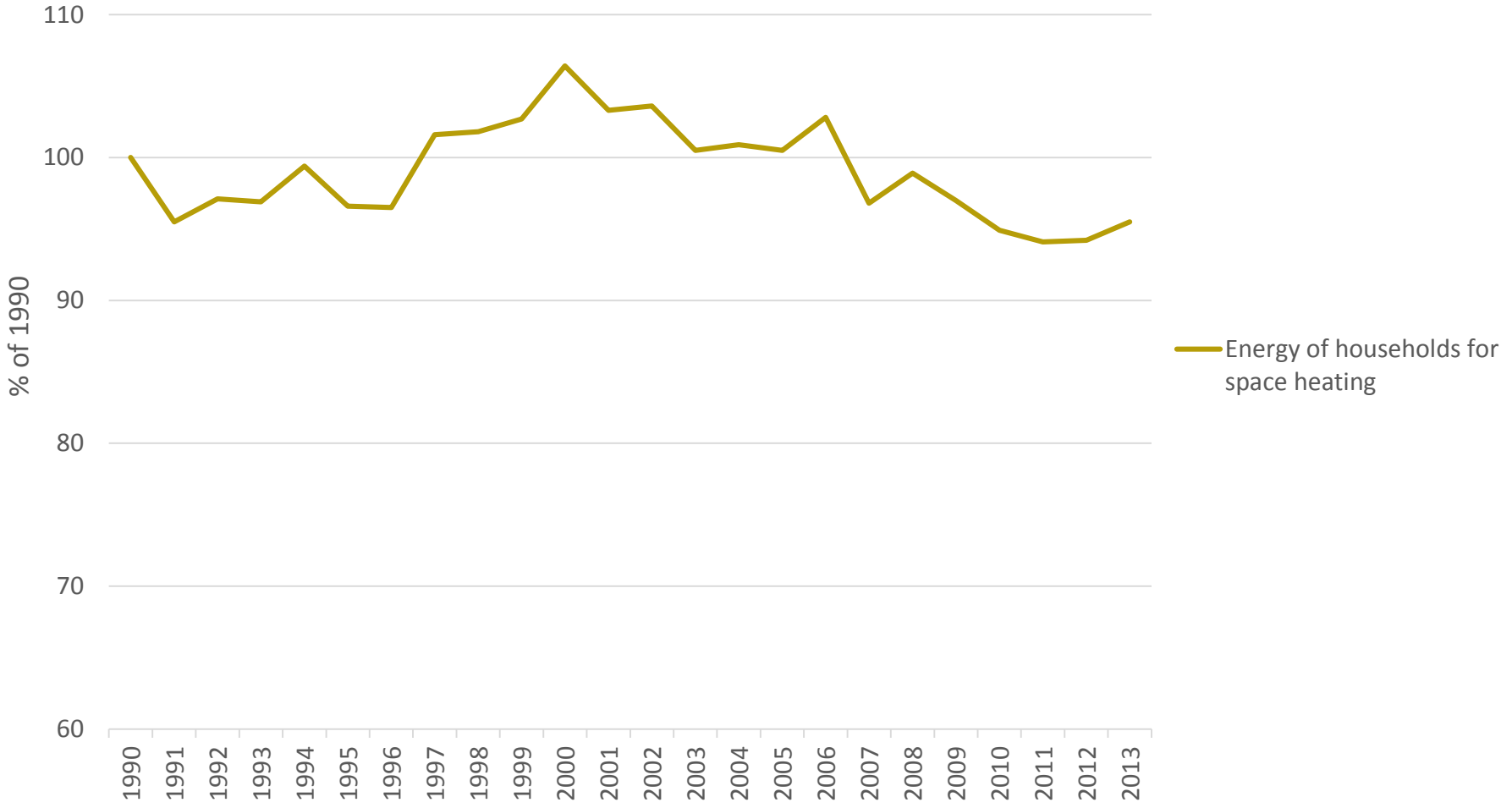
Rebound effect/Jevons paradox

CENTER FOR ENERGY STUDIES

EE/ES vs. Environmental policies

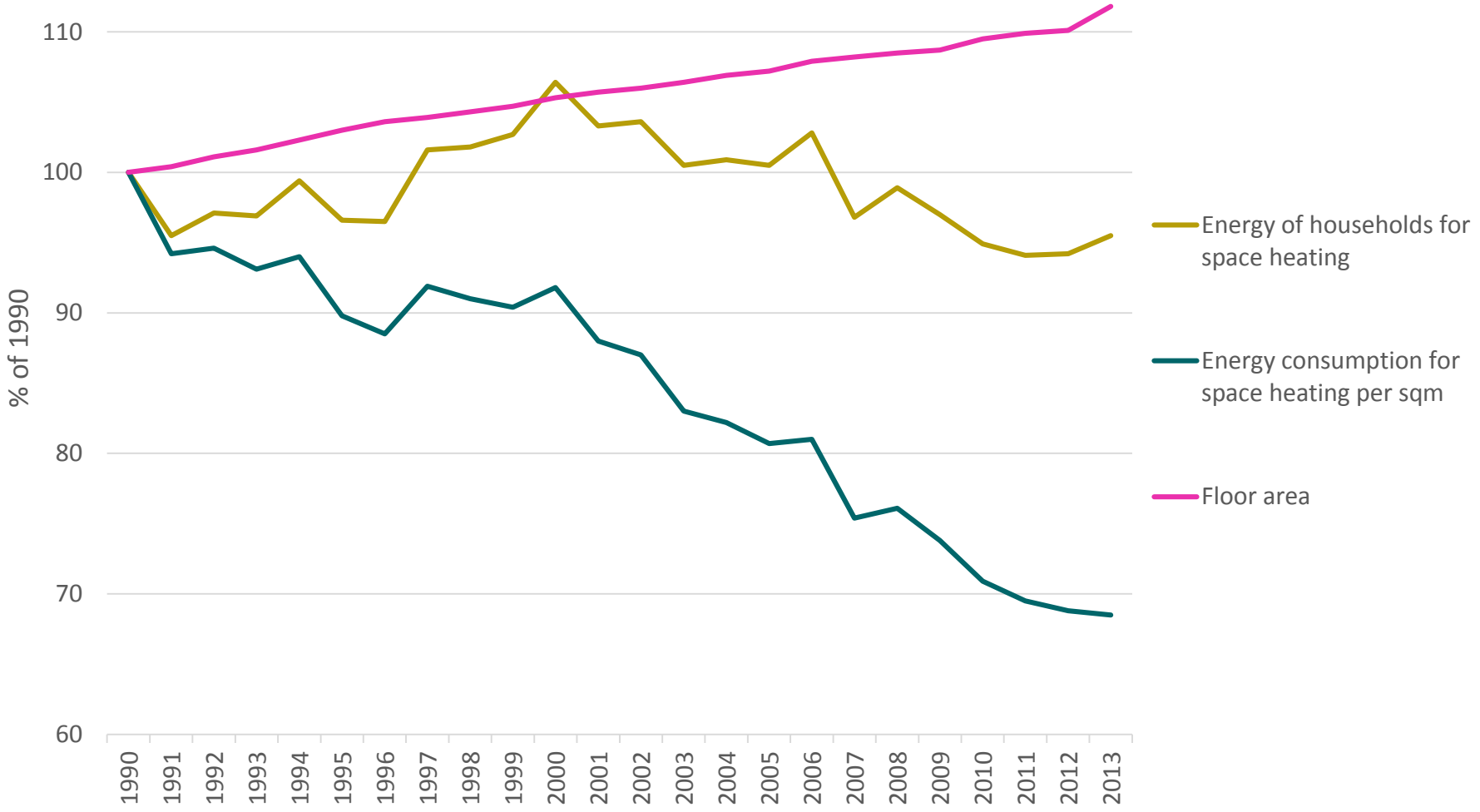
CENTER FOR ENERGY STUDIES

How to assess impact of EE/ES policies?



CENTER FOR ENERGY STUDIES

Source: European Environment Agency



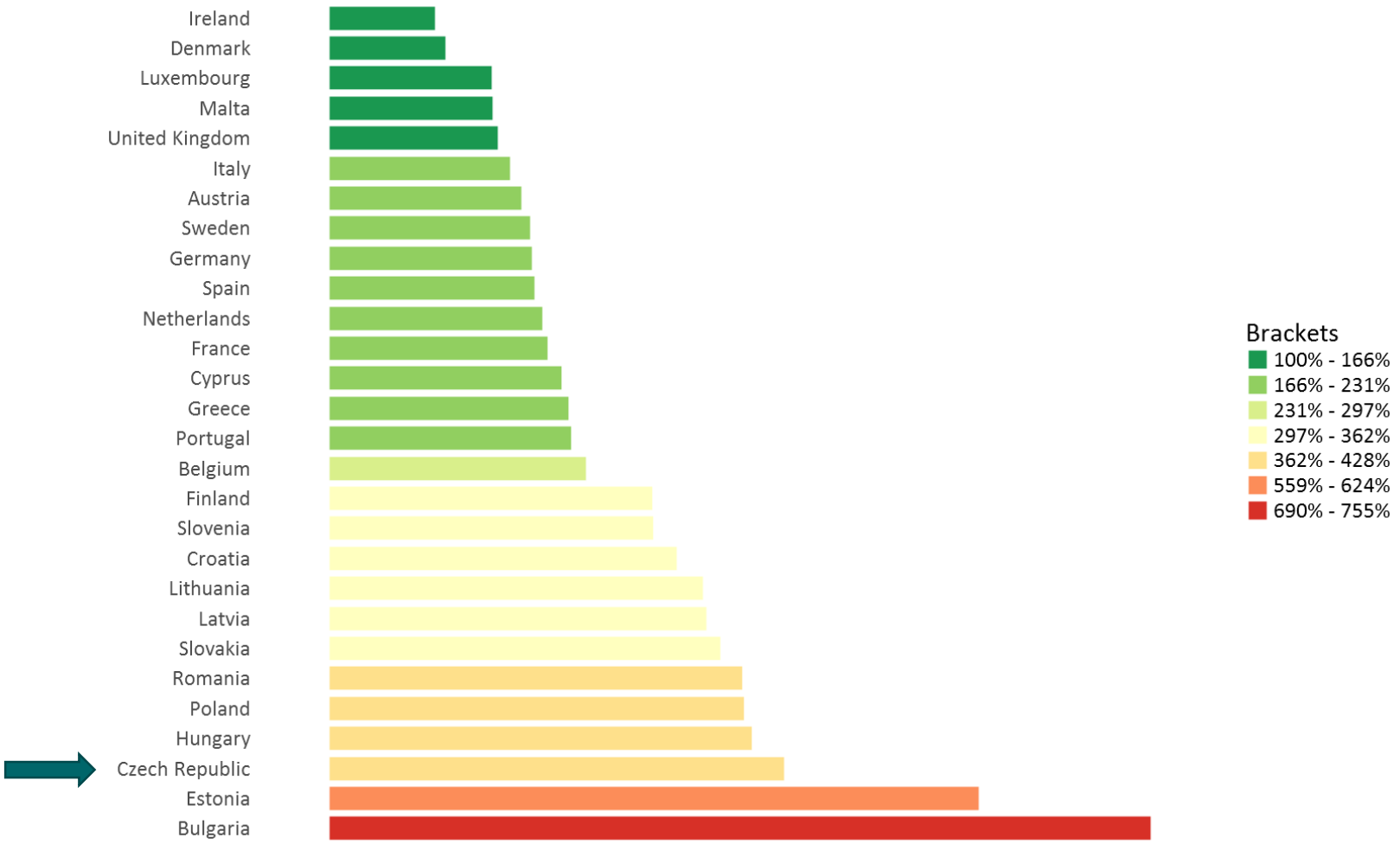
CENTER FOR ENERGY STUDIES

Source: European Environment Agency

Energy intensity

CENTER FOR ENERGY STUDIES

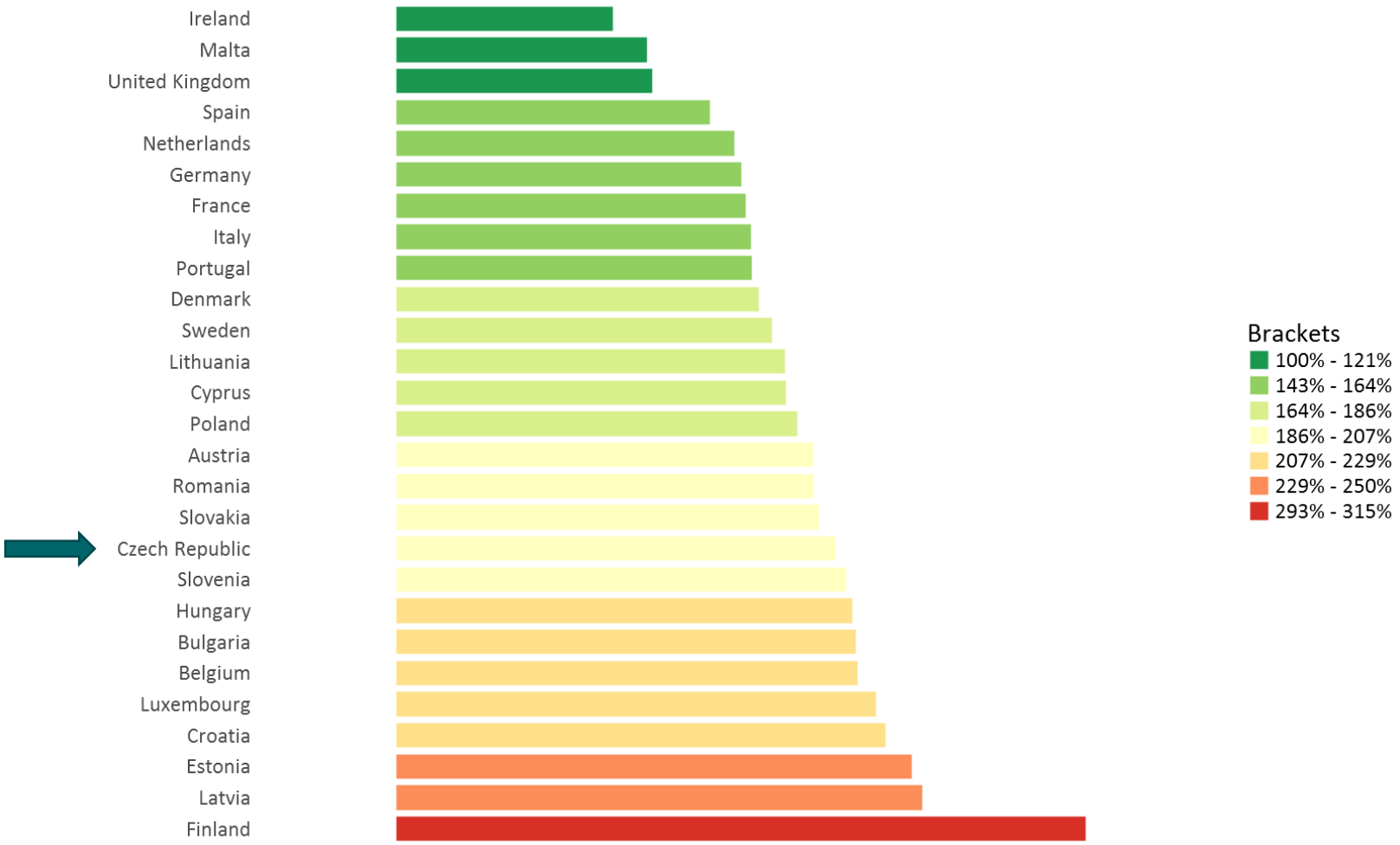
Energy intensity 2015



CENTER FOR ENERGY STUDIES

Source: Author, Eurostat data indicator tsdec360

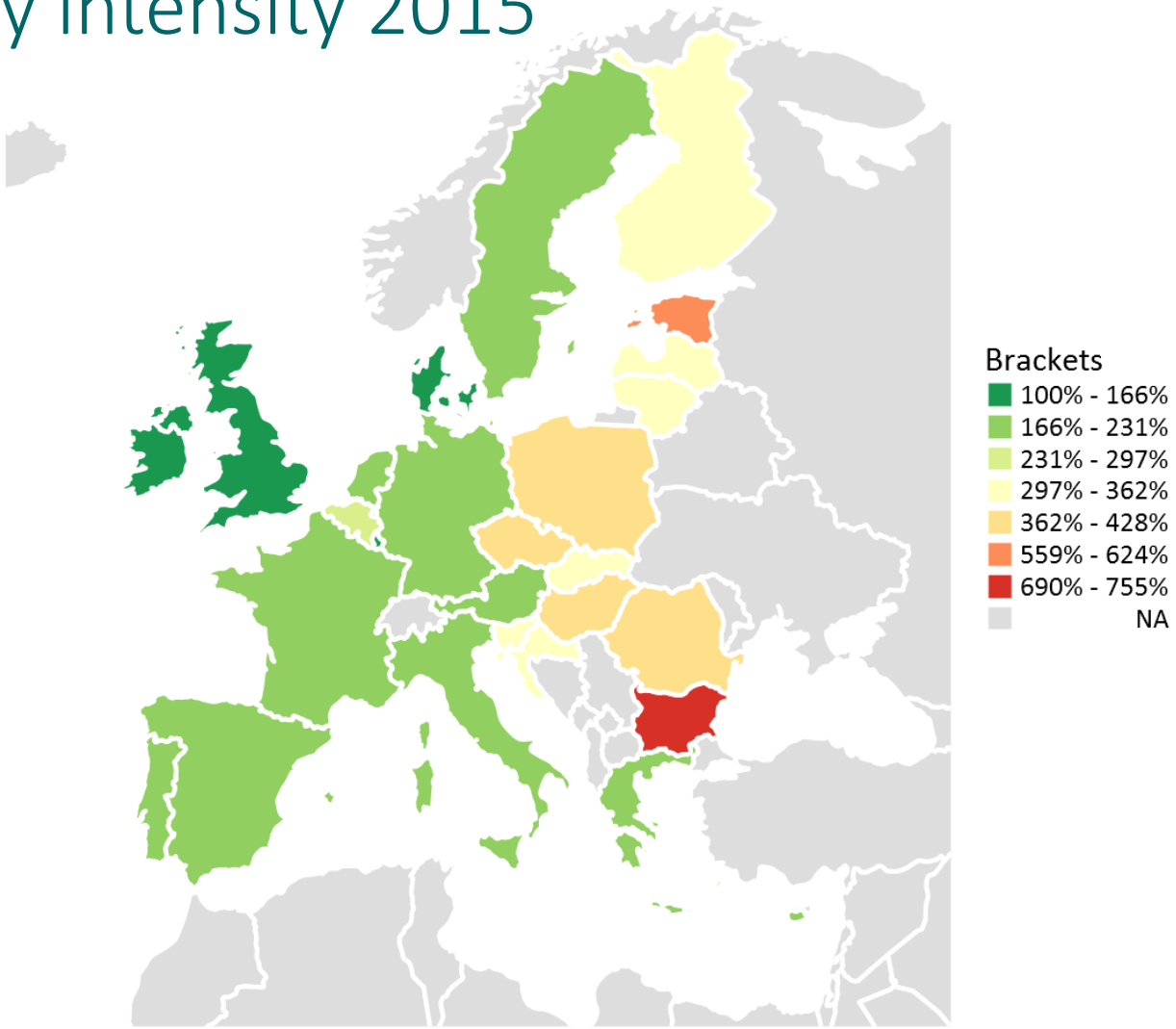
Final energy intensity 2015 - adjusted



CENTER FOR ENERGY STUDIES

Source: Author, ODYSSEE-MURE data

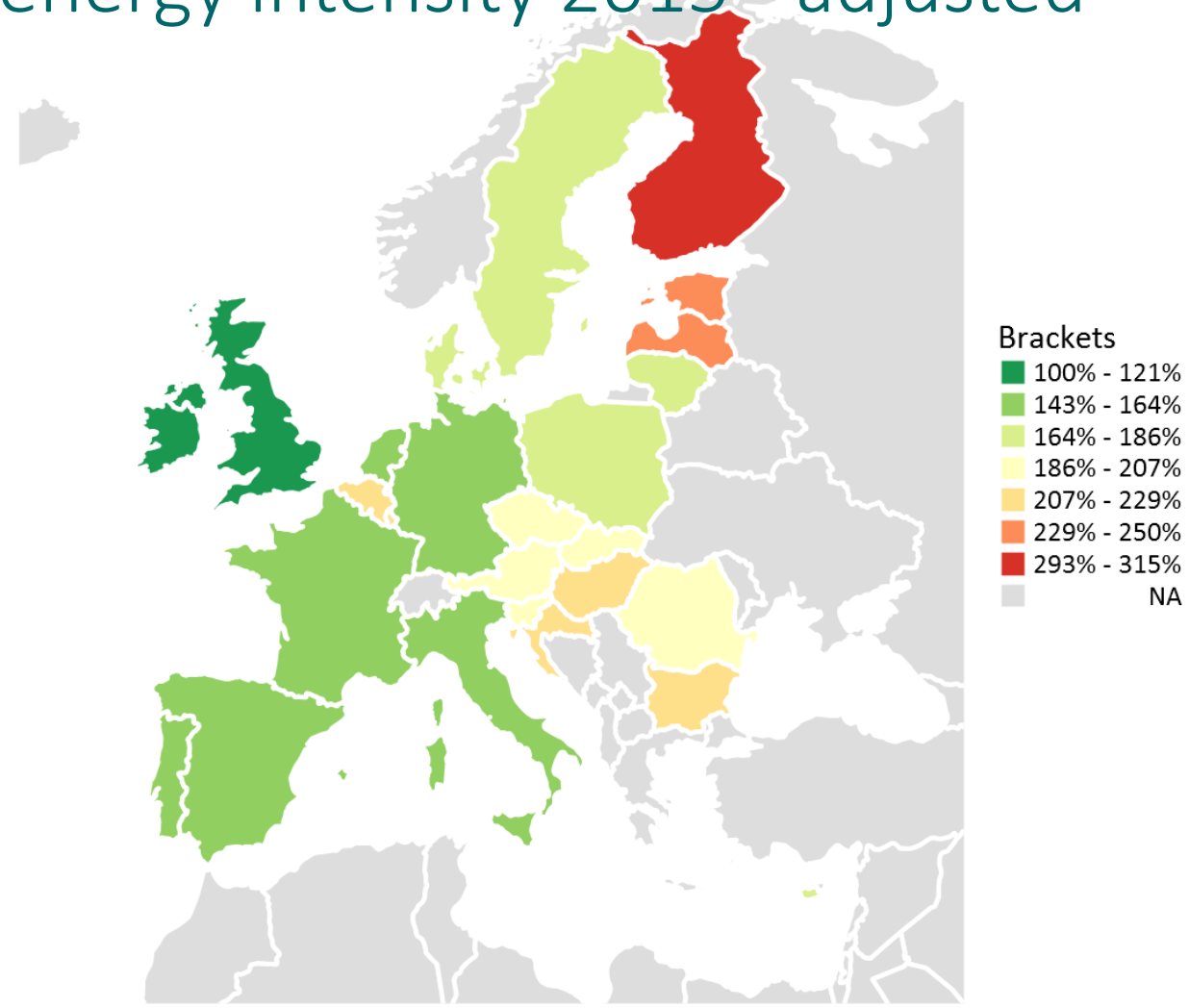
Energy intensity 2015



CENTER FOR ENERGY STUDIES

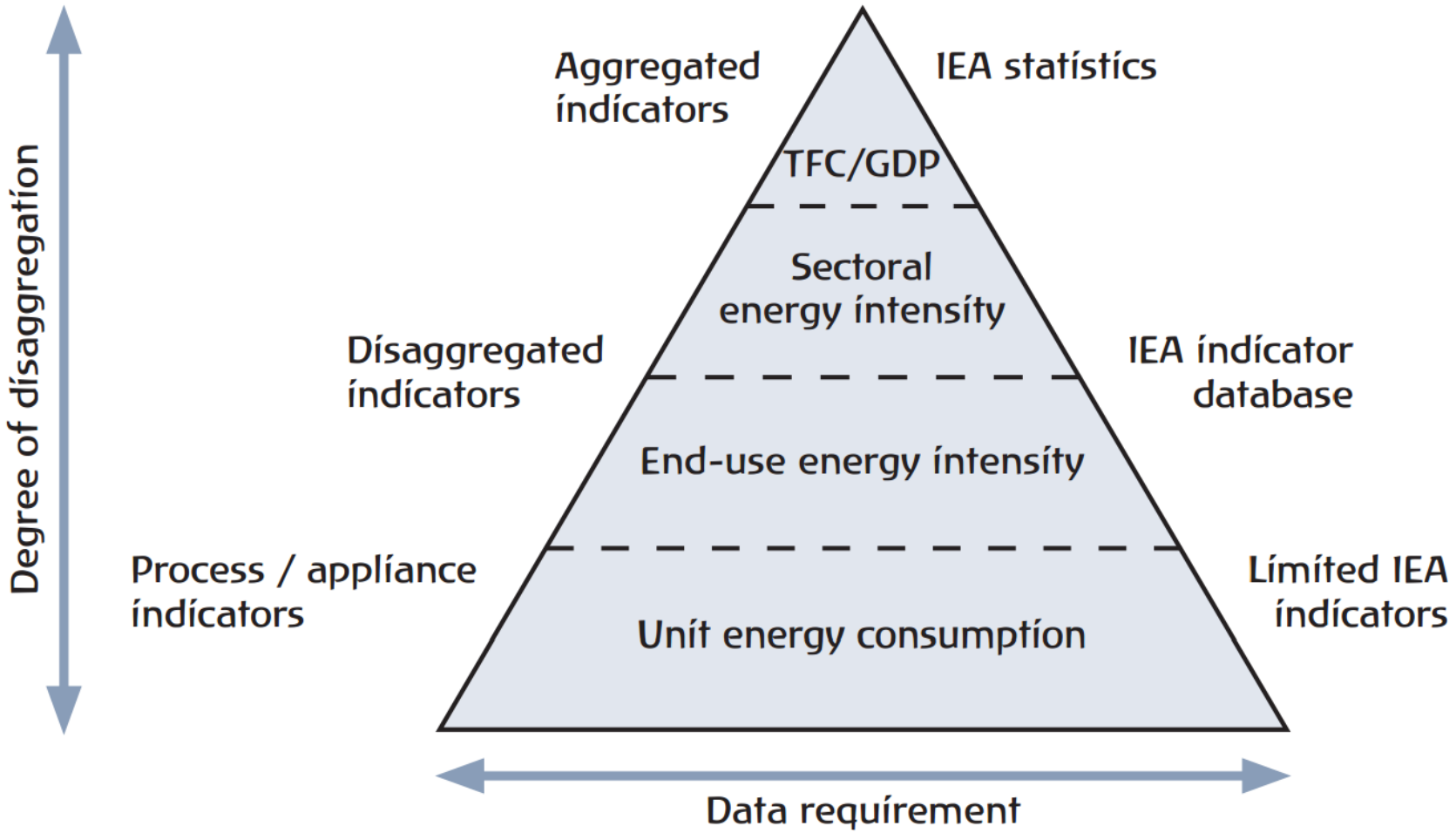
Source: Author, Eurostat data indicator tsdec360

Final energy intensity 2015 - adjusted



CENTER FOR ENERGY STUDIES

Source: Author, ODYSSEE-MURE data



CENTER FOR ENERGY STUDIES

Source: IEA Energy Efficiency Indicators: Essentials for Policy Making

Policy measures

What are technical/investment measures – what can be done?

CENTER FOR ENERGY STUDIES

Taxation

CENTER FOR ENERGY STUDIES

Regulations and rules

CENTER FOR ENERGY STUDIES

PRŮKAZ ENERGETICKÉ NÁROČNOSTI BUDOVY

vydaný podle zákona č. 406/2000 Sb., o hospodaření energií, a vyhlášky č. xxx/2012 Sb., o energetické náročnosti budov

Ulice, číslo: .....

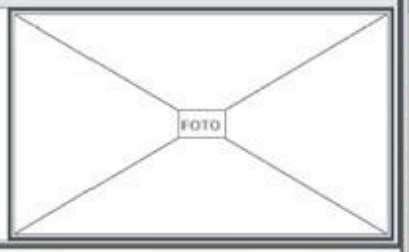
PSČ, místo: .....

Typ budovy: .....

Plocha obálky budovy: ..... m²

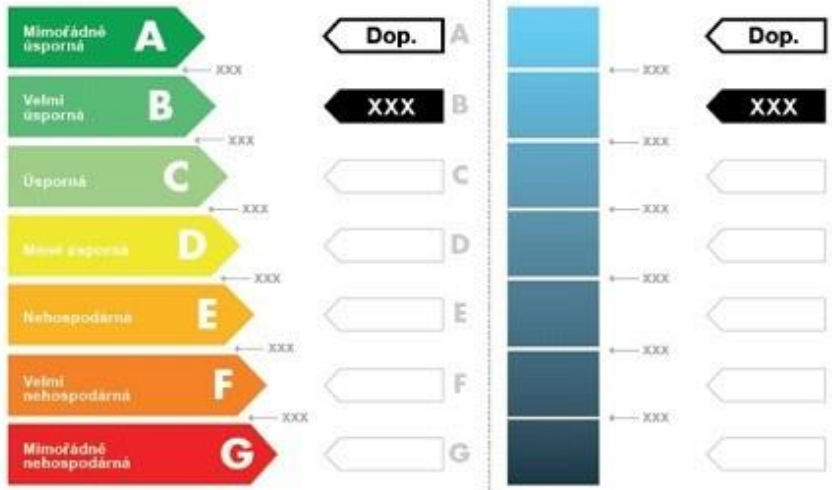
Objemový faktor tvaru A/V: ..... m²/m³

Celková energeticky vztažná plocha: ..... m²



ENERGETICKÁ NÁROČNOST BUDOVY

Celková dodaná energie (Energie na vstupu do budovy)	Neobnovitelná primární energie (Vliv provozu budovy na životní prostředí)
Měrné hodnoty kWh/(m² rok)	



Hodnoty pro celou budovu MWh/rok	XX,X	XX,X

DOPORUČENÁ OPATŘENÍ

Opatření pro	Stanovena
Vnější stěny:	☑
Okna a dveře:	☑
Střechu:	☑
Podlahu:	☐
Vytápění:	☑
Chlazení/klimatizaci:	☐
Větrání:	☑
Přípravu teplé vody:	☐
Osvětlení:	☑
Jiné:	☐

Popis opatření je v protokolu průkazu a vyhodnocení jejich dopadu na energetickou náročnost je znázorněno šipkou

Doporučení

PODÍL ENERGONOSITELŮ NA DODANÉ ENERGII

Hodnoty pro celou budovu
MWh/rok

Elektřina ze sítě – XX,X
Slunce a en. prostředí – XX,X
Zemní plyn – XX,X

UKAZATELE ENERGETICKÉ NÁROČNOSTI BUDOVY

	Obálka budovy	Vytápění	Chlazení	Větrání	Úprava vlhkosti	Teplá voda	Osvětlení
	U_{em} W/(m² K)	Dílčí dodané energie Měrné hodnoty kWh/(m² rok)					
A	Dop.			Dop.		Dop.	
B			Dop.			XX	XX Dop.
C	X,XX		XX				
D		Dop.		XX			
E		XX			Dop.		
F					XX		
G							
Hodnoty pro celou budovu MWh/rok		XX,X	XX,X	XX,X	XX,X	XX,X	XX,X

Zpracovatel: .....

Kontakt: .....

Osvědčení č.: .....

Vyhotoveno dne: .....

Podpis: .....

CENTER FOR ENERGY STUDIES

Financial instruments: Green investment schemes

CENTER FOR ENERGY STUDIES

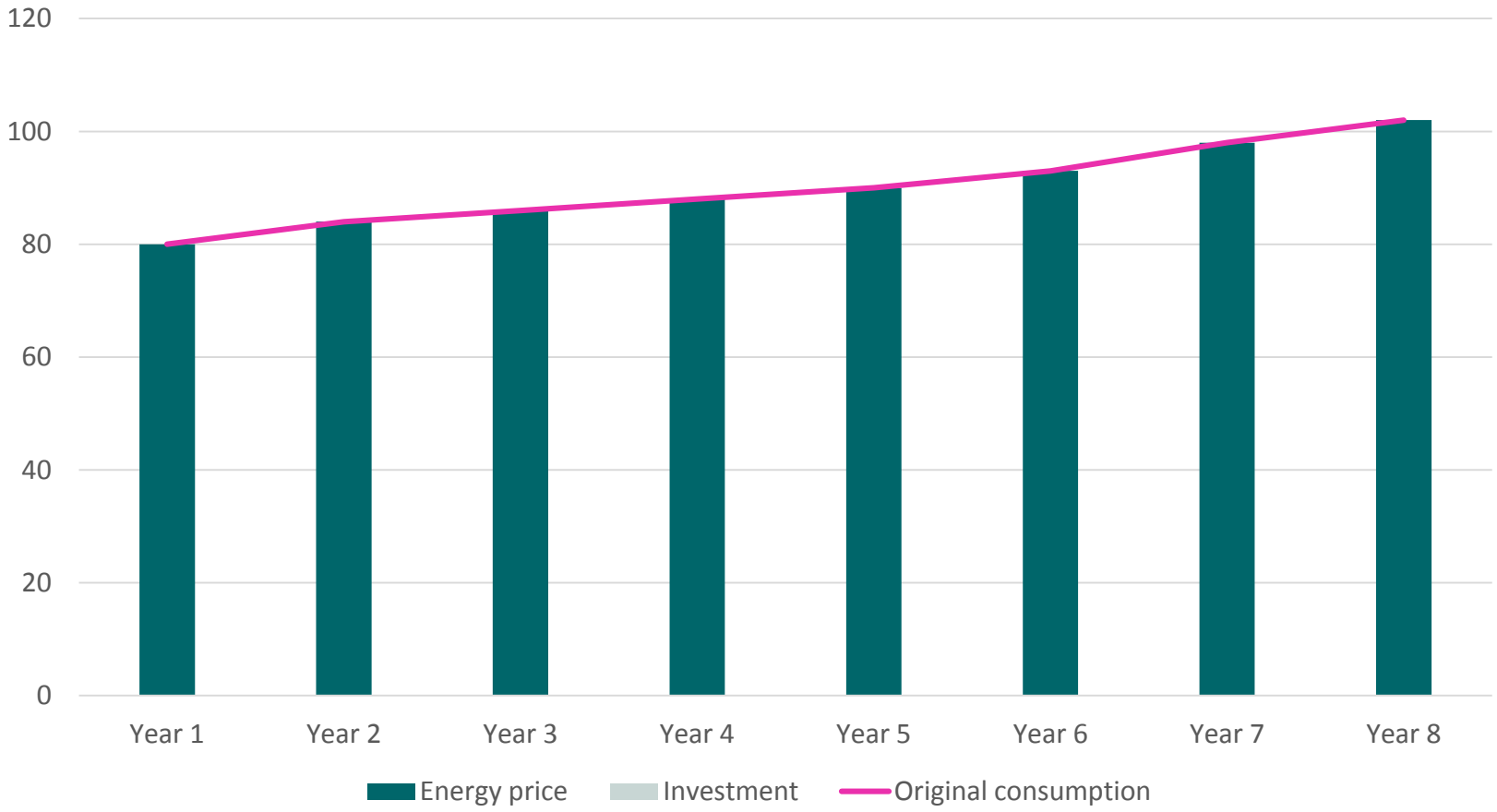
Energy obligation schemes: White certificates

CENTER FOR ENERGY STUDIES

Energy services:
Energy Performance Contracting

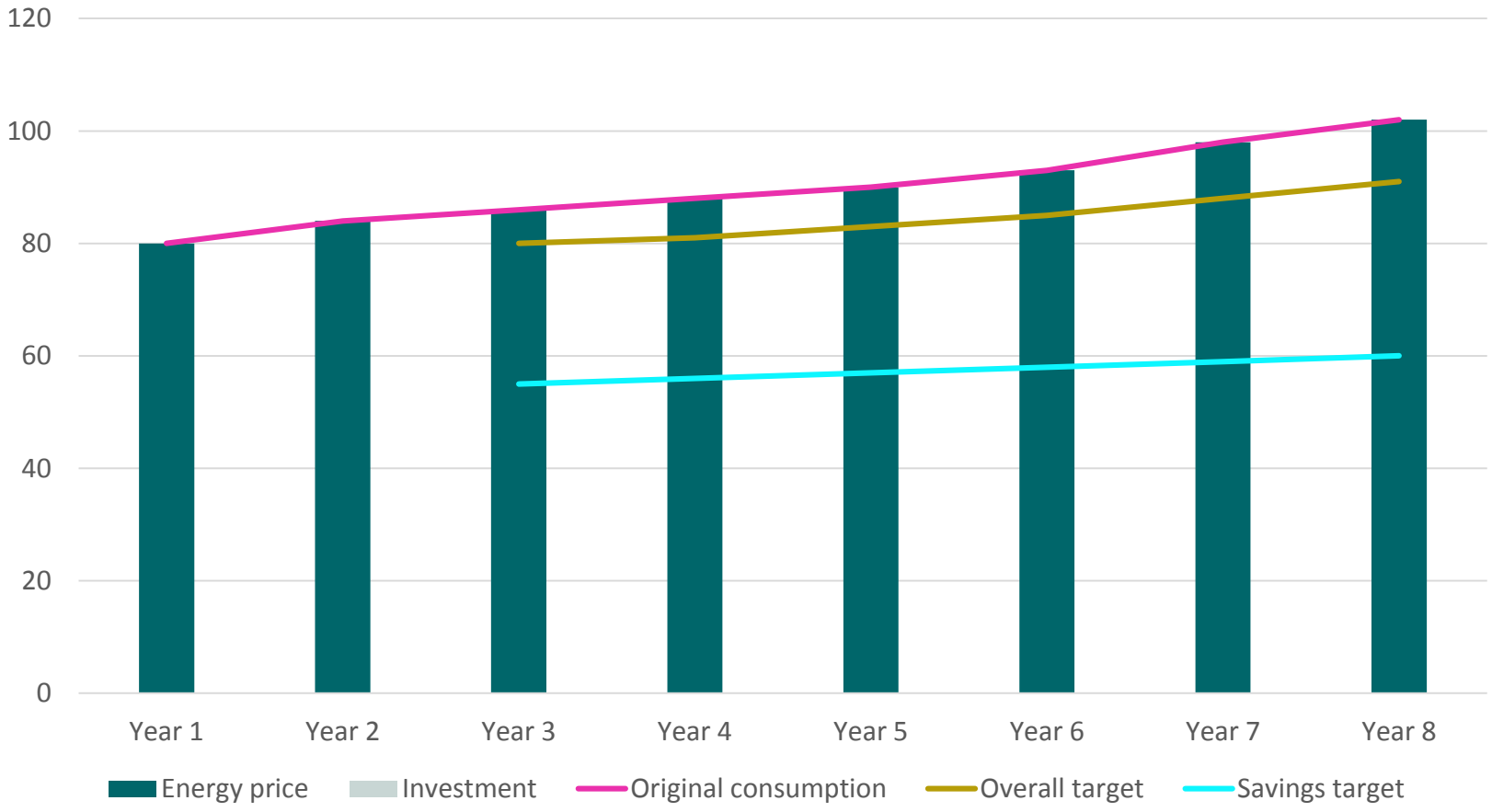
CENTER FOR ENERGY STUDIES

Energy services - logic



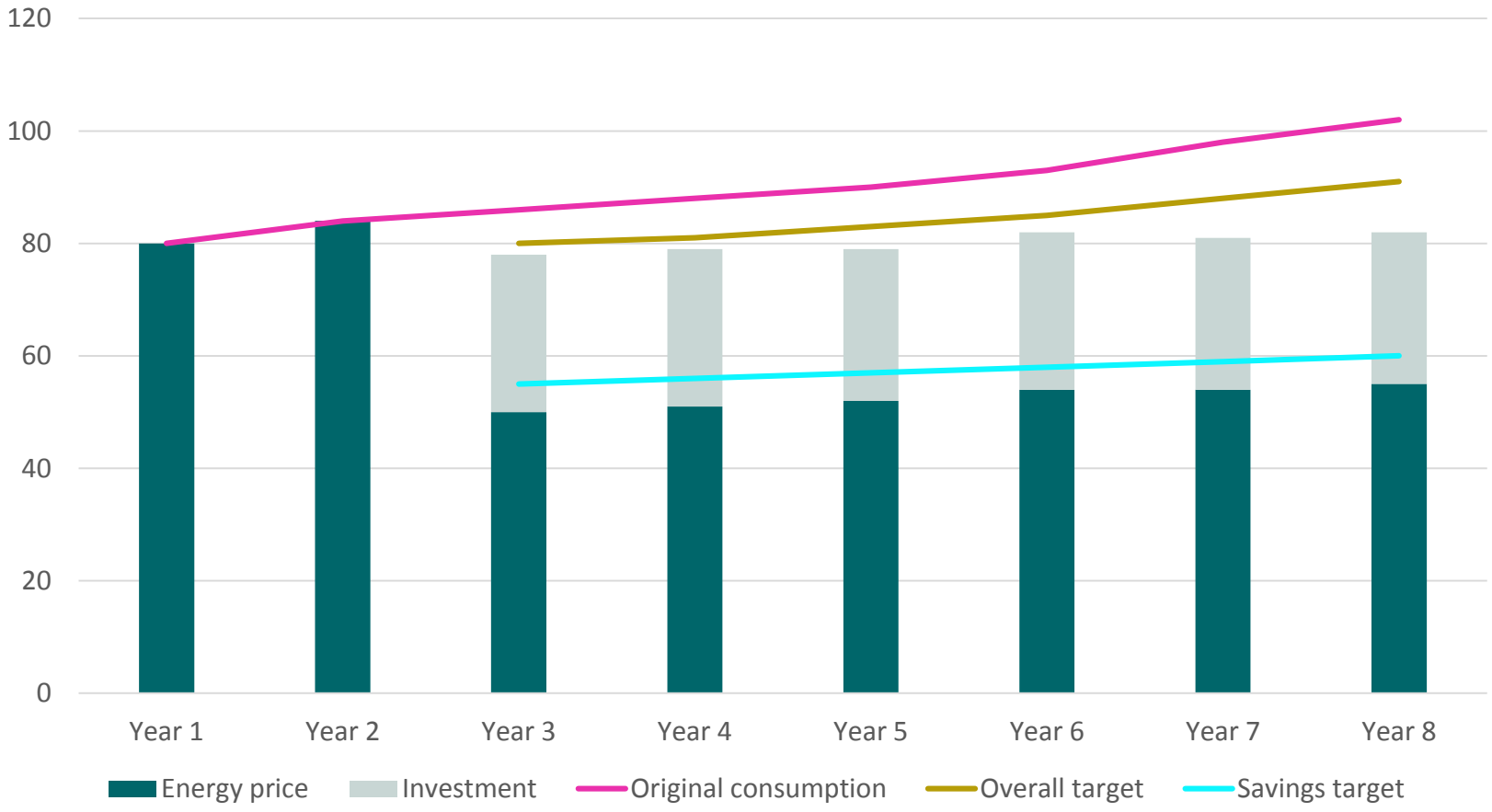
CENTER FOR ENERGY STUDIES

Energy services - logic



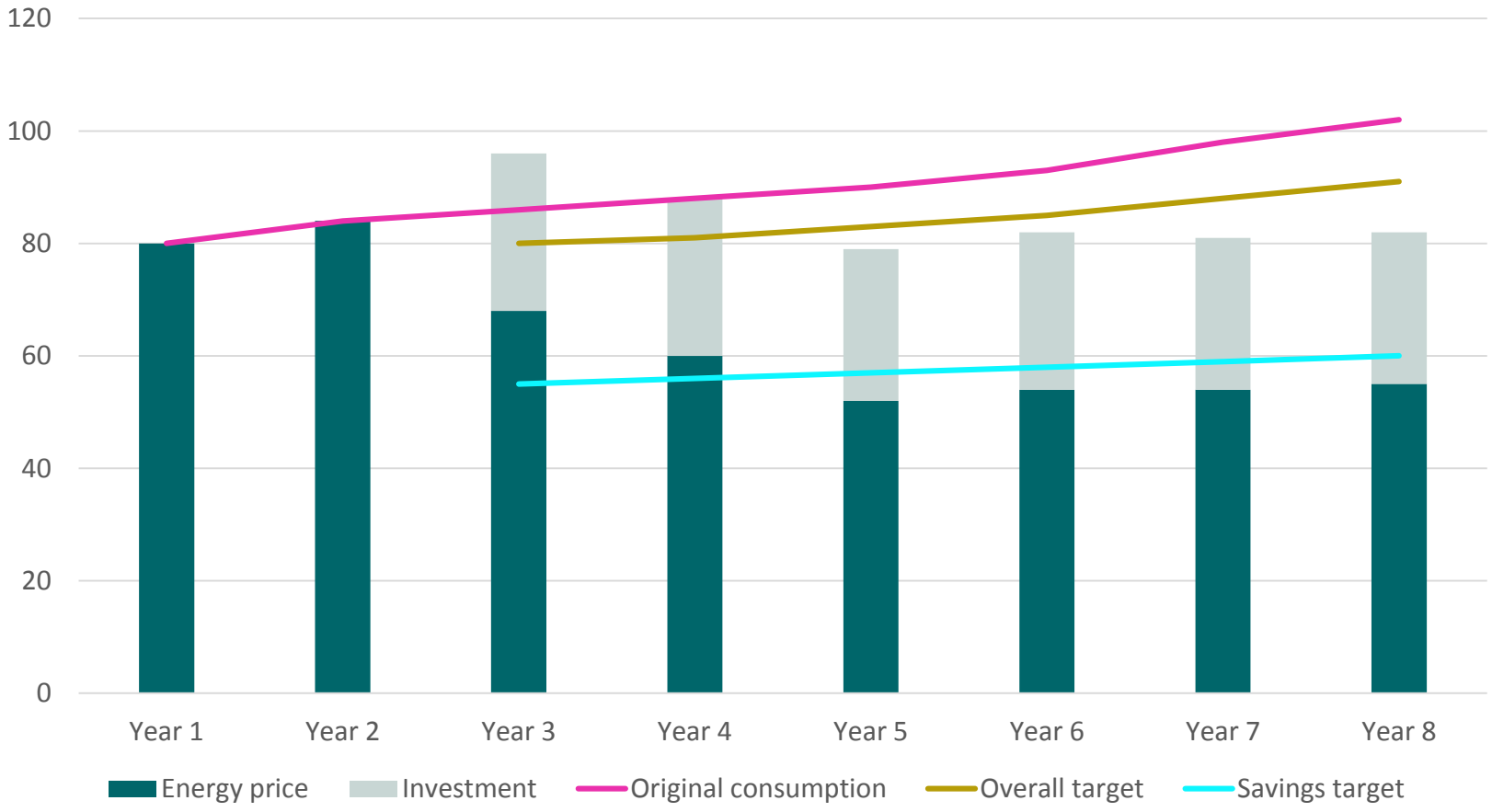
CENTER FOR ENERGY STUDIES

Energy services - logic



CENTER FOR ENERGY STUDIES

Energy services - logic



CENTER FOR ENERGY STUDIES

Voluntary agreements and other soft measures

CENTER FOR ENERGY STUDIES

Should efficiency/savings be market based?

CENTER FOR ENERGY STUDIES

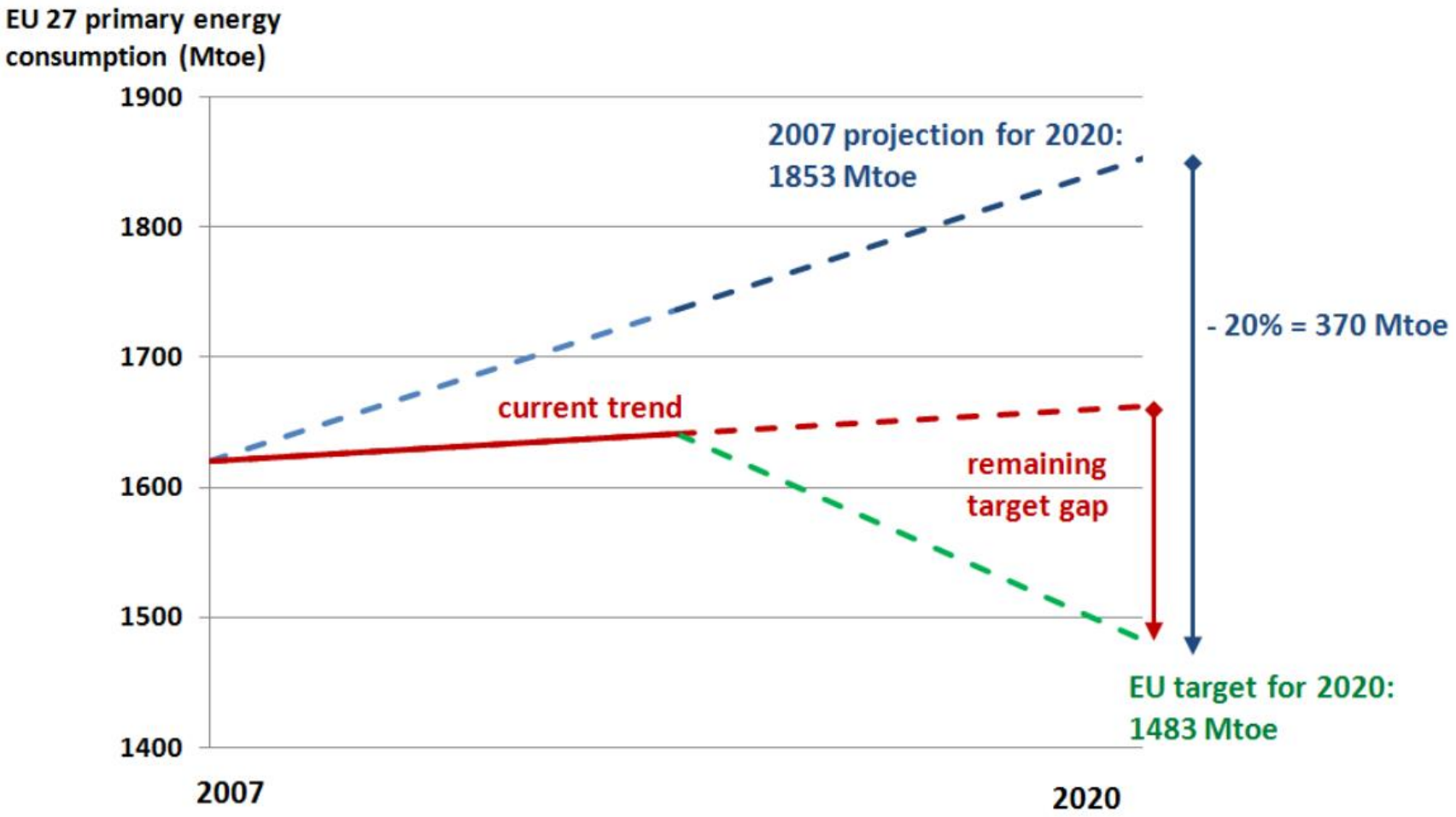
Efficiency policies – EU framework

CENTER FOR ENERGY STUDIES

Europe 2020

CENTER FOR ENERGY STUDIES

2020 efficiency target explained



CENTER FOR ENERGY STUDIES

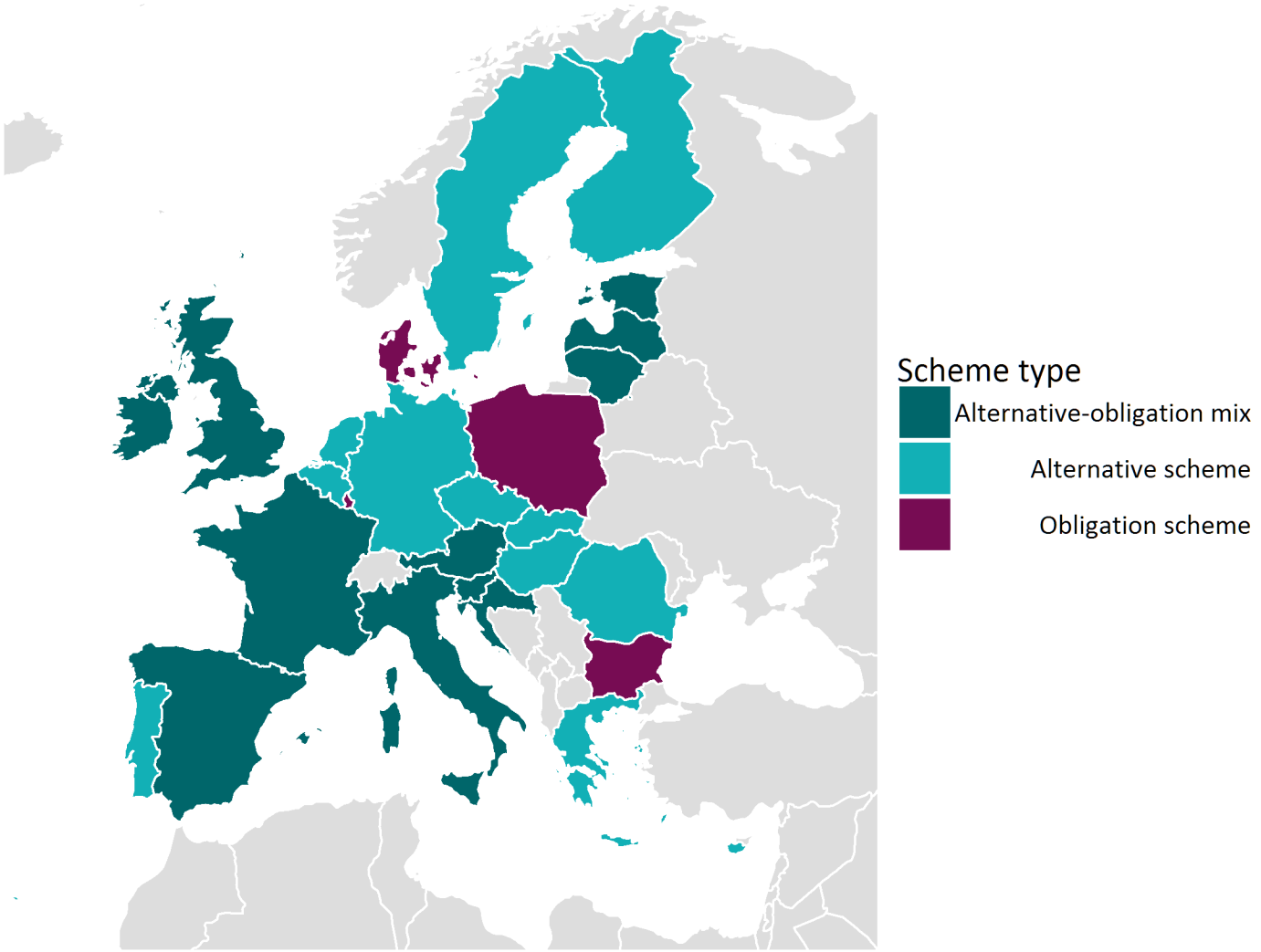
Source: http://eedguidebook.energycoalition.eu/

2012/27/EU
Energy efficiency directive

CENTER FOR ENERGY STUDIES

- Under review
- Focus on (public) buildings
- Efficiency obligation vs. alternative measures

CENTER FOR ENERGY STUDIES



CENTER FOR ENERGY STUDIES

Source: Author, Enspol – Energy Saving Policies and Energy Efficiency Obligation Scheme

- 2009/125/EC (Ecodesign)
- 2010/30/EU (Energy labelling)
- 2010/31/EU (Energy performacnce of buildings II) – under review

CENTER FOR ENERGY STUDIES

Energy efficiency policies in Czech Republic

CENTER FOR ENERGY STUDIES

Reasons for choice of alternative scheme

Avoid increases in end-user prices

Incorporate existing programmes

Maintain governmental oversight

Utilize EU financing while available

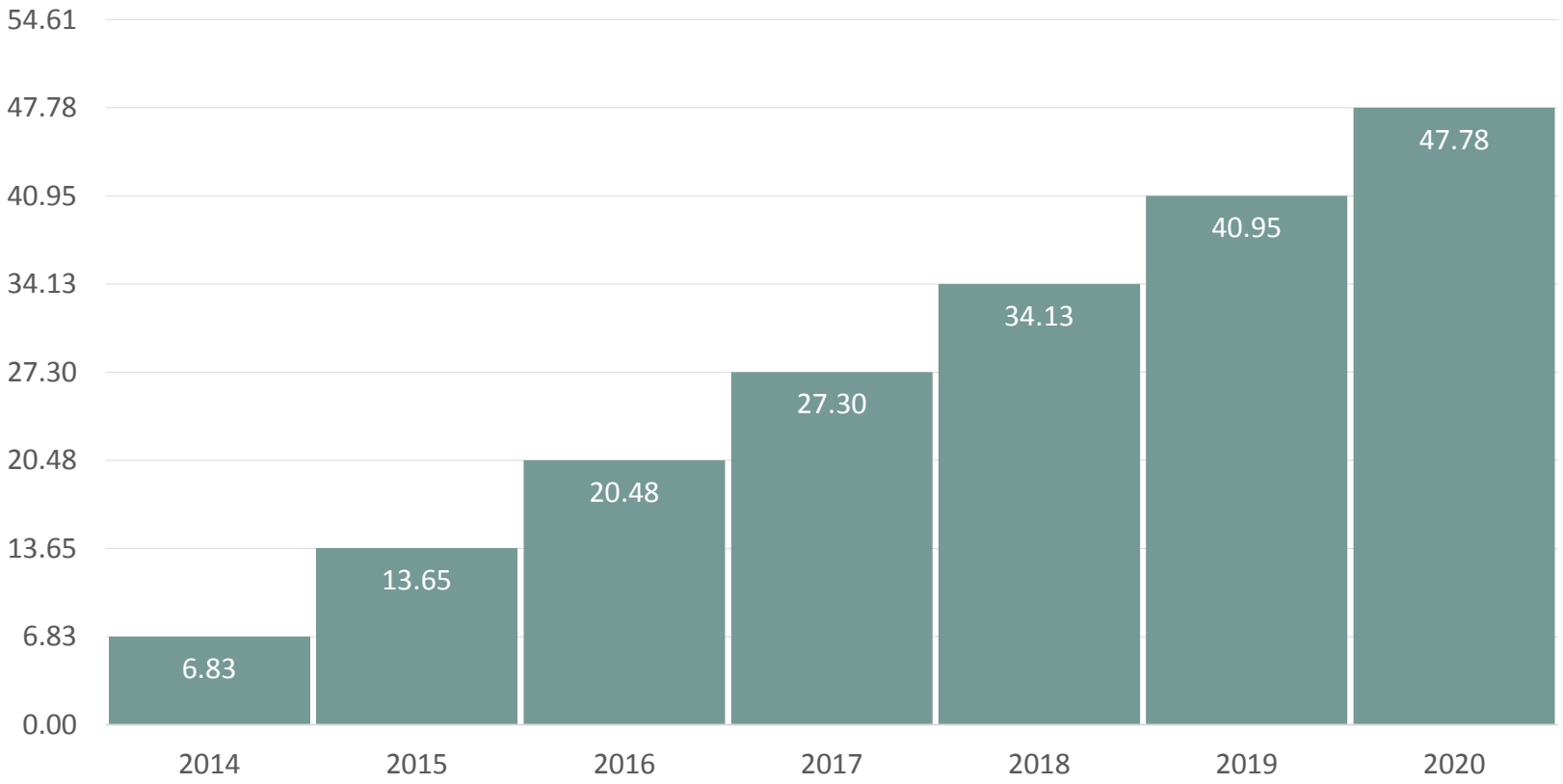
Avoid risks of implementation of unknown scheme

CENTER FOR ENERGY STUDIES

National EE action plan 2016

CENTER FOR ENERGY STUDIES

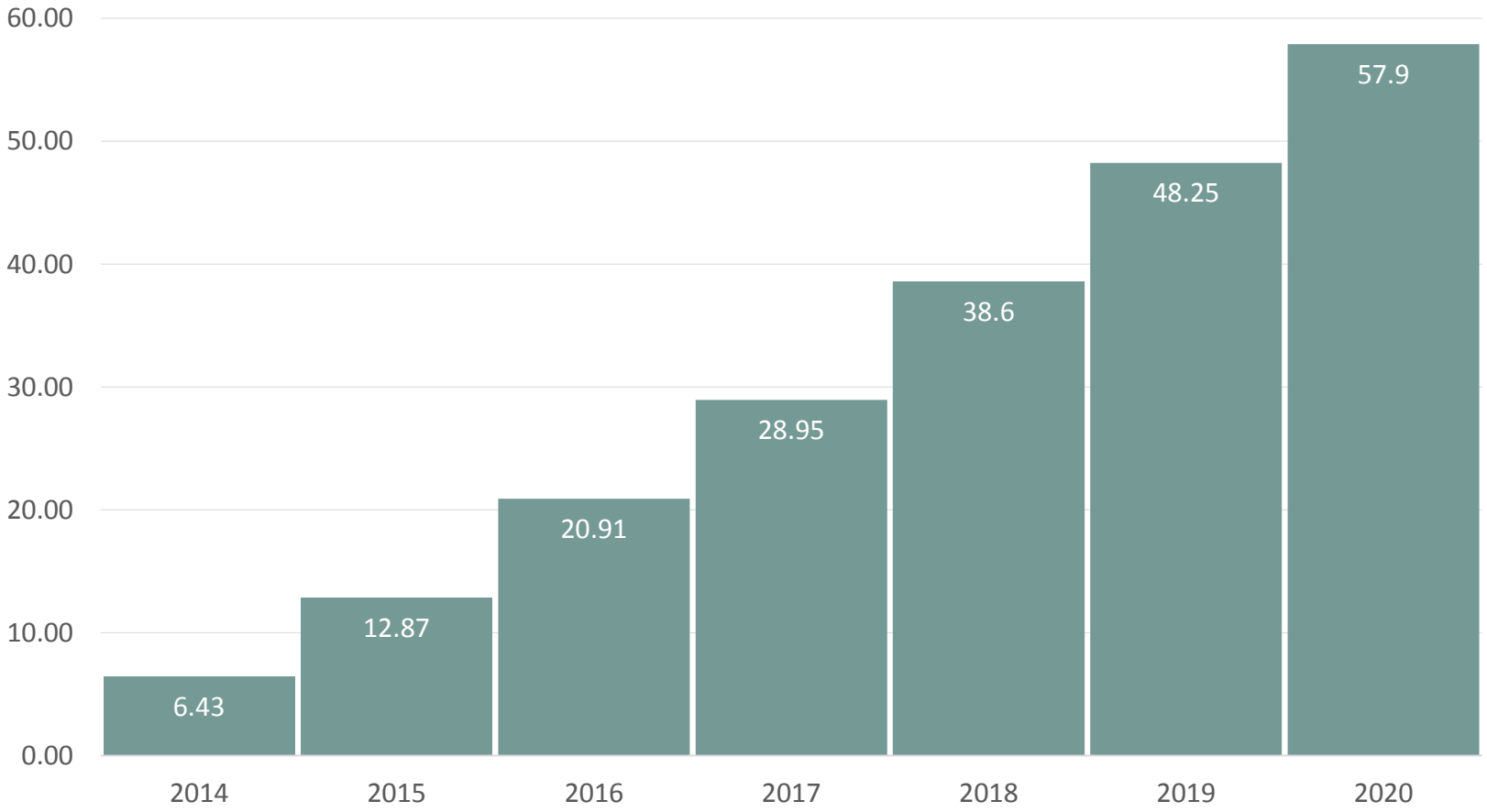
Czech target in savings 2014



CENTER FOR ENERGY STUDIES

Source: National Action Plan on Energy Efficiency 2014

Czech target in savings 2016



CENTER FOR ENERGY STUDIES

Source: National Action Plan on Energy Efficiency 2016

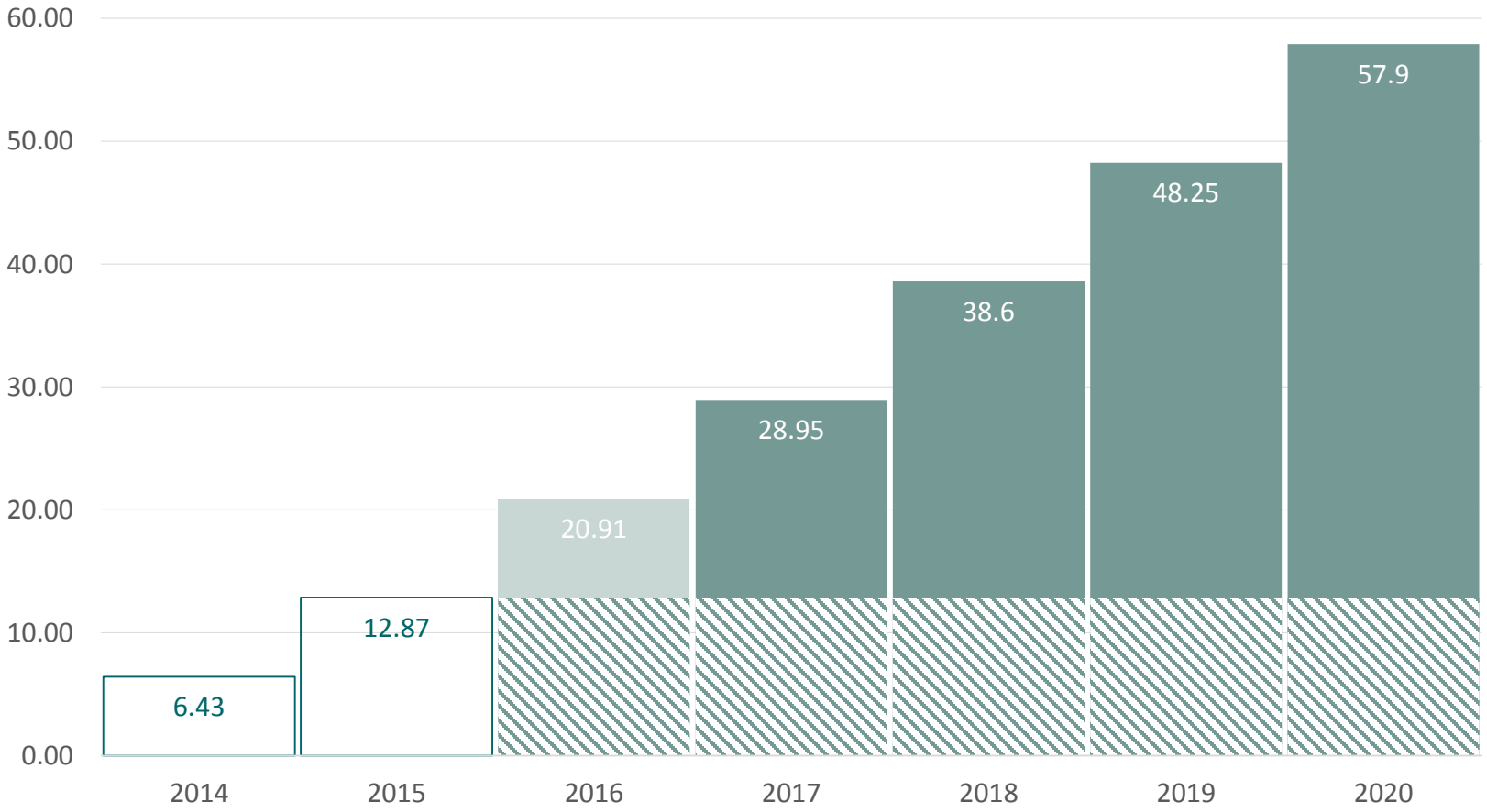
Measures and resources

CENTER FOR ENERGY STUDIES

Risks of the state-managed efficiency measures

CENTER FOR ENERGY STUDIES

Czech target in savings 2016/2017



CENTER FOR ENERGY STUDIES

Source: National Action Plan on Energy Efficiency 2016

Expected savings by 2020

Program	Predicted (PJ)	Actual (PJ)
Enterprises and innovations Operational Program (EU)	20,0	9,6
Operational Program Environment (EU)	5,0	5,0
Integrated Regional Operational Program (EU)	3,5	3,5
New Green Savings (GIS)	14,4	10,3
"Prague – Pole of Growth" Operational Program (EU)	0,01	0,01
EFEKT (National)	0,14	0,4
Total	**43,05**	**28.81**

CENTER FOR ENERGY STUDIES

Source: Sochor 2017

Thank you for your attention!

CENTER FOR ENERGY STUDIES