

# Successes and failures in energy efficiency : lessons learned from 20 case studies across Europe

Results from the AID-EE project (Active  
Implementation of the Directive on  
Energy Efficiency)



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  - The choice of policy instruments
  - Key monitoring indicators to explain success or failure and monitor policy implementation

## Reasons to start the project (1)

- EU Directive on **End-use Energy Efficiency and Energy Services (EE-Directive)** that entered into force in May 2006
- The EE-Directive sets an indicative target to cut energy use compared to business-as-usual in the period 2008 – 2017 by 9%
- The Directive requires Member States to draw up a series of energy efficiency action plans (EEAP). First deadline is June, 30 2007.

## Reasons to start the project (2)

- EE-Directive puts strong focus on 'measuring' energy savings
- Role of the **AID-EE project** within the implementation process of the Directive:
  - Provide lessons learned on success and failures of policy instruments. With the aim to guide Member States in implementing effective policies to reach the indicative target set in the EE-Directive
  - Provide input to Member States for drawing up their Energy Efficiency Action Plan (EEAP) among others through 7 workshops for policy makers across Europe

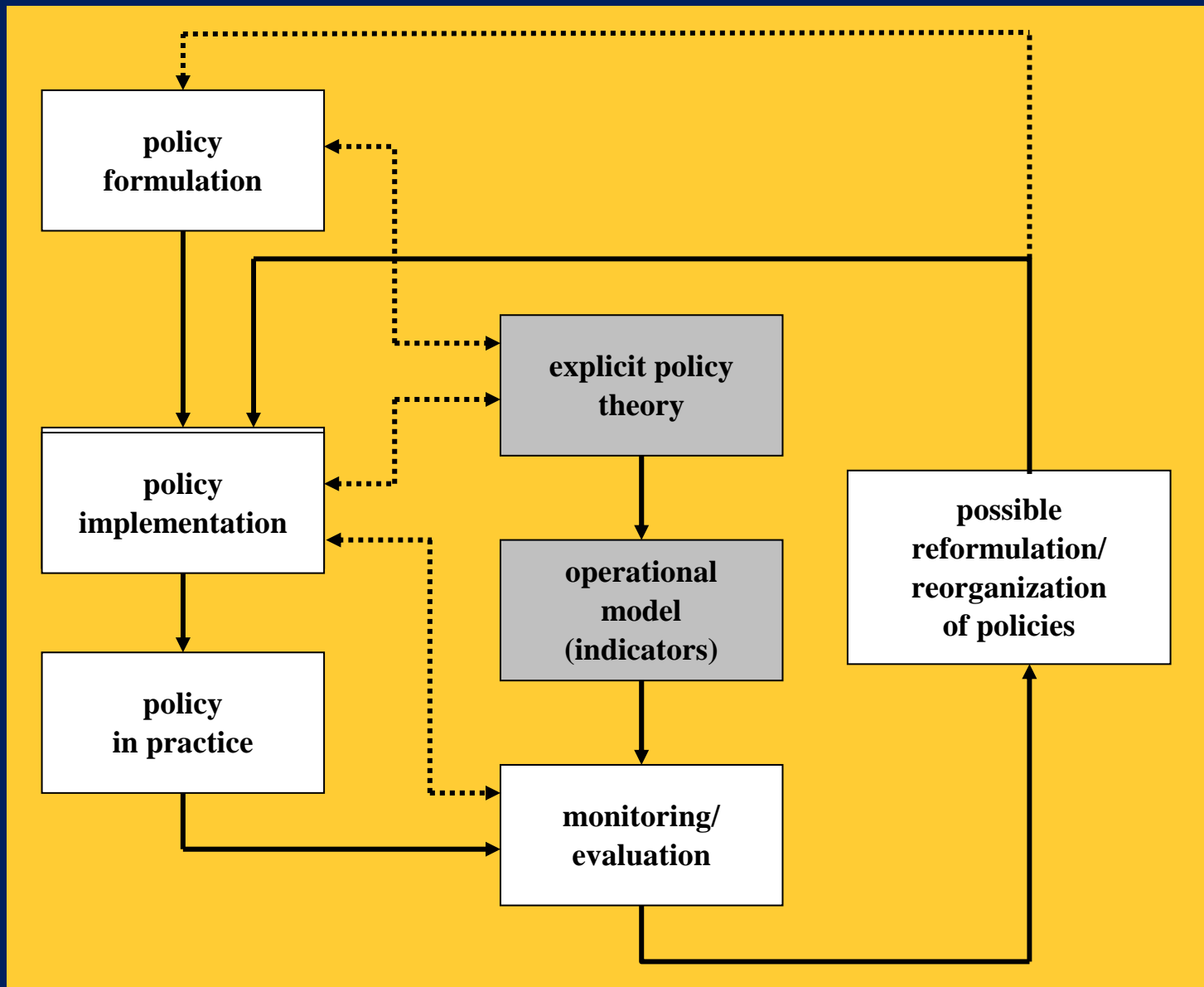
## Approach: standardized evaluation method

- Ex-post evaluation of 20 of instruments applied in different sectors (households, services, industry, transport) across Europe.
- Application of a standardised evaluation methodology based on the 'theory based policy evaluation', which not only focuses on the final impact (energy savings), but also on intermediate indicators and on the interaction between instruments.

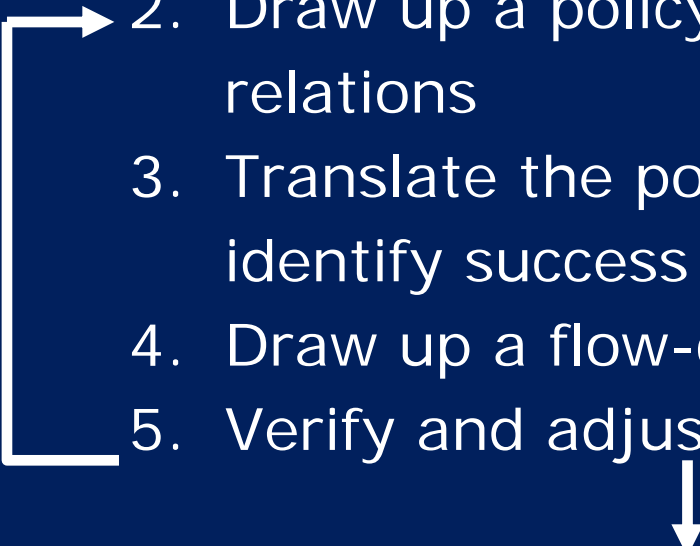
## Methodology: “Theory-based evaluation”

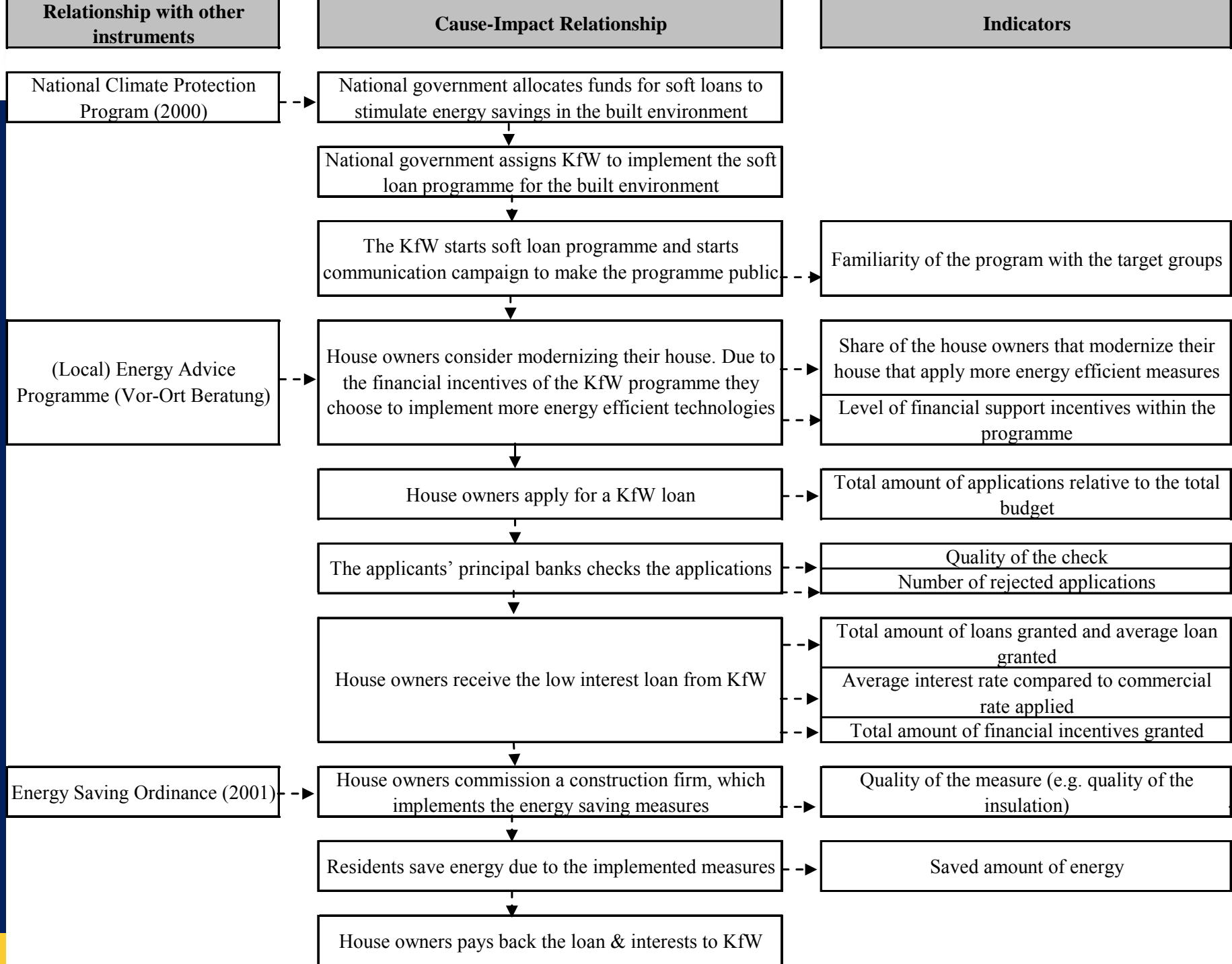
- Theory-based policy evaluation is extensively described and illustrated (Rossi et al., 2004)
- The method was applied to evaluate market transformation of EE programs in California (Blumstein et al, 2000)
- So far, however, not extensively applied in evaluating energy efficiency policies
- Main characteristic of the methodology:
  - Central element is the policy theory which describes how a policy instrument is expected to lead to energy savings
  - Method not only focuses on the final impact (energy savings) but also on intermediate results

# Role of policy theory in the policy cycle



## Evaluation in practice: 6 steps

1. Make an initial characterisation of the policy instrument
  2. Draw up a policy theory > mapping cause-impact relations
  3. Translate the policy theory to concrete indicators and identify success and fail factors
  4. Draw up a flow-chart of the policy theory
  5. Verify and adjust the policy theory
  6. Collect information and analyse all aspects of the policy theory (including target achievement, net impact and cost-effectiveness)
- 



# Evaluated policy instruments

1. Building standard (NL)
2. Energy regulation buildings (IT)
3. Energy manager obligation (IT)
4. Top runner approach (JP)
5. Energy Efficiency Commitment (UK)
6. Mandatory targets for network companies (BE)
7. ACEA agreement (EU)
8. Voluntary agreement (DK)
9. Audit programme (FIN)
10. FEMP (US)
11. EE Procurement group (SE)
12. Energy+ (EU)
13. Advice service (DE/NRW)
14. Energy concept for industrial branches (DE)
15. Industrial EE network (NO)
16. Local energy advisors (SE)
17. Eco-driving (NL)
18. Appliances labelling (NL)
19. Soft loans for buildings (KfW) (DE)
20. Energy investment deduction scheme (NL)

**Seperate reports of casestudies are available  
on the project website [www.aid-ee.org](http://www.aid-ee.org)**

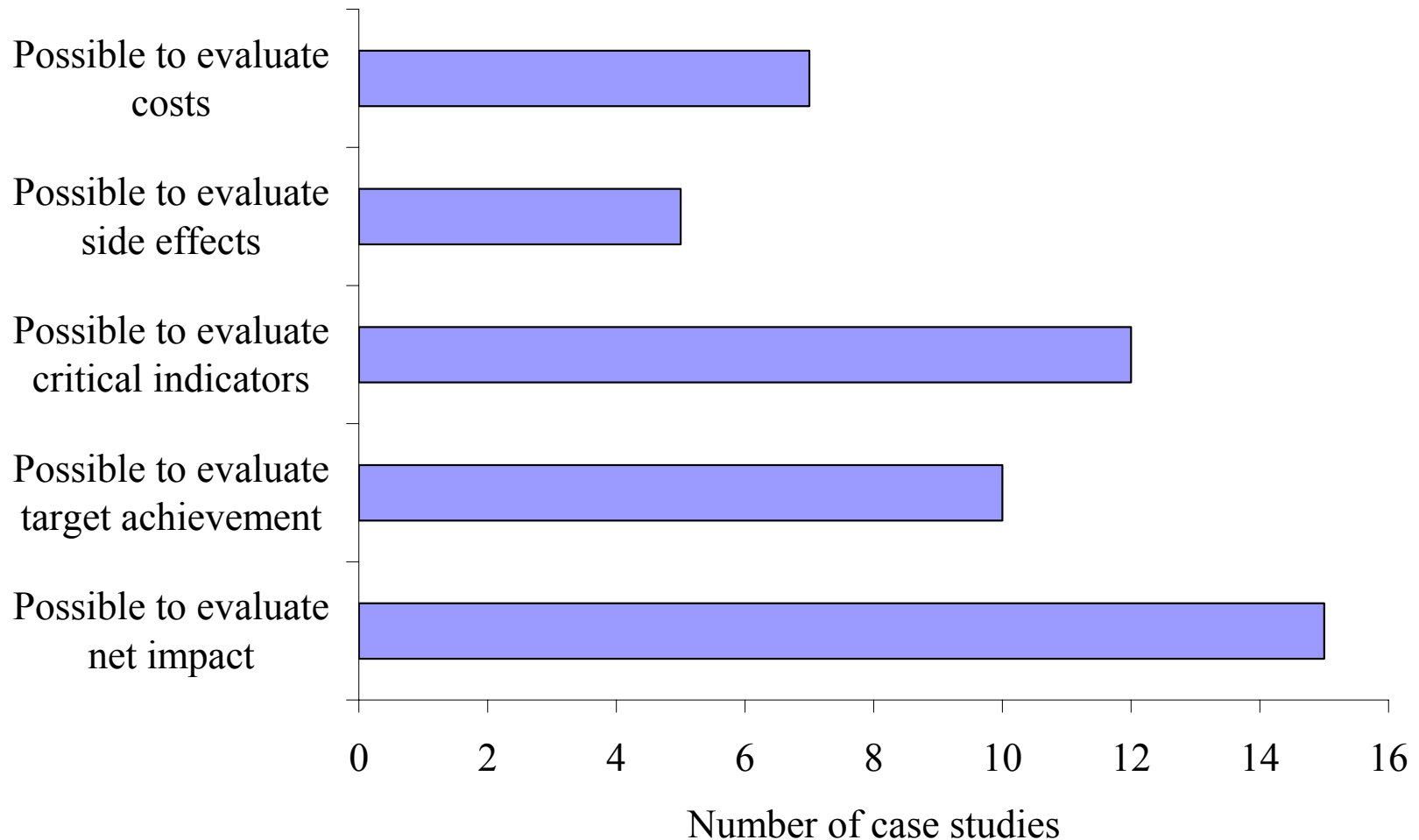


# Overall finding on target achievement, impact and cost-efficiency

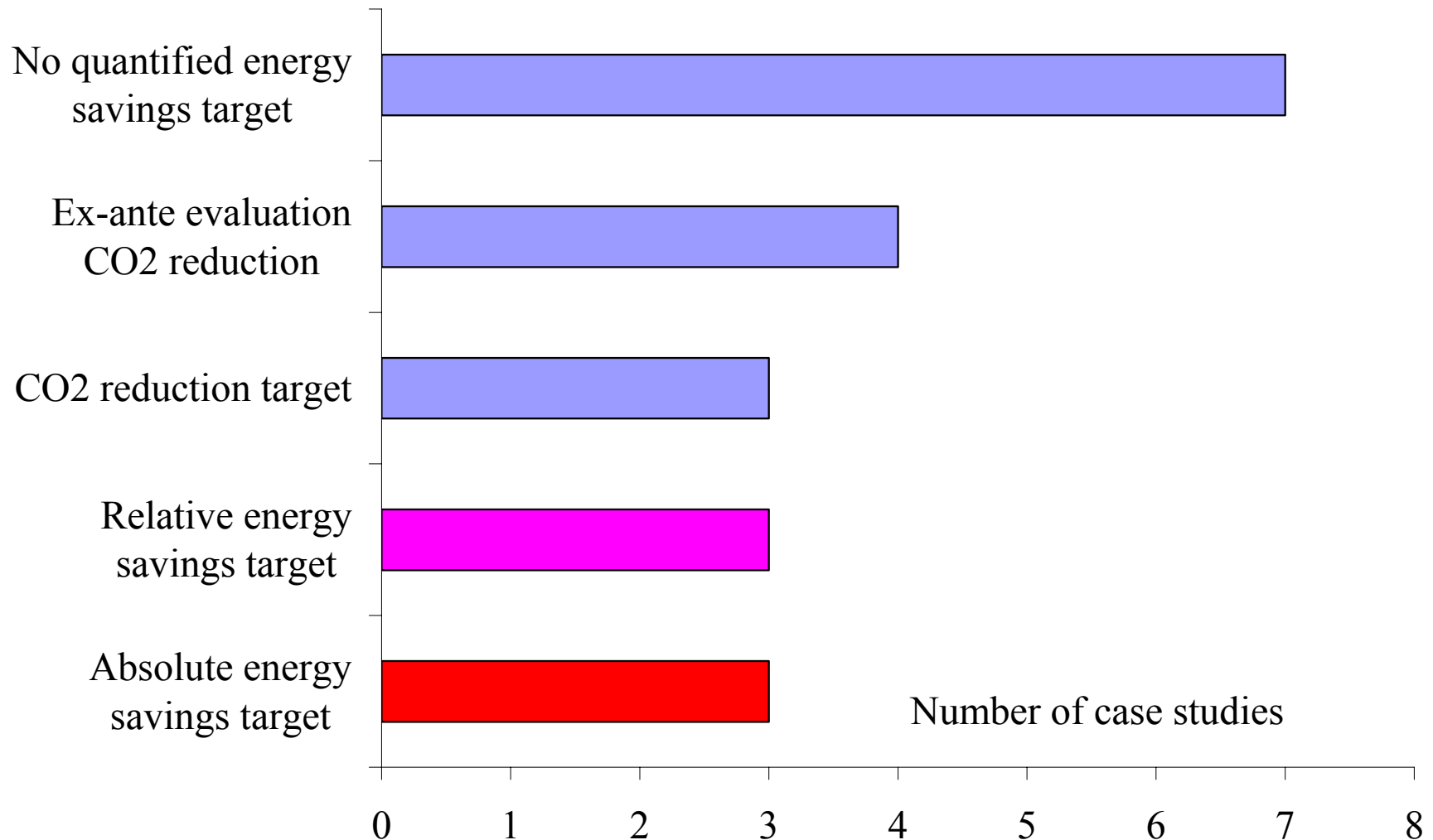
# Definitions

- TARGET ACHIEVEMENT/EFFECTIVENESS: To what extent do/did the policy instruments contribute to achieving the targets
- IMPACT/EFFECTIVENESS: The extent to which a policy instrument made/makes a difference compared to the situation without a policy instrument
- COST-EFFECTIVENESS/EFFICIENCY. What are/were the cost and benefits of a policy instrument, and could targets have been reached against lower costs

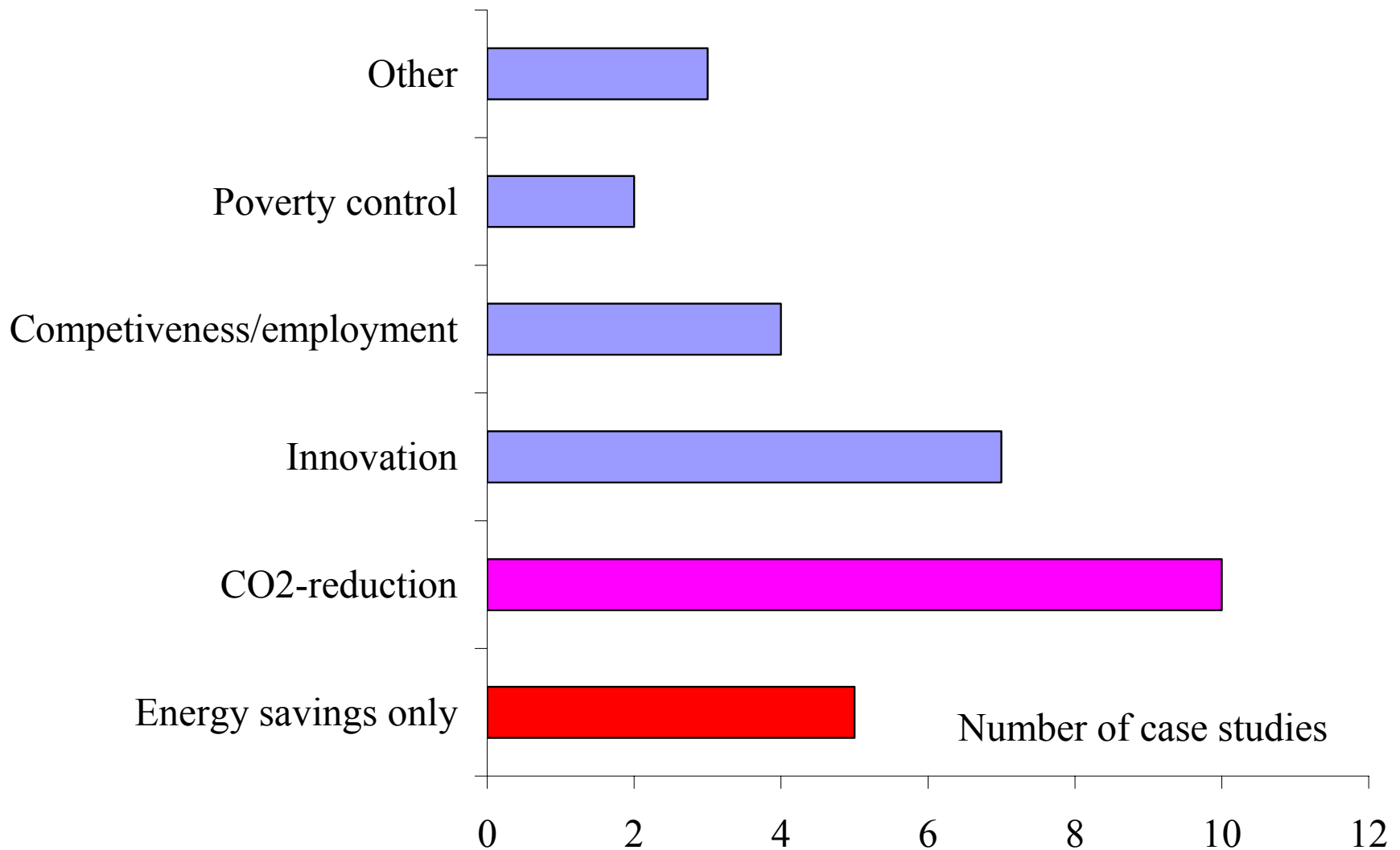
## For most instruments monitoring information is collected on a regular basis, however, monitoring does not have high priority



# Often quantitative targets on energy efficiency improvements and clear time frames are lacking



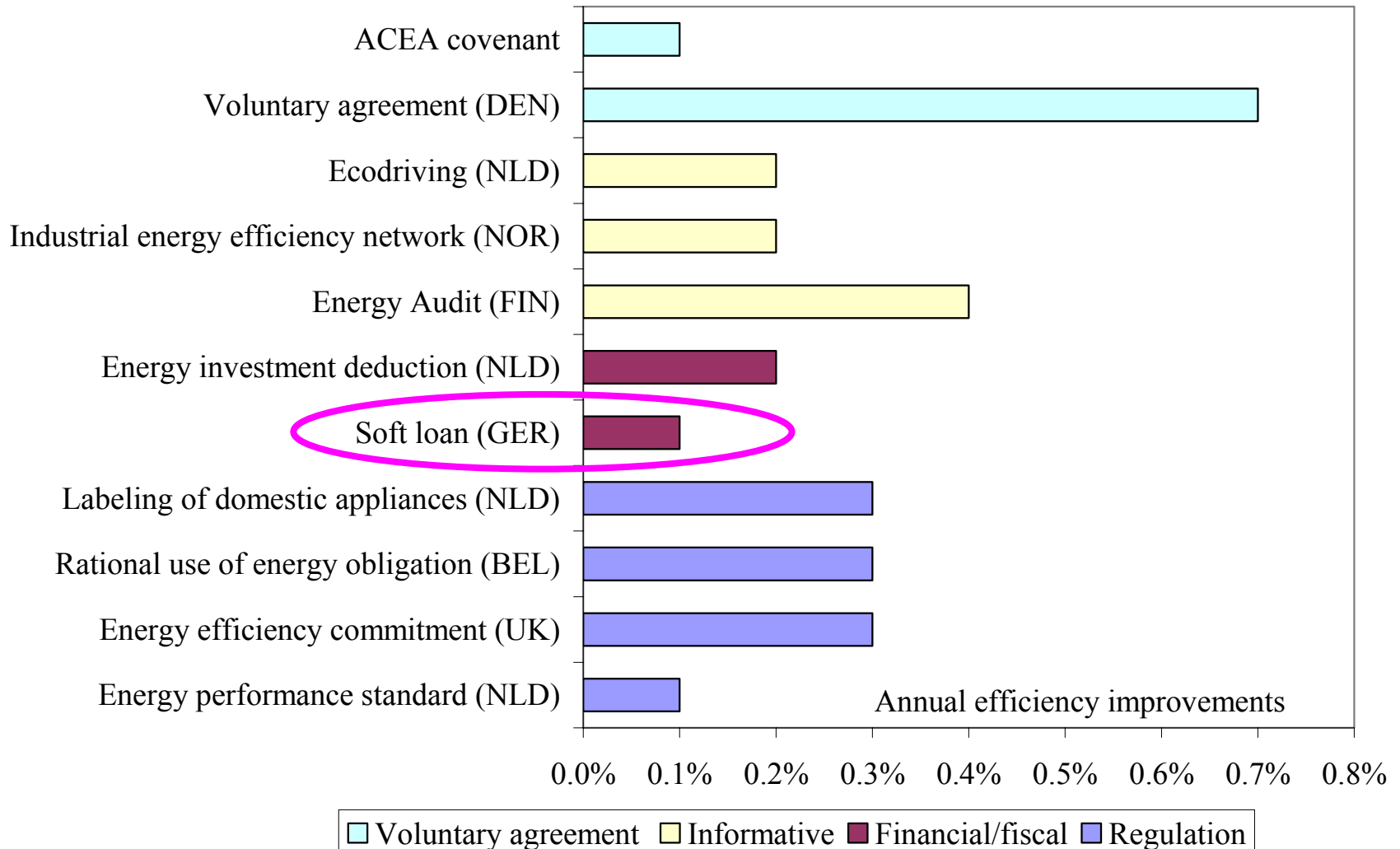
## Often policy instruments have multiple and/or unclear objectives



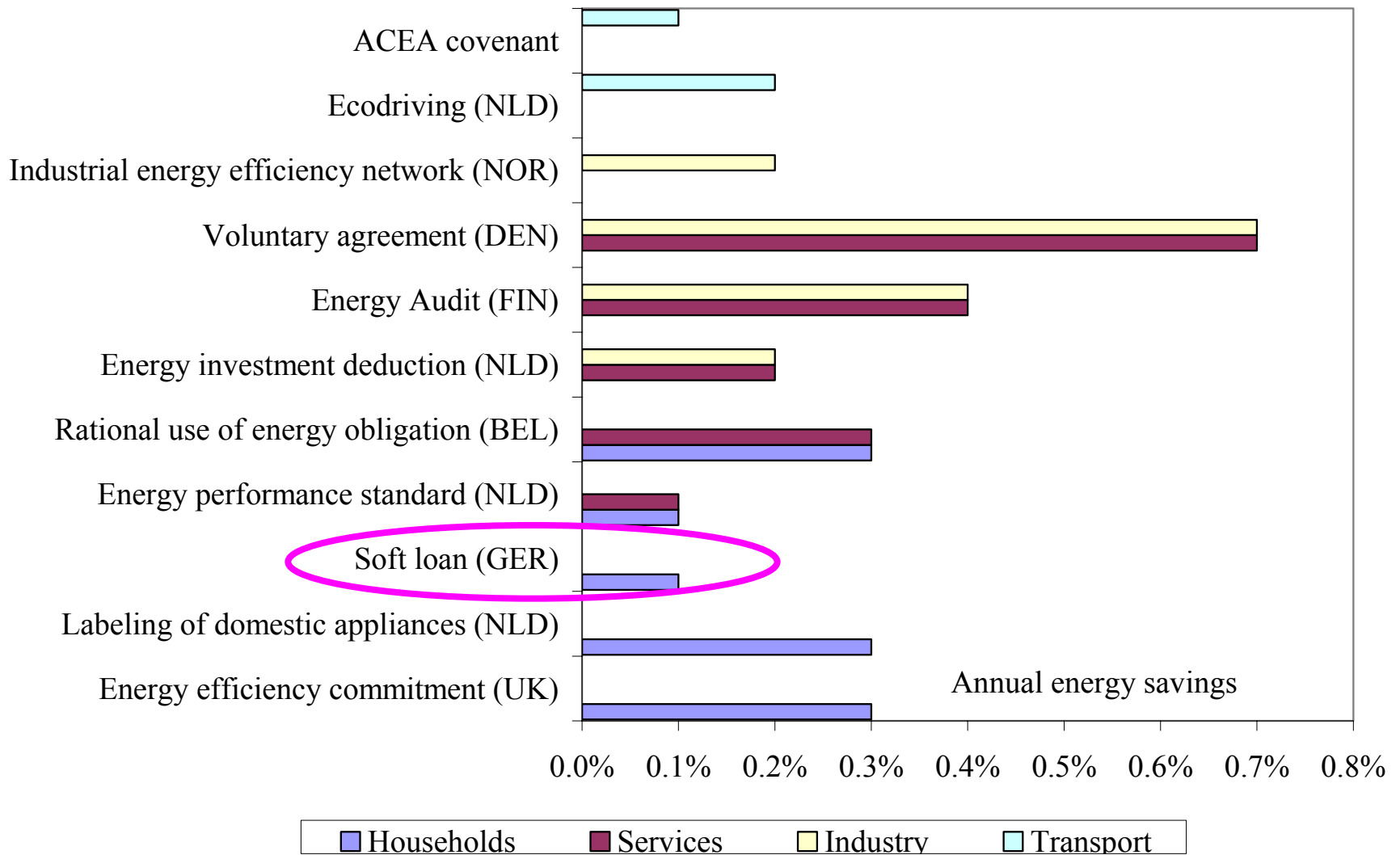
# Target and target achievement

	Instrument	Evaluated period	Target	Target achievement
Regulation	Energy performance standard for buildings (NLD)	1996-2004		
	Building regulation (ITA)	2003-2005		
	Energy Efficiency Commitment (UK)	2002-2005		
	Mandatory targets on energy consumption (BEL)	2003-2004		
	Top Runner (JAP)	1999-2005		
	Labeling of domestic appliances (NLD) (+ rebate)	1995-2004		
	Obligation on having an energy manager (ITA)	1999-2003		
Financial	Soft loans for building modernization (GER)	1996-2004		
	Energy investment deduction scheme (NLD)	1997-2004		
Informative	Local Energy Advice (SWE)	1998-2004		
	Energy audits program (FIN) (+ subsidy) <b>Public</b> services	1992-2004		
	Energy audits program (FIN) (+ subsidy) <b>Private</b> services	1992-2004		
	Energy audits program (FIN) (+ subsidy) <b>Industry</b> services	1992-2004		
	Industrial energy efficiency network (NOR)	1996-2004		
	Energy concept for branches (GER)	1996-2003		
	Individual Advice Services (GER)	1990-2005		
	Eco-driving (NLD)	2000-2004		
	FEMP (USA)	1985-2004		
VA	Voluntary agreements on energy efficiency (DEN) (+ subsidies)	1996-2003		
	ACEA covenant (EUR)	1998-2003		
Procurement	Energy+ (EUR)	1999-2004		
	BELOK (SWE)	2001-2005		
	Quantitative target			
	Target has been achieved or overachieved.			
	Target has not been achieved.			
	Target year has not been reached yet; unclear whether target achievement is on track.			
	Due to a lack of a quantified target, target achievement cannot be assessed.			

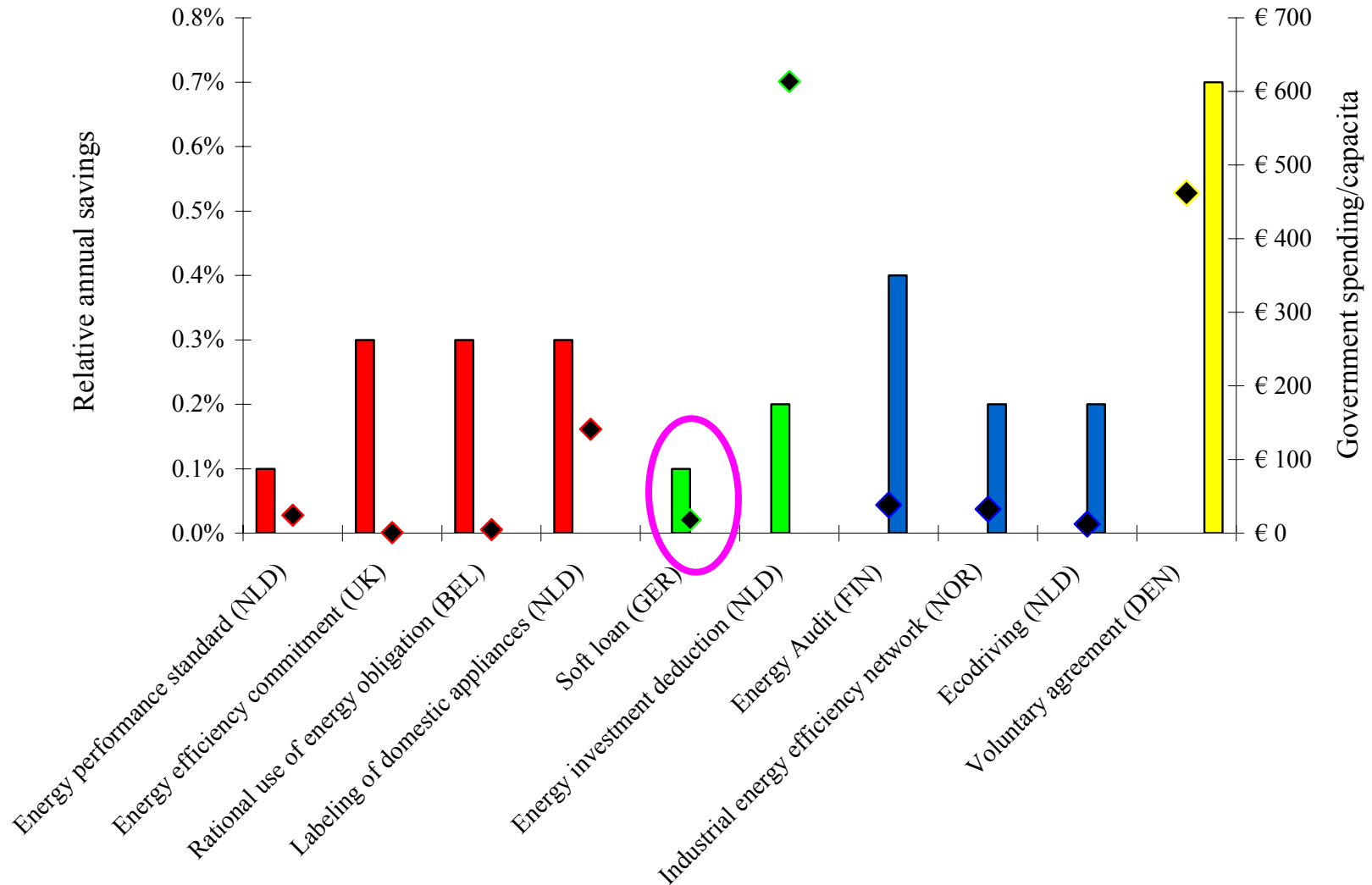
# No clear differences can be observed in annual savings for the different types of instrument



# Largest saving in industry/service sector, lowest in transport



# Government spending and savings



# Most instruments are part of a policy package, and it is often difficult to isolate the impact of a single policy instrument

	Minimum energy performance standard	Building code & enforcement	Mandatory target & enforcement	Labeling	Promotion campaign / general information	Information centre / network	Energy audit	Education & training	Demonstration	Governing by example	Targeted taxes / tax exemptions	Project or product related subsidies	Reduced interest rates	Voluntary agreement	Technology procurement
Regulation	Energy performance standard for buildings (NLD)	X	√					√	√			√			
	Building regulation (ITA)		X												
	Top Runner (JAP)	X			√	√			√		√				
	Energy Efficiency Commitment (UK)			X		√					√	√			
	Mandatory targets on energy consumption (BEL)			X		√					√	√			
	Obligation on having an energy manager (ITA)			X			√								
	Labeling of domestic appliances (NLD)				X	√					√	X			
Financial	Soft loans for building modernization (GER)				√		√						X		
	Energy investment deduction scheme (NLD)										√	X		√	
Informative	Local Energy Advice (SWE)					X						√			
	Energy audits program (FIN)					√	X					X		√	
	Industrial energy efficiency network (NOR)					X	X	X			√				
	Energy concept for branches (GER)						X	X				X	X		
	Eco-driving (NLD)				√	X			X		X	X			
	FEMP (USA)		X		X		X	X		X	X	X			X
	Individual Advice Services (GER)					X	X	X					X		
VA	Voluntary agreements on energy efficiency (DEN)						√				√	√		X	
	ACEA covenant (EUR)				√						√			X	
Procurement	Energy+ (EUR)					√									X
	BELOK (SWE)	√	√												X

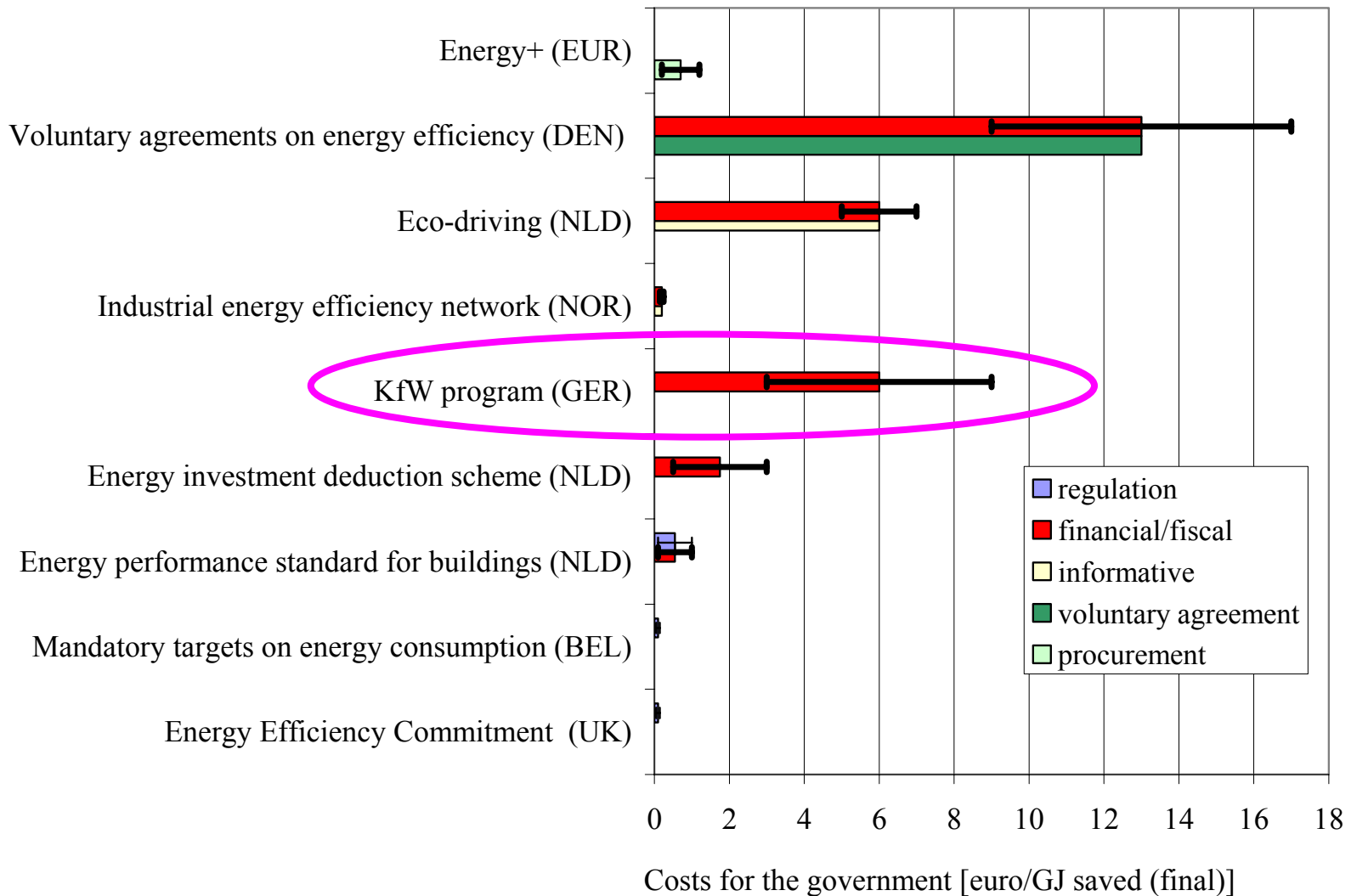
X = instrument(s) evaluated in the AID-EE case studies

√ = instruments linked to the evaluated instrument(s) (policy mix)

## Most instruments in policy packages are reinforcing each other, however, empirical evidence is weak

- Analysis shows that each instrument has its own specific role in the package. E.g. creating awareness, showing opportunities, providing financial means etc.
- However,
  - There is a lack of attention for optimisation of policy packages i.e. ensuring that policy instruments are reinforcing and don't overlap or have a mitigating effect.
  - In most cases clear targets for each of the instruments in a policy package are lacking

# Cost for the government





## **Guidelines for the choice of policy instruments:**

- When to apply a certain policy instrument?**
- What characteristics determine success?**

# Financial incentives (subsidies, fiscal measures, soft loans)

## Applying when

- there is a financial barrier in place.
- an informative instrument (e.g. energy audit) needs financial incentives to attract the target group

## Key characteristic determining success

- Is the target group aware of the existence of the instrument?
- Is the financial support sufficient to attract new investments?
- Is the procedure for getting financial support simple enough?
- Is it clear for the target group which technologies are eligible for financial support?
- Is the list of technologies regularly updated to limit free riders?
- Is the instrument implemented for a long time period to ensure security for investors?

# Energy performance standards for buildings, cars or appliances

## Applying when

- dealing with a target group which is unwilling to act or difficult to address (e.g., land-lord – tenant problem)
- aiming at removing the worst products or services from the market with regard to energy consumption

## Key characteristic determining success

- Is the target group well prepared?
- Are there sufficient resources in place to enforce the legislation?
- Are there penalties in place for non-compliance?
- Are the penalties at a sufficiently high level to stimulate meeting the standard?
- Is the standard timely adjusted to technology progress?

# Voluntary agreements

## Applying when

- dealing with a small number of actors with which you need to negotiate or a strongly organized sector
- there is much relatively cheap saving potential (low hanging fruit)

## Key characteristic determining success

- Is the target group motivated to participate in the voluntary agreement?
- Is the target set beyond business-as-usual?
- Are there penalties in case of non-compliance (or are there other incentives in place to prevent non-compliance)?
- Is there a good monitoring system in place?
- Are supporting instruments in place ?



**Guidelines on key indicators to monitor in order to be able to explain success or failure and monitor policy implementation**

# Financial instruments

- **Key monitoring information to explain success or failure**
- Number/share of eligible actors that are familiar with the scheme
- Number of eligible actors that apply for the scheme
- Number and variety of rejected projects
- Number, variety and (additional costs) of granted projects (to determine a.o. free riders)
- Market share of eligible measures / changes in product range of suppliers
- Changes in energy tax / other financial incentives / energy prices

# Energy performance standards for buildings

- **Key monitoring information to explain success or failure**
- Number of checks carried out (permits, buildings)
- Number of non-compliant permits / buildings
- Number of sanctions
- Changes in product range suppliers
- Number, variety and (additional) costs energy saving measures
- Number of buildings constructed according to standard

# Voluntary agreements

- **Key monitoring information to explain success or failure**
- Number/share of companies in the sector that signed the agreement
- Share of total sectoral energy consumption accounted for by the participants in the scheme
- Number of VA compliance plans
- Number, variety and (additional) costs of energy saving measures implemented
- Energy savings achieved with implemented projects