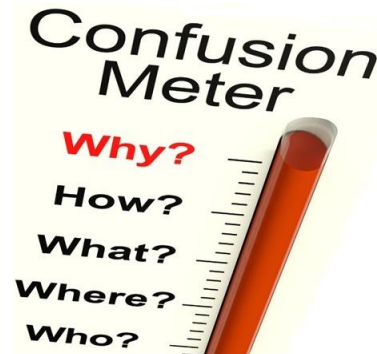




# EED, Energisyn og tilskudsmuligheder

# Dagsorden

- Hvem er DI Energi?
- Hvad er Energieffektivitetsdirektivet?
- Energisyn
  - Energisynsforpligtelsen: hvorfor og hvem er forpligtet?
  - Energisyn i SMV'er?
- Tilskuds- og støttemuligheder



# Hvad skal I have med fra dette oplæg?

- Store virksomheder er forpligtet til at foretage energisyn.
- Der er flere tilskuds- og støttemuligheder, hvis I ønsker at spare energi.
- DI Energi er her for at hjælpe jer.





# DI Energi?

# Hvad er DI Energi?

- Et branchefællesskab
- Medlemmer: virksomheder, der arbejder med energi
- Hvad laver DI Energi?
  - Interessevaretagelse
  - Fremmer branchens eksport
  - Opdaterer på energidagsordenen
    - Sektioner, udvalg og netværk
    - Nyhedsbrev



Læs mere på: [www.energi.di.dk](http://www.energi.di.dk)

# Hvad kan DI Energi bl.a. tilbyde jer?

- **ESCO-netværk og netværk for energieffektivitet**
  - Orientering om nye politikker
  - Danne DI's holdning
  - Erfaringsudveksling
- **Netværk for energisyn**
  - Erfaringsudveksling
  - Opdateret på de nyeste erfaringer
- DI Bioenergi
- Markedsnetværk
- Forsknings- og innovationsudvalg
- Energiinfrastruktur og smart grid
- [www.klimakompasset.dk](http://www.klimakompasset.dk)



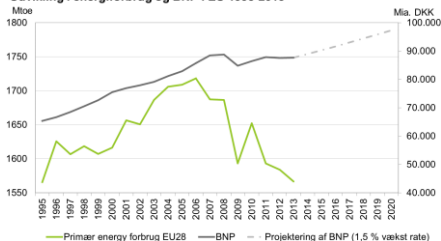
Læs mere på: [www.energi.di.dk](http://www.energi.di.dk)

# Energieffektivitetsdirektivet

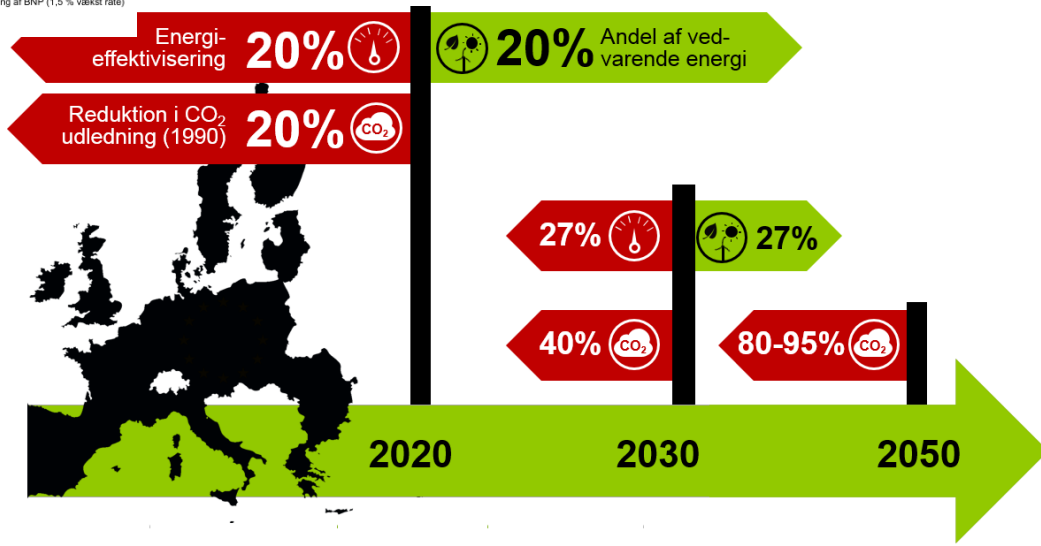


# EU's klima- og energimålsætninger

Udvikling i energiforbrug og BNP i EU 1995-2013



Anm. BNP aflæses på højreaksen. BNP er i 2005 markedspriser.  
Kilde: EUROSTAT, Europe Kommissionen og DI beregninger.



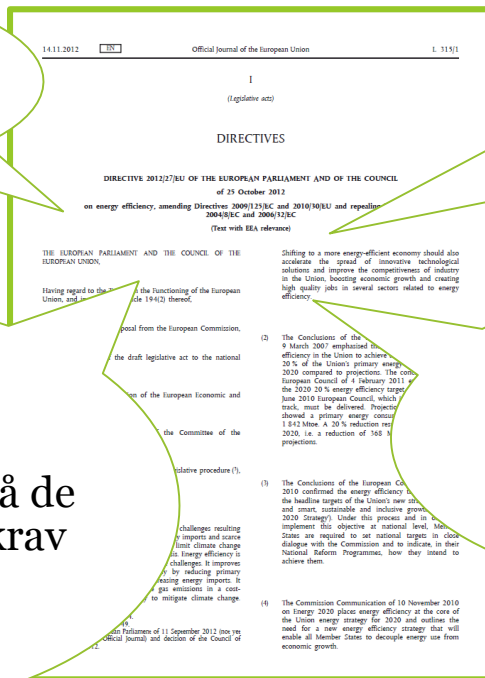
# Energieffektivitetsdirektivet?

Energiselskabernes  
energipareindsats

Obligatorisk  
**energisynd**  
for store  
virksomheder

3 % af statens  
bygninger skal  
renoveres årligt, så de  
opfylder mindstekrav  
til energimæssige  
ydeevne

Energiforbrugerne  
skal have mulighed  
for at få individuelle  
energimålere.





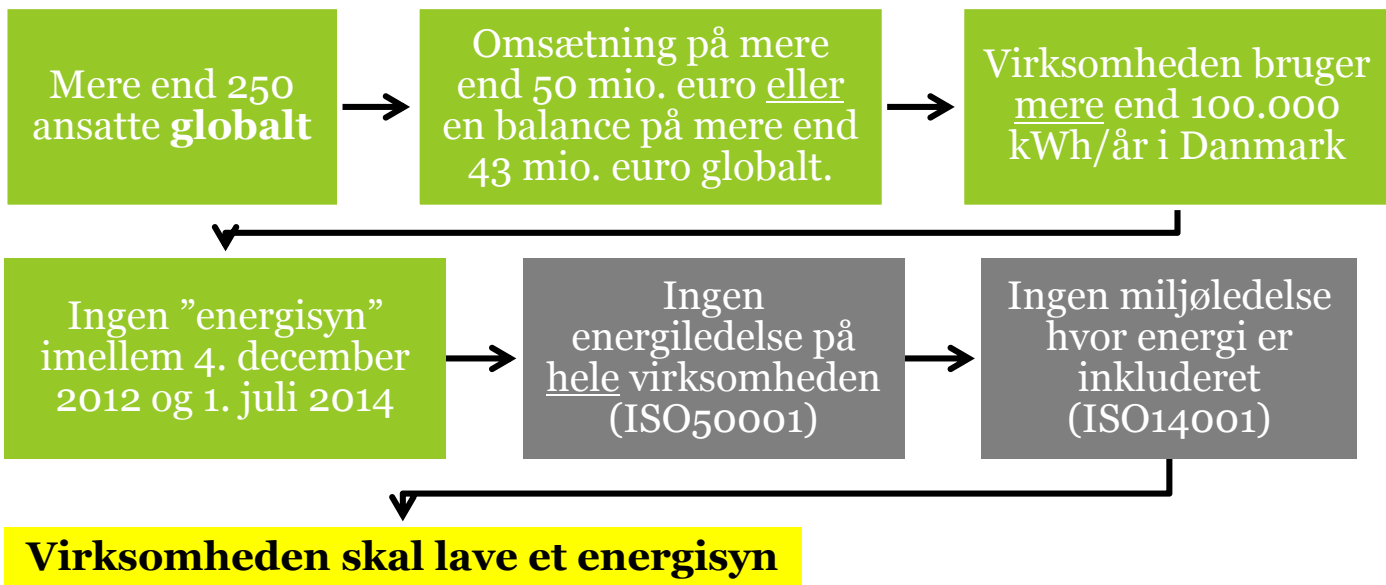
Energisyn?

# Hvad er et **energisyn**?



# Hvilke virksomheder skal lave et energisyn?

”Ja” til alle 6 spørgsmål → forpligtet til at foretage et energisyn

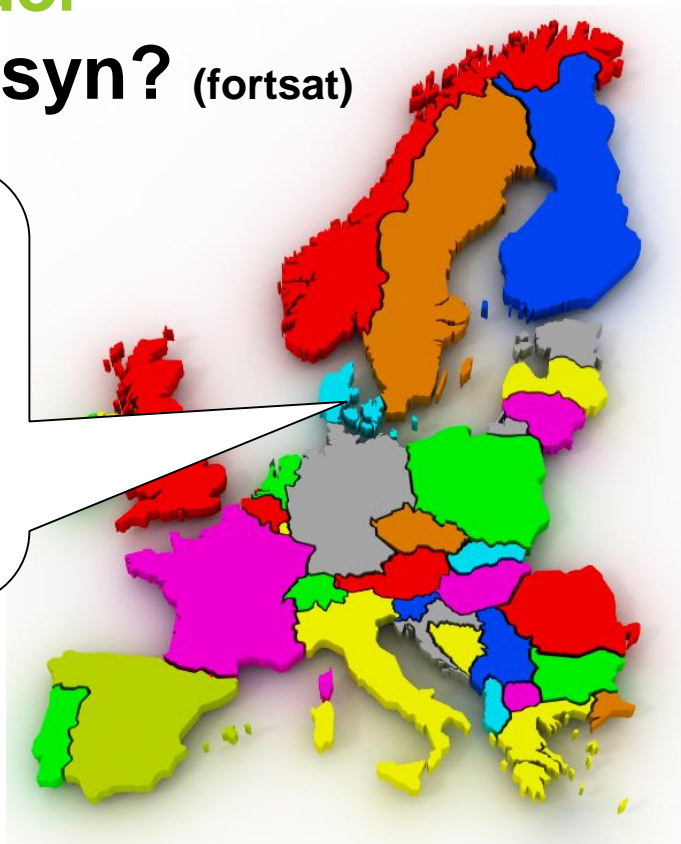


**Grønne bokse:** Gælder i Danmark.

**Grå bokse:** Gælder i hele EU.

# Hvilke virksomheder skal lave et energisyn? (fortsat)

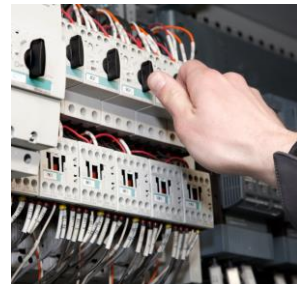
**Danske regler** gælder  
for virksomheder  
**beliggende** i Danmark  
men forpligtelsen  
gælder i alle EU-lande.



# Hvad skal et energisyn **indeholde**?

En kortlægning af virksomhedens energiforbrug af alt hvad virksomheden **råder over**:

- Bygninger
- Processer og installationer
- Transport



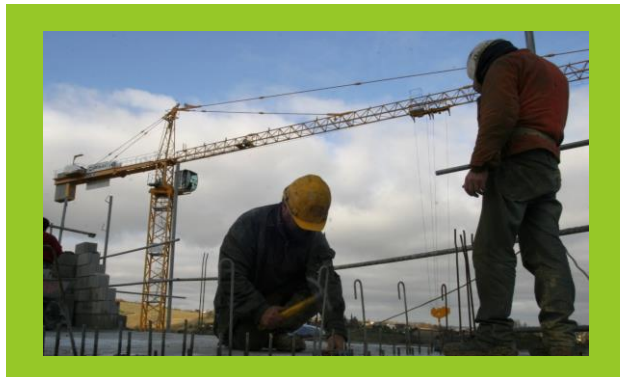
Energisynet skal foretages hvert fjerde år.

# Undtagelser

Skibe mindre end 5.000 bruttoregister-ton



Bygge- og anlægsprojekter  
(maskiner i entreprenør-  
virksomheder er dog omfattet)



# Fleksibiliteter: Overgangsordning for transportvirksomheder



Forpligtelsen er opfyldt for virksomheder, som deltager i Trafikstyrelsens ordning for **Grøn certificering af transportvirksomheder**.

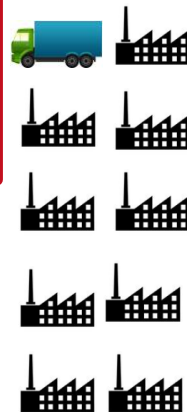
Gælder frem til 1. marts 2016.

## Fleksibiliteter (fortsat)

Op til 10 % af virksomhedens totale energiforbrug i Danmark kan undtages.

Elementer i virksomheden der er omfattet af **BAT-konklusioner**, som er relateret til **energieffektivitet**, behøves der ikke blive lavet energisyn af.

Energisyn af bygningsdelen kan laves ud fra informationerne fra et gyldigt **driftsmærke** baseret på en bygningsgennemgang.



# Hvem kan foretage et energisyn?



**Egne eksperter** skal være:

- Uvildige ift. det der laves energisyn på.
- Godkendt af Energistyrelsen.

**Eksterne eksperter** skal opfylde én af disse punkter:

- Registeret energisynskonsulenter.
- Godkendt af Energistyrelsen.
- Ansat i en akkrediteret virksomhed.
- For handel- og servicevirksomheder:  
Energimærkningsfirma.

Læs mere på: <http://energisyn.teknologisk.dk/> → NYT →  
Hvordan bliver jeg Energisynskonsulent

# Rapportering

- Energisynsrapport eller resumé indsendes til [energisyn@ens.dk](mailto:energisyn@ens.dk) senest 1. marts 2016.
- Er virksomheden ISO50001- eller ISO14001 certificeret skal certificeringsrapporten indsendes.
- Angivelse af om virksomheden vil nævnes på positivlisten.



# Straf

1. Påbud

2. Politianmeldelse

→ domstolen fastsætter en bøde, som skal virke **afskrækkende**.



# SMV'erne og energisyn



En række vejledninger til energiledelse light +  
*”Tilskynde SMV’er til at få foretaget energisyn”* kommer.

# Nyttige **links** om energisyn mm.

- Energieffektivitetsdirektivet (artikel 8): <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1399375464230&uri=CELEX:32012L0027>
- Bekendtgørelse, som fastsætter reglerne for energisyn i Danmark: <https://www.retsinformation.dk/Forms/R0710.aspx?id=165880>
- Energistyrelsens hjemmeside om forpligtelsen inkl. vejledningen til energisyn: <http://www.ens.dk/forbrug-besparelser/indsats-virksomheder/tilskud-energispareafgift-aftale-energieffektivisering/lo-5>
- Energistyrelsens hjemmeside med links til informationsmateriale om energibesparelser i erhvervslivet: <http://www.ens.dk/forbrug-besparelser/indsats-virksomheder/aftaleordning/energibesparelser-erhvervslivet>
- Dansk Standards værktøjer til energiledelse f.eks. skemaer til kortlægning af energiforbruget <http://www.ds.dk/da/raadgivning/energiledelse/energiledelse-for-mindre-og-mellemstore-virksomheder/energiguide>
- Energiledelse Light: [http://www.ens.dk/sites/ens.dk/files/info/nyheder/nyhedsarkiv/energiledelse-light-vejledning-maa-mellemstore-virksomheder/EnergiledelseVejledningLight\\_april2010.pdf](http://www.ens.dk/sites/ens.dk/files/info/nyheder/nyhedsarkiv/energiledelse-light-vejledning-maa-mellemstore-virksomheder/EnergiledelseVejledningLight_april2010.pdf)

# Støttemuligheder ved energibesparelser i Danmark?

## Energiselskabernes energispareindsats

- Energiselskaberne skal spare energi.
- Tilskud og/eller rådgivning til at foretage energibesparelser.
- Tilskud = tilbagebetalingstid > 1 år
- Aftale med et energiselskab inden energispareprojektet startes.
- Muligheden løber frem til og med 2020 og formentlig forlænges den herefter.



# Støttemuligheder ved energibesparelser i Danmark? (fortsat)

## VE til procesordningen:

- Investeringsstilskud op til 65 pct.
- Tilskud til energieffektiviseringer i konverteringen.
- Der er afsat en pulje på 3,65 mia. kr. i perioden 2013-2021.



# Støttemuligheder ved energibesparelser i Danmark? (fortsat)

## PSO-godtgørelse til el-intensive virksomheder

- 7 øre/kWh godtgørelse for PSO-betaling på el frem til og med 2020. I 2015 forventes tilskuddet at blive 15 øre/kWh.
- Der er afsat 185 mio. kr. årligt i perioden 2015-2020



## Kravet er:

- Tilhører branche fra bilag 3 i EU's statsstøttere regler.
- Energiledelse (ISO50001).
- En aftale med Energistyrelsen, bl.a. om at implementerer alle elbesparelser med en tilbagebetalingstid under 5 år.

# Nyttige **links** om tilskudsmuligheder

- Brancheliste i bilag 3: [http://eur-lex.europa.eu/legal-content/DA/TXT/PDF/?uri=CELEX:52014XC0628\(01\)&from=EN](http://eur-lex.europa.eu/legal-content/DA/TXT/PDF/?uri=CELEX:52014XC0628(01)&from=EN)
- PSO-godtgørelsen, inkl. vejledning til at finde jeres branchekode: <http://energi.di.dk/nyheder/pages/statstilskudtilpso-betaling.aspx>
- Find din branchekode: [www.cvr.dk](http://www.cvr.dk)
- Energiselskabernes energispareindsats: <http://www.ens.dk/forbrug-besparelser/energiselskabernes-spareindsats>
- VE til procesordningen: <http://www.ens.dk/forbrug-besparelser/indsats-virksomheder/ve-proces>

# Hvad **skal I** have med fra dette oplæg?

- ✓ Store virksomheder er forpligtet til at foretage energisyn.
- ✓ Der er flere tilskuds- og støttemuligheder, hvis I ønsker at spare energi.
- ✓ DI Energi er her for at hjælpe jer.







# Hvem er vi?

	<p><b>Troels Ranis</b> Branchedirektør DI Energi</p> <p>Tlf: 3377 3683 Mob: 2328 5056 E-mail: trra@di.dk</p>		<p><b>Hans Peter Siente</b> Chefkonsulent Markedsudvikling</p> <p>Tlf: 3377 3722 Mob: 2949 4594 E-mail: hps@di.dk</p>
	<p><b>Sune Thorvildsen</b> Chefkonsulent</p> <p>Forskning og udvikling Smart Grid Analyse og statistik</p> <p>Tlf: 3377 3614 Mob: 6167 1616 E-mail: sunt@di.dk</p>		<p><b>Michael Persson</b> Sekretariatsleder DI Bioenergi</p> <p>Tlf: 3377 3515 Mob: 6054 4031 E-mail: mipe@di.dk</p>
	<p><b>Anne Lund Andersen</b> Konsulent</p> <p>Bæredygtig energi Energieffektivisering</p> <p>Tlf: 3377 3514 Mob: 3016 6563 E-mail: adla@di.dk</p>		<p><b>Ania Graasbøl-Schmidt</b> Sekretær DI Energi</p> <p>Tlf: 3377 3682 E-mail: ags@di.dk</p>



# Tak for opmærksomheden

# EPC (ESCO) i Europa og Danmark som undersøgt i Transparensen projektet

Temadag om energieffektivisering  
Vejle, 30 sept. 2015

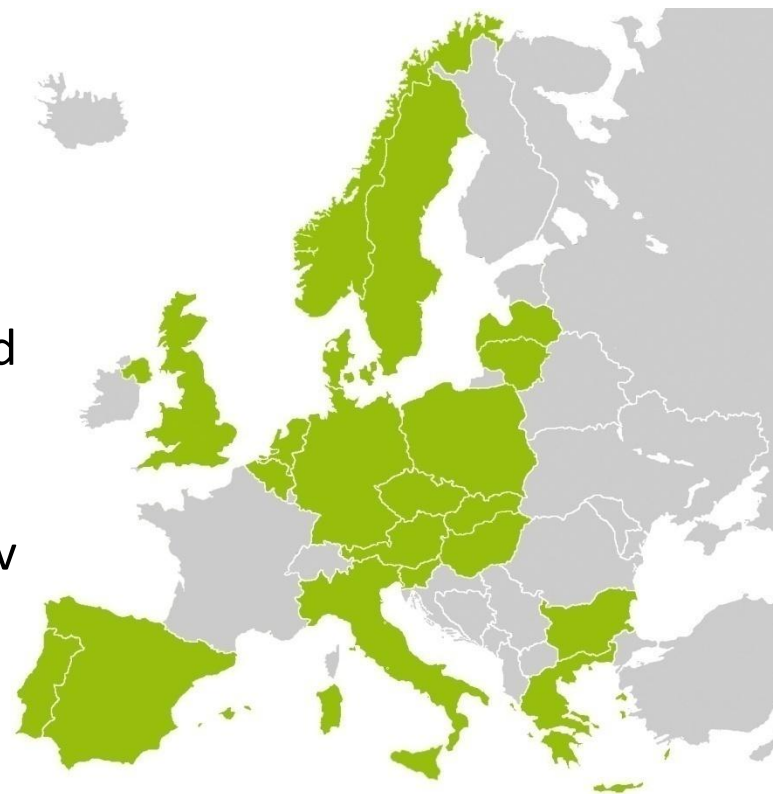


V/Nils Daugaard

# Projekt Summary Transparens

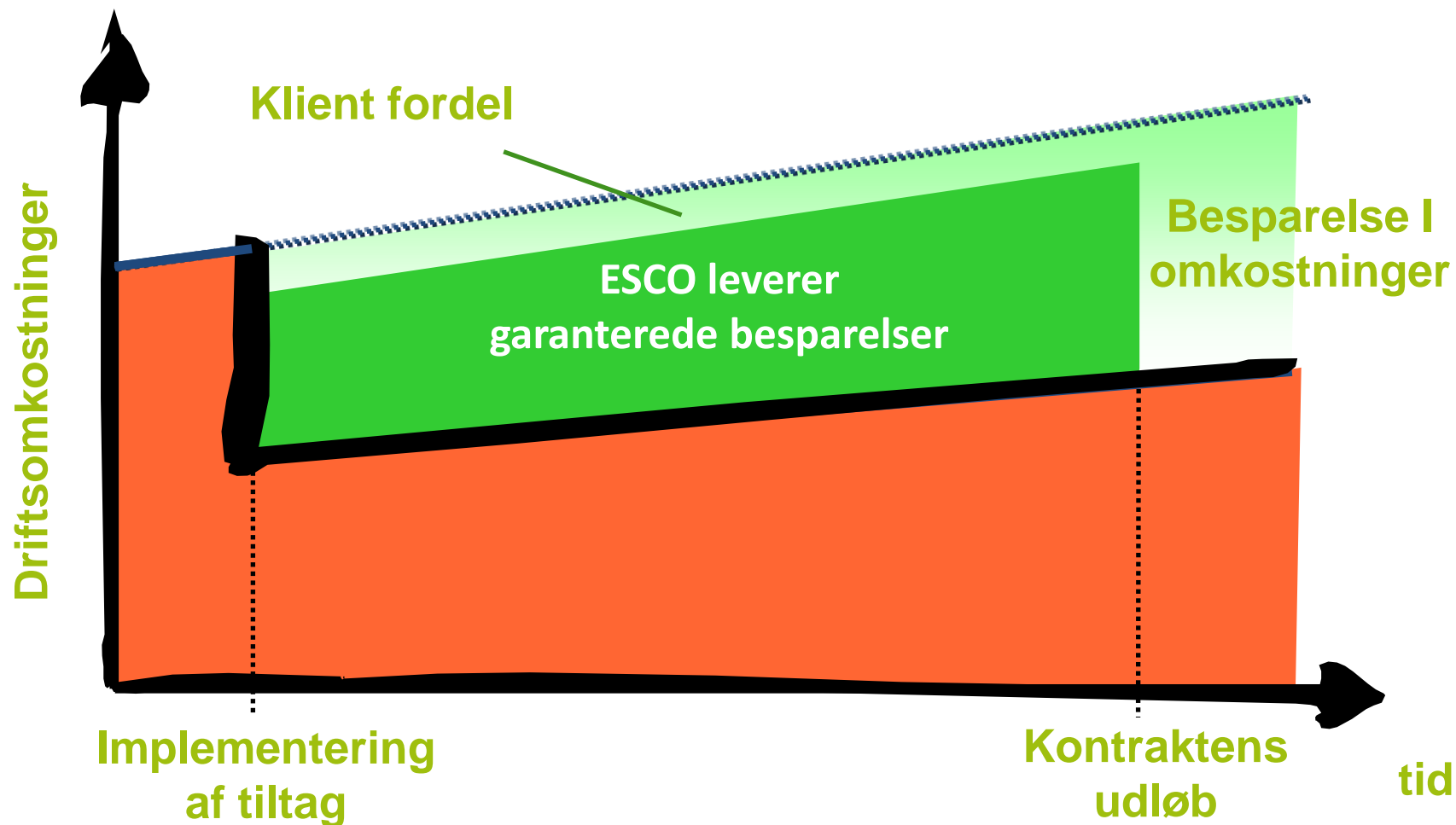


- Koordinator – SEVEN (Tjekkiet)
- 20 partnere fra 20 EU medlemslande
- Dansk partner: EC Network
- Projektperiode: **1. 4. 2012 - 30. 9. 2015**
- Overordnede formål:
  - Tage pulsen på det eksisterende marked
  - Øge **tilliden til EPC markedet** gennem udvikling af retningslinjer for grundlæggende værdier og kvalitetskrav for EPC Projekter
  - Videns- og erfaringsudveksling landene imellem
  - Træning af EPC aktører



# Grundlæggende omkring EPC

## Omkostningsbesparelser i EPC



# Grundlæggende omkring EPC

## Fordele ved EPC



- **ESCOet har samme interesse i projektet som klienten**
  - Effektiv og professionel projektgennemførelse med henblik på at generere flest mulige energibesparelser
- **Kontrakten omfatter en komplet service**
  - Design, projektering, implementering, idriftsættelse, ansvar for korrekt drift, M&V af besparelser
- **Besparelserne er garanteret gennem kontrakten**
  - Hvis det kontraktlige mål ikke opfyldes betaler leverandøren for det overskydende energiforbrug



# Grundlæggende omkring EPC

## Typiske karakteristika for et EPC projekt



### ■ Kontraktlængde

- typisk 4 til 10 år
- I blandt andet Danmark er der dog en tendens til at kontrakterne bliver længere og længere (op til 20 år) m.h.p. at inkludere renoveringsopgaver og vedvarende energianlæg
- Et "dansk" projekt vil således typisk inkludere tiltag med kort tilbagebetalingstid kombineret med tiltag med længere tilbagebetalingstid - v.h.j.a. middel tilbagebetalingstid kan der således opnås både energirenovering samt bedre bygningsstandard

### ■ Energibesparelser i forhold til baseline energiforbruget

- typisk 15% til 50%

### ■ Investeringsvolume

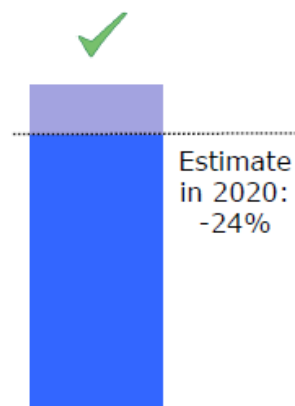
- typisk fra 50.000 EUR til 5 million EUR (I Danmark op til 20 MEUR = 150 mill. kr)



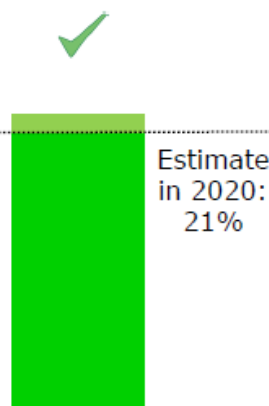


### Europe is on its way to meeting its 2020 targets

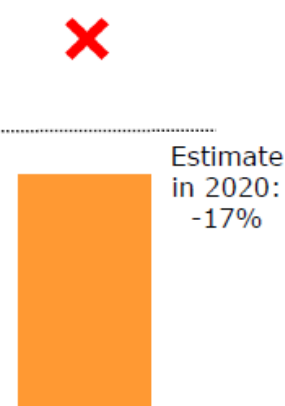
**Reduce greenhouse  
gas levels by 20%**



**Increase share of  
renewables to 20%**



**Reduce energy  
consumption by 20%**



Presentation of J.M. Barroso to the European Council, 20-21 March 2014

Source: European Commission 2

- **Energy Performance Contracting – prioriteret i EED**
  - Offentlig-privat samarbejde gennem EPC kan sikre gennemførlighed og kvalitet af energiprojekter
  - Opnåelse af EU mål kræver privat involvering og kapital
  - Hovedparten af investeringerne i EE/RES skal komme fra den private sektor – EU og nationale fonde skal kun supplere
  - Investeringsbehov 2011 – 2020: **850 Milliarder EUR**
  - Cirka 85 Milliarder EUR per år hvoraf 60 Milliarder EUR er relateret til bygninger



# EPC Support Strategi

## Implementering af art. 18 (EED)



- **Fremme af energitjenester: Medlemsstaterne skal fremme markedet for energitjenester og små og mellemstore virksomheders adgang hertil bl.a. gennem**
  - Information
  - Standardkontrakter (EPC)
  - Fremme udbredelsen af frivillige kvalitetsmærker
  - Formidle information om bedste praksis, finansieringsinstrumenter m.v.
  - Mulig etablering af en uafhængig instans m.h.p. at sikre en effektiv behandling af klager og bilæggelse af tvister, der opstår fra energitjenestekontrakter (EPC kontrakter)



# TRANSPARENSE - EPC Support Strategi

## EPC Code of Conduct



- **Transparense støtter EPC markedet gennem udvikling af EPC Code of Conduct**
  - Omfatter grundlæggende principper for planlægning og gennemførelse af EPC/ESCO projekter
  - Øge gennemsigtighed, kvalitet, og troværdigheden af EPC ydelser
  - Projektet sigter på at sikre bred accept og brug af EPC Code of Conduct blandt markedsaktører
  - Og dermed støtte en stigende efterspørgsel efter EPC ydelser



1. EPC projekter er økonomisk attraktive
2. EPC-udbyderen påtager sig performance-risikoen (vurdering af besparelser, design, implementering, drift)
3. Besparelserne er fuldt ud garanteret af EPC-udbyderen
4. ESCOet understøtter opbygning af systematisk og struktureret energiledelse hos klienten
5. Forholdet mellem ESCOet og klienten er langsigtet, fair og transparent
6. Alle trin i et EPC projekt er transparente (overholdelse af national lovgivning, nul-tolerance mod korruption m.v.)
7. EPC projekter støtter finansiering af tiltag i nødvendigt omfang
8. EPC projekter kræver kvalificeret personale
9. ESCOet fokuserer på høj kvalitet og omhu i alle trin af projektets gennemførelse

# TRANSPARENSE

## EPC Code of Conduct



- Er et første dokument/udgangspunkt mellem leverandør og klient
- Erstatte ikke ABT 93, ABR 89, standard modeller/kontrakter, CEN standarder m.v.
- Principperne i CoC opfyldes allerede for det meste i en dansk sammenhæng, fordi der i Danmark er grobund for at offentlig-privat samarbejde kan ske på transparente vilkår. Men det er i dansk interesse hvis en sådan praksis udbredes europæisk
- Fremadrettet – efter Transparense projektets afslutning – vil CoC på EU plan blive administreret af de europæiske foreninger eu.ESCO og EFIEES



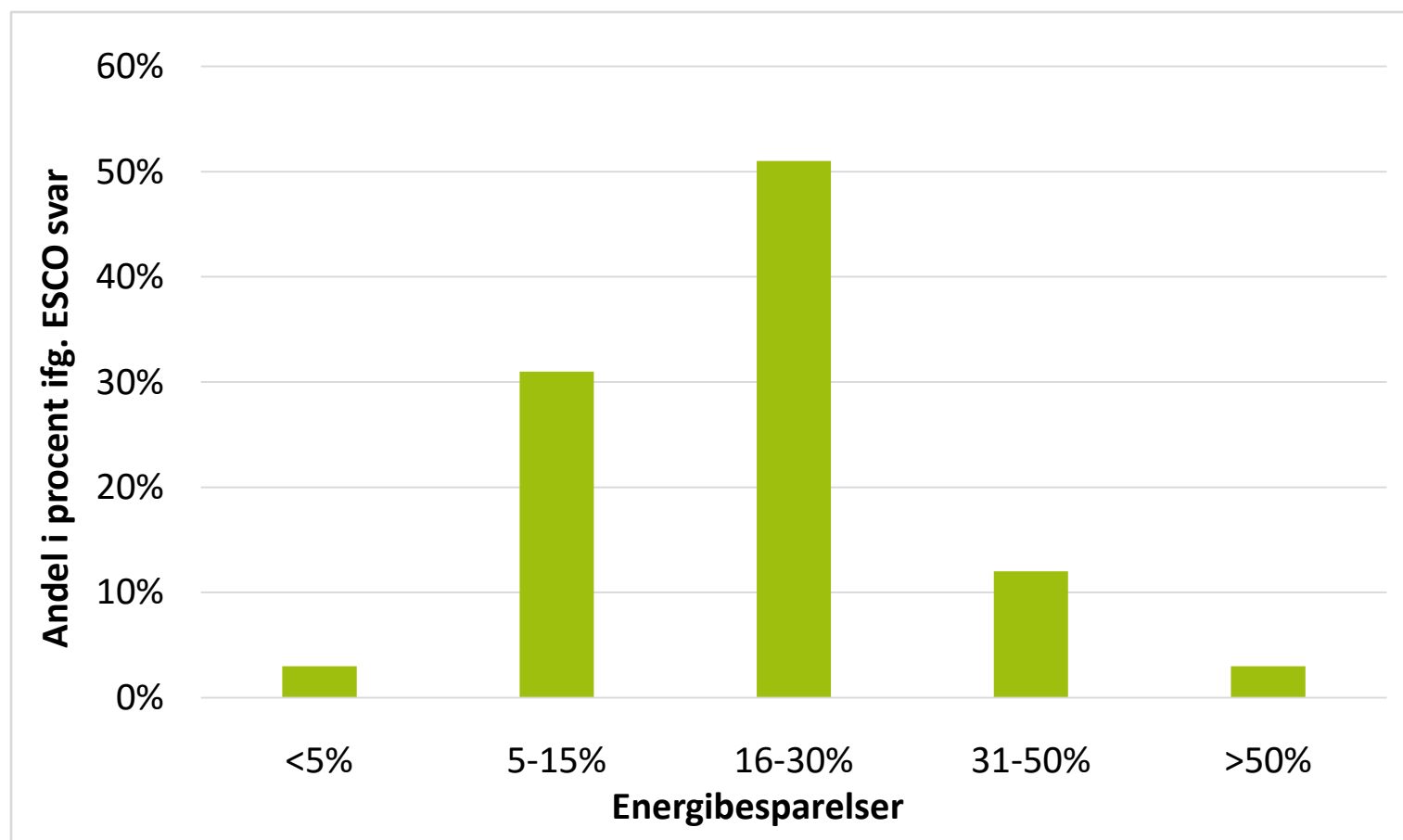
### Respondenter

- Har adresseret de væsentligste leverandører af EPC ydelser i de 20 projektlande gennem spørgeskemaer og direkte kontakt
  - **141** ESCOer har udfyldt det rundsendte spørgeskema
  - Banker og finansiseringsinstitutter var også adresseret: I alt 42 svar
  - Koordinator af undersøgelsen: EEVS, Energy Efficiency Verification Specialist, UK



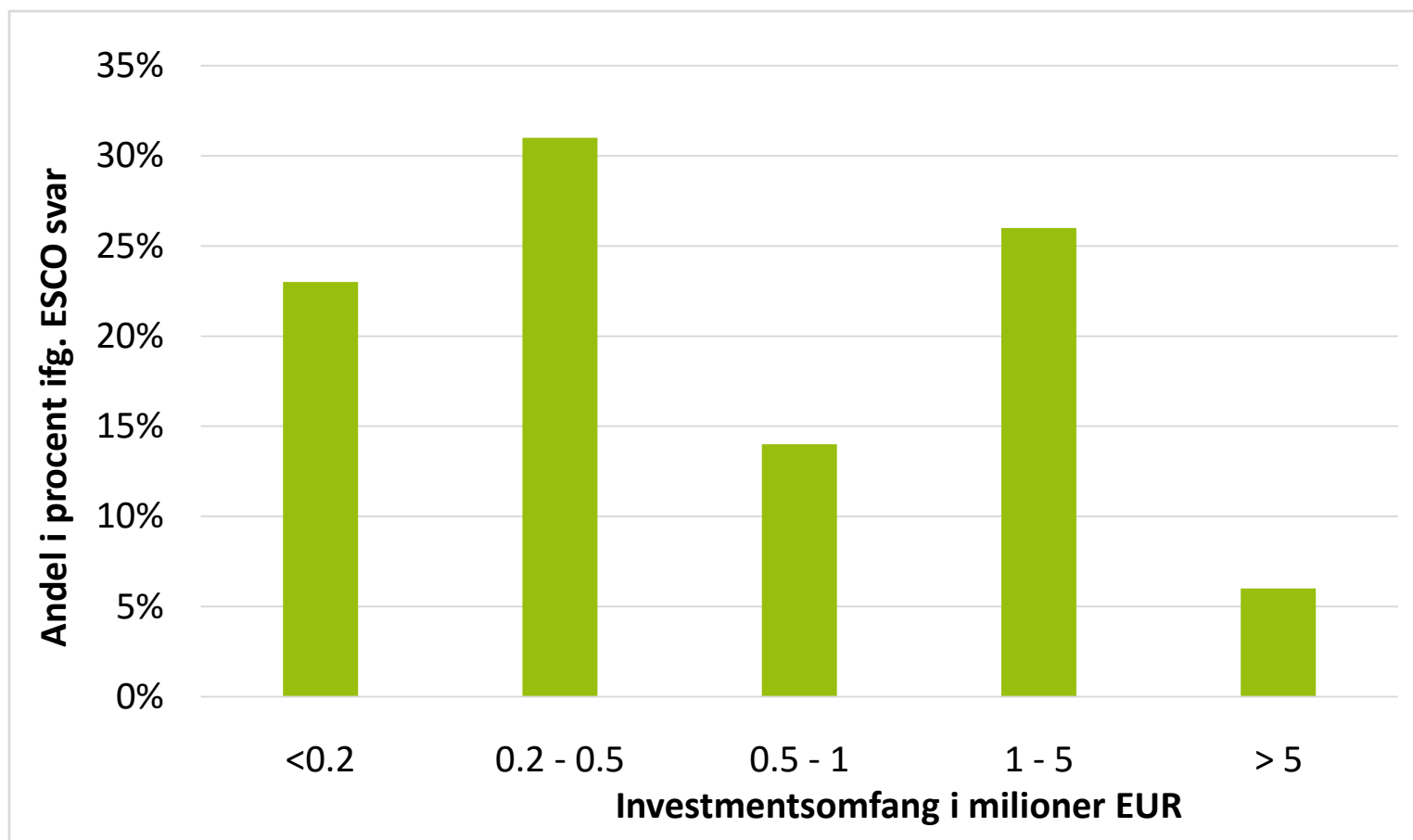
# Transparence EPC Europa survey (2013)

## Typisk opnåede energibesparelser



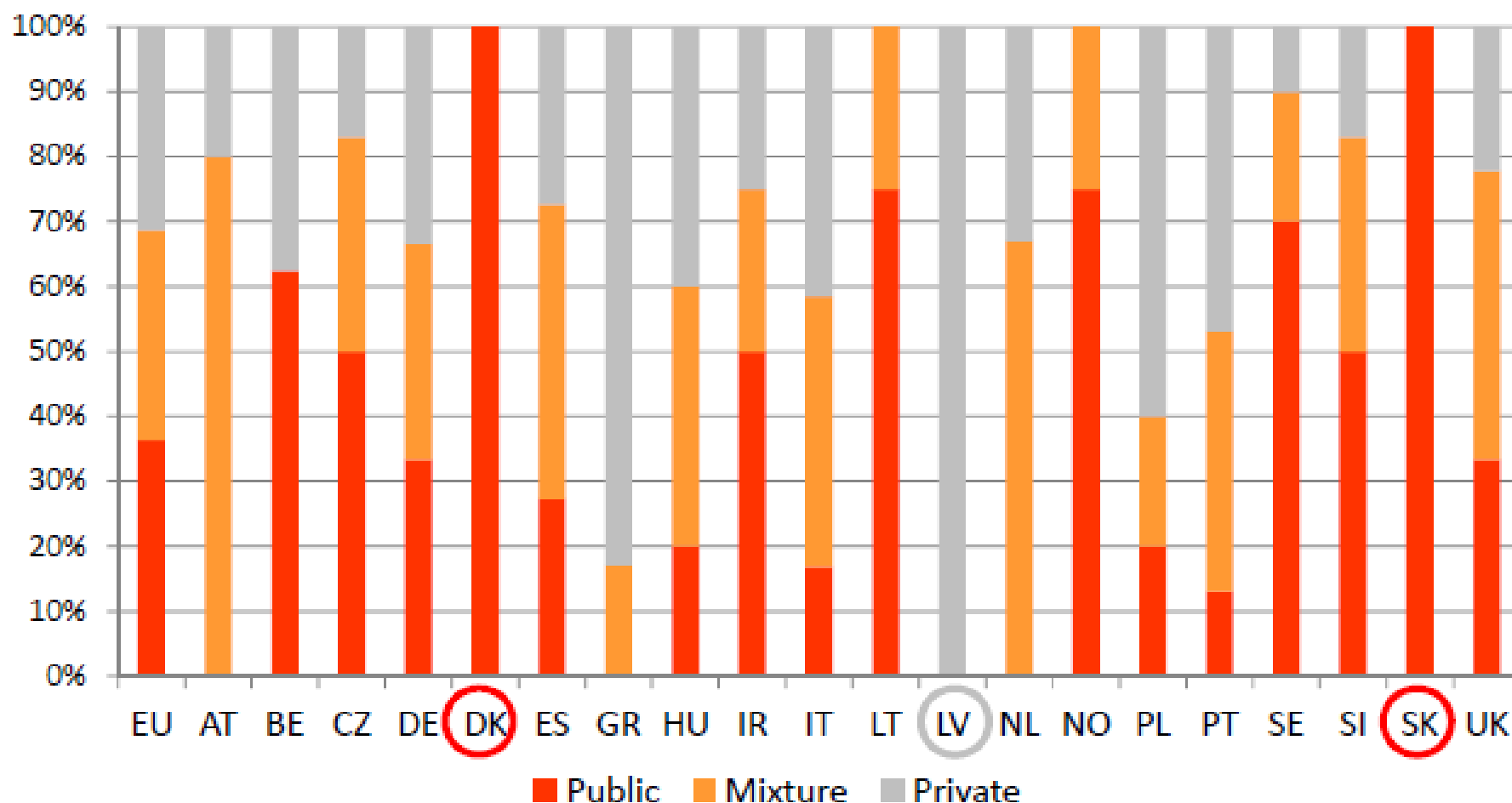
# Transparence EPC Europa survey (2013)

## Mest almindelige investeringsomfang



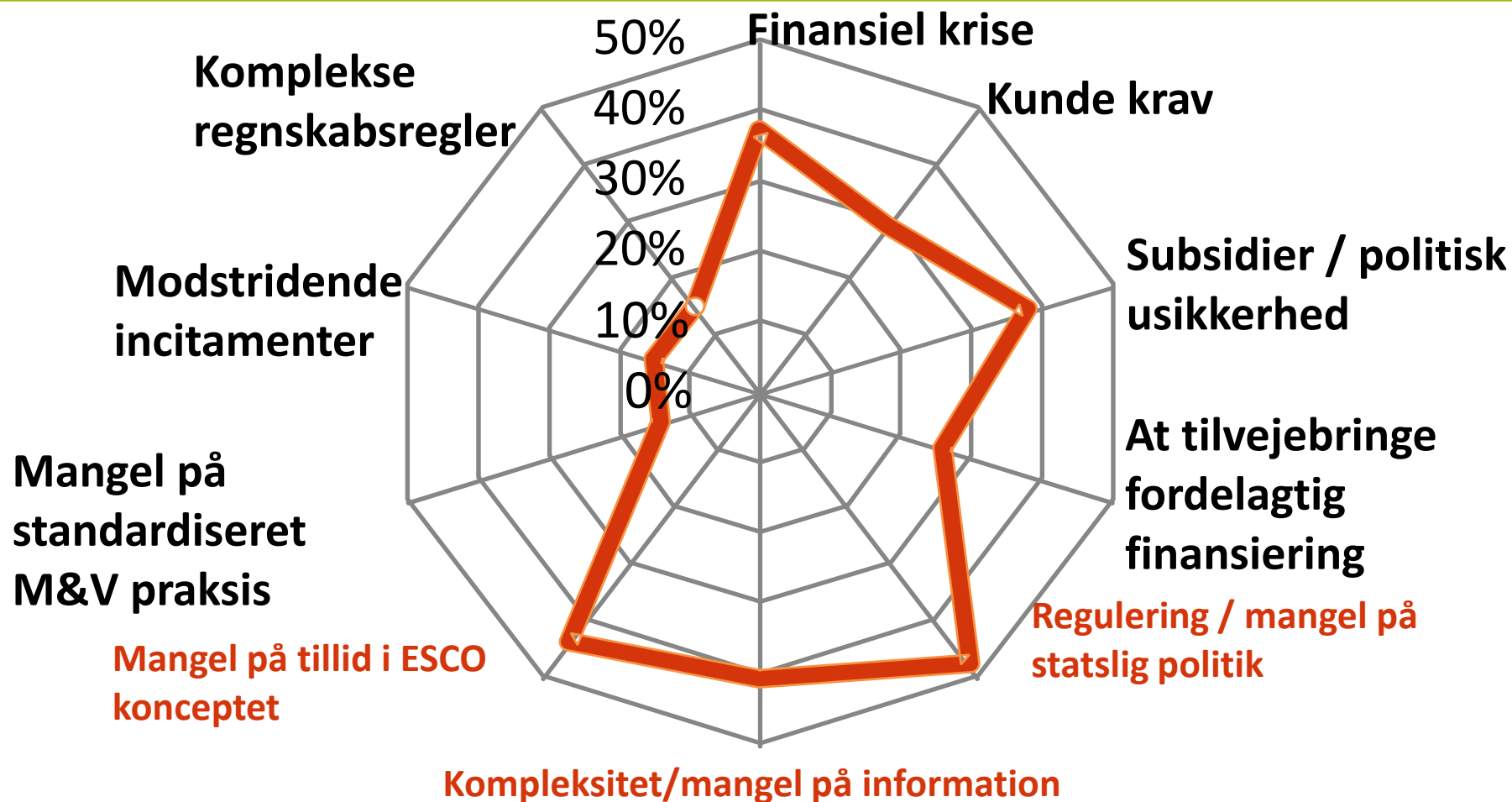
# TRANSPARENSE Markedsundersøgelse

## Fordeling på offentlig og privat sektor



# Transparence EPC Marked Survey (2013)

## Hovedbarrierer set af ESCOs



# EPC udviklingen i Danmark:

## Tidslinje



Tid

- 2015 2015: EPC projekterne i den kommunale sektor tenderer at have nået et mætningspunkt. Til gengæld er der stor aktivitet i hospitalerne og der er potentiale for udbredelse af EPC indenfor andre områder
- 2010 2010-2014: EPC oplever et boom i den kommunale sektor, hvorved 30 kommuner enten har gennemført fuld skala EPC projekter eller pilot projekter. Erfaringerne er generelt set gode og der sker en kvalitet udvikling undervejs
- 2006-2009: Igangsættelse af de tre første EPC projekter rettet mod kommunale bygninger. 'ESCOmmunities' blev dannet til at sprede erfaringer til andre danske kommuner
- 2005 2005: En politisk aftale skaber bedre vilkår for energibesparelser i bygninger, herunder giver kommuner mulighed for at optage lån udover de almindelige restriktioner
- Indtil 2005: Danmark har haft en aktiv energi politik med energibesparelser og vedvarende energi i højsædet, men ingen EPC tradition



### Danmark:

- Et af de hurtigste voksende markeder i Europa, op mod 30 ESCO projekter siden 2008, især i kommuner
- Drivkræfter: Vedligeholdelsesefterslæb, Lokal klima- og energipolitik, kapacitetsbehov, energimærker, EEO, fordelagtig finansiering
- Udfordringer: kompleksitet, tillid, behov for standardisering, manglende politisk support ifølge 50% af respondenterne, mangel på koordinering i sektoren, spredning til andre typer af klienter/sektorer
- Den mest bemærkelsesværdige udvikling, sammenlignet med andre lande: stigende længde af tiltag med lang tilbagebetalingstid, op til 20 år, og den stigende projektstørrelse baseret på puljing af flere bygninger

# EPC udviklingen i Danmark: Fra første til anden/tredje generation af EPC projekter



## Første generation af EPC projekter

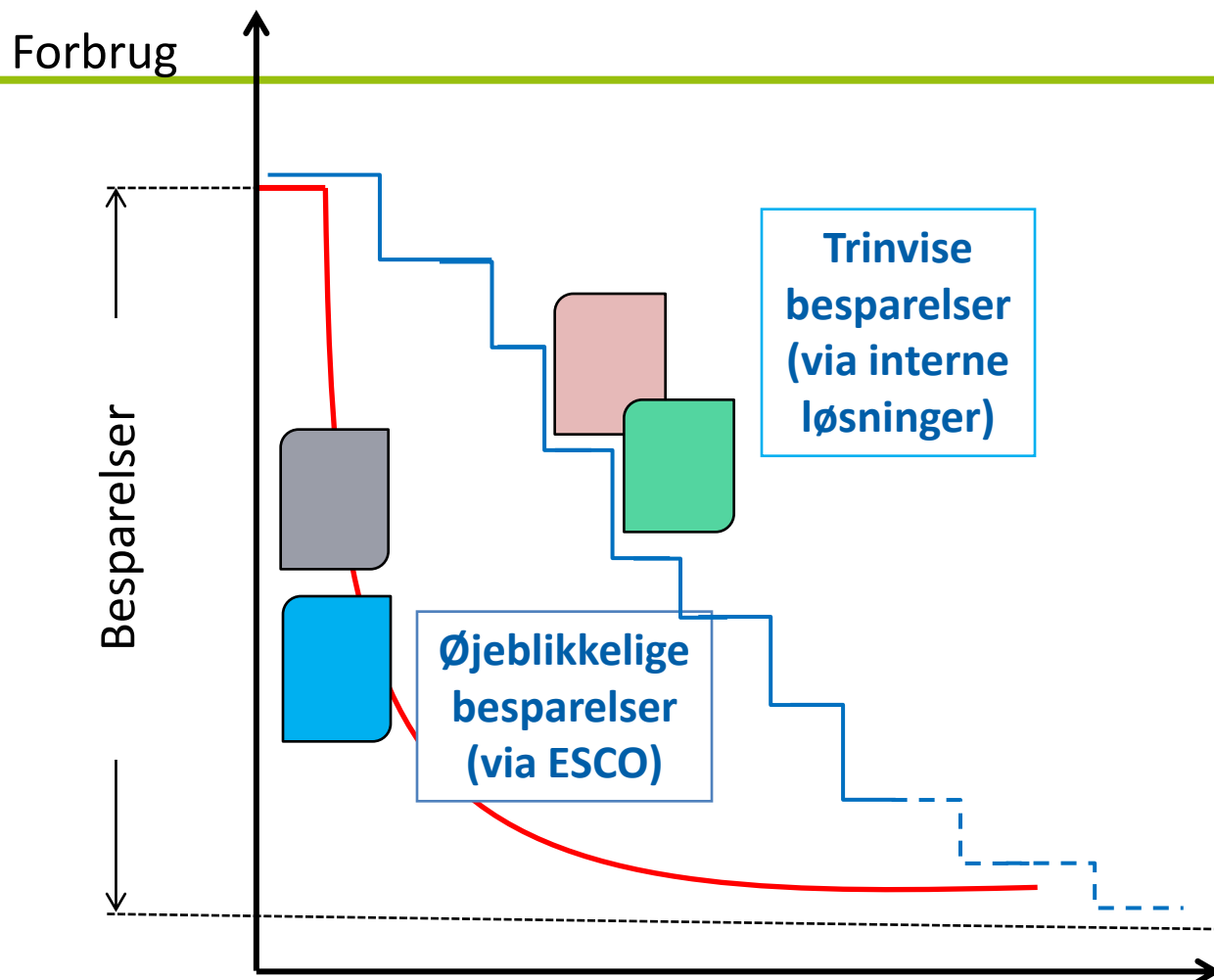
- ☐ Volumen op til 3 MEUR
- ☐ Fokus på 'lavt hængende frugter' - tilbagebetalingstiden af energispare tiltagene har været 8-10 år
- ☐ De garanterede energibesparelser fra ESCO side har typisk været i intervallet 15- 25%
- ☐ Baseline – Energy data var ofte mangelfuld
- ☐ Projekterne er finansieret af kommunen (bl.a. Via lån i KommuneKredit)

## Næste generation af ESCO projekter

- ☐ Øget volumen op til 6 - 20 MEUR
- ☐ Har udviklet sig i en holistisk retning (inkl. klimaskærm mm. og spredt til andre områder såsom gadebelysning)
- ☐ Tilbagebetalingstiden af energispare tiltagene er øget til 10-20 år
- ☐ De garanterede energibesparelser fra ESCO side er øget til 15- 25%
- ☐ The Baseline – Energy data er forbedret
- ☐ Projekterne er (stadig) finansieret af kommunen



# Trinvis eller øjeblikkelige besparelser



## 😊 Motivation for ESCO

Besparelserne kan opnås hurtigt. Generelt gode erfaringer med de danske ESCO projekter. Mod forventning har projekterne ofte været gode til at skabe lokal arbejdskraft

## ☹ Forbehold mod ESCO

Kan opleves som om at nogle af de økonomiske gevinster forsvinder fra kommune kassen  
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Results of the  
Transparen**se** project

Towards  
Transparent Energy  
Performance  
Contracting  
Markets



Co-funded by the Intelligent Energy Europe  
Programme of the European Union

# Towards Transparent Energy Performance Contracting Markets

Final Report of the Transparensense project – Increasing Transparency of Energy Services Markets (IEE/12/678/SI2.644737) co-funded by the Intelligent Energy Europe Programme of the European Union

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## Key characteristics

### of an Energy Performance Contracting (EPC) project

- **Turnkey service:** The EPC provider provides all the services required to design and implement a comprehensive energy saving project at the customer's facility, from initial energy audit to measurement and verification of savings.
- **No need for up-front capital:** Energy efficiency investments are repaid directly from energy savings and related financial savings, so there is no need for up-front capital from the customer.
- **Risks for customers minimised:** The EPC provider assumes the contractually agreed performance risks of the project.
- **Savings guaranteed:** The EPC provider guarantees the achievement of the contractually agreed level of savings and is obliged to compensate savings shortfalls.
- **Support in securing financing:** The capital to finance the EPC project can either be supplied out of the client's own funds or by the EPC provider or a third party. Financing by the EPC provider is an option, not a necessary part of the EPC project.

## Key definitions

- **EPC provider** means an energy service provider who delivers energy service in the form of EPC.
- **Energy service provider** means a natural or legal person who delivers energy services or other energy efficiency improvement measures to a final customer's facility or premises. Energy service company (ESCO) is a synonym of energy service provider.

See also Definitions and Glossary at the end of this document.

*Energy Performance Contracting (EPC) is an energy service allowing the client to save energy without capital costs, as the investments are repaid directly from the saved energy costs. There is great potential for EPC projects within the EU, but most of it is not utilised. Every year billions of euros and millions of GHG emissions could be saved using EPC on a commercial basis. Why is this not happening in the face of urgent climate change and energy security issues?*

*An initial Transparens survey showed that the major barriers to EPC include lack of confidence in the EPC providers, the complexity of the EPC method and low demand on the client side. The Transparens project aims to respond to these barriers and increase the transparency of EPC markets as well as the quality of the services provided. We believe this will result in a marked increase in the number of implemented EPC projects and consequent economic, environmental and social benefits.*

*I would like to thank all members of the Transparens Consortium for all their hard work in contributing to the success of the project. I thank also the Steering Committee members and especially the European ESCO associations eu.ESCO and EFIEES as well as EASME project officers Björn Zapfel, Timothée Noël and Adrien Bullier for valuable support and guidance.*

**Jana Szomolányiová**

Transparens project co-ordinator  
SEVEN – The Energy Efficiency Center



# 1 Transparens project

## Towards transparent EPC markets

The goal of the Transparens project was to increase the transparency and trustworthiness of Energy Performance Contracting (EPC) markets throughout Europe. With its 20 partners covering both mature and emerging EPC markets, the project exploited its potential to transfer know-how and support EPC markets across Europe, and thereby achieve substantial improvements to energy efficiency.

The Transparens project started in April 2013 and was completed in September 2015. The project was financed by the Intelligent Energy Europe Programme of the European Union with co-funding from the project partners.

## EPC market trends, barriers and drivers identified

- Two EPC market surveys were conducted within the Transparens project by partners in each of 20 European countries. Both surveys mapped four main areas: EPC market developments, EPC models, financing models and policy initiatives. The results summarised in tables and graphs can be found in EPC Market Databases on the Transparens website.

- Twenty national and two European reports provide an overview of European EPC markets and recommendations on how to support further market developments. The main barriers identified to the EPC market were lack of trust in the EPC industry on the client side and the complexity of the EPC concept.

## European Code of Conduct to increase the quality of services

- To face the existing barriers and increase trust in and transparency of the EPC markets, the **European Code of Conduct for EPC<sup>1</sup>** was developed within Transparens and launched in 2014. The Code defines the basic values and principles that are considered fundamental for the successful preparation and implementation of EPC projects. It underwent a two-year stakeholder process to ensure that market players accept their principles. The Code of Conduct was developed in cooperation with the European Association of Energy Service Companies (eu.ESCO) and the European Federation of Intelligent Energy Efficiency Services (EFIEES). These associations have been administering the Code of Conduct since September 2015, ensuring its sustainability.
- The Code of Conduct has been put into practice and already has 171 signatories across Europe: 123 EPC providers, 14 associations of energy service companies (ESCOs) and 34 other entities operating on the EPC market.
- EPC providers from advanced EPC markets often demanded a quality assurance scheme in their feedback. **The Report on Recommendations on Quality Certification for EPC Services<sup>2</sup>** analysed different designs of quality assurance schemes and gave concrete recommendations for introducing them. Two case studies from Austria and the Czech Republic<sup>3</sup> are attached to the report.

<sup>1</sup> Stanicic D., Szomolanyi J. et al.: European Code of Conduct for EPC, July 2014. Available for download at [www.transparens.eu/download-library/european-code-of-conduct-for-epc](http://www.transparens.eu/download-library/european-code-of-conduct-for-epc).

<sup>2</sup> Amann S., Leutgöb K.: Report on Recommendations on Quality Certification for EPC Services, August 2015. Available for download at [www.transparens.eu/eu/publications/quality](http://www.transparens.eu/eu/publications/quality)

<sup>3</sup> Sochor V., Szomolanyi J.: Czech Case Study: Recommendations on Quality Certification for EPC Services, August 2015. Available for download at [www.transparens.eu/eu/publications/quality](http://www.transparens.eu/eu/publications/quality).

# Transparens project

## Pilot projects tested Code of Conduct and provided examples of best practices

- The Code of Conduct has been tested in 37 EPC pilot projects, which at the same time contributed to the promotion of best practices both on the part of ESCOs and clients. Six pilot projects are presented as best practice examples in this report.
- Overall, the Code was perceived as clearly defined, reflecting all the requirements placed on ESCOs and clients in EPC projects.
- Moreover, the projects supported by Transparens are expected to save more than 174 GWh of primary energy and more than 41,000 t of CO<sub>2</sub> emissions annually, leading to investments of more than EUR 68 million.

## Market players involved and know-how transferred

- The Code of Conduct has been promoted and discussed with the EPC market stakeholders at about 40 workshops and about 20 business facilitation seminars.
- The Code of Conduct, as well as information gathered in the market surveys and reports, etc., was disseminated through a number of channels (60 national newsletters, 40 press releases, 160 articles and video). The project partners delivered more than 130 presentations at the conferences and workshops.
- The emergence of new ESCOs and the quality of services provided was supported by 70 training seminars organised in the course of the Transparens project, attracting about 1,500 participants. The training seminars were primarily targeted at ESCOs, but clients, facilitators and policymakers were invited to contribute to a variety of attendees. The seminars also served as a platform for discussion about the European Code of Conduct for EPC and gave stakeholders an important means of promotion. The training modules<sup>4</sup> presented focus on EPC basics, EPC processes, and financial and strategic aspects, and are available publicly for further use by stakeholders.
- In Slovakia, Slovenia and Sweden, the establishment of EPC provider associations has been supported by local Transparens partners.

<sup>4</sup> Available for download at [www.transparens.eu/eu/trainings/training-modules](http://www.transparens.eu/eu/trainings/training-modules).

## 2 European EPC markets

### Information collected from a survey of EPC market players

Two EPC market surveys were conducted within the Transparens project by partners in each of the 20 European countries. The new 2015 survey is a follow-up to the 2013 survey. Both market surveys contained questions around four main areas: EPC markets development, EPC models, financing models and policy initiatives. As the surveys were similarly designed, it is easy to make comparisons between the years 2013 and 2015. The results summarised in tables and graphs can be found in **EPC Market Databases**<sup>5</sup> on the Transparens website.

In both the 2013 and 2015 surveys, the first step in collecting the data used in the EPC databases was to distribute a questionnaire on EPC to the country's most relevant market players. While the focus was on the 20 European countries involved in Transparens, there were also several answers from other countries. In the 2013 survey, the respondents were energy services companies and financial institutions. However, as it proved to be much more difficult to obtain responses from financial institutions, in 2015 these were replaced by EPC facilitators, consultancies working on the client side with a broader knowledge of current EPC market developments.

- The 2013 survey was sent or communicated to most major EPC providers across Europe, through direct meetings, phone conversations or emails, and was completed by 144 of them. A slightly different survey, modified for a different target audience was also sent to the major banks and other financial institutions. Responses were obtained from 42 of them.
- In 2015, altogether 141 market players (81 EPC providers and 60 facilitators) completed the survey, including the largest EPC providers. The survey was made available online in order to make the distribution process as easy as possible.

### European EPC Market reports provided analysis and overview

Once the survey responses were obtained in 2013, additional information was gathered by the national authors in order to present a thorough and up-to-date picture of the state of the EPC market in each of the 20 EU countries. The **Country Reports on Recommendations for Action for Development of EPC Markets**<sup>6</sup> summarised the information obtained for each country involved and identified barriers to and success factors for the implementation of EPC projects. Based on this, recommendations for action to be taken by the market actors and governments have been developed to support EPC market developments.

In addition, information from the 2013 survey and the country reports has been summarised in the **Report on European EPC markets overview**<sup>7</sup>. This EU-wide report is not a compilation of everything that was presented in the national reports. Instead, it presents two types of information: summary statistics across all countries (i.e. EU-wide averages) and cross-country comparisons.

Recommendations for action were developed for 20 countries and summarised in the **European Report on recommendations for action to support EPC markets**<sup>8</sup> in 2014.

<sup>5</sup> Visit [www.transparens.eu/eu/epc-databases](http://www.transparens.eu/eu/epc-databases).

<sup>6</sup> Country reports are available for download at the national subsites of [www.transparens.eu](http://www.transparens.eu).

<sup>7</sup> Garnier O.: Report on European EPC markets overview, prepared within Transparens project, London 2013. Available for download at [www.transparens.eu/download-library/epc-market](http://www.transparens.eu/download-library/epc-market)

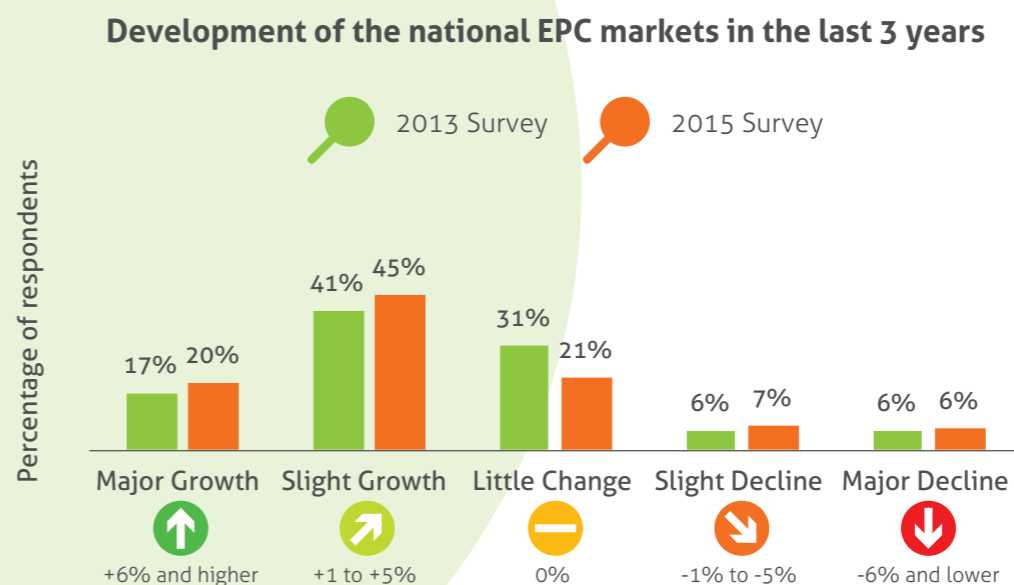
<sup>8</sup> Garnier O.: European Report on recommendations for action to support EPC markets, prepared within Transparens project, London 2014. Available for download at [www.transparens.eu/download-library/recommendations-epc-markets](http://www.transparens.eu/download-library/recommendations-epc-markets).

## European EPC markets

### 2015 results confirm EPC markets growing slightly

The following overview highlights some of the facts gathered from the latest 2015 market survey, supplemented by a comparison with the 2013 survey.

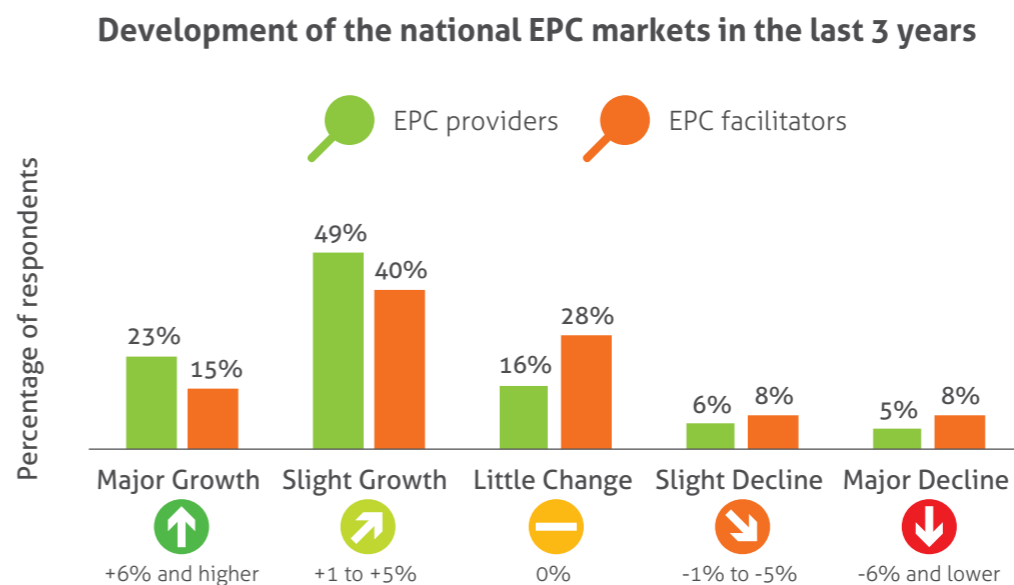
**The development of the EPC market in Europe** provides a rather positive view. About two thirds of all respondents reported that their national EPC market had seen growth over the last three years, with 17% of respondents describing major growth (of 6% and higher) and 45% of respondents describing slight growth (of 1% to 5%). While 13% of respondents are witnessing a decline, 21% reported no change whatsoever. These results are marginally more positive than those from the survey carried out in 2013, where only 41% of respondents described slight growth and only 17% reported significant growth.



**Figure 1.**

Development of the national EPC markets in the last three years

Interestingly, EPC providers seem more optimistic in their assessment of the EPC market than EPC facilitators. While only 15% of EPC facilitators reported major growth, 23% of EPC providers reported such major growth. Likewise, 28% of EPC facilitators think that their national markets have stagnated over the last three years, while only 16% of EPC providers share this opinion.



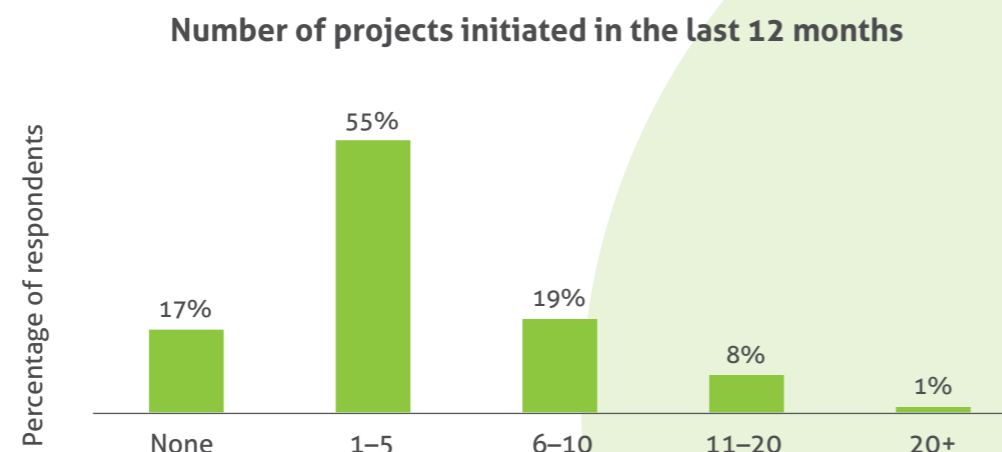
**Figure 2.**

Development of the national EPC markets in the last three years (perspective of providers and facilitators)

The typical **number of EPC projects initiated within the last year** is between one and five. Just above a quarter of the respondents (28%) had started six projects or more. On the other side of the spectrum, 17% of respondents indicated that no project had been initiated at all, which is a slight improvement compared to 18% from the 2013 survey.

**Figure 3.**

Number of projects initiated in the last 12 months

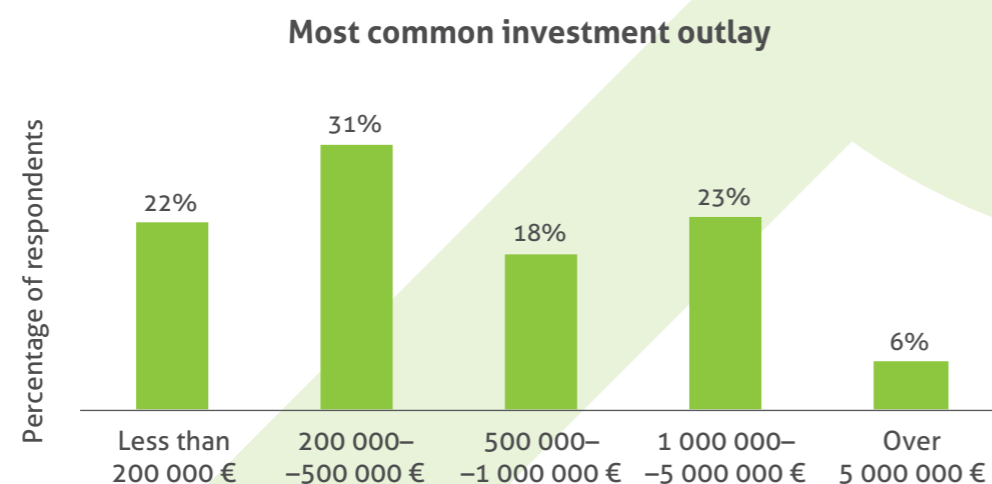


#### Typical EPC project investment: EUR 200,000 – 500,000

The most common **initial investment outlay** for EPC projects in Europe ranges from EUR 200,000 to EUR 500,000. While 22% of EPC projects had an investment outlay lower than this range, almost half of the projects had a higher investment outlay. With only 6% of responses, investments exceeding EUR 5 million are rather rare.

**Figure 4.**

Most common investment outlay

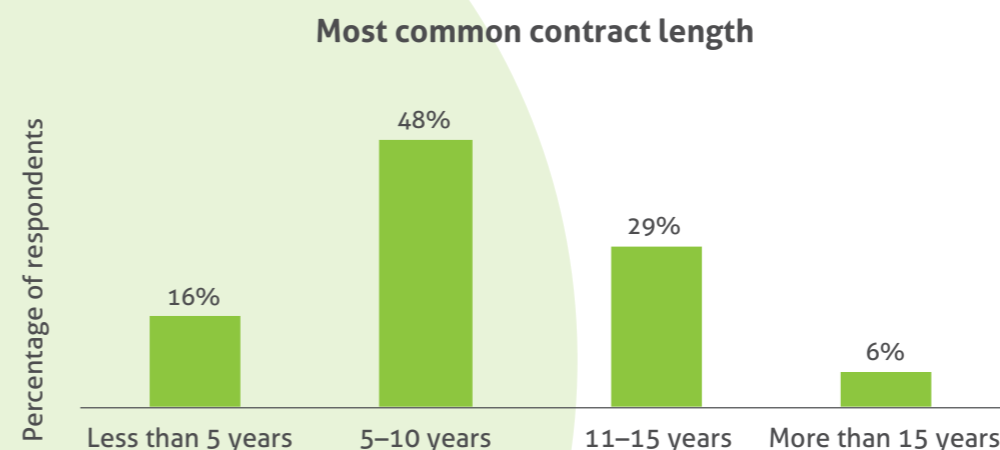


#### Most common EPC contract length is five to ten years

While 16% of respondents reported most common **EPC contract length** of less than five years, almost half of the respondents (48%) reported contract length of five to ten years. 29% of respondent reported 11–15 years as a typical duration of contract. With only 6% of responses, contracts exceeding 15 years are rather rare.

**Figure 5.**

Most common contract length

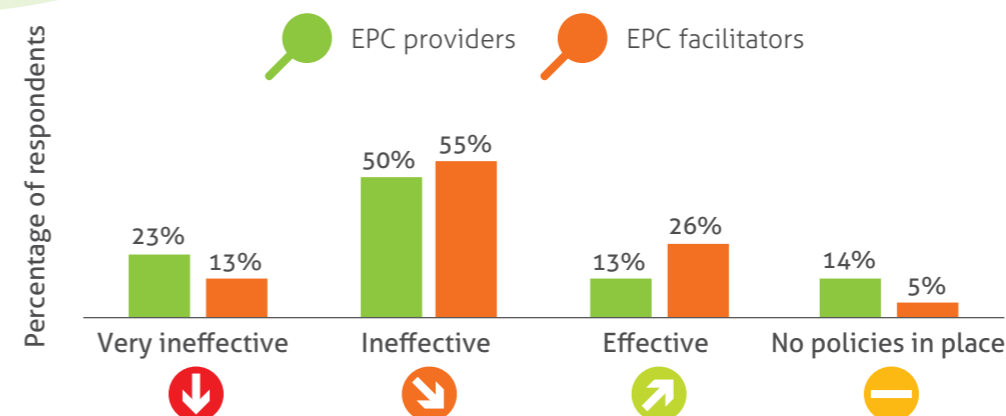


#### Government policies seen as ineffective

As the figure shows, the general **energy efficiency policies** of European governments are mostly perceived as ineffective, with 87% of respondents saying their country is characterised as having „no policies in place“ or as being „very ineffective“ or „ineffective“.

The discontent appears to be milder, however, when it comes to **policies specific to EPC** reaching 73% of respondents saying their country is characterised as having „no policies in place“ or as being „very ineffective“ or „ineffective“. This shows a positive shift since the last survey in 2013, when 83% of respondents found their governments' EPC policies lacking or ineffective.

#### Effectivity of energy-efficiency and EPC policies



**Figure 6.**

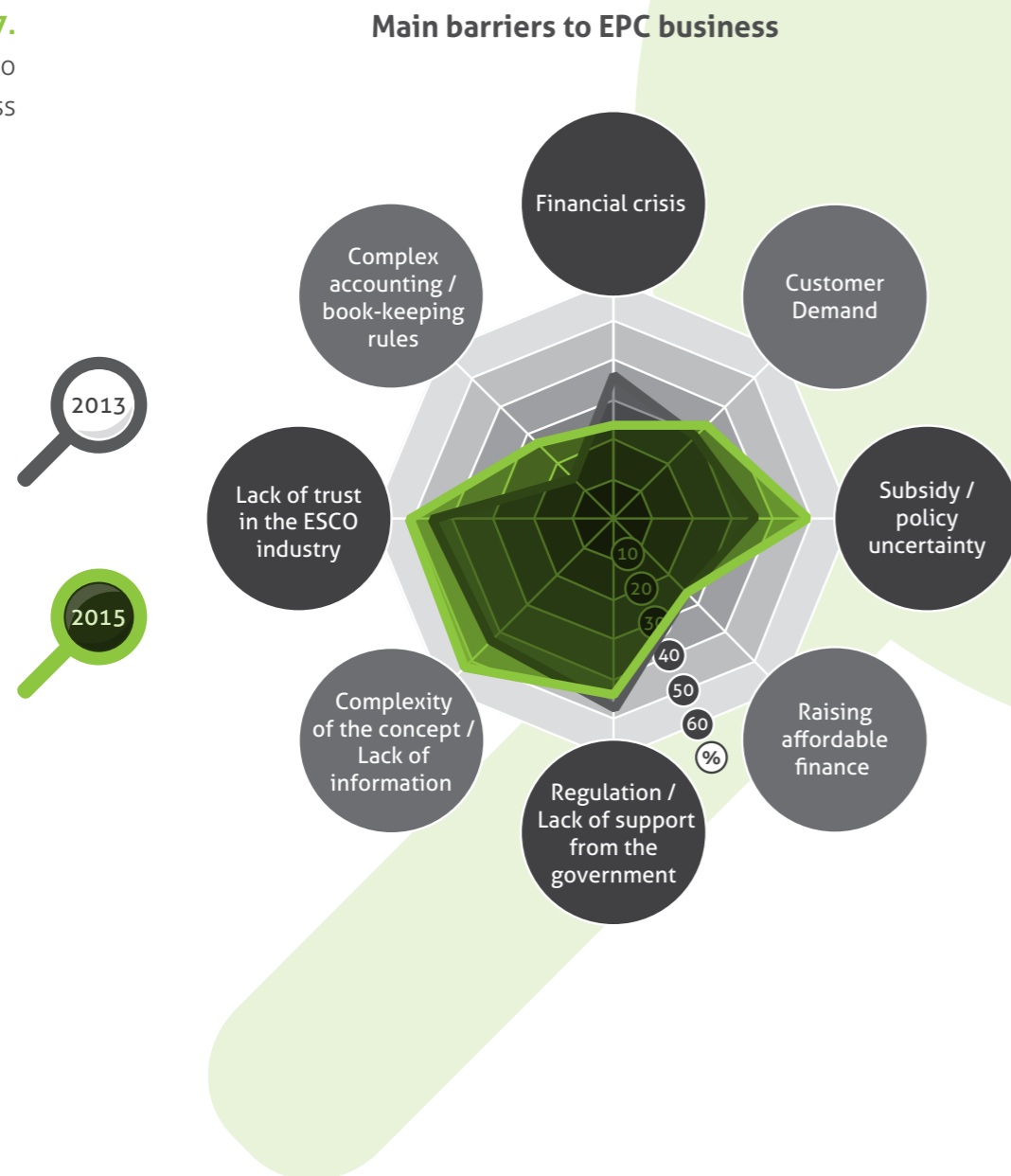
Effectiveness of energy-efficiency and EPC policies

### Main obstacle? Complexity of the EPC concept

The most significant **barriers to EPC business** revealed in the survey can be identified as regulatory („regulation / lack of support from the government“, „subsidy / policy uncertainty“) and structural („lack of trust in the ESCO industry“, „complexity of the concept / lack of information“).

Some interesting changes can be observed from the previous survey, as 20% fewer respondents saw the financial crisis as the main barrier in 2015 than in 2013. On the other hand, 27% respondents considered complex accounting and bookkeeping rules a major issue in 2015 in comparison to 14% in 2013. The reasons could be more positive economic developments in Europe and rising concerns with the role of regulations counting EPC investments as public debt<sup>9</sup>, creating a significant barrier to the EPC market.

**Figure 7.**  
Main barriers to  
EPC business



<sup>9</sup> As regards Directive 2011/85/EU on requirements for budgetary frameworks of the Member States (Fiscal Directive), any form of obligation, including EPC, is considered as an increase in public debt. This discourages public authorities from approving EPC and thus creates a barrier.

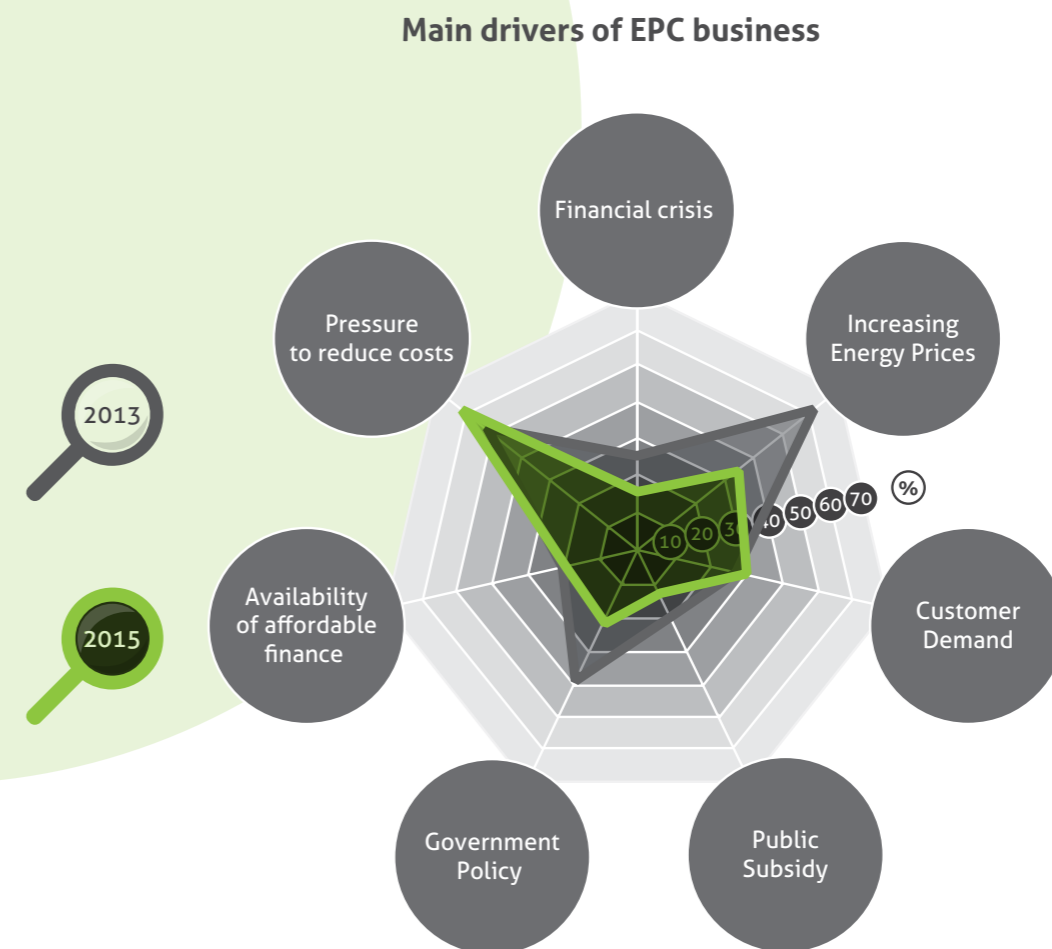
### Pressure to cut energy costs drives the market

As far as the **main drivers** of the EPC business are concerned, clearly the most substantial aspect is the pressure to reduce costs, followed by increasing energy prices and customer demand.

Again, we can see significant changes in the responses. While in 2013 „increasing energy prices“ was identified as the leading driver with 70% of responses, in 2015 its share dropped to half (35% of responses). Obviously this is connected to the turnaround in energy price developments.

It is surprising to discover that only about a fifth (22%) of respondents indicated „government policy“ as a driver, compared to 41% in 2013. This is in contrast to the improved perception of the effectiveness of the governments' EPC policies since 2013, as identified above.

**Figure 8.**  
Main drivers of  
EPC business



# 3 European Code of Conduct for EPC

## Code of Conduct developed in stakeholder process

The European Code of Conduct for Energy Performance Contracting (EPC)<sup>10</sup> has been developed within the Transparens project in cooperation with EPC providers and their associations, clients, facilitators and policy makers. The Code of Conduct defines the basic values and principles that are considered fundamental for the successful preparation and implementation of EPC projects. The Code was launched in 2014 and generally welcomed by market players in all 20 European countries participating in the Transparens project.

Its main role is to bring confidence to the EPC markets in Europe, taking into account its variety across the countries. Compliance with the Code of Conduct serves as a minimum guarantee of the quality of implemented EPC projects.

The Code of Conduct underwent a two-year stakeholder process to ensure that market players accept its principles. It has been discussed at about 40 national workshops, where feedback has been collected and reflected in the final wording of the principles of the Code. Moreover, about 20 business facilitation seminars for EPC providers and their clients explained the principles of the Code and how they can be implemented in a best practice project.

## Nine guiding principles of the European Code of Conduct for EPC

1. The EPC provider delivers economically efficient savings
2. The EPC provider takes over the performance risks
3. Savings are guaranteed by the EPC provider and determined by M&V
4. The EPC provider supports long-term use of energy management
5. The relationship between the EPC provider and the Client is long-term, fair and transparent
6. All steps in the process of the EPC project are conducted lawfully and with integrity
7. The EPC provider supports the Client in financing of EPC project
8. The EPC provider ensures qualified staff for EPC project implementation
9. The EPC provider focuses on high quality and care in all phases of project implementation

For the complete wording of the principles, please download the Code of Conduct at [www.transparens.eu](http://www.transparens.eu).

<sup>10</sup> Stanicic D., Szomolanyi J. et al.: European Code of Conduct for EPC, July 2014. Available for download at [www.transparens.eu/download-library/european-code-of-conduct-for-epc](http://www.transparens.eu/download-library/european-code-of-conduct-for-epc).

# European Code of Conduct

## Code of Conduct administered by European ESCO associations and national administrators

The Code of Conduct was developed in cooperation with the European Association of Energy Service Companies (eu.ESCO) and the European Federation of Intelligent Energy Efficiency Services (EFIEES). Although the Transparens project will be completed in September 2015, the two European associations will continue administering and maintaining the Code of Conduct. Thus the EU EPC industry itself will ensure the sustainability of the Code administration and its further custody.

*„The main role of the European Code of Conduct for EPC is to bring confidence to the EPC market in the EU, taking into account its variety across Member States.“*

**Valérie Plainemaison**

Secretary General of EFIEES, European Code Co-administrator



*It is a positive sign towards the market and a resilient foundation for long-term business development.“*

**Voker Dragon**

managing director of eu.esco, European Code Co-administrator



Until September 2015, national Code administrators have already been identified in 21 countries<sup>11</sup>. These are 11 ESCO associations as well as also other governmental and non-governmental organisations influencing the EPC market. National administrators administer the Code of Conduct according to common procedures<sup>12</sup> and maintain national lists of the signatories online.

*„The European Code of Conduct for EPC is a commitment of EPC providers, who believe their responsibility is to help clients to implement energy efficiency improvement measures in an economically efficient way. Meeting their needs, they strive to deliver professional services with excellence, through systematic and disciplined management of EPC projects, and in a transparent way. As trusted EPC providers, they commit themselves to the Code, putting its core values in action and managing EPC projects in line with its principles.“*

**Damir Stanicic**

Josef Stefan Institute, Slovenia



## The Code is supported by the European Commission

„The European Code of Conduct for EPC defines common values and approaches for EPC providers and clients on a voluntary basis. It was designed in cooperation with relevant stakeholders and endorsed by the European Association of Energy Service Companies (eu.Esco) and the European Federation of Intelligent Energy Efficiency Services (EFIEES). Against this background, it has the potential to further enhance transparency and market confidence in EPC as an important means to tackle the energy efficiency challenge.“

**Björn Zapfel**

EASME, European Commission



<sup>11</sup> National Code administrators have been established in 20 Transparens countries and Romania.

<sup>12</sup> Available for download at [http://euesco.org/cms/upload/CoC-EPC/EPC\\_CoC\\_Procedures\\_2015.09.01\\_v07.pdf](http://euesco.org/cms/upload/CoC-EPC/EPC_CoC_Procedures_2015.09.01_v07.pdf).

Successful Code of Conduct uptake

The Code of Conduct was received with interest, depending on the level of development of the national EPC market and the presence of core business EPC providers.

There were no major barriers to the introduction and the start-up of a list of signatories, but there was some initial reluctance in terms of national EPC priorities or priorities of the ESCOs (the Code was perceived as too narrow in scope or as adding yet another novelty to an already complex market). Some countries reported that market players often saw priorities in standardised procedures, template documents and guidelines, and development of the EPC quality assurance scheme.

However, after the Code of Conduct was finalised and put in use, EPC provides and facilitators gained positive experience and a better understanding of the potential benefits of using the Code. The uptake of the Code in terms of the number of signatories was successful even in countries where the EPC framework is laid down in the national EPC standard (NO) or where some kind of national legislative EPC code existed (EL).



In September 2015 Code of Conduct has already 171 signatories across Europe: 123 EPC providers, 12 national associations and 2 European associations of ESCOs and 34 other entities operating on the EPC market.

Four uptake strategies implemented

The goal of the Code uptake strategies was to raise awareness about the benefits of adhering to the Code for both providers and clients and thus gain acceptance and commitment from the market stakeholders. Four main approaches were applied to the specific conditions and market maturity:

1. Directly contacting EPC providers

As an initial strategy, project partners contacted the major EPC providers directly, highlighting the benefits of the Code of Conduct and encouraging them to become signatories. This activity often targeted major EPC providers and reflected the specific national EPC market framework: ESCOs from the National ESCO Registry (EL), the National Registry Database for ESCOs Qualification (PT), relevant ESCOs active throughout the country with a proven EPC record (DE), etc. In some countries all major EPC providers signed the Code (CZ, HU, NL, SE, SI).

While the primary Code target group is EPC providers, it was strategically important to include all the EPC market players into the stakeholder process of the Code development and later implementation. Thus, EPC project and market facilitators and EPC clients are the Code signatories too, albeit in a lower number.

2. Involving ESCO Associations

The main national and European associations for energy service providers were targeted to become signatories, with the aim that the members would follow their lead. Endorsement of the Code by the most important associations of energy service providers at the national level was the key step in uptake of the Code in a number of markets (AT, CZ, DE, ES, NL, SE, SK, UK). The majority of these associations took over administration of the Code, providing sustainable guidance and benefits to the Code signatories and other EPC stakeholders based on genuine EPC industry interest and enabling

further EPC providers to network at the EU level. Some of these associations successfully promoted the Code among their members, who signed the Code individually, indicating their high level of commitment and motivation (CZ, NL).

3. Disseminating and promoting

A variety of Code dissemination channels were used, comprising press releases, conference presentations, seminars and workshops for EPC providers and clients, National Steering Committee meetings, discussion meetings on EPC quality, etc. For example, joint press releases were completed with new signatories of the Code, which had the dual benefit of raising awareness and providing a positive marketing opportunity (UK).

4. Integrating within EPC procurement frameworks and engaging key stakeholders

There are numerous EPC procurement frameworks, for example public tendering, energy efficiency funds and schemes, energy efficiency obligation schemes, programmes for deep renovation of buildings, etc. Each framework usually provides procurement and contractual processes and templates, including an EPC provider competition process. By engaging clients and facilitators to sign the Code of Conduct and integrating the Code principles in EPC tender dossiers (AT, BE, BG, EL, SK) and contracts (BE, BG, DE, EL, ES, HU, LV, PT, SK, UK), a strong position for uptake of the Code among EPC providers was established. The establishment of a strong Code uptake partnership with two key national EPC governmental authorities was the road to success in Portugal.

An example of the comprehensive national Code uptake strategy in Bulgaria is presented in the table below.

No.	Action	Target groups
1	Code presentation and discussion at Transparens training courses, workshops and seminars	EPC providers Clients, EPC facilitators, policymakers
2	Code presentation and discussion at more than 15 training courses, seminars and workshops on EPC organised by third parties	ESCOs, municipalities (including all medium and large ones), EPC facilitators, policymakers
3	Publications in online media, municipal newsletters and the website of the Sustainable Energy Development Agency – SEDA (National Code Administrator)	All EPC stakeholders
4	Integration of the Code in widely used tender dossiers (developed by the EBRD project „ExE“) and national model contract for public authorities	Municipalities and other public authorities

Table 1. Good practice example: Code of Conduct uptake actions in Bulgaria





## Lessons learned

The Code of Conduct serves as harmonised European quality requirements for EPC projects. Its key message is that EPC represents a fair energy service business model. It has already been successfully used in introducing clients into the EPC concept and has been perceived by providers as a unique selling proposition. However, the key to success is that EPC providers understand that they will benefit from adhering to a set of rules for the EPC business due to an increase in trust on the part of clients and a resulting increase in demand for EPC projects.

For clients, the Code functions as an EPC quality indicator on what they should expect and require from EPC providers and which principles they themselves should adhere to in order to achieve expected energy savings and related benefits. For example, the key characteristics of an EPC project is that the EPC provider guarantees a contracted level of the energy savings and/or related costs and if these are not achieved he has to compensate the shortfalls in cost savings to the client. This is one of the main principles of the Code of Conduct, which helps to make it clear to the client that they should require such guarantees from the companies.

The Code of Conduct is a voluntary commitment and is not legally binding. That is why it is important to implement the principles of the Code within the EPC contracts and tender dossiers to create a control mechanism. The Code is especially useful in EPC beginner markets (BG, PL), where the Code will be implemented by governmental bodies in the first EPC model contracts and tender dossiers.

## Recommendations for use of the Code of Conduct

The Code of Conduct has vast potential to support EPC market development, which can be exploited as follows:

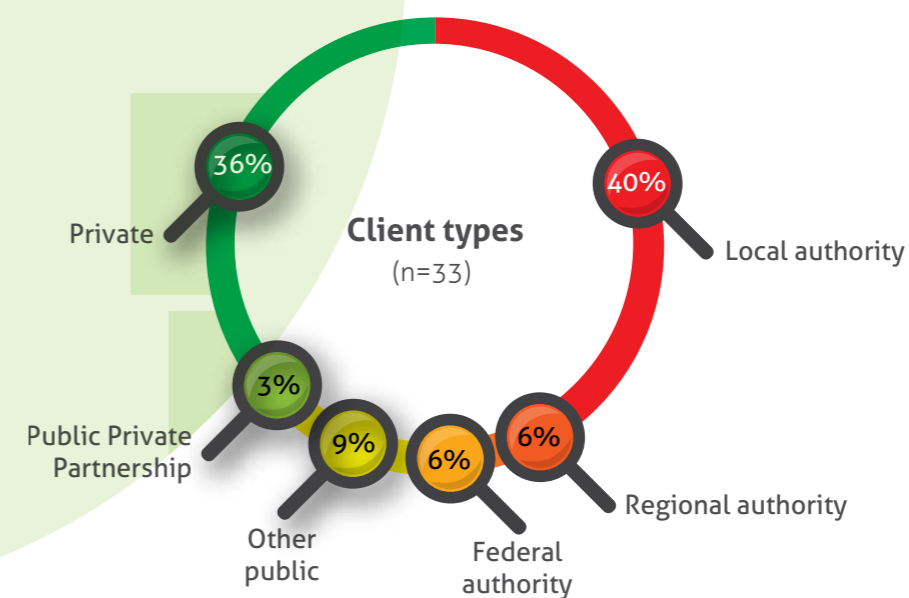
- Discussion guideline, creating a common understanding of main EPC principles between client and EPC provider and establishing sound communication. In addition, the Code should be distributed to EPC project facilitators and policymakers, who can use it as a discussion guideline and education instrument, too.
- Guidance for preparation of tender dossiers and contracts in line with a well-established European-wide EPC business model. Here, inclusion in model tender dossiers and model contracts will be most effective approach, especially if widely accepted or approved by governments.
- Opportunity to the governments, being major potential EPC clients, to use it as a set of minimum requirements for the EPC projects conducted on their property.
- Marketing tool for EPC providers and facilitators: The Code proved to be successful in increasing client trust, as it highlights EPC as a well-established European-wide business model.
- Starting point for EPC quality assurance scheme development. In their feedback EPC providers frequently demanded a quality assurance scheme with respect to the advanced energy efficiency services market.
- Tool for companies to make strategic decisions on whether to enter into the EPC market.

# 4 Code of Conduct applied in pilot projects

The objective of the European Code of Conduct for EPC is to increase the transparency of the EPC markets and to ensure the high quality of energy services provided by ESCOs. It is expected that by adhering to the EPC core values and to the principles of the Code of Conduct, ESCOs and clients will develop a solid foundation for a working partnership based on trust and confidence. These expectations have been tested by applying the Code of Conduct in 37 EPC pilot projects. Overall, the Code was perceived as clearly defined, reflecting all key requirements on ESCOs and clients in EPC projects.

The major stakeholders (both on the client and provider side) in the pilot projects have been interviewed. Detailed questionnaires were used for this purpose and served as the main data source for the evaluation and feedback provided by the project partners in the country reports<sup>13</sup> for each of 20 Transparence countries. The key findings are summarised below based on the European summary report<sup>14</sup>. Moreover, six pilot projects are presented in detail in the next chapter as best practice examples of EPC.

As can be seen from the figure, the majority of the clients in the pilot projects come from the public sector (61%), while 36% are private and 3% were implemented as public-private partnerships.



**Figure 9.**  
Distribution of  
pilot's client  
sector

## EPC pilot projects to save more than 174 GWh annually

Altogether, the pilot projects are expected to lead to investments of more than EUR 68 million, annual savings in primary energy of more than 174 GWh and annual savings in greenhouse gas emissions of more than 41 kt CO<sub>2</sub>. Most of this volume – investments of EUR 44 million resulting in 154 GWh of annual primary energy savings and 37,000 tCO<sub>2</sub> – is created by the 31 pilot projects<sup>15</sup> initiated by the Transparence projects. The rest comes from six projects not initiated but supported by Transparence at a later stage of its implementation („later-stage projects“). The estimated values do

<sup>13</sup> Country Reports on EPC Pilot Projects Evaluation and Feedback prepared for 20 Transparence countries are available for download at national subsites of [www.transparence.eu](http://www.transparence.eu).

<sup>14</sup> Hermann L., Warneke J.: Summary Report of the Code of Conduct Application in EPC Pilot Projects, Berlin, July 2015. Available for download at [www.transparence.eu/eu/pilot-projects](http://www.transparence.eu/eu/pilot-projects).

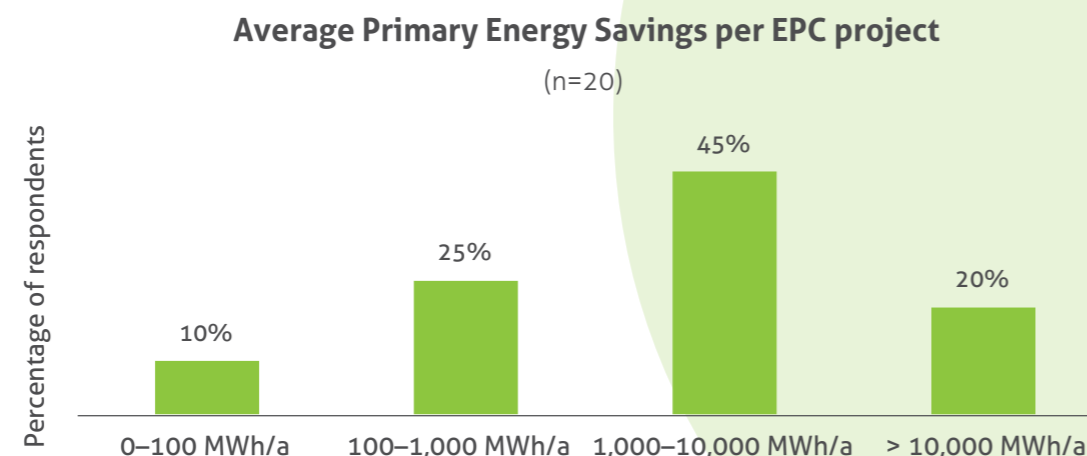
<sup>15</sup> The European Code of Conduct and its testing within the pilot project was communicated and agreed in principle with the client or ESCO before or during the procurement process of the EPC project.

not include pilot projects where private clients keep the data confidential, thus in reality the overall values for all pilot projects supported by Transparensen will be higher than the specified volumes.

The average duration of the first three project phases „Preparation“, „Procurement“ and „Implementation“ is on average 18.2 months, so it took just over 1.5 years until all measures were installed and the savings phase could begin. The average contract duration is 10.4 years, with the shortest period being four years and the longest 20 years. The savings guaranteed range in between 6% and 70%, with an average savings rate of almost 38%, largely depending on the type of project<sup>16</sup> and the availability of extra funding. Projects without such co-funding still achieved average savings of more than 30%.

The project sizes and durations vary significantly, from baseline sizes of less than EUR 20,000 up to more than EUR 15 million, with the average around EUR 1 million. An average project achieves primary energy savings of more than 8,500 MWh per year, translating to greenhouse gas reductions of more than 1,800 tCO<sub>2</sub> annually.

**Figure 10.**  
Average Primary  
Energy Savings  
per EPC project



### Professional EPC facilitators as success factor

Assessing the customers' satisfaction with the pilot projects and the ESCO throughout all project phases, concerning the quality criteria as defined in the Code, the contentment was generally high. Specific challenges which may occur in almost any project never questioned the general suitability of the EPC model or the qualification of the ESCO involved.

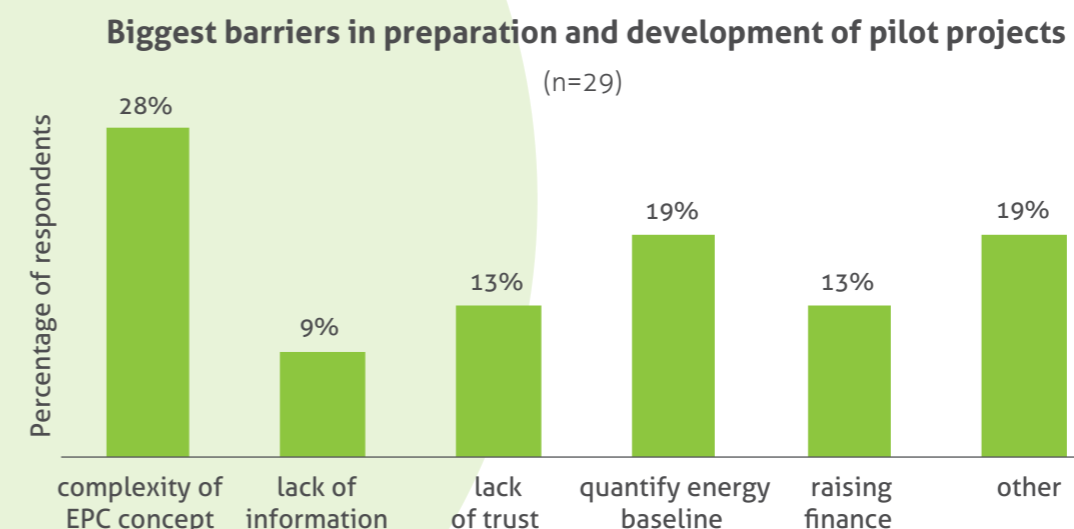
Both clients and ESCOs made good experience with projects where professional facilitators supported the client in the process. Still, EPC remains a challenge, especially for the client side. The complexity of the concept and the baseline calculation are seen as the biggest challenges in the process. ESCOs naturally are more familiar with the concept of EPC than the clients, but they do see challenges in the complex communication with a large number of stakeholders.

Looking at the nine principles defined in the Code, the survey showed a high level of fulfilment of these quality criteria. The customers' expectations were met to a very large degree. The only goal that is not always implemented 100% is the application of energy management in projects. This is due to manifold reasons. In some cases, it was the client side who did not agree with specific energy management measures. This shows that the Code – next to defining quality standards – can also play a role in informing both sides about what should be regarded as good practice in an EPC project.

<sup>16</sup> Lighting EPC projects often achieve very high savings by switching to LED.

### Clients concerned with the complexity of the EPC concept

Clients saw the complexity of the EPC concept as the biggest barrier to EPC implementation and they used different approaches to overcome it. They acquired more information and advice or applied regulations increasing transparency of the process. The most frequently used strategy was consulting with project facilitators (CZ, DE, DK, SI). Other clients compared different procurement models and model contracts (ES), held stakeholder meetings providing explanations about expected savings (GR), achieved an adaption of regulations to enable the use of EPC (IT, SI), and participated in EPC seminars, e.g. organised within the Transparensen project (LT).



**Figure 11.**  
Biggest barriers  
in preparation  
and development  
of pilot projects

The second biggest barrier – quantifying the energy cost baseline – was largely overcome by putting more effort into the process, namely preliminary analysis, including research and data collection (HU, ES, NO) or by consulting external experts (CZ).

The lack of information was mostly resolved in the same way as the complexity issue, meaning that clients used training courses (BG), did research (ES) or distributed FAQs and business case scenarios within their own organisation and engaged non-executive directors within the process as well.

The lack of trust was tackled by consultations, where in some cases the introduction of the Code was used to build trust (CZ, LV). The lack of trust towards the concept itself among the engineering staff was successfully reduced by involving the staff in the business case development. They were also persuaded that EPC helps solve backlog maintenance issues<sup>17</sup> and does not threaten their jobs.

Raising money is a general issue with no special approaches mentioned in the responses to the questionnaires.

Another barrier mentioned is the necessity to prove the profitability of the EPC project. In the case of the project in Sweden, the Public Procurement Act does not allow certain qualitative qualification criteria to be used, which made the process more demanding. Afterwards the client considered involving external experts as a reasonable means to facilitate the process.

Uncertainty about contractual details could be overcome by hiring a legal expert to draft the contract (NL).

<sup>17</sup> Maintenance tasks which should have been performed in the past but have not.

### Key challenge for ESCOs: financing

The ESCO perspective regarding the barriers and success factors naturally is different from that of the clients. Many of the barriers addressed are first of all client barriers, for which the ESCO offers possible solutions.

According to the survey, the most important aspect for ESCOs is raising money. In some projects, the financing issue is seen as one of the major services for the client. This is in line with principle no. 7 of the Code: „The EPC provider supports the Client in the financing of EPC projects.“

EPC providers use various financing options, such as:

- sale of long-term receivables by ESCO to a financial institution (CZ);
- financing by the client (ES);
- use of subsidies (LV);
- ESCO financing on their own balance sheet (LV, NL);
- co-financing by public funds (UK);
- equity of the client or loan (SE, UK);
- concession model (SI).

Some ESCOs made recommendations on the financing options:

- Development of an alternative investment management fund in order to make forfeiting (ESCO sells the future ESCO rates to a financial institution) a viable option in countries with less developed financial markets (LV).
- ESCOs should be allowed to use longer payback periods in case of deep renovation projects, a view which generally is also shared by the clients (DK).

The **complexity of the EPC concept** obviously is not a prime barrier for most ESCOs as they are operating within their own area of expertise. In the UK, from the ESCO side the complexity was seen as a challenge to balance the various drivers: e.g. that while financial staff demand short payback periods, energy and environmental staff demand maximised energy and CO<sub>2</sub> savings and technical staff see an opportunity to clear as much backlog maintenance as possible. Stakeholder meetings, during which ranked NPV analyses were presented and the measures list was adapted accordingly in order to set the correct priorities, showed good success.

**Lack of information** is seen as an issue mainly on the client side. ESCOs often recommend that clients hire EPC facilitators or consult external experts for the whole project or certain phases, such as contract development, measurement and verification or invoice auditing (DK, LV, NL, SI). Communication is seen as key, especially if the client does not fully understand the opportunities or has a distorted perception of some EPC aspects (LV, PT, UK, NL, SE).

The barrier created by **lack of trust** can be overcome by explaining everybody's role in the EPC process, getting the staff on board, e.g. by means of a project board conducting regular meetings and regular progress reports, and probably even by setting up a motivational or bonus programme (CZ, UK). In Denmark, some ESCOs actively promote their own compliance systems. This is another area of potential Code of Conduct integration. The UK ESCOs have suggested that adherence to recognised procurement processes can build trust. In Latvia, lack of standardisation was reported as a barrier and baseline and contract templates with recognition value and a general platform endorsed by policymakers is proposed as a solution.

Almost all ESCOs referred to the International Performance Measurement and Verification Protocol (IPMVP) as a useful guideline for quantifying the baseline (CZ, DK, NL, SE, UK). Still, the involvement of an expert should definitely be considered (NL).

## 5 Best practice examples

### Antwerp World Diamond Centre (AWDC) – Belgium



Via the Stadslab 2050 programme, the City of Antwerp, together with several local companies and industries, promotes energy efficiency and sustainable energy in the city. The Antwerp World Diamond

Centre is a key player in the Stadslab 2050 programme and commissioned an EPC project implemented by EPC provider Factor4, a company specialising in making buildings more energy efficient and comfortable. An audit of Factor4 showed that via better use of existing installations, a more than 15% energy cost reduction could be achieved. This would lead to or EUR 12,000 per year could be savings on the cost of cooling and heating. „We have made several adjustments in recent years, so that major investments were unnecessary,“ says Ari Epstein, CEO of AWDC. „By means of a number of simple interventions, such as a new scheme for cooling and heating and proper coordination of the new installations, we will already be much more energy efficient.“ An innovative feature of the EPC contract was the integration of an additional energy cost reduction target of EUR 9,000 per year, to be realised via a new energy supply contract. In total, the EPC project foresees a yearly energy cost reduction of EUR 21,000.

A collaboration based on trust and partnership is important to make an EPC project successful. To support this, Factor4 signed the European Code of Conduct for EPC as well as an EPC contract stipulating explicitly that Factor4 will comply with the values and principles of the Code. In accordance with one of the main principles of the Code, the EPC contract foresees a penalty for Factor4 if the agreed energy performance results are not achieved and a bonus if the results are better than foreseen.

#### Facility

- Headquarters of the Antwerp World Diamond Centre
- Location: diamond quarter in the City of Antwerp
- 11,000 m<sup>2</sup>
- 150 employees

#### Initial Situation

- Several adjustments were made in recent years, so no need for major investments.
- Need for (re-)commissioning of installations.

#### Goals of the building owner

- To reduce the carbon footprint of AWDC.
- To take a leading role in the in the Stadslab 2050 programme of the City of Antwerp. Via Stadslab 2050, the City of Antwerp, together with several local companies and industries, promotes energy efficiency and sustainable energy in the city.

#### Measures

- Replacement of specific parts of the building management systems and fine-tuning of the overall system
- Control of the vending machines for soft drinks
- Cost reduction via a new energy contract
- Setting up an M&V procedure and system

#### Facts

- **Contract duration: 9 years**
- **Investments: 41,000 EUR**
- **Initial energy costs (baseline): 80,000 EUR/year**
- **Guaranteed savings: 12,000 EUR/year**
- **Guaranteed savings: 15 %**
- **Reduction of CO<sub>2</sub> emissions: 44 t/year**

#### Innovations and Advantages for the Client

- First Belgian EPC contract where the Code of Conduct was implemented
- The use of a short, flexible and straightforward EPC contract that can be applied in a private business environment.
- The integration of an additional energy cost reduction target of EUR 9,000 per year, to be realised via a new energy supply contract.



## Best practice examples: Pool of buildings in the city of Moravska Trebova – the Czech Republic



The main goal of the pilot project was renovation of energy technological equipment and covering investment by savings in the pool of buildings owned by the client – the City of Moravska Trebova.

The client was supported from the beginning by the EPC facilitator, SEVEN – The Energy Efficiency Center, to ensure that the project is designed and implemented to maximise the benefits of the client. The facilitator prepared preliminary analyses showing the suitability of using the EPC method at the buildings owned by the client. The EPC facilitator helped the client to organise the public procurement procedure as a „negotiated procedure with prior publication of a contract notice“ according to the public procurement law. Six EPC providers expressed their interest in the EPC procurement and five offers have been received by the client. The ESCOs were required to meet standard qualification criteria and to provide reference projects. In addition, the client, supported by the EPC facilitator, held several rounds of negotiations with the ESCOs about the conditions of their tenders during the procurement process. The final choice of the winning tenderer – Amper Savings a.s. – was made by the City Council, who also had to officially approve the choice. The contract was signed in October 2014, 10 months after the first publication of a contract notice in January 2014.

The Code of Conduct was communicated to the client during the procurement procedure as a tool to ensure that the EPC provider would supply them with a high-quality EPC. The final wording of the contract fully reflected the principles of the Code. The EPC provider – Amper Savings a.s. – was introduced to the Code as a member of the Association of Energy Service Providers (APES) in 2014. Later on it committed itself to comply with the principles of the Code during project implementation by signing the Code. Both the client and the ESCO reported that the Code was helpful when implementing the project.



### Facility

- Complex of five buildings
  - Two primary schools
  - Three administrative buildings

### Initial Situation

- Moravska Trebova is a town with around 11,300 inhabitants in the Pardubice Region of the Czech Republic.
- Another EPC project in the area of public lighting was implemented in 2012, so the client was aware of the EPC process.

### Goals of the building owner

- To renovate energy technological equipment and cover investment by savings
- To achieve energy efficient operation of the energy system in the facility

### Measures

- Installation of new efficient heat sources
- Installation of IRC system (heat consumption is controlled in each room individually)
- Savings in lighting
- Efficient equipment for water consumption

### Facts

- **Contract duration: 10 years**
- **Investments: 430,000 EUR**
- **Initial energy costs (baseline): 420,000 EUR/year**
- **Guaranteed savings: 80,000 EUR/year**
- **Guaranteed savings: 19 %**
- **Reduction of CO<sub>2</sub> emissions: 285 t/year**

### Innovations and Advantages for the Client

- Building owners are motivated to achieve energy efficient operation of the energy system in their buildings, leading to costs savings
  - Implementation of **effective energy management**, system management and energy efficient coordination of all equipment (air-conditioning, ventilation, lighting, heating, etc.)
  - EPC project allows the client to use external funding to cover the investment costs, while saving funds for other investments

## Best practice examples: Hanzehal Zutphen – The Netherlands



The Hanzehal is a large sports and events facility building owned by the municipality of Zutphen. An EPC supplier installed a package of energy saving measures: roofing renovation and insulation, wall insulation, solar PV, sensor lighting, solar water heating and a building management system.

The Hanzehal project is noteworthy for the amount of energy savings, resulting in a significant energy cost reduction. In the contract, the EPC supplier guaranteed 30% savings on gas and 7% savings on electricity. The achieved savings are higher: 50% reduction of gas consumption and 23% reduction of electricity consumption.

In summary, the most important success factors and barriers seem to arise during the project preparation and procurement phases.

**Success factors:** A key reason why the EPC contract was cost effective is that insulation measures were implemented, when replacement of the roofing was already needed. Thus regular renovation and maintenance were carried out together with the installation of measures. Furthermore, in the Hanzehal project an investment and a maintenance plan were drafted, to be evaluated and possibly adapted annually. In this way, the project planning has the flexibility to account for maintenance investments on replacement time. As the project was a pilot, for the client as well as for the EPC supplier, this created mutual trust and understanding within the project, as every party involved learned through trial and error.

**Barriers:** Project preparation took around two years, mainly to draft the contract (the legal part), and the selection process did not follow standard procurement procedures. As the project was innovative, only one party was selected to set up a project plan with which a contract was negotiated. The municipality had some trouble with the legal aspects and hired an expert to draft the contract. It was also complex to determine the KPIs and to distribute tasks and responsibilities within the project. Finally, the EPC supplier had difficulty obtaining financing and thus had to use its own equity.

The project seems to have incorporated more or less all the principles in the Code of Conduct. For example, in the case of financing, the Hanzehal project goes even beyond the principles (as financing was by the EPC supplier).



## Best practice examples: Hanzehal Zutphen – The Netherlands



### Facility

- The Hanzehal is a large sports and events facility building
- One building, with a floor area of around 3,700 m<sup>2</sup>

### Initial Situation

- The sports building needed to be renovated, e.g. the roofing had to be renewed.
- There was no energy management system before the EPC project was started.

### Goals of the building owner

- To renovate the building while at the same time making it more sustainable.
- To save personnel costs by outsourcing building maintenance.
- At the end of the contract, to deliver the property according to established standards in a considerably better condition than at the start of the contract. Although this is not quantified, the value of the property has increased.

### Measures

- Roofing renovation and insulation
- Wall insulation
- Solar PV
- Sensor lighting
- Solar water heating
- Building management system

### Facts

- **Contract duration: 11 years**
- **Investments: Approx. EUR 500,000**  
but only EUR 210,000 on energy saving measures
- **Initial energy costs (baseline): 65,000 EUR/year**
- **Guaranteed savings: 16,000 EUR/year**
- **Guaranteed savings: 30% (gas) and 7% (electricity)**
- **Reduction of CO<sub>2</sub> emissions: 40 (guaranteed) t/year**

### Innovations and Advantages for the Client

The Hanzehal was a pilot project both for the client as well as for the EPC supplier. Because of its innovative nature, it was possible to deviate from European procurement rules and to award the project to a preferred supplier. The EPC supplier financed the project with own equity, in itself not an innovation, but also not widespread practice within the EPC market. For the client (the municipality), advantages are a more sustainable and valuable building, lower energy costs and outsourcing of maintenance.

## Best practice examples: Energy efficiency at Esther complex building – Spain



Escan, s.l. – a consulting company and Transparens partner – presented the European Code of Conduct for EPC in 2014 – 2015 to more than 300 associations and companies related to EPCs operating in Spain. After several presentations in ESCO Congresses at the local and national level, bilateral meetings with ESCOs and the like, the voluntary agreement for using the Code is used by about 15% of them.

The presented Esther project was successfully implemented by iON Smart Energy, an innovative ESCO company and one of the first to include the Code of Conduct in its EPC projects in Spain. The project optimised the energy consumption in a building complex in Sevilla that includes residential and commercial use with more than 220 households, garages, gardens, a swimming pool, shops, a restaurant and a sports centre.

Energy consumption is reduced by more than 28% per year with the incorporation of new light technologies, more efficient ventilation systems and innovative energy management controls.

### Facility

- Building complex
- Residential and commercial use
- More than 220 households, garages, gardens, swimming pool, restaurant and sports centre

### Initial Situation

- The building complex was built in the 1990s
- The electricity and lighting systems required replacement

### Goals of the building owner

- To achieve energy savings and reduce energy consumption.
- To install better lighting, electricity systems, etc.
- To improve comfort in the common areas.
- To implement an energy management system to measure and control energy consumption.

### Measures

- Replacement of old lighting with new LEDs
- Improvement of the buildings' electricity and ventilation systems
- Innovative Energy Management System, EMS
- Maintenance, equipment supply and information to users

### Facts

- **Contract duration: 6 years**
- **Investments: 31,500 EUR**
- **Initial energy costs (baseline): CO EUR/year**
- **Guaranteed savings: CO EUR/year**
- **Guaranteed savings: 28 %**
- **Reduction of CO<sub>2</sub> emissions: 65 t/year**

### Innovations and Advantages for the Client

The advantage for the client is the possibility to know the energy consumption of the building and of their home. In addition, iON Smart Energy provides the newest Energy Management Systems tailored to this building complex. Improvements are made if required.

Private clients are sometimes reluctant to use and sign EPC contracts in Spain, but this is one of the examples which show that with control management systems, new technologies and information for users iON Smart Energy is achieving excellent results in energy savings in the residential sector.



## Best practice examples: Guy's and St Thomas' NHS Foundation Trust (GSTT) – United Kingdom



Guy's and St Thomas' NHS Foundation Trust (GSTT) is one of the largest public healthcare organisations in the UK. Serving the central London Boroughs of Southwark and Lambeth and bringing together two of England's oldest and most well-known teaching hospitals, the Trust has an extensive estate with buildings ranging in age from 150 years old to present day in prime locations; for example St Thomas' Hospital overlooks the river Thames opposite Big Ben and the Houses of Parliament.

Having installed combined heat and power (CHP) engines on its estate in 2009, which made considerable cost and carbon savings, GSTT's focus changed to demand side energy conservation measures. An audit by the Carbon Trust confirmed the Trust's calculations that heating, ventilation and cooling plant upgrades would provide the basis for a large investment case. The EPC method was chosen to expedite the savings and to deliver an extensive range of energy conservation measures.

GSTT worked with EPC facilitator Essentia Trading Limited to develop the procurement process and core EPC contract – an open tender through OJEU received 15 expressions of interest and was won by British Gas Business (BGB), the first UK based ESCO to sign the European Code of Conduct for EPC. Essentia now hosts a leading EPC framework in the UK with a panel of 8 pre-procured ESCOs<sup>18</sup>). BGB are a leading ESCO within the healthcare sector and currently guarantee in excess of EUR 65million of savings within the NHS.

The EUR 1.5million annual savings guarantee given by BGB will be monitored by the project team using an IPMVP adherent measurement and verification (M&V) process. GSTT worked with independent M&V specialists EEVS Insight to help them fully understand and consider the M&V Plan developed by the ESCo during the Investment Grade Audit.

<sup>18</sup> [www.essentia.uk.com/capabilities/sustainability-and-utility-management/guaranteed-energy-and-carbon-savings](http://www.essentia.uk.com/capabilities/sustainability-and-utility-management/guaranteed-energy-and-carbon-savings)

### Facility

- Guy's and St Thomas' NHS Foundation Trust (GSTT)
- Guy's Hospital – Teaching Hospital with 400 Beds
- St Thomas' Hospital – Teaching Hospital with 840 Beds and Accident & Emergency
- Based in Central London

### Initial Situation

- Guy's and St Thomas' NHS Foundation Trust (GSTT) is one of the largest public healthcare organisations in the UK. Serving the central London Boroughs of Southwark and Lambeth and bringing together two of England's oldest and most well-known teaching hospitals, the Trust has an extensive estate with buildings ranging in age from 150 years old to present day in prime locations; for example St Thomas' Hospital overlooks the river Thames opposite Big Ben and the Houses of Parliament.



## Best practice examples: Guy's and St Thomas' NHS Foundation Trust (GSTT) – United Kingdom



- Optimisation and improvement of Building Energy Management Systems
- Metering improvements, monitoring & targeting software and on-going energy management

### Facts

- **Contract duration: 10 years**
- **Investments: 16,310,000 EUR**
- **Initial energy costs (baseline): 15,354,482 EUR/year**
- **Guaranteed savings: 1,506,760 EUR/year**
- **Guaranteed savings: 9.8 %**
- **Reduction of CO<sub>2</sub> emissions: 8,000 t/year**

### Innovations and Advantages for the Client

Both The ESCo and the client understand the benefit of forming a strong partnership throughout the EPC term based on trust and transparency. To demonstrate this BGB and GSTT have appended the Code of Conduct to the EPC and have embraced its principles, particularly in establishing a detailed performance guarantee and offering a long term energy management process. This involves regular reporting and the deployment of a specialist energy saving manager from BGB during the operational phase.

The EUR 1.5million annual savings guarantee given by BGB will be monitored by the project team using an IPMVP adherent measurement and verification (M&V) process. GSTT worked with independent M&V specialists EEVS Insight to help them fully understand and consider the M&V Plan developed by the ESCO during the Investment Grade Audit.

- Having installed combined heat and power (CHP) engines on its estate in 2009, which made considerable cost and carbon savings, GSTT's focus changed to demand side energy conservation measures. An audit by the Carbon Trust confirmed the Trust's calculations that heating, ventilation and cooling plant upgrades would provide the basis for a large investment case.

### Goals of the building owner

- To determine the energy usage of Guys and St Thomas's estate
- Identify energy saving opportunities and deliver these measures under an Energy Performance Contract.

### Measures

- Lighting Retrofit & Controls
- Motor Replacement (with higher efficiency models)
- Time, Zone and Occupancy Controls and installation of Variable Speed Drives on HeatingVentilation, Air Conditioning Plant (fans, pumps and split A/C)
- Re-configuration and optimisation of chilled water and hot water circuits
- Gas Boiler refurbishment, improvements & optimisation
- Optimisation of on-site generation
- Solar PV



## Best practice examples: Barts Health NHS Trust, CCHP Project – United Kingdom



Barts Health is the largest National Health Service Trust in England with an annual turnover of EUR 1.7bn. It employs over 14,000 staff who deliver healthcare to more than 1.3 million patients a year. Over 574,000 m<sup>2</sup> of real estate, the Trust's buildings deliver specialist care in cardiac, cancer, stroke and trauma services.

To date investment by the Trust has been focused around efficiency schemes with a short term payback (1–2 years). However, this EPC goes much further: the single technology solution at the St Bartholomew's Hospital site will deliver a 1.3MW Combined Cooling, Heat and Power Plant (CCHP) engine that will form an integral part of a new Energy Centre.

In the first project of its kind in the UK, the EPC has been structured, procured and delivered through a variation to the Trust's existing PFI contract and was the first project to be signed through the 'Powering Health' partnership framework supported by the NHS Confederation, GE and IHEEM. The existing contractual frameworks were adapted to allow the project to be financed by an external fund, which invested 100% of the capital cost of the project.

The result was a EUR 3.4 million investment, via the EPC provider Skanska, which removed the up-front capital requirement, the construction and commissioning risk and, via performance guarantees, the operating risk of the low-carbon energy solution. The installation will remove nearly 2,500 tonnes of CO<sub>2</sub> (17% of the site's overall emissions) from the Trust's operation. This saves the Trust EUR 675,000 in energy costs, EUR 54,000 per annum in carbon tax and helps achieve its legislative 2020 targets.



### Facility

- St Bartholomew's Hospital site

### Initial Situation

- Barts Health operates across five main hospital sites as well as a range of community health centres; and provides care at home to those who are vulnerable within the Trust's communities.
- The Trust's estates are diverse in both age and infrastructure; from the oldest site at St Bartholomew's built in 1123 to the state-of-the-art facilities still in construction as part of the EUR 1.35bn Private Finance Initiative (PFI) development.
- Over 574,000 m<sup>2</sup> of real estate, the Trust's buildings deliver specialist care in cardiac, cancer, stroke and trauma services to the 2.5 million residents of east London.



## Best practice examples: Barts Health NHS Trust, CCHP Project – United Kingdom

### Goals of the building owner

- To date investment by the Trust has been focused around efficiency schemes with a short term payback (1–2 years)
- Barts Health NHS Trust's goals (in relation to this project): to limit its financial liability; to achieve the carbon reductions necessary under the Climate Change Act (a commodity which is now subject to taxation); and to ensure it looks at longer term strategies for investment and change, which will positively benefit the health local community. Overall to ensure that the organisation is financially, environmentally and socially sustainable, driving a focus on preventative and sustainable models of care
- This will drive reductions in both health and social inequalities enabling the Trust to look beyond its current boundaries to work with its partners to explore what is possible
- The CCHP project powers the oldest Hospital at St Bartholomew's at no upfront cost to the Trust, establishes guaranteed savings and ensures the trust remains resilient in terms of its on-site power generation. Additionally the installation removes nearly 2,500 tonnes of CO<sub>2</sub> (17% of the site's overall emissions) from the Trust's operation. This saves the Trust EUR 675 000 in energy costs, EUR 54,000 per annum in carbon tax and helps achieve its legislative 2020 targets. The project also aims to raise awareness of how energy efficiency technology can support critical care provision and add value to the community by raising EUR 136,000 for cancer services at the site

### Measures

- Single technology solution at the St Bartholomew's Hospital site to deliver a 1.3MW Combined Cooling, Heat and Power Plant (CCHP) engine that will form an integral part of a new Energy Centre

### Facts

- **Contract duration: 7 Years**
- **Investments: 3,437,860 EUR**
- **Initial energy costs (baseline): 2,687,400 EUR/year**
- **Guaranteed savings: 675,100 EUR/year (£493,000)**
- **Guaranteed savings: N/A %**
- **Reduction of CO<sub>2</sub> emissions: 2,492 t/year**

### Innovations and Advantages for the Client

- It was the first time in the UK, the EPC has been structured, procured and delivered through a variation to the Trust's existing PFI contract.
- The project has created a great opportunity for everyone to pull together, in an attempt to raise critical funds and awareness for cancer services at Barts, and for Cancer Research UK, through the "Pink Power" campaign. The Combined Cooling Heating and Power (CCHP) Jenbacher gas engine unit that will be fitted into the Trust's new energy centre is pink. The colour pink was chosen to represent fund raising efforts, and to raise awareness of the technology throughout the project's delivery.
- The project was made possible through the expertise of each of the partners. The financial expertise provided by the external fund enabled Skanska to design a solution that was compatible with the existing PFI scheme, securing the support of existing lenders and investors. This collaboration enabled a concise contractual suite to be created between Skanska and the external fund to facilitate a variation under Skanska's existing PFI contract. The Trust's financing team worked with Skanska to structure the terms of the offering and the allocation of risks under the variation, such that savings could be used to deliver a cost neutral solution to the organisation.



## 6 Training seminars

### Capacity building to support EPC market development

The ultimate goal of the training seminars organised by Transparensen partners was to support the supply side in keeping pace with market developments while continuing to offer high-quality services. Through the seminars, attendees were informed from different viewpoints not only about the Energy Performance Contracting concept, but also about more specific aspects, such as financing issues, legal matters or technical details. The trainings also served as a platform for discussion about the European Code of Conduct for EPC and provided stakeholders with an important means of promotion.

In total 70 training seminars were organised in the course of the project, attracting some 1,500 participants (about twice as many as initially planned), leading to a substantially greater information impact.

The training seminars were originally planned to primarily target ESCOs, but during the project it turned out to be more useful to widen the target group and invite not only ESCOs, but also clients, facilitators, policymakers, etc. As a consequence, they could complement each other and thus provide a more comprehensive understanding of the EPC concept.

The seminars were tailored to the particular level of EPC market development and the current needs of the stakeholders. At the beginning of the Transparensen project, a set of training modules were developed focusing on EPC basics, EPC process, financial and strategic aspects. The modules were developed in such a way as to be easily used by stakeholders for their follow-up activities. In 2015, the training modules were updated<sup>19</sup> and distributed to the market players.

### Interactive parts found most valuable

To gain feedback, an evaluation sheet was distributed to the participants at each training seminar. The participants evaluated the seminars very positively, with the overwhelming majority of attendees saying they were useful for gaining insight into the EPC concept and helpful for preparing an EPC contract and implementing projects. The information provided was in general found to be exhaustive and the speakers were praised for their experience. One of the most successful aspects in the trainings turned out to be the interaction between speakers and trainees and between speakers themselves. The exchange of views and know-how contributed to a more comprehensive learning environment.



<sup>19</sup> English versions of the training modules are available at the [www.transparensen.eu/eu/trainings/training-modules](http://www.transparensen.eu/eu/trainings/training-modules), while the versions in the national languages can be downloaded from the national subsites of the Transparensen website [www.transparensen.eu](http://www.transparensen.eu).

## Training seminars

### Trainees learned how to use the Code of Conduct in practice

One of the objectives of the trainings was to promote the European Code of Conduct for EPC and ensure its acceptance and application. In their feedback, attendees welcomed the Code of Conduct, with many saying it has the power to raise awareness about the importance of transparency and thus contribute to the elimination of barriers, such as lack of trust on the client side.

### Detailed information and best practices demanded

Some participants reported that the length of the training seminars was insufficient for more detailed discussion of the topics or for focusing on specific legal or financial aspects. These responses indicate that in some markets it would be useful to organise either longer workshops or a series of workshops focused on more specific topics allowing for more detail and discussion.

There was a lot of interest in experience from other European countries. In several cases, the trainees said that the number of case studies was too low, so in response the trainings subsequently included more best-practice examples. In countries with a lack of experience, case studies from more advanced markets were presented.

### Diversity of trainees as advantage

Initially the seminars had been targeted on training the EPC providers. However, low participation on the part of clients was criticised by participants in the evaluations of some countries. This was addressed in subsequent trainings by widening the target group to include a variety of stakeholders, which had the twofold effect of bringing more balance to the supply-demand relationship during trainings (providing a more holistic view of the whole topic) and attracting more EPC providers to the seminars due to the presence of clients.



# Definitions and glossary

Term	Definition
<b>Client</b>	means any natural or legal person to whom an EPC provider delivers energy service in the form of EPC
<b>Energy Efficiency Directive (EED)</b>	means Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency
<b>energy efficiency improvement*</b>	means increase in energy efficiency as a result of technological, behavioural and/or economic changes
<b>energy efficiency*</b>	means the ratio of output of performance, service, goods or energy, to input of energy
<b>energy management system*</b>	means a set of interrelated or interacting elements of a plan which sets an energy efficiency objective and a strategy to achieve that objective
<b>energy performance contracting* (EPC)</b>	means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings
<b>energy savings*</b>	means an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption
<b>energy service*</b>	the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings
<b>energy service provider*</b>	means a natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer's facility or premises
<b>energy*</b>	means all forms of energy products, combustible fuels, heat, renewable energy, electricity, or any other form of energy, as defined in Article 2(d) of Regulation (EC) No 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics
<b>EPC provider</b>	means an energy service provider who delivers energy services in the form of Energy Performance Contracting
<b>savings</b>	means energy savings and/or related financial savings; the financial savings include the costs of energy provision and can also include other operational costs, such as the costs of maintenance and workforce
<b>The International Performance Measurement and Verification Protocol (IPMVP)</b>	is the widely referenced framework for „measuring“ energy or water savings and is available at <a href="http://www.evo-world.org">www.evo-world.org</a>

Notes: \*Definitions according to the Energy Efficiency Directive

# Transparensen project partners

 <b>Project coordinator and partner for the Czech Republic:</b> <b>SEVEN, The Energy Efficiency Center</b>   <a href="http://www.svn.cz/en">www.svn.cz/en</a> Americka 17, 120 00 Prague, Czech Republic   Jana Szomolanyiova   <a href="mailto:code@svn.cz">code@svn.cz</a>	
 <b>Austria:</b> e7 Energie Markt Analyse GmbH <a href="http://www.e-sieben.at/en">www.e-sieben.at/en</a> Stefan Amann   <a href="mailto:stefan.amann@e-sieben.at">stefan.amann@e-sieben.at</a>	 <b>Lithuania:</b> LEI, Lithuanian Energy Institute <a href="http://www.lei.lt">www.lei.lt</a> Romualdas Skema   <a href="mailto:skema@mail.lei.lt">skema@mail.lei.lt</a>
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 <b>Bulgaria:</b> Black Sea Energy Research Center (BSERC)   <a href="http://www.bsrec.bg">www.bsrec.bg</a> Angel Nikolaev   <a href="mailto:angel@bsrec.bg">angel@bsrec.bg</a>	 <b>Norway:</b> NEE, Norsk Enøk og Energi AS <a href="http://www.nee.no">www.nee.no</a> Thea Mørk   <a href="mailto:tmm@nee.no">tmm@nee.no</a>
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 <b>Greece:</b> REACM, Anatoliki Development Agency of Eastern Thessaloniki's Local Authorities S.A   <a href="http://www.anatoliki.gr">www.anatoliki.gr</a> Kostas Konstantinou   <a href="mailto:kostas@anatoliki.gr">kostas@anatoliki.gr</a>	 <b>Slovakia:</b> ECB, Energy Centre Bratislava <a href="http://www.ecb2.sk">www.ecb2.sk</a> Marcel Lauko   <a href="mailto:lauko@ecb.sk">lauko@ecb.sk</a>
 <b>Hungary:</b> GDI, GreenDependent Institute Nonprofit Ltd <a href="http://www.intezet.greendependent.org">www.intezet.greendependent.org</a> Kristof Vadovics   <a href="mailto:kristof@greendependent.org">kristof@greendependent.org</a>	 <b>Slovenia:</b> IJS, Jozef Stefan Institute <a href="http://www.ijs.si">www.ijs.si</a> Damir Stanicic   <a href="mailto:damir.stanicic@ijs.si">damir.stanicic@ijs.si</a>
 <b>Italy:</b> DTTN, Trentino Technological Cluster S.c.ar.l.   <a href="http://www.dttn.it">www.dttn.it</a> Raimonda Marzani   <a href="mailto:raimonda.marzani@dttn.it">raimonda.marzani@dttn.it</a>	 <b>Spain:</b> ESCAN, Escan s.l.   <a href="http://www.escansa.es">www.escansa.es</a> Margarita Puente   <a href="mailto:mpuente@escansa.com">mpuente@escansa.com</a>
 <b>Latvia:</b> Ekodoma   <a href="http://www.ekodoma.lv">www.ekodoma.lv</a> Claudio Rochas   <a href="mailto:claudio@ekodoma.lv">claudio@ekodoma.lv</a>	 <b>Sweden:</b> IVL, IVL Swedish Environmental Research Institute Ltd.   <a href="http://www.ivl.se">www.ivl.se</a> Jenny Gode   <a href="mailto:jenny.gode@ivl.se">jenny.gode@ivl.se</a>
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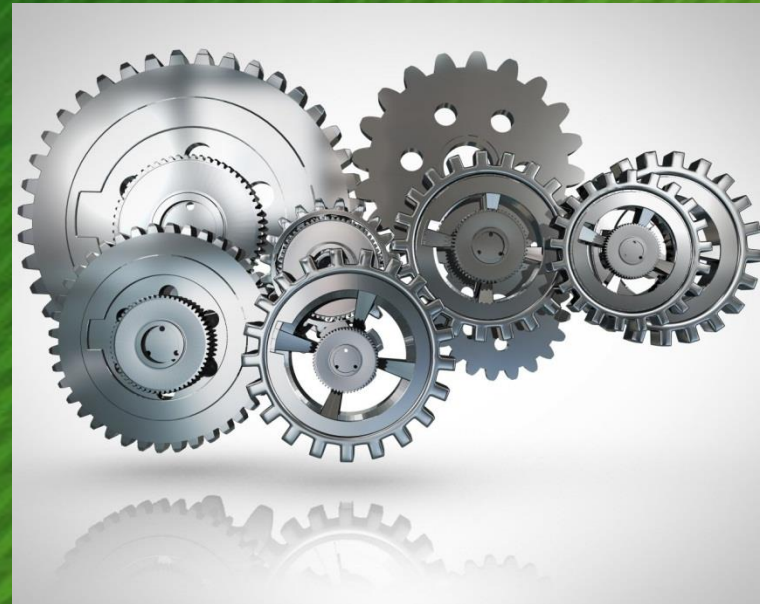
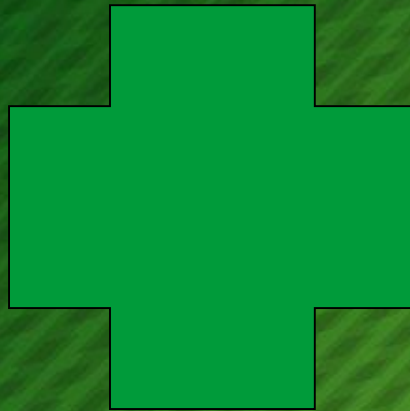
# Energioptimeringer på Carlsberg/Tuborg/Coca Cola

Undskyldning nr. 43 for, hvorfor du  
ikke slukkede for strømmen:

"Jeg troede,  
der var en anden,  
der gjorde det"



Glem de dårlige undskyldninger  
**Husk at slukke, når du går**



# Carlsberg Group



- Carlsberg Group er det overordnede Holding Carlsberg Selskab
- Med hovedsæde i Danmark
- Herunder befinder mere end 15 datterselskaber sig
- Over 45.000 ansatte
- Nr. 1 i Nordeuropa
- Nr. 1 i Østeuropa
- Nr. 4 i verden

**1999**



**2013**



**CARLSBERG GROUP TODAY**

**No. 1**

in Northern & Eastern  
Europe and fourth  
largest brewer in the  
world

**500**

different beer  
brands

**41,000**

employees on  
three  
continents

**36,000,000,000**

bottles of beer sold in 2012

- Produktion på 75 bryggerier i 25 lande
- Over 500 produkter i alt som sælges til mere end 150 markeder
- Producerede 120mill hl øl og 20m hl andre drikkevarer i 2008
- Carlsberg Breweries tre vigtigste markeder er Vesteuropa, Østeuropa og Asien.
- Carlsberg Malawi Brewery var det første Carlsberg-bryggeri, der blev opført uden for Danmark.

# Fredericia-Tåstrup-Valby-Saltum-Kina-Asien

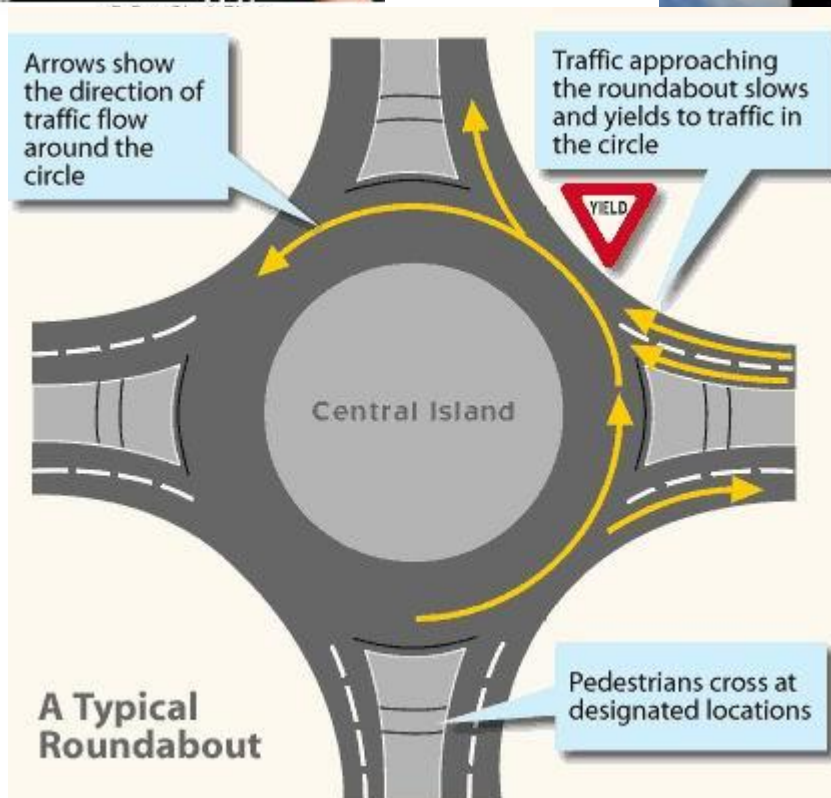


# Fra ekstern konsulent til intern konsulent i 2010



**Danfoss Solutions - EPC**

*Danfoss*



## PROCESS CONTROL OPTIMISATION - THE BUSINESS CASE



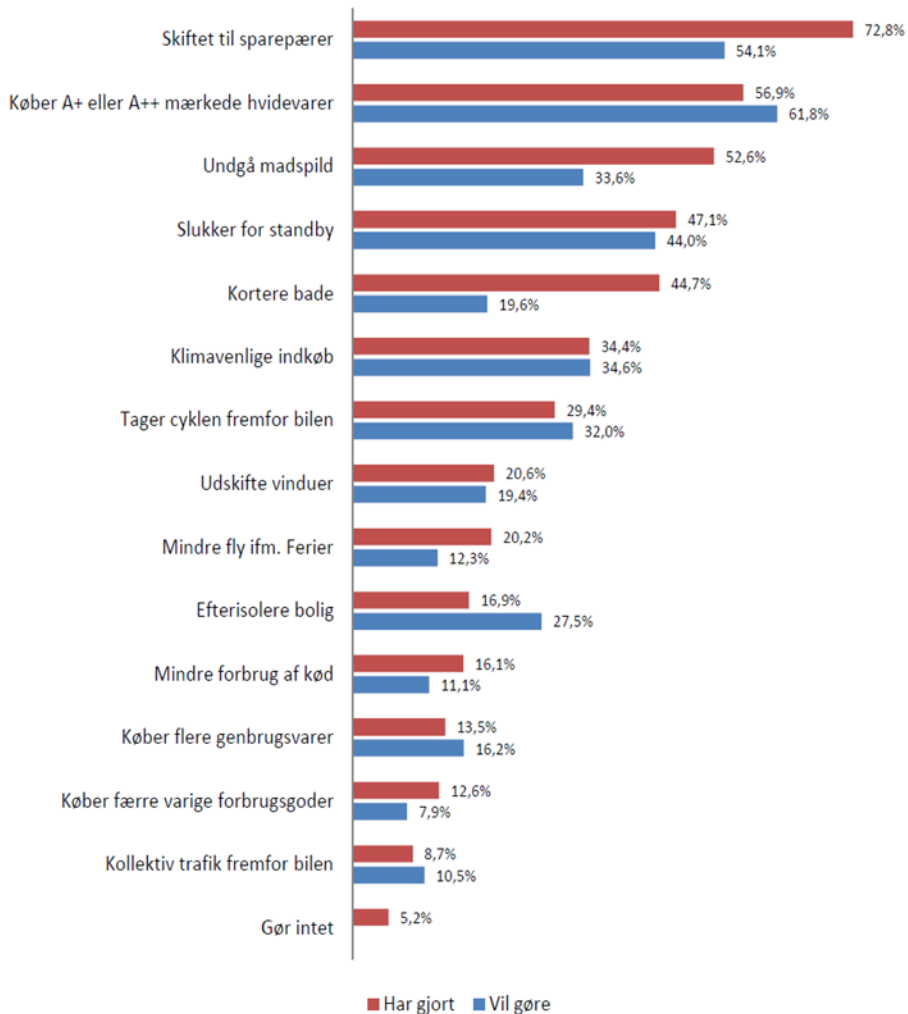
by / Johnnie R. Jansen, President,  
Danfoss Solutions A/S, Denmark

**Ejerskab**

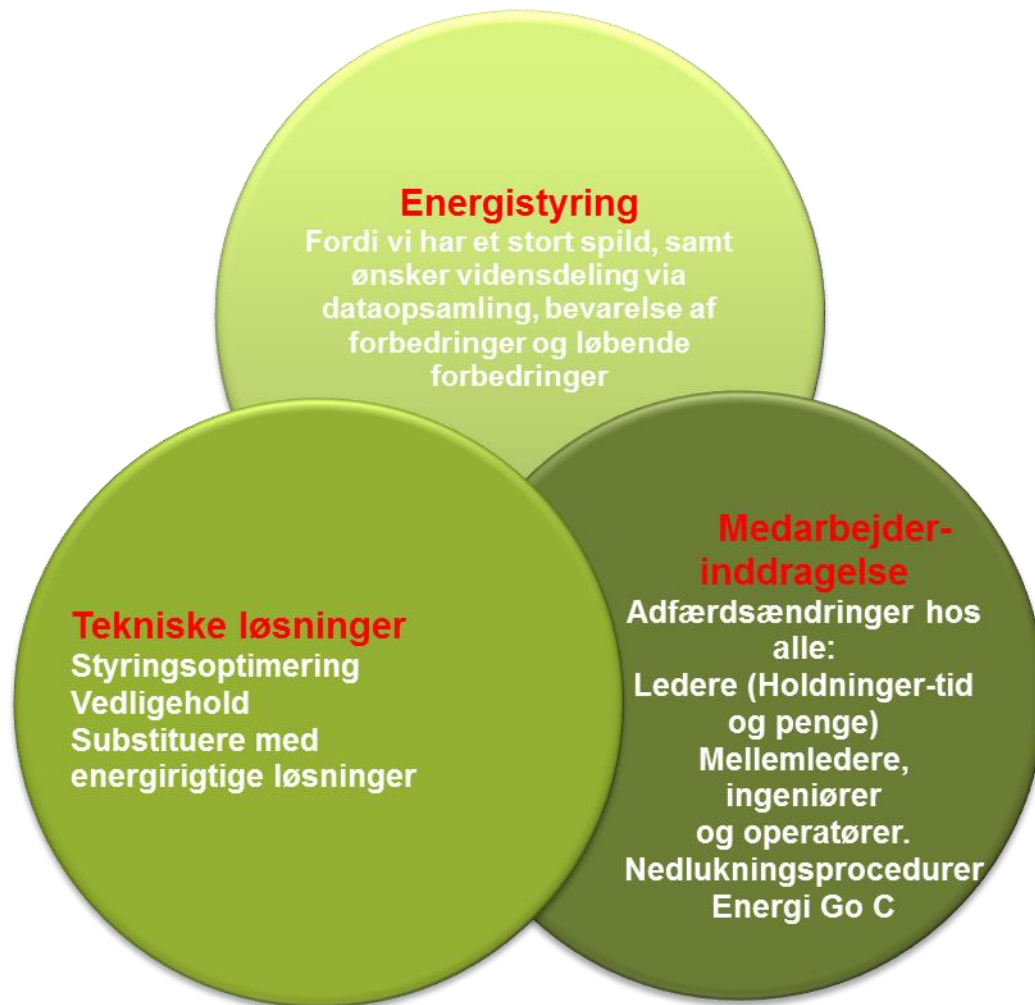
- ***1 måling er bedre end 1000 meninger!***

# Potentiale: Teknik 30% Adfærd 20%, men den grundlæggende adfærd....

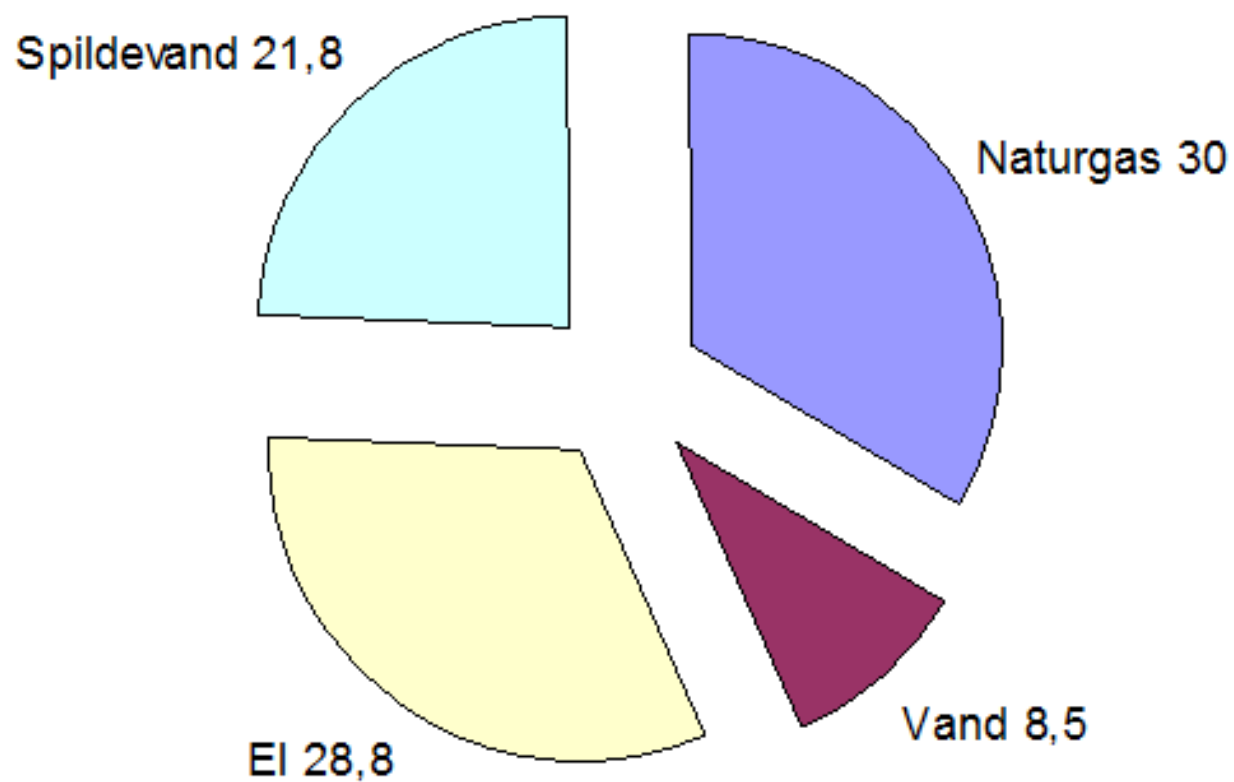
Figur 16: Hvad gør danskerne, og hvad vil danskerne gøre i fremtiden?



Der er mere prestige i at renovere  
køkken og bad end en energi-  
renovering af boligen



# Kortlægning

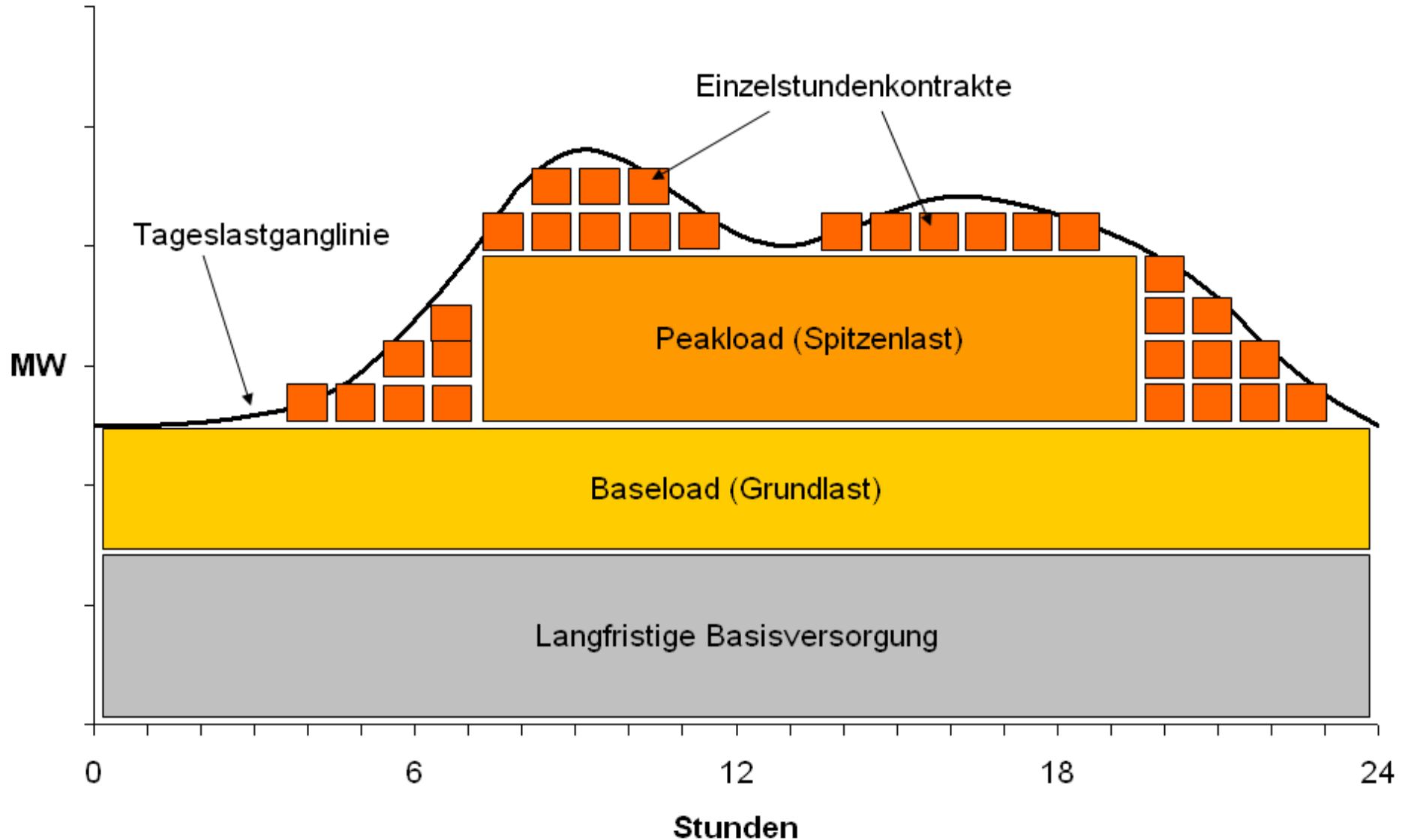


# Vi bliver målt i forhold til hinanden i Europa

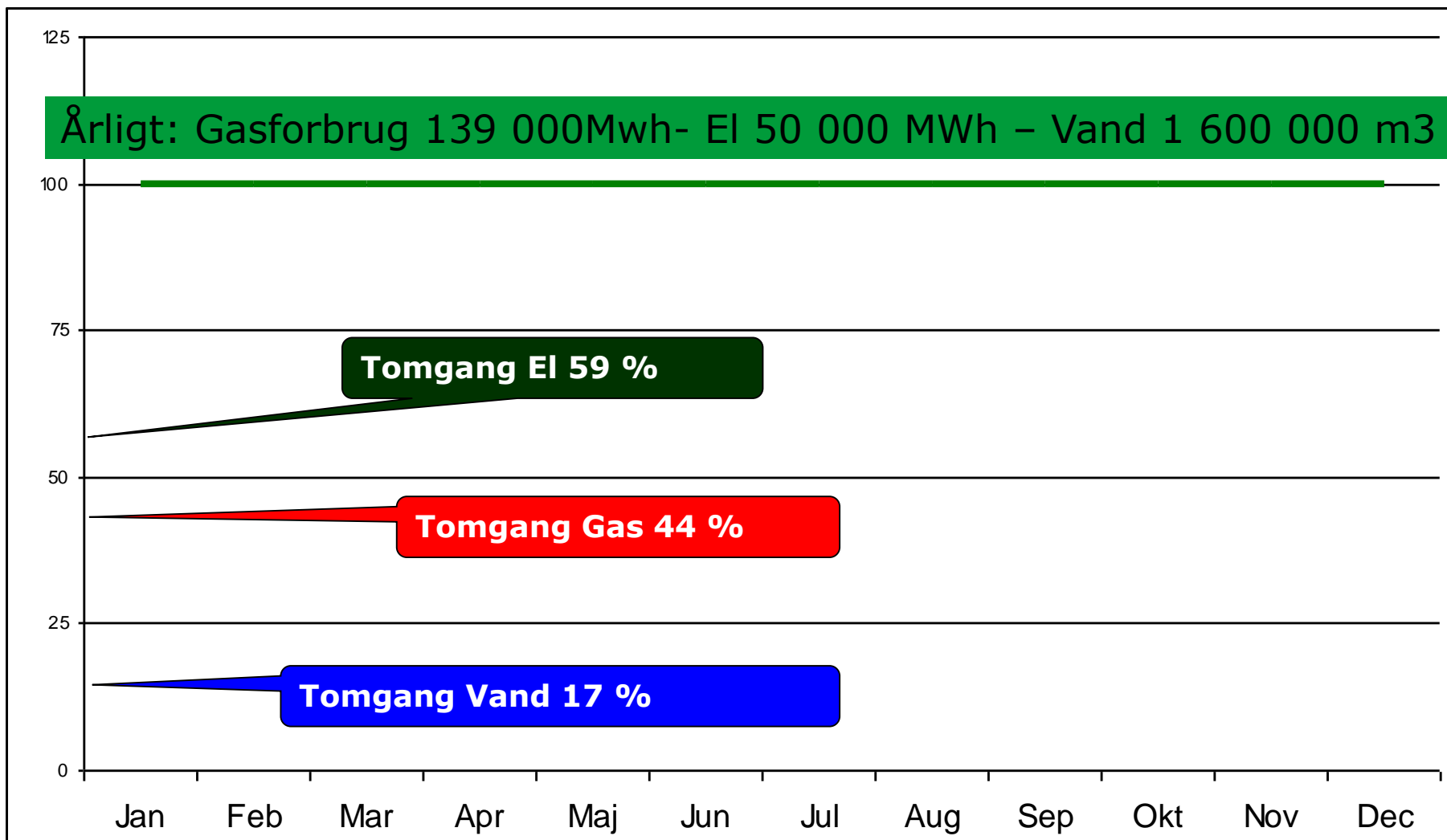
## Vi skal gøre noget ved vore omkostninger

Bryggerier (G13)	År til dato (nov. 2008)		
	Service [%]	Kvalitet [Index]	Omkostninger [kr.]
	Perfekt ordre	Kundeklager	Ikke mat. Omk. / HL
<b>Carlsberg Danmark A/S</b>	<b>3</b> 92,3	<b>1</b> 0,3	<b>1</b> 130,8
Carlsberg Sweden A/S	86,6	4,4	72
Ringnes Norway A/S	77,1	1,6	98,3
Sinebrychoff Finland	97,7	3,6	94,6
Carlsberg UK	99	3,8	75,8
Carlsberg Germany	98,4	0,3	89,4
Feldschloesschen	98,7	4,3	90,9
Carlsberg Italia	96,1	10	89,3
Carlsberg Poland	96,7	0,7	57,7
Carlsberg Croatia	97,7	0,7	67,9
Carlsberg Bulgaria	97,4	1,1	44,3
Carlsberg Serbia	99,9	0,4	38,9

# Kender vi vores forbrugsmønstre?



# Group krav 1: Optimal energiidnyttelse = Økonomi og bevarelse af arbejdspladser. Aktuel situation i Fredericia 2010



# Vi opfører os som vi er opdraget til.



So, the rumours are true! You have been friendly with the Postman! My own son! Shame on you!

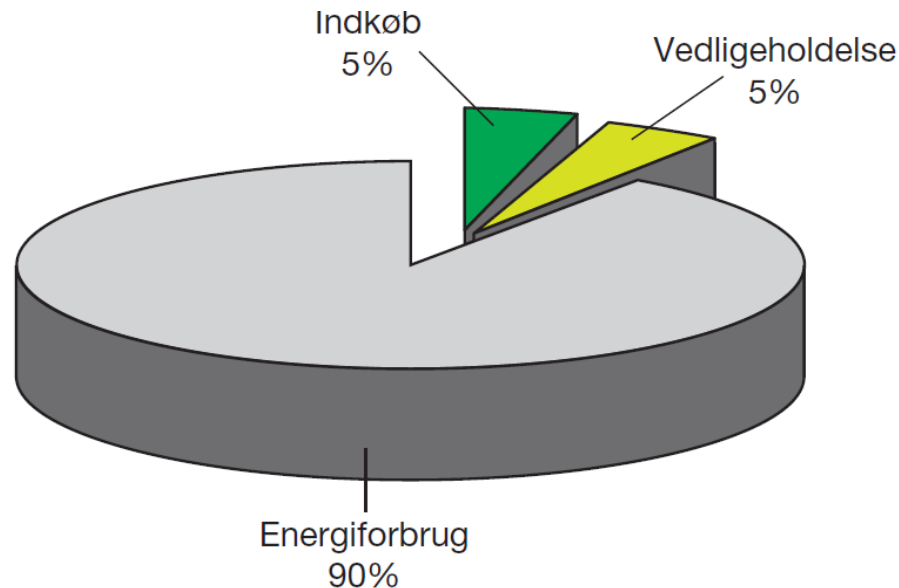
## Energi har vi nok af.



# Your Money or your Life..... Lederadfærd

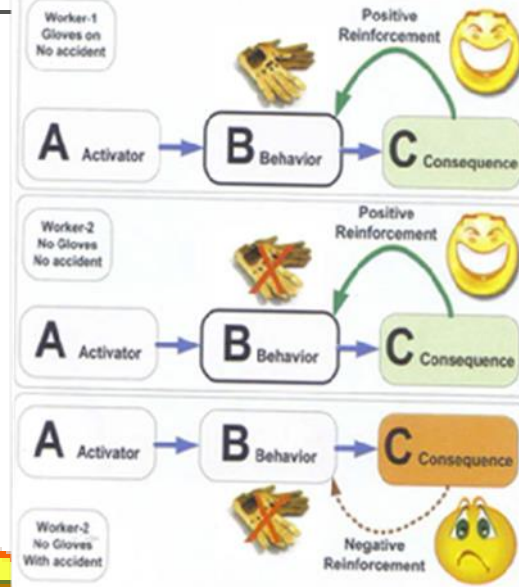
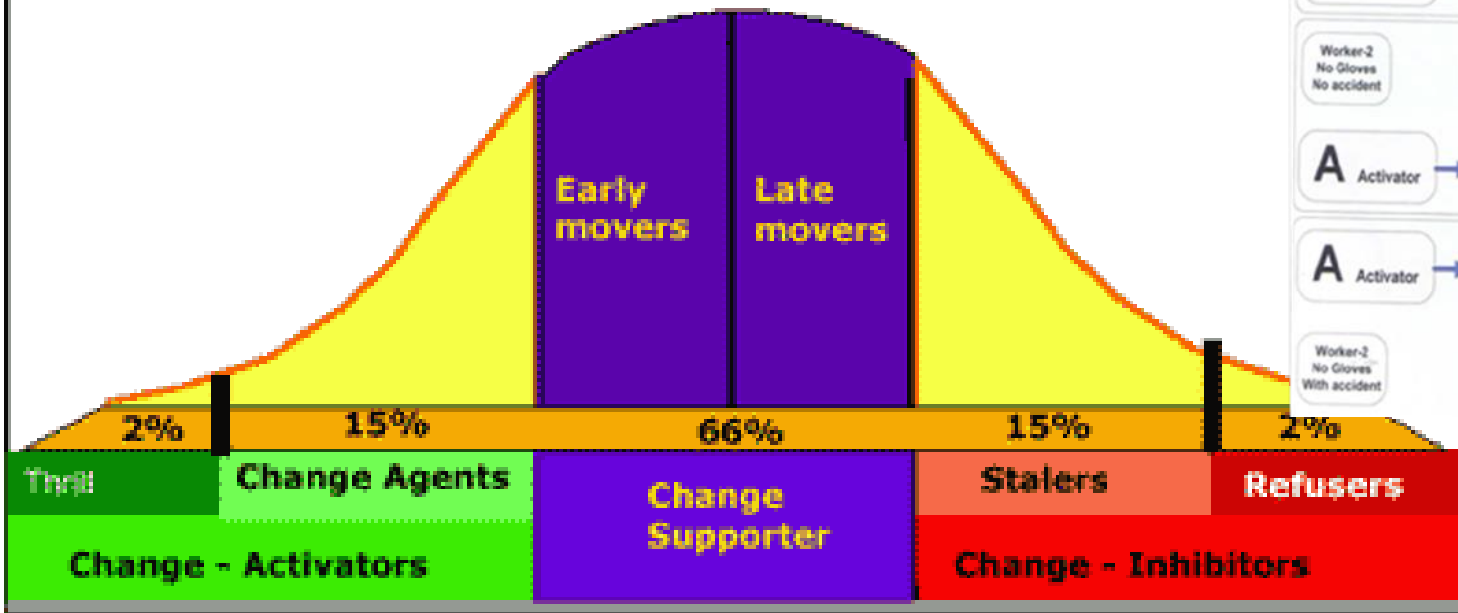


# Vi skal begynde at tænke langsigtet fra starten af....projektlederadfærd



# Operatøradfærd

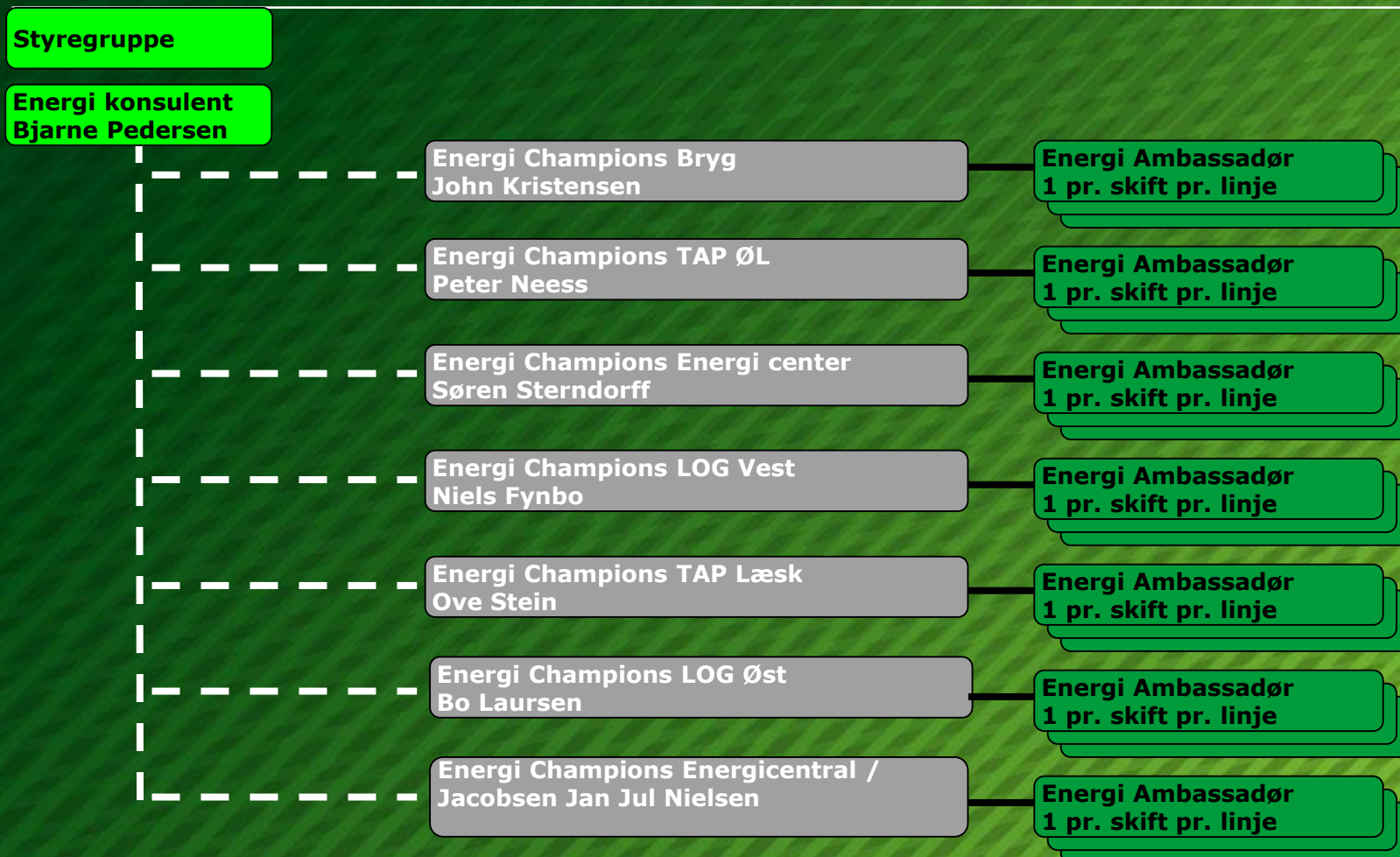
## Change Behaviors



The biggest mistake you could ever make is being too afraid to make one.

If you never want to be criticized, don't do anything new.

# Energiorganisation medarbejderinddragelse

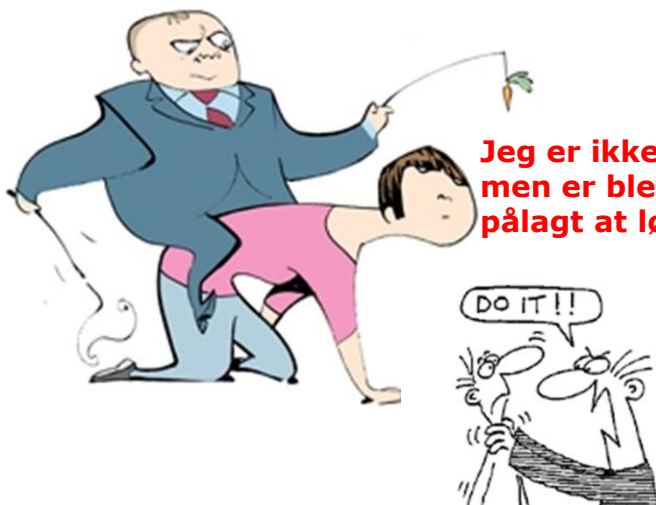


# 4 Slags motivation og holdninger

## Corydons mand får bonus for at trimme lønftaler

Finansministerens topchef i Moderniseringsstyrelsen kan få kontant belønning, hvis det lykkes at »frigøre ressourcer« ved at ændre løn- og ansættelsesvilkår for statens ansatte.

### Ydre motivation



Jeg er ikke motiveret, men er blevet pålagt at løse opgaven

Hvis du udfører opgaven, får du en bonus

Hvis du ikke udfører, opgaven bliver du opsagt

Holdningsmæssig positiv og kan se et formål med opgaven

### Indre motivation

Jeg vil meget gerne udføre opgaven

Jeg er meget motiveret

Jeg vil meget gerne udføre opgaven, men har svært ved at se formålet med opgaven

Kræver uddannelse, træning og inddragelse

## Pesticidafgift får kun hver anden landmand til at mindske forbruget

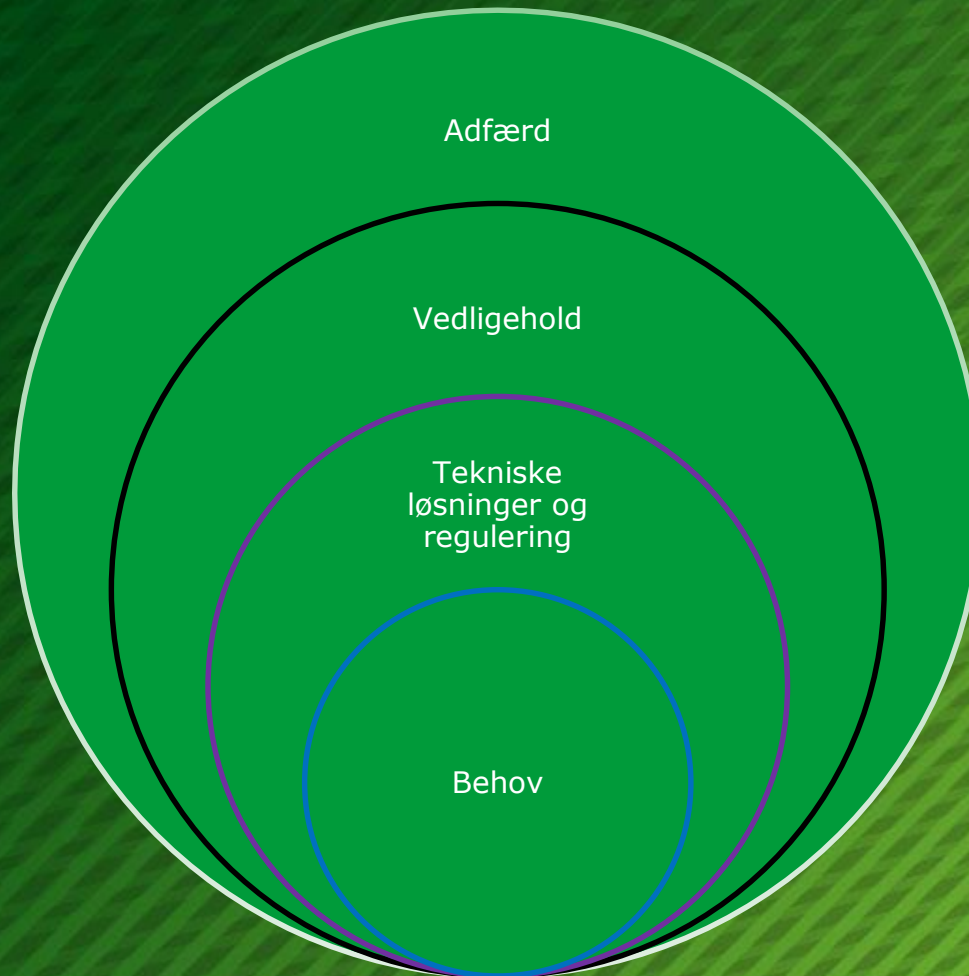
Selv stærkt forhøjede afgifter på pesticider vil kun få hver anden landmand til at reducere forbruget, viser ny undersøgelse, der kommer kort tid efter miljøministerens bebudede nye pesticidafgift. Og landmænd med landbrug større end 200 hektar er mindst tilbøjelige til at lade sig påvirke af afgiften.

Negativ og kan ikke se formålet med opgaven

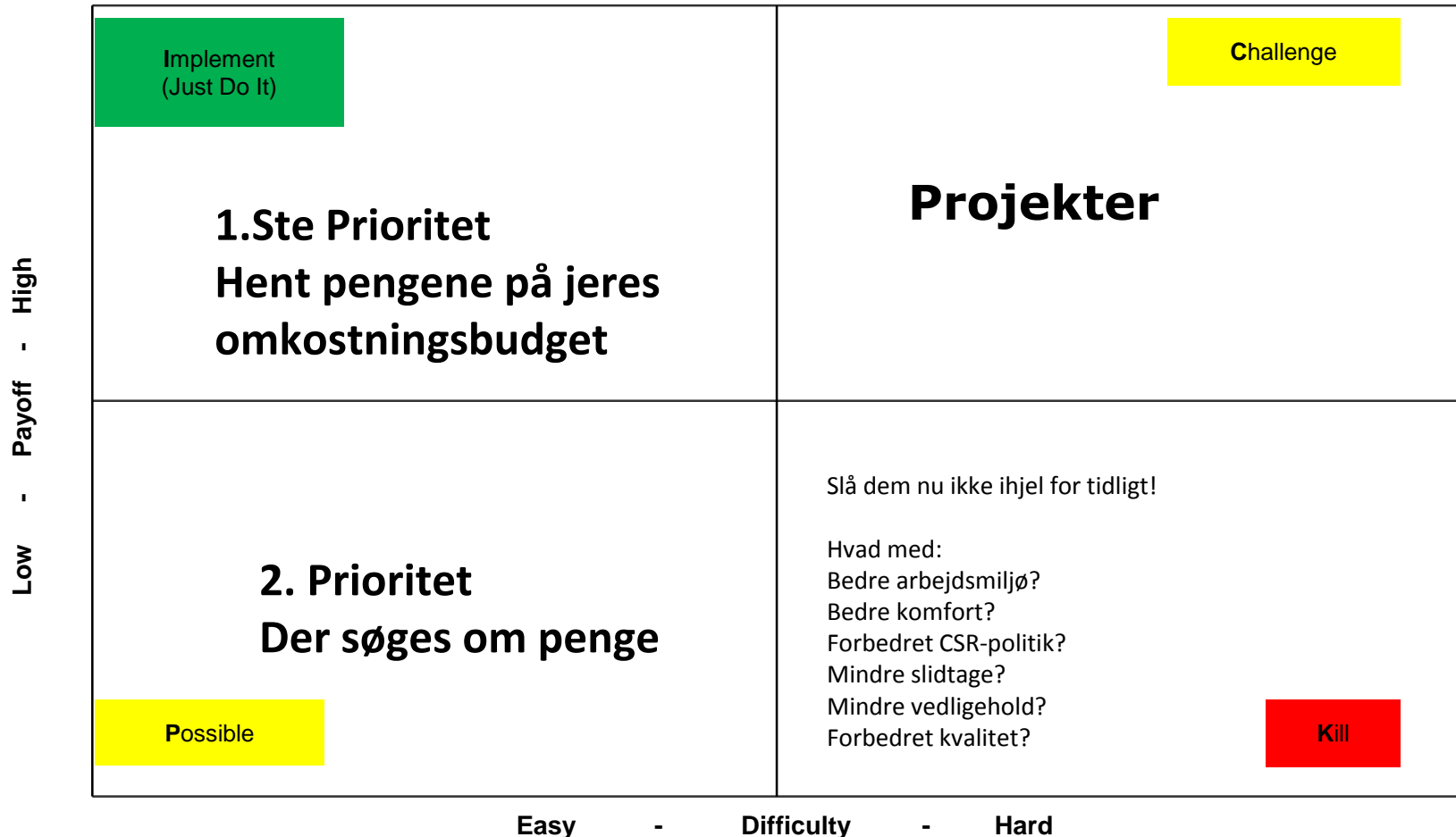


**Medarbejderinddragelse giver den største gevinst  
og de vaner vi bruger hjemme kan sagtens  
overføres til arbejdspladsen, og så koster det ikke noget!.**

---



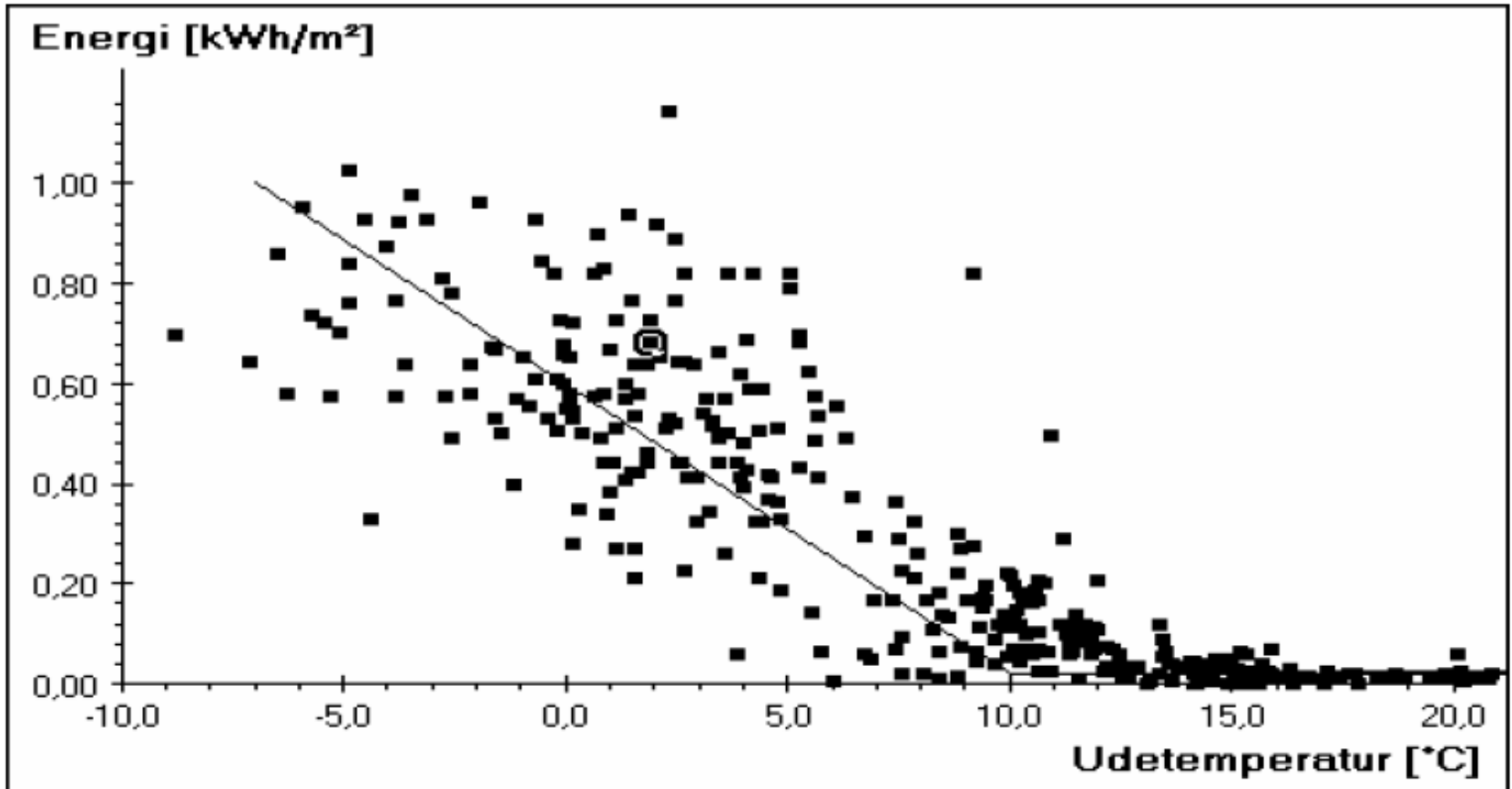
# Prioritering og forklaring efter Go C Energy



Opgavens sværhedsgrad

# Energisignatur, ikke alt er 100%

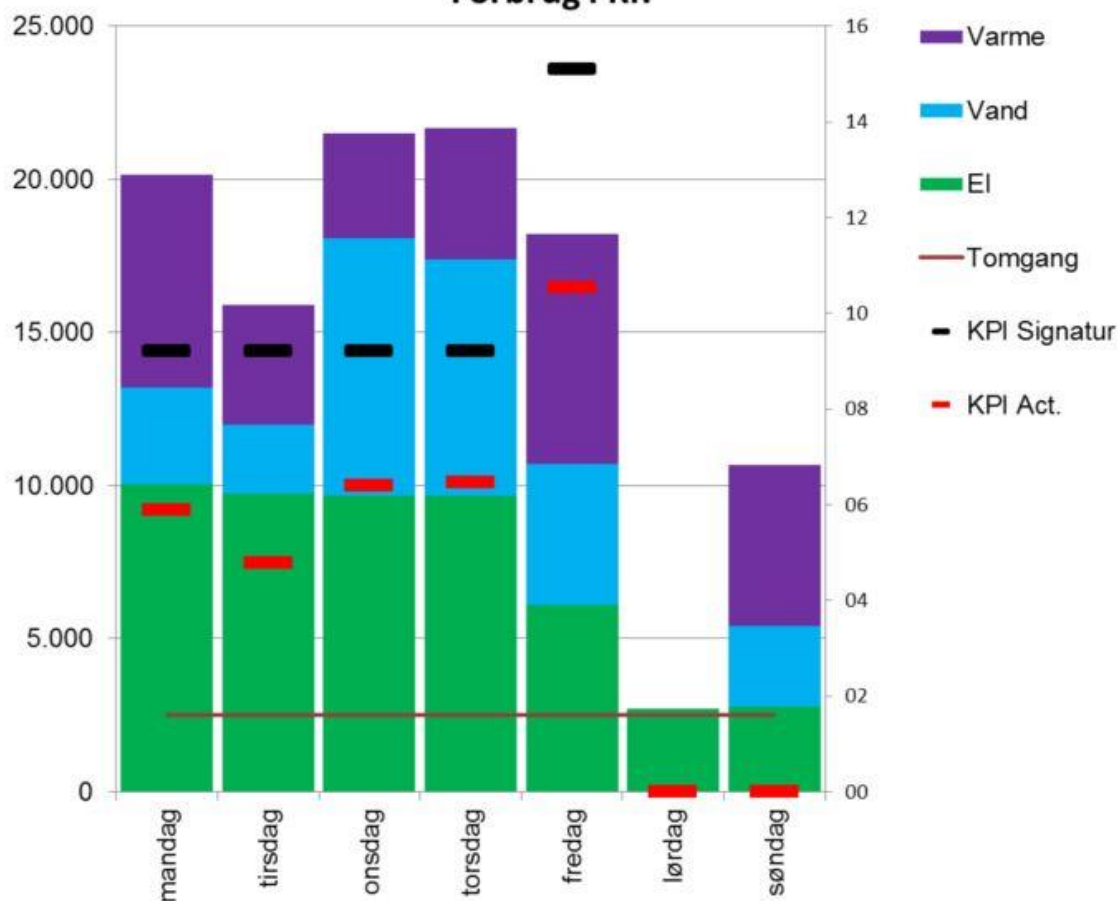
- Faktisk



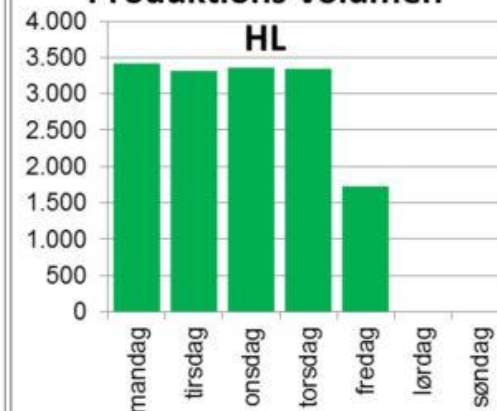
## Energi forbrug Ø4 - [Kr./døgn]

Opdateret: mandag d. 10 kl. 11 2014

### Forbrug i Kr.



### Produktions Volumen



#### Actual 7 dage

7,3 Kr./HL  
110.811 Kr.

#### Mål 7 dage

10,2 Kr./HL  
155.010 Kr.








#### Mål korrektion

100 %

Niveau:  
Ø4

Update  
Karsten Østergaard

Kilde:  
Energicenter Vantage Point

	De syv spildformer	Eksempler på spild	Eksempler på energispild
	Overproduktion	<ul style="list-style-type: none"> <li>• Produktion til lager efter forecast.</li> <li>• Produktion for at undgå omstillinger.</li> </ul>	<ul style="list-style-type: none"> <li>• Forbrug på lager</li> <li>• Maskiner kører unødigt med emner</li> </ul>
	Fejl	<ul style="list-style-type: none"> <li>• Skrot</li> <li>• Ombearbejdning</li> <li>• Fejl</li> <li>• Rettelser</li> <li>• Variation</li> <li>• Forsvundne dele</li> </ul>	<ul style="list-style-type: none"> <li>• Maskiner kører unødigt med emner.</li> <li>• Bortskaffelse af materialer</li> <li>• Belysning</li> <li>• Opvarmning</li> </ul>
	Ikke nødvendige lagre	<ul style="list-style-type: none"> <li>• Råvarer</li> <li>• Varer-i-arbejde</li> <li>• Færdigvarer</li> </ul>	<ul style="list-style-type: none"> <li>• Forbrug af el på lager (køl, lys etc.)</li> </ul>
	Ikke nødvendige processer	<ul style="list-style-type: none"> <li>• Papirarbejde</li> <li>• For strenge tolerancer</li> <li>• Dårlig design af værktøj</li> <li>• Dårlig design af emner</li> </ul>	<ul style="list-style-type: none"> <li>• Maskiner kører unødigt</li> <li>• It-udstyr og printer</li> </ul>
	Overflødig transport	<ul style="list-style-type: none"> <li>• Flytte emner til og fra lager.</li> <li>• Flytte emner fra en arbejdsstation til en anden.</li> </ul>	<ul style="list-style-type: none"> <li>• Truckkørsel</li> <li>• Transportbånd</li> <li>• Træk-kulde fra porte</li> </ul>
	Ventetid	<ul style="list-style-type: none"> <li>• Vente på emner</li> <li>• Vente på tegninger</li> <li>• Vente på inspektion</li> <li>• Vente på maskiner</li> <li>• Vente på information</li> <li>• Vente på maskinreparation</li> </ul>	<ul style="list-style-type: none"> <li>• Tomgangsforbrug, maskiner kører uden emner</li> <li>• Opvarmning</li> <li>• Belysning</li> </ul>
	Ikke nødvendig bevægelse	<ul style="list-style-type: none"> <li>• Søgning efter emner, værktøjer etc.</li> <li>• Sortering af emner.</li> <li>• Række ud efter værktøjer</li> <li>• Løfte kasser med emner.</li> </ul>	<ul style="list-style-type: none"> <li>• Maskiner kører på halv kraft</li> <li>• Tomgangsforbrug</li> <li>• Truck - palle løfter</li> <li>• Hjælpeudstyr</li> </ul>

**Nye energimedarbejdere får deres kursusbevis overrakt af vores direktør. Også en synlig ledelsesmæssig handling.**

---



# 5 år = -29%



Også på produktionssiden er der i løbet af 2014 sket store fremskridt. Bryggeriet i Fredericia er Carlsberg Gruppens mest energieffektive, og da energieffektiv produktion gavner både miljøet og vores forretning, er dette en 1. plads vi bør være stolte over. På bryggeriet har der i løbet af året desuden været stor fokus på at forbedre udnyttelsesgraden af vores linjer (den såkaldte OEE) og i det hele taget at øge effektiviteten. Gemba Kaizen blev introduceret i foråret og en række medarbejdere har været med til at identificere små og store projekter, der gør hverdagen lettere i produktionen og samtidig sparer på omkostningerne.

fuldt arbejde bidraget  
på vores

analyse af  
ning til mere optimale  
uling af flasker.  
rer højere genbrug af  
det udgør 21.723.266  
rug i en husstand.  
varer til 75 et-plans



!



# Velkommen

## State of Green

- Jeres internationale udstillingsvindue



30. September 2015

Cecilie Buch Thomsen

# State of Green

State of Green er et offentligt-privat partnerskabejet af:

Formål:

- Øge eksporten af grønne danske løsninger
- Synliggøre Danmarks grønne løsninger internationalt
- Tiltrække investeringer til Danmark

Målgruppe:

- Politiske og kommercielle beslutningstagere og journalister

State of Greens kommercielle partnere:



Ministry of Environment and Food



Premium partners

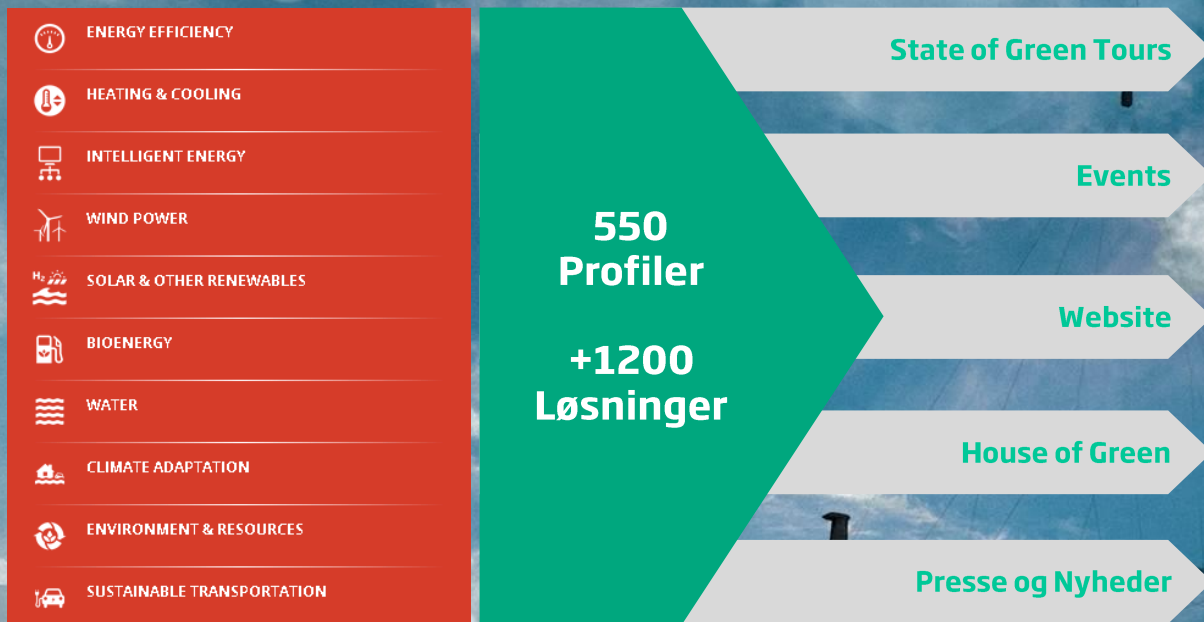


Associate partners



**State of Green**   
Join the Future. Think Denmark

# Sharing Denmark's green know-how



# Case-eksempel: Danfoss



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0

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## SECTORS

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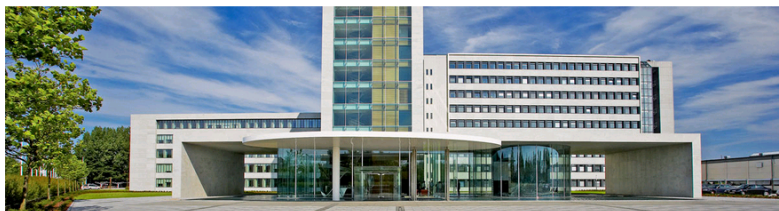
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## IN FOCUS

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## PROFILE: DANFOSS



## DANFOSS

Share



Danfoss engineers technologies that enable the world of tomorrow to do more with less. We meet the growing need for infrastructure, food supply, energy efficiency and climate-friendly solutions. Our products and services are used in areas such as refrigeration, air conditioning, heating, motor control and mobile machinery. We are also active in the field of renewable energy as well as district heating infrastructure for cities and urban communities. Our innovative engineering dates back to 1933 and today Danfoss is a world-leader, employing 24,000 employees and serving customers in more than 100 countries. We are still privately held by the founding family.

Read more about us at our [website](#).



**Danfoss**  
At: Lasse Bastkjær Jensen  
Nordborgvej 81  
6430 Nordborg  
Denmark  
Phone: +45 74882222

SEND A MESSAGE

VISIT OUR WEBSITE

MAP

See our solutions worldwide



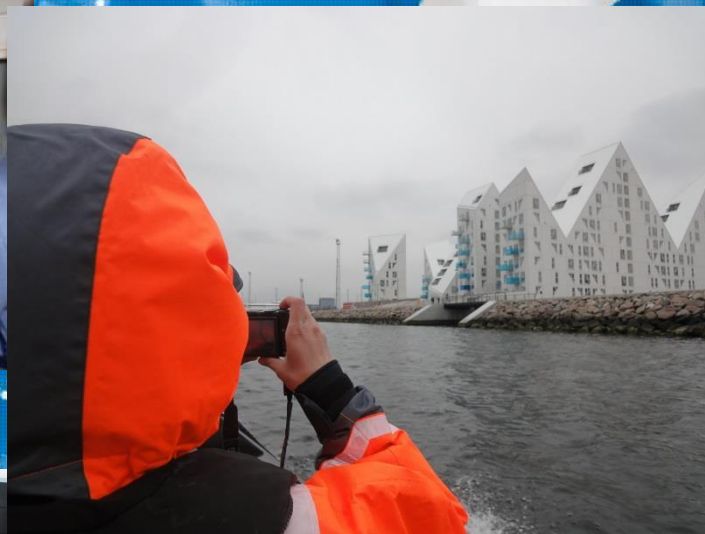
WE ARE OPEN FOR VISITS

Visit us on a State of Green Tour

REQUEST A VISIT

**State of Green**  
Join the Future. Think Denmark

# State of Green Tours



State of Green

Join the Future. Think Denmark

# Hvordan fungerer Tours?

## Planlægningen

1. Vi bliver kontaktet af den udenlandske delegation
2. Baseret på deres interesser laver vi et showcase-program
3. Delegationen accepterer programmet
4. Vi kontakter danske virksomheder
5. Vi arbejder altid for et win-win match



# Presse og Kommunikation



- **Skræddersyede besøg** for 100-125 journalister, bloggere, kommentatorer hvert år
- **Formidling og kontaktskabelse**
- **Netværksdannelse** blandt danske nøgleaktører med netværksture, arrangementer og uddannelsesrejser

# Nyheder

## NEWS



## NEWS

### SIGN UP FOR OUR WEEKLY NEWSLETTER

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E-mail address

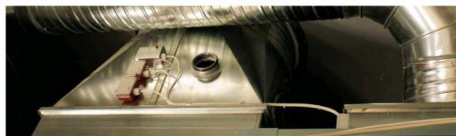
Full name

Full name

SUBSCRIBE

2013.11.28

## DANFOSS OPENS WORLD'S FIRST INDOOR CLIMATE TEST CENTER



2012.06.20

## DANFOSS AND COWI TO IMPLEMENT DISTRICT HEATING SYSTEM IN ANSHAN, CHINA

## NEWS

Danfoss and Cowi has signed the deals signed by the Jintao's state visit to Denmark



Iver Høj Nielsen, Head of Press  
State of Green Consortium  
Phone: +45 22 49 65 12  
Email: ihn@stateofgreen.com

## Smart Grid Strategy

Intelligent energy systems



## DANFOSS HOSTED NEW SMART GRID STRATEGY

Martin Lidegaard, Minister of Climate and Energy in Denmark presented the Danish government's strategy for developing the intelligent power and energy network. Smart Grid



Contact  
Danfoss  
At: Lasse Baskjer Jensen  
Head of Press



2012.11.02

## DANFOSS COMPRESSORS KEEP AMERICAN POLICE COOL

Compressors from Danish company Danfoss help keep the Houston Police Department Building cool during hot summer days.



Iver Høj Nielsen, Head of Press

State of Green Consortium

Phone: +45 22 49 65 12

## NEWS



2013.10.29

## HUGE SOLAR CELL PARK AT DANFOSS HEADQUARTERS

Located close to company headquarters in Nordborg, Denmark, the 2.1 MW facility is set to be operational before the turn of the year.



ProjectZero  
Peter Røhlke  
+45 4040 8636

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## NEWS



2014.02.26

## DANFOSS AND SMA SOLAR TECHNOLOGY WILL CREATE ONE OF THE WORLD'S LARGEST CONVERTER ALLIANCES

Danfoss and SMA Solar Technology plan to enter into a close strategic partnership for a step change in competitiveness. The two leading system technology specialists will take full advantage of economies of scale and joint development initiatives.



Chair: Thomas Lauritzen  
Communication Manager  
State of Green  
Phone: +45 22 49 65 10  
Email: ihn@stateofgreen.com

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# Sociale medier



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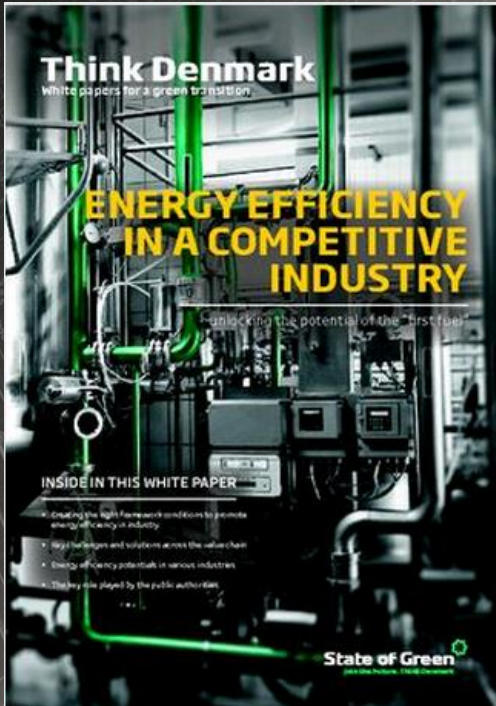
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# White Papers - Toolbox



# Events og fremstød - WFES, COP 21



# Udnyt mulighederne

- › Fortæl os I er der - Opret en profil
- › Vis jeres bedste løsninger
- › Vil I modtage besøg?
- › Nyheder - brug vores nyhedskanaler
- › I bestemmer omfanget!



# Tak for jeres opmærksomhed

Cecilie Buch Thomsen  
[cbt@stateofgreen.com](mailto:cbt@stateofgreen.com)

# **Comparison of the Scanenergi ESCO funding model against a “self-funded” approach**

Chris Stuart-Bennett  
30<sup>th</sup> September 2015

# About me...

Formerly Group Energy Manager at Imperial Tobacco Ltd

Have worked with Scanenergi Solutions (SeS) since 2010

Project Managed full lifecycle implementation of 5 SeS ESCO projects, launched a further 2 before leaving ITG

# Overview

- The Scanenergi Model – a recap
- Funding Your Project
- Issues encountered
- Conclusions

# The Scanenergi Model

- Multi-disciplinary energy management approach
  - Technical (Lighting, HVAC, Boilers, Comp Air)
  - Processes (Measurement, Monitoring, Management)
  - Behaviour (Employees – at all levels)
- Projects funded by SeS, paid for by savings
- IPMVP-compliant baselines and measurement
- Minimum savings level guaranteed

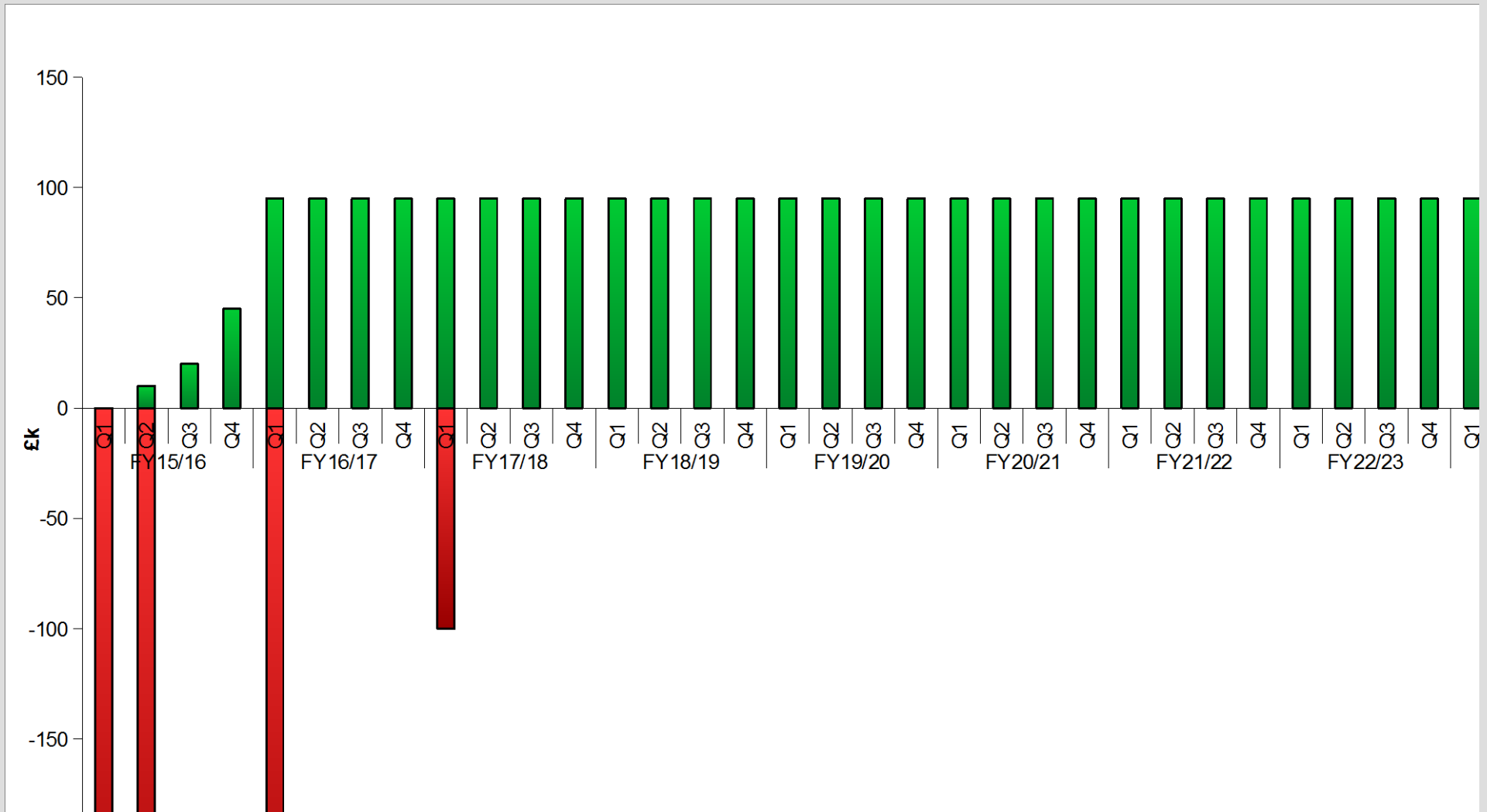
# Funding your Project

- Often key issue behind go/no-go
- Traditional model is capital intensive
- Financing requires commitment and trust
- I'll believe it when I see it!

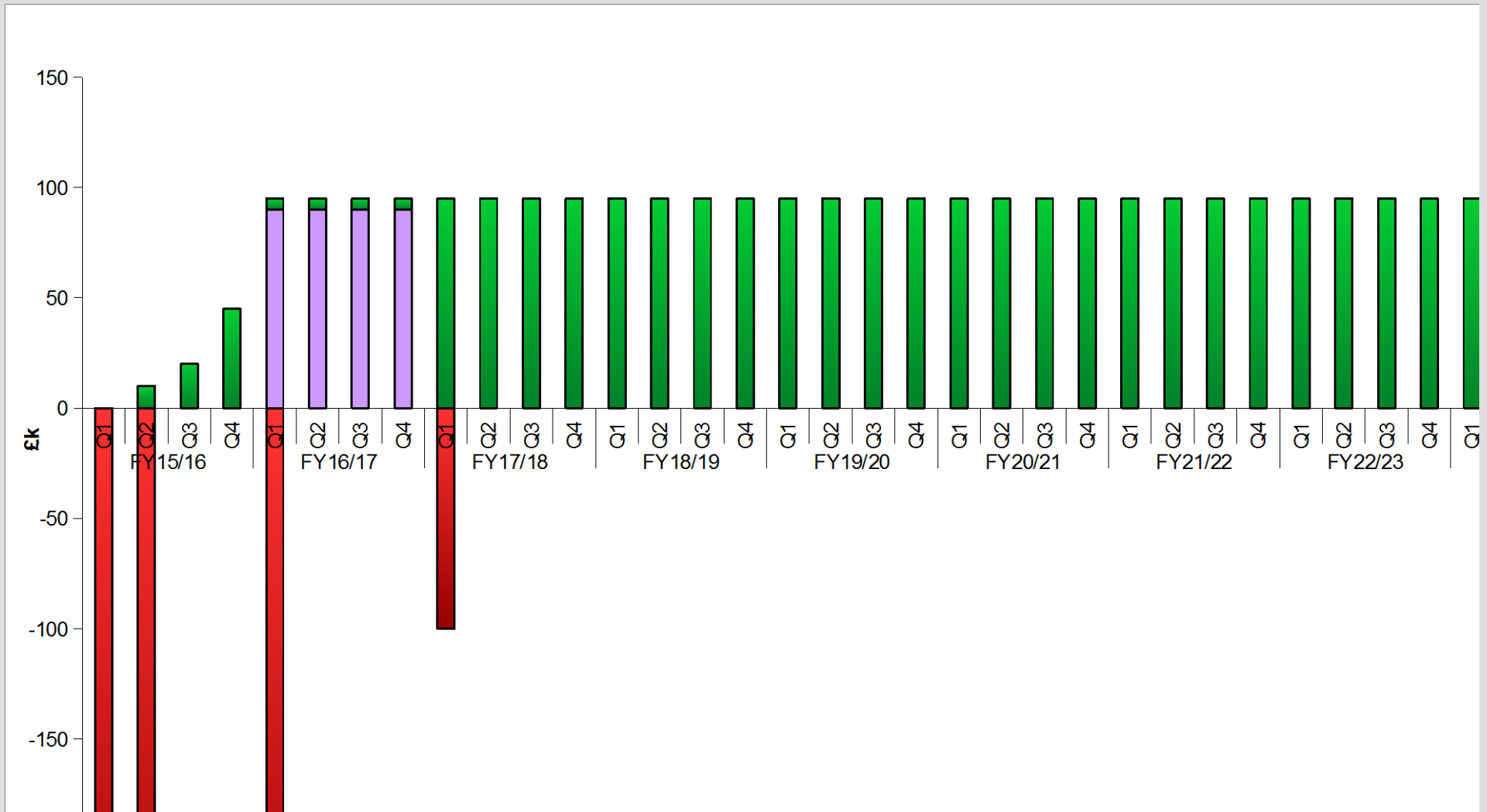
# Funding your Project

- Often key issue behind go/no-go
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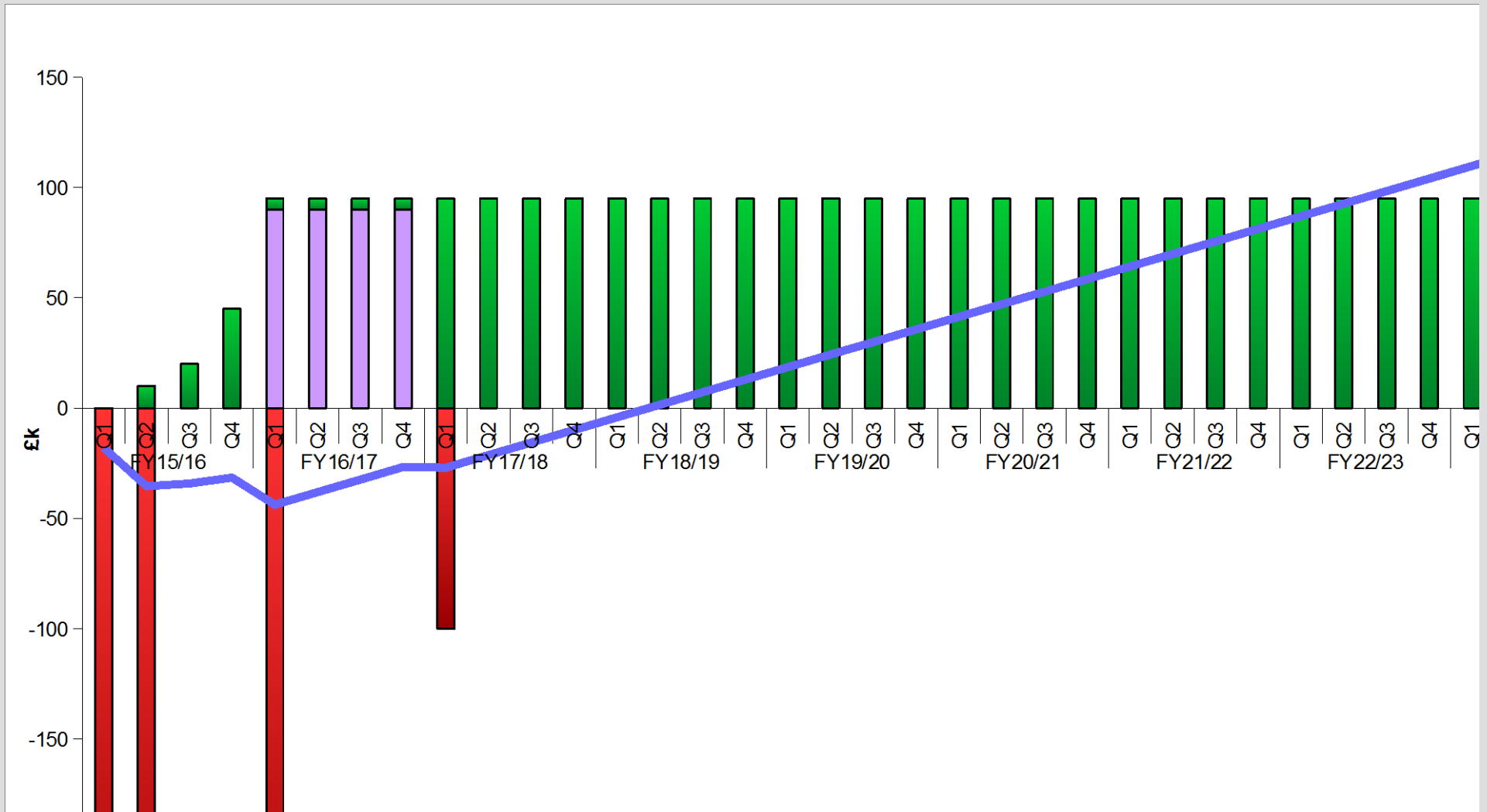
# Traditional Funding



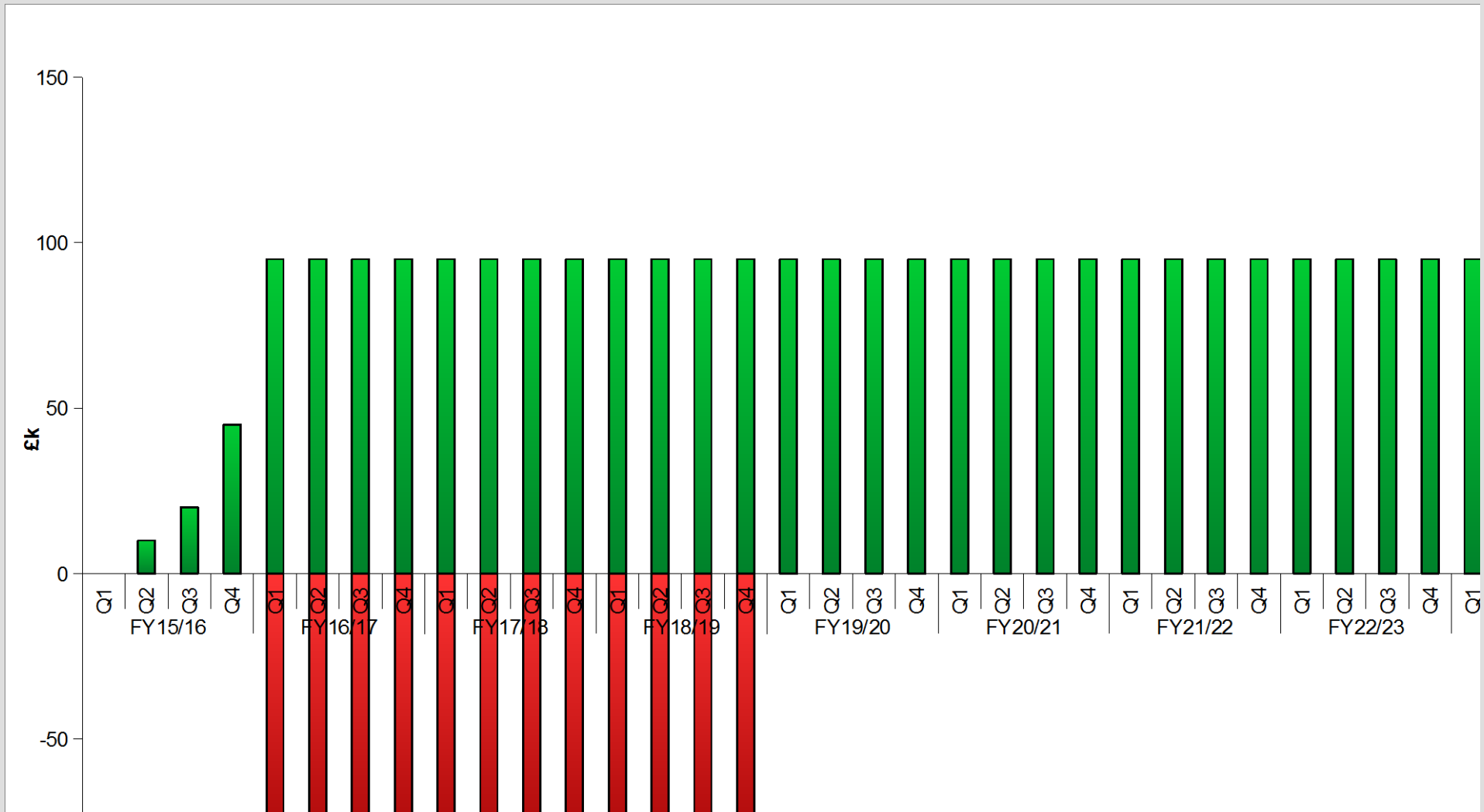
# Traditional Funding



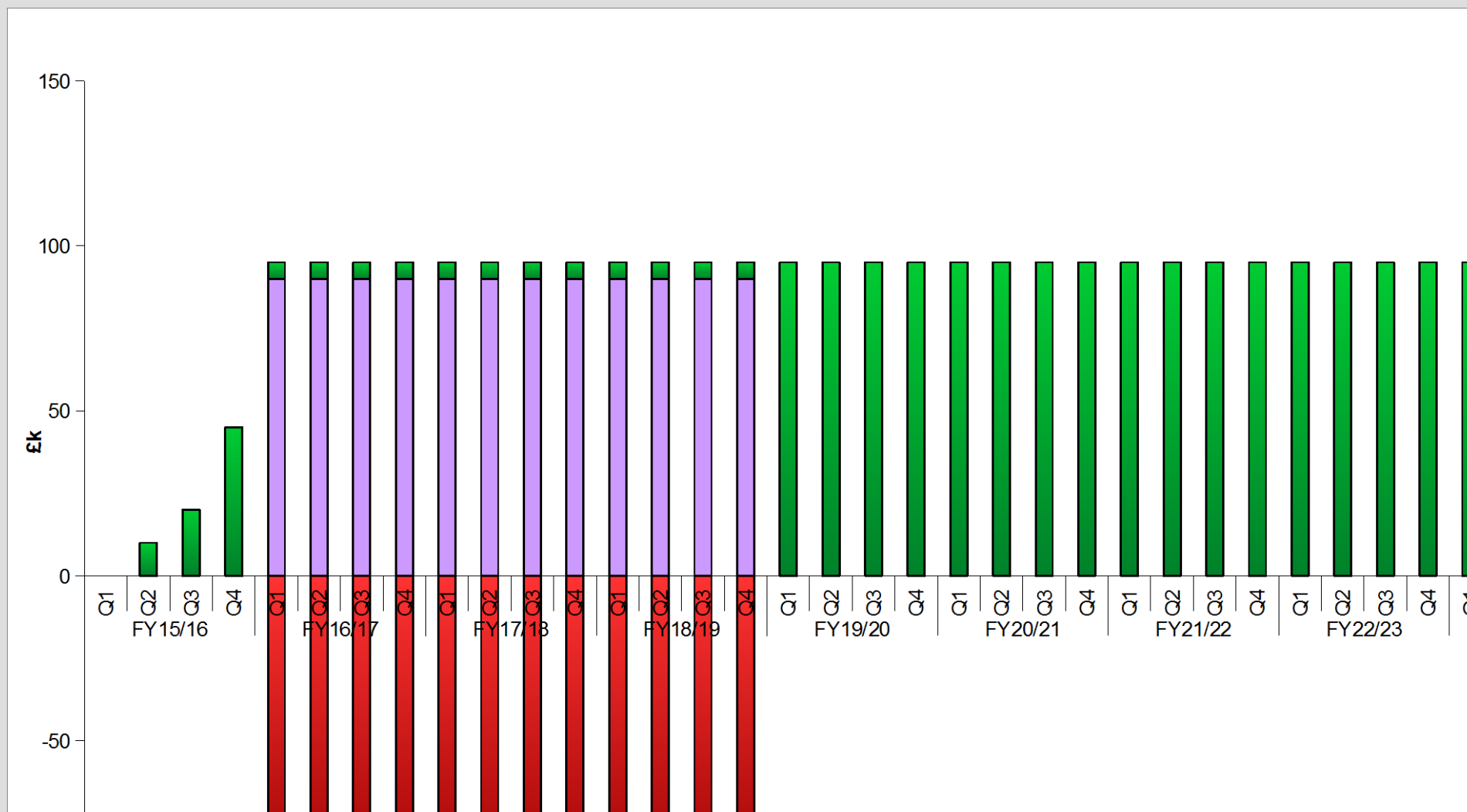
# Traditional Funding



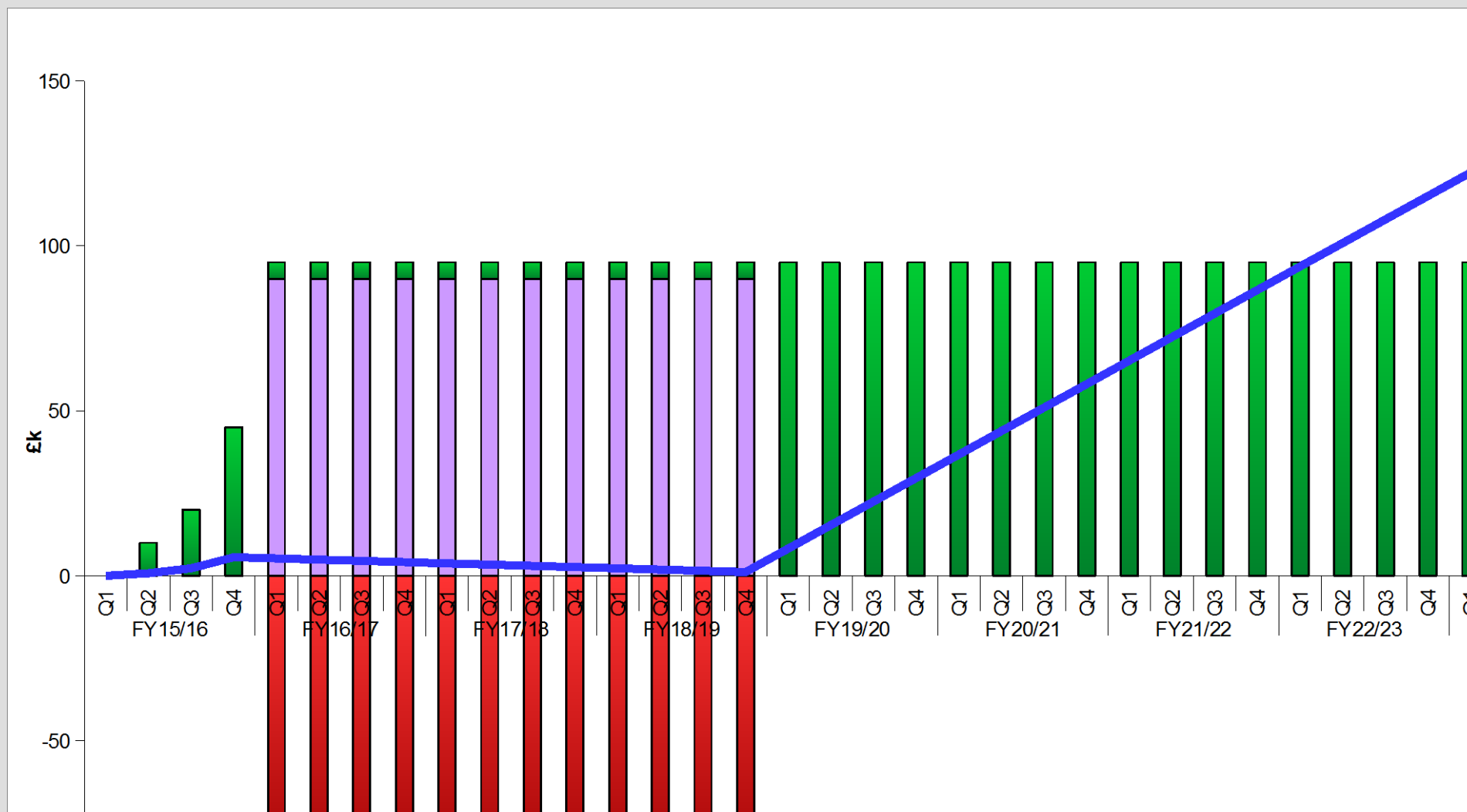
# ESCO Funding



# ESCO Funding



# ESCO Funding



# Issues Encountered

Site closure mid-project.

- > vital to ensure that business strategy/long-term plans are known!

Major project underperformance.

- > good test of savings guarantee.

Conflicting business priorities.

- > ensure project sponsor/champion is senior enough to fight for your cause.

# Conclusion

Financially attractive

Significantly reduced risk

Leverages expertise



# Contacting me

## LinkedIn

<http://uk.linkedin.com/pub/chris-stuart-bennett/2/102/B48>

## Email

[cjsb@neostasis.co.uk](mailto:cjsb@neostasis.co.uk)

# Finansiering af energioptimeringer

Jacob Mortensen  
Green Tech Center, Vejle  
30. Sep. 2015



# Agenda

1. **Om finansiering hos Scanenergi Solutions**
2. **Definitioner vedr. finansiering**
3. **Udfordringen**
4. **Hvad kan finansiering bruges til?**
5. **Finansierings modeller**
6. **Case**

## **EnSave**

Navn på energibesparelsesprogram med ét  
års garanti.

Milepæls-betaling i løbet af projektet

## **EPC**

Energy Performance Contracting.

Som EnSave med fler-årig besparelses  
garanti.

Betaling mens besparelserne realiseres.

## **Operating Lease**

Som ovenstående, med investering off-  
balance (100% OPEX)



Definitioner

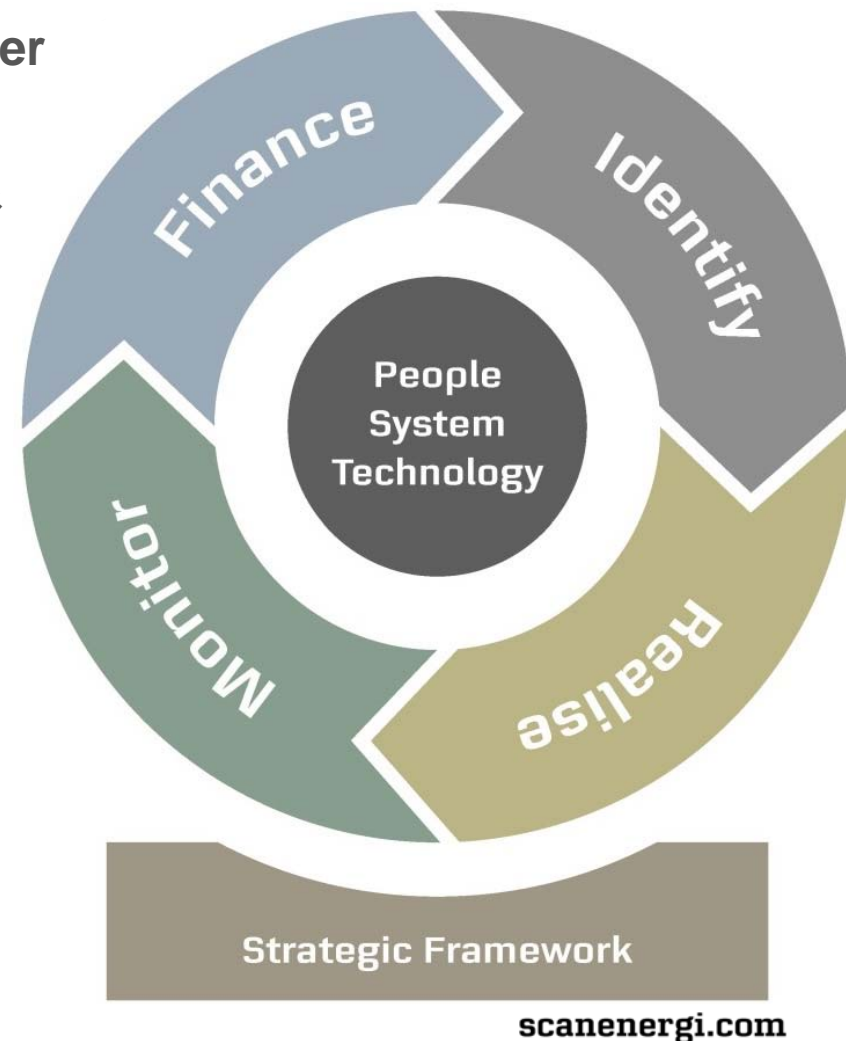


# Financing of **energy** **optimization**

# Om Scanenergi Solutions A/S

## Processen for at generere energibesparelser

- Lean energi proces - **EnSave**
- Forandring via energiledelse, mennesker & systemer samt tekniske tiltag.
- Ejerskab start til slut
  - Identificér
  - Design & specs
  - Indkøb & implementering
  - Realisering
  - Monitorering
  - Projektledelse & optimering
- Option for
  - Garanti
    - 1,2,3,4,5..... år
  - Finansiering
    - EPC / Operating Lease



## Vores kunder



# Case

## En typisk case

Identificeret besparelse 15%

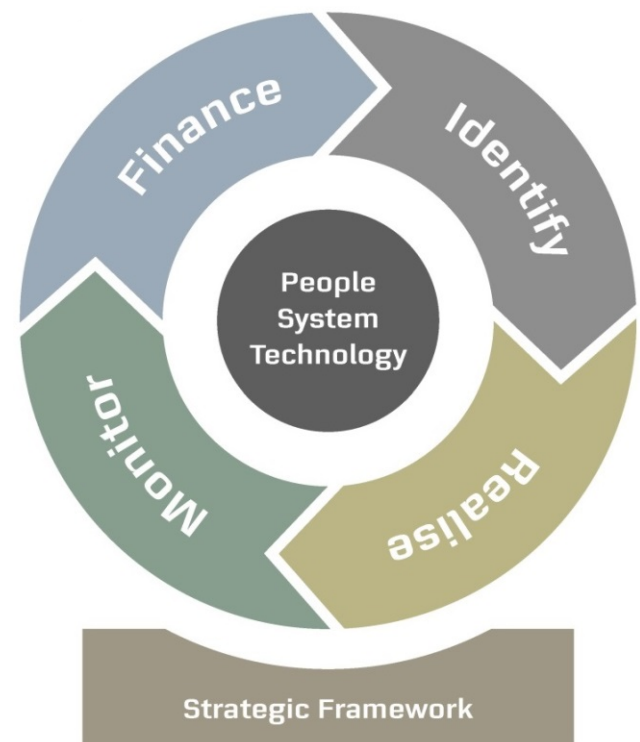
Besparelse 3.000.000,- DKK

Business case 3.5 års tilbagebetaling

Investering 10.5 mio. DKK

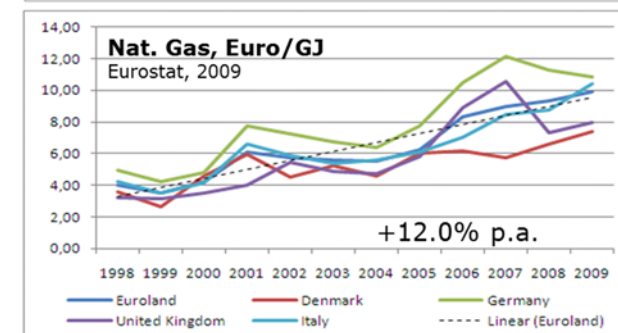
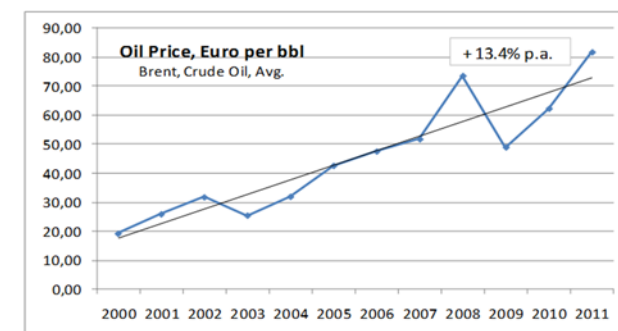
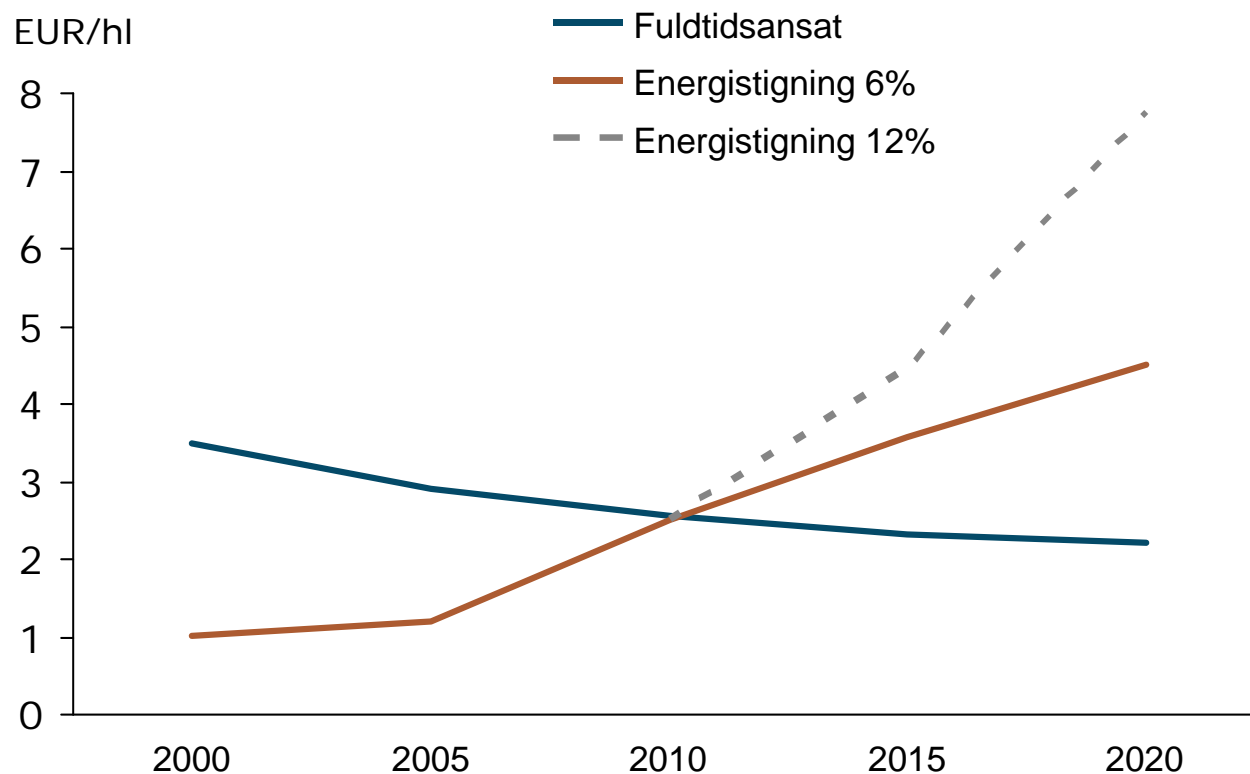
Virksomhedskrav Max. 3 års tilbagebetaling  
Max. 500.000 i drifts-budget  
Energiopsummerings-budget?  
Prioritet?

## Udfordringen



# Hvad er din løn-udg. ift energi-udgift?

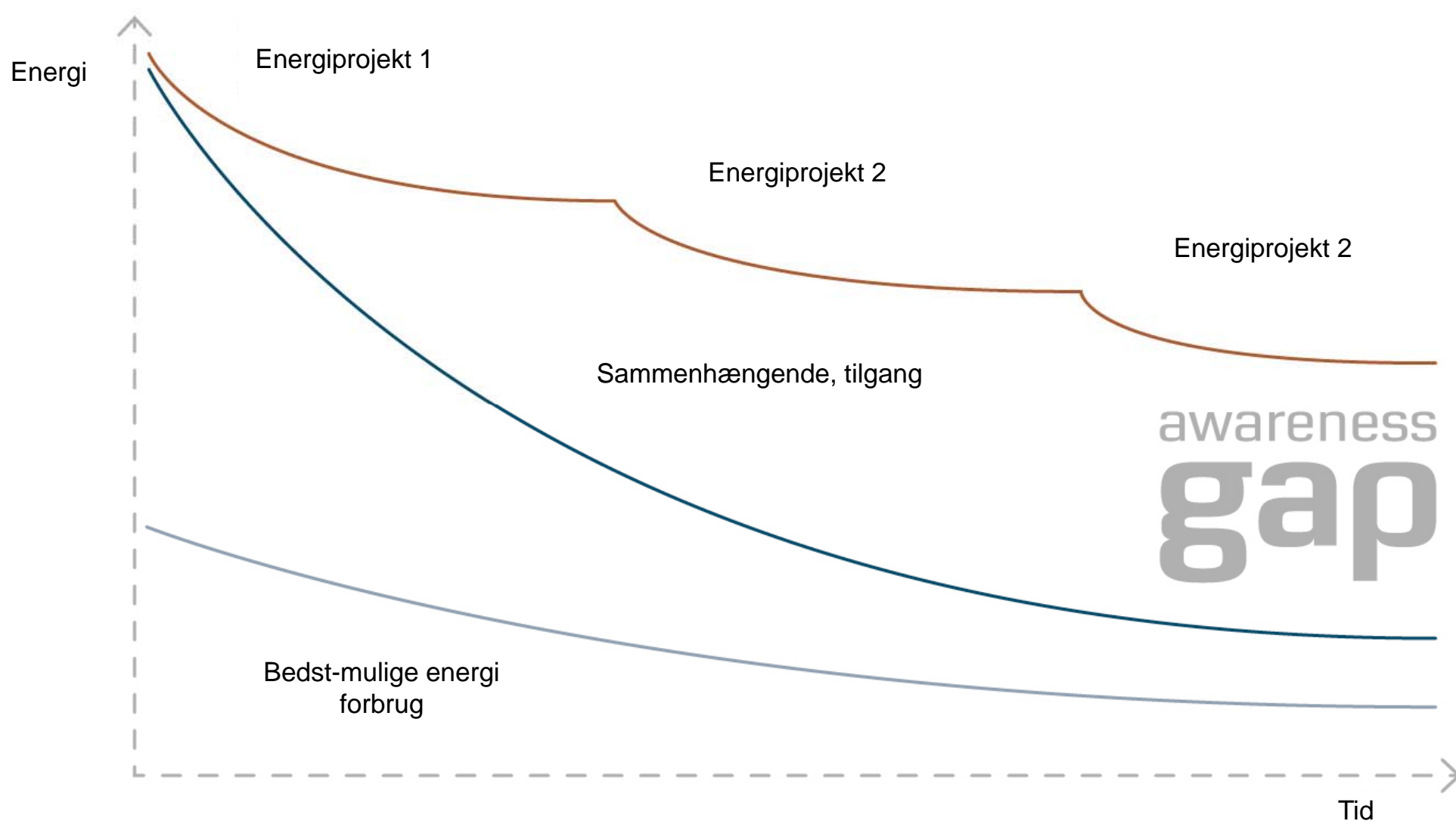
Eksempel fra 100 bryggerier



Og så er der jo de  
berømte  
lavthængende  
frugter....  
Hvad gør du, når  
de er plukket?



# Hvad kan finansiering bruges til?



# Finansierings modeller

**Model**

**Investering**

**Finansiering**

**Besparelser  
pr. år**

**Garanterede  
besparelser**

**Investering**

**Tilbagebetalin  
g**

**Betalingsbetin  
gelser**

**CAPEX/OPEX**

**Fleråris  
garanti**

# Finansierings modeller

Model	EnSave
Investering	CAPEX
Finansiering	100% CAPEX
Besparelser pr. år	€ 400.000
Garanterede besparelser	€ 400.000
Investering	€ 1.000.000
Tilbagebetaling	2.5 år
Betalingsbetingelser	30-30-30-10 payment schedule during project.
CAPEX/OPEX	100 % CAPEX. Udstyr overgår til kunden efter installation.
Flerårs garanti	5% af besparelserne + 25 mandedage pr. år

# Finansierings modeller

Model	EnSave	
Investering	CAPEX	
Finansiering	100% CAPEX	% Split CAPEX/OPEX
Besparelser pr. år	€ 400.000	€ 400.000
Garanterede besparelser	€ 400.000	€ 400.000
Investering	€ 1.000.000	€ 1.000.000
Tilbagebetaling	2.5 år	2.5 år
Betalingsbetingelser	30-30-30-10 payment schedule during project.	30-30-30-10 (milepæle) ifm. projektet.
CAPEX/OPEX	100 % CAPEX. Udstyr overgår til kunden efter installation.	70/30 split CAPEX/OPEX. Udstyr overgår til kunden efter installation.
Flerårs garanti	5% af besparelserne + 25 mandedage pr. år	5% af besparelserne + 25 mandedage pr. år

# Finansierings modeller

Model	EnSave		EPC (1 år)
Investering	CAPEX		Finansiel lease
Finansiering	100% CAPEX	% Split CAPEX/OPEX	På balancen
Besparelser pr. år	€ 400.000	€ 400.000	€ 400.000
Garanterede besparelser	€ 400.000	€ 400.000	€ 400.000
Investering	€ 1.000.000	€ 1.000.000	€ 1.050.000
Tilbagebetaling	2.5 år	2.5 år	2.63 år
Betalingsbetingelser	30-30-30-10 payment schedule during project.	30-30-30-10 (milepæle) ifm. projektet.	4 kvartalsvise betalinger á €260.000 fra installation af teknisk udstyr gennemført..
CAPEX/OPEX	100 % CAPEX. Udstyr overgår til kunden efter installation.	70/30 split CAPEX/OPEX. Udstyr overgår til kunden efter installation.	Mellem 100% og 50/50 split. Udstyr overgår til kunden efter installation.
Flerårs garanti	5% af besparelserne + 25 mandedage pr. år	5% af besparelserne + 25 mandedage pr. år	Inkluderet i investering (kan udelukkes)

# Finansierings modeller

Model	EnSave		EPC (1 år)	
Investering	CAPEX		Finansiel lease	Operating lease
Finansiering	100% CAPEX	% Split CAPEX/OPEX	På balancen	Ikke på balancen
Besparelser pr. år	€ 400.000	€ 400.000	€ 400.000	€ 400.000
Garanterede besparelser	€ 400.000	€ 400.000	€ 400.000	€ 400.000
Investering	€ 1.000.000	€ 1.000.000	€ 1.050.000	€ 1.050.000
Tilbagebetaling	2.5 år	2.5 år	2.63 år	2.63 år
Betalingsbetingelser	30-30-30-10 payment schedule during project.	30-30-30-10 (milepæle) ifm. projektet.	4 kvartalsvise betalinger á €260.000 fra installation af teknisk udstyr gennemført..	4 kvartalsvise betalinger á €260.000 fra installation af teknisk udstyr gennemført..
CAPEX/OPEX	100 % CAPEX. Udstyr overgår til kunden efter installation.	70/30 split CAPEX/OPEX. Udstyr overgår til kunden efter installation.	Mellem 100% og 50/50 split. Udstyr overgår til kunden efter installation.	100% OPEX. Ejerskab af udstyr forbliver ved SES indtil leasingperiodens udløb, hvorefter kunden får det tilbudt.
Flerårs garanti	5% af besparelserne + 25 mandedage pr. år	5% af besparelserne + 25 mandedage pr. år	Inkluderet i investering (kan udelukkes)	Inkluderet i investering (kan udelukkes)

# Finansierings modeller

## EnSave, EPC & Operating Lease



### Finansierings modeller

#### Til at dække forskellige behov:

- **EnSave:** 1-års garanteret besparelse og investering ifm projektet.
- **EPC:** Som EnSave men med mulighed for fler-årig garanti og betalt efterhånden som energibesparelser realiseres.
- **Operating Lease:** Som EPC men ikke på balancen og 100% OPEX for yderligere styrket cash-flow / EBIT

Model	EnSave	EPC	Operating Lease
CAPEX / OPEX	100% CAPEX	Split CAPEX / OPEX	100% OPEX
1. års garanti	Inkluderet	Inkluderet	Inkluderet
Fler-årig garanti	Ikke inkluderet	Inkluderet	Inkluderet
Finansiering	Ikke inkluderet	Inkluderet	Inkluderet

# Case

## Fra enten-eller til både-og

Finansiering gør kun business case'n bedre

Sund business case, maksimér potentialet

Sikkerhed for investering & besparelse

Høj forrentning af investeret kapital

Åben dialog

$2+2 = 5$

## Opsummering



# Tak for opmærksomheden

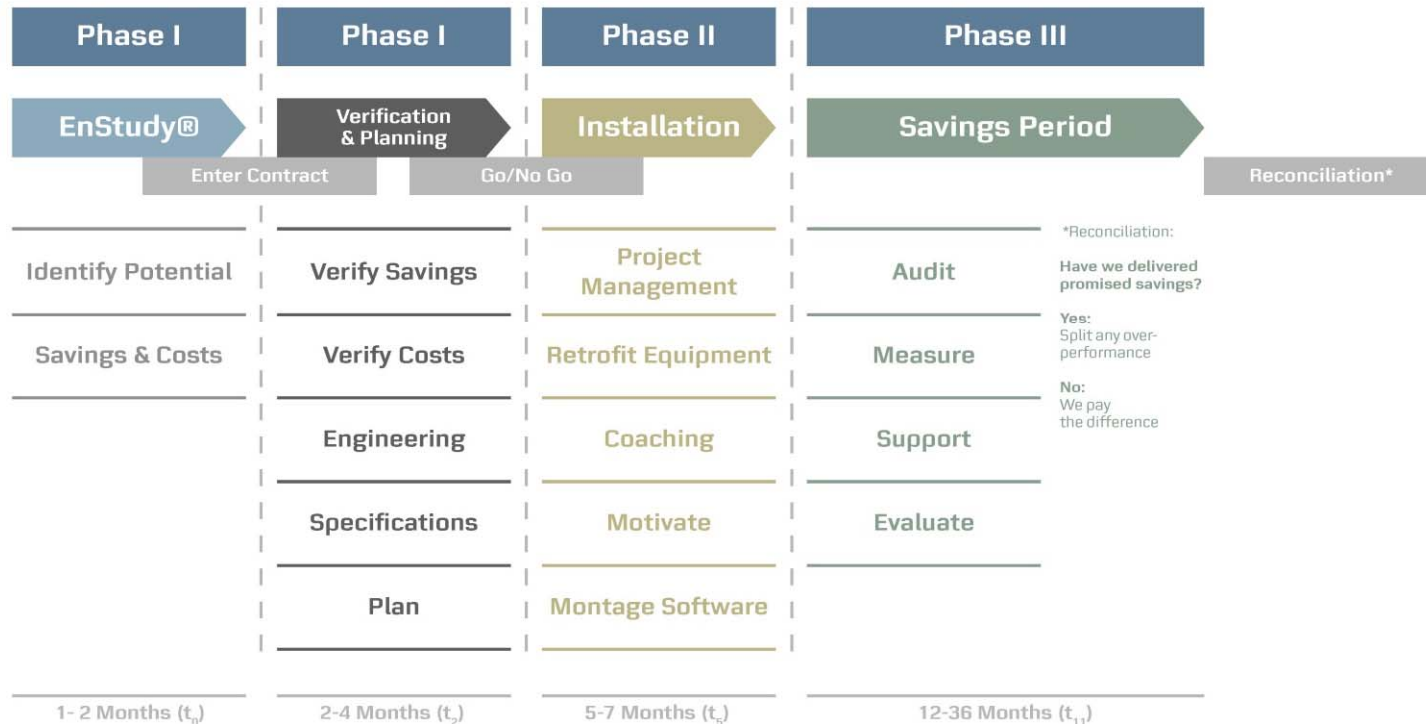
Jacob Mortensen  
Markedschef, Scanenergi Solutions A/S  
jrm@scanenergi.com  
+45 5171 8306  
www.scanenergi.com

# **BILAG**

## **Processen**

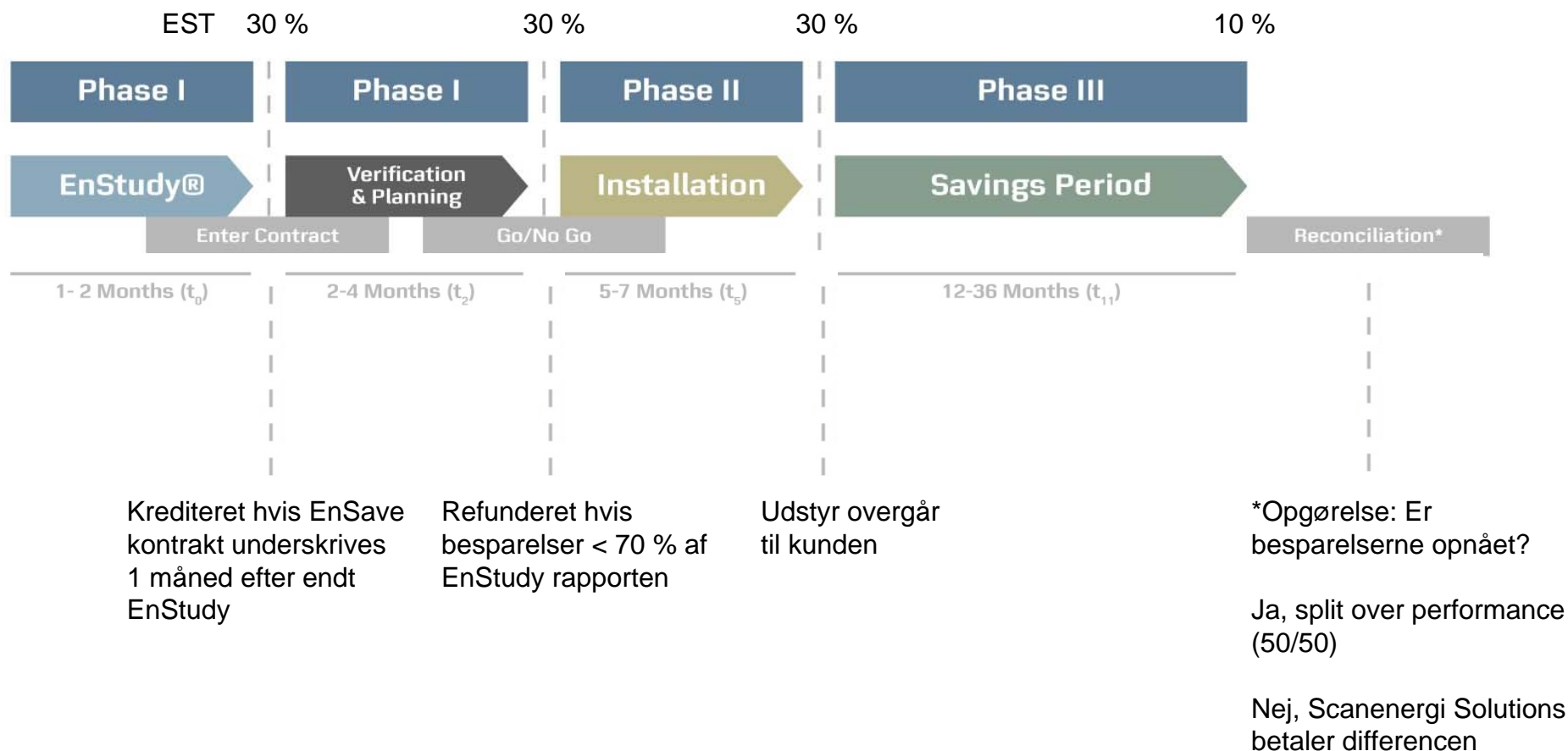
# Typisk EnSave process

## The EnSave® Programme



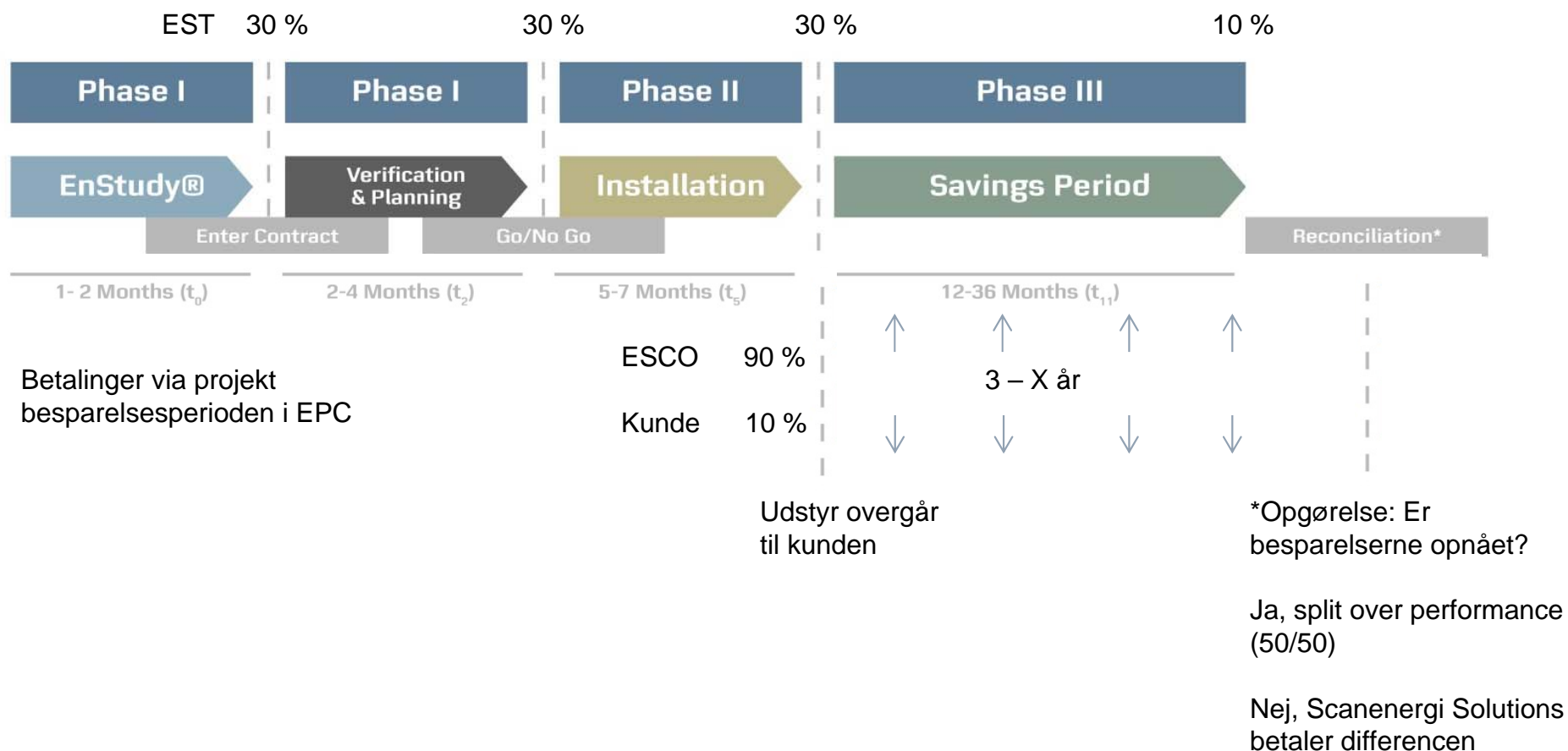
# Standard EnSave Model

## Betalingsplan



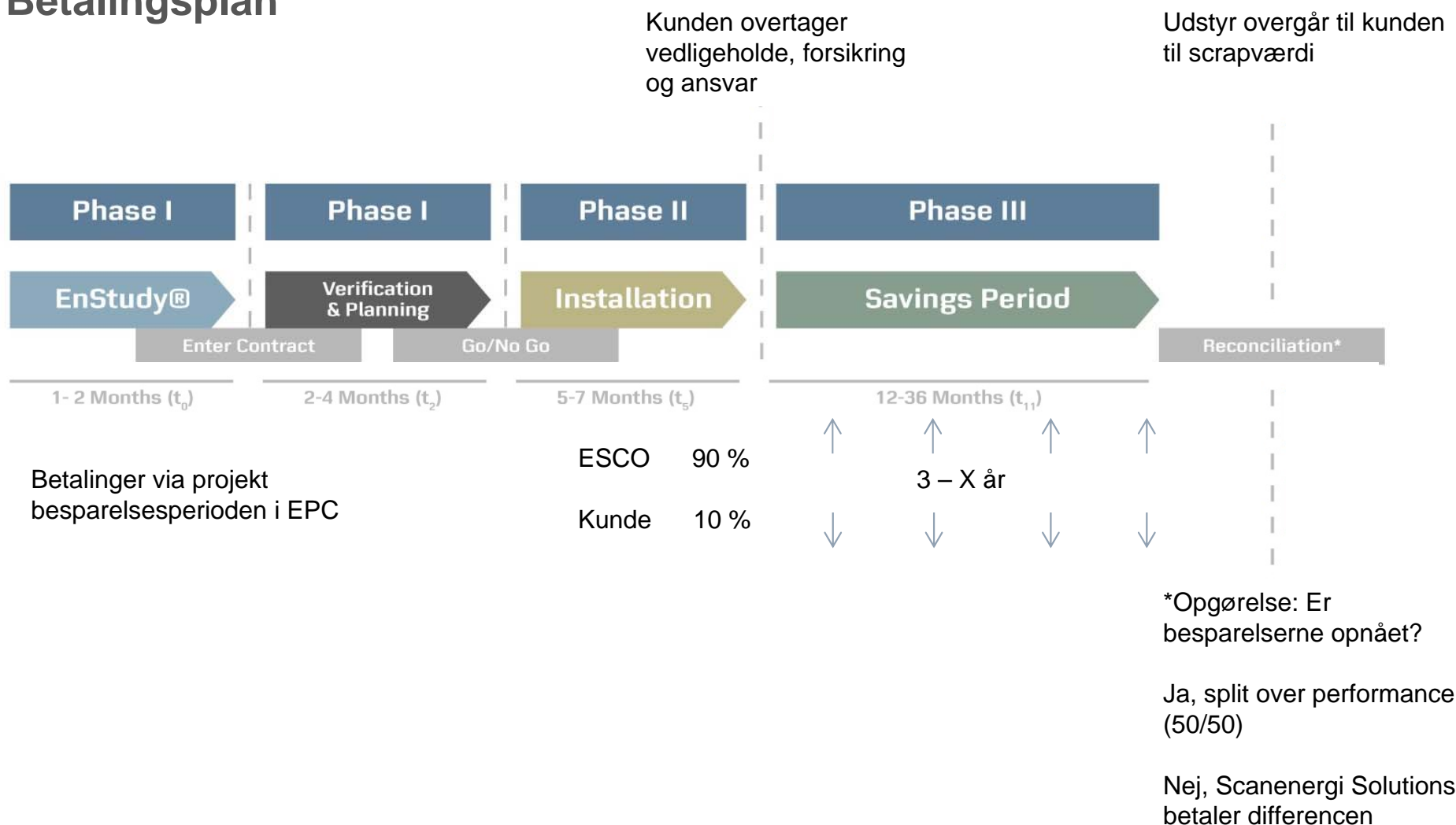
# EPC

## Betalingsplan



# Operating Lease

## Betalingsplan





# Green Tech Center Center of Excellence



**Green Tech Center**  
Smart Grid Living Lab

**Demonstration & Commercialization of Green Technology**

June 2014



**Green Tech Center**  
- International Smart Grid Living Lab

**Green Tech Center**  
Smart Grid Living Lab



Visionen er:

at skabe et center for udvikling  
af grønne teknologier – og hjælpe  
virksomheder på eksportmarkedet

# Triple helix samarbejde – et innovationssamarbejde med 3 vinduer

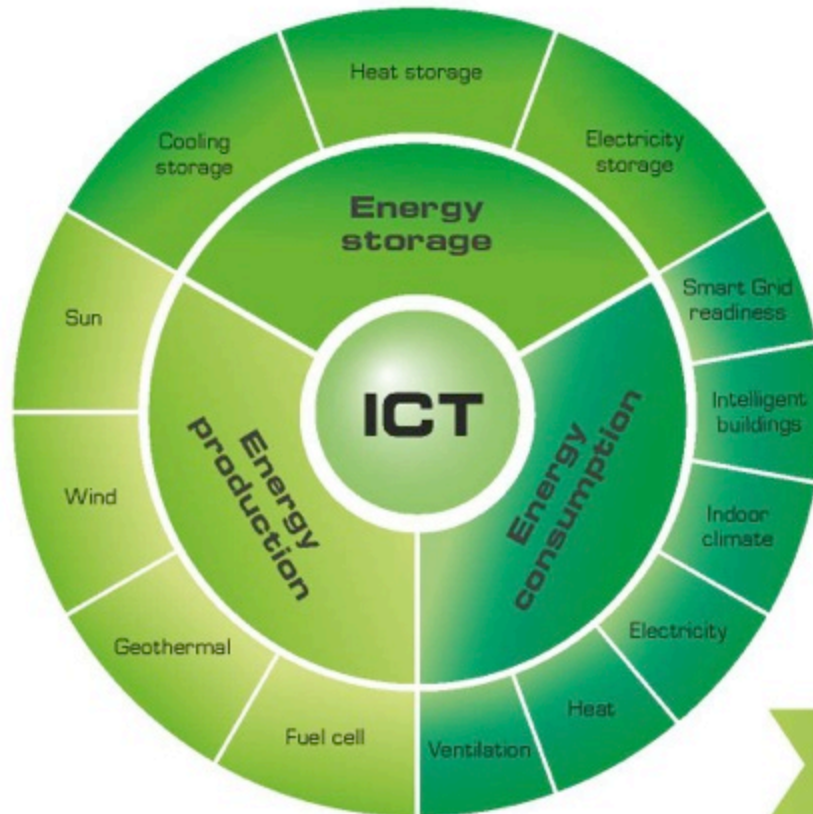
Det offentlige: Vejle Kommune	Det private erhvervsliv: Green Tech Centers virksomheder	Uddannelsesinstitutioner: Syddansk Universitet Via University College EAL m.fl
Offentlige indkøb Rammeudvikling Erhvervsservice Projekter	Special kompetencer Kommercialisering Projekter	Studerter samarbejde Projekter Uddannelse Phd

# Triple helix samarbejde – et innovationssamarbejde med 3 vinduer

Det offentlige: Vejle Kommune	Det private erhvervsliv: Green Tech Centers virksomheder	Uddannelsesinstitutioner: Syddansk Universitet Via University College EAL m.fl
Offentlige indkøb Rammeudvikling Erhvervsservice Projekter	Special kompetencer Kommercialisering Projekter	Studerter samarbejde Projekter Uddannelse Phd

# Green Tech Center Focus Areas

Our Smart Energy Wheel



## Concept

At Green Tech Center, you will find knowledge, development and entrepreneurship within the Smart Grid field – all in one place.

**Researchers and developers**

**Companies**

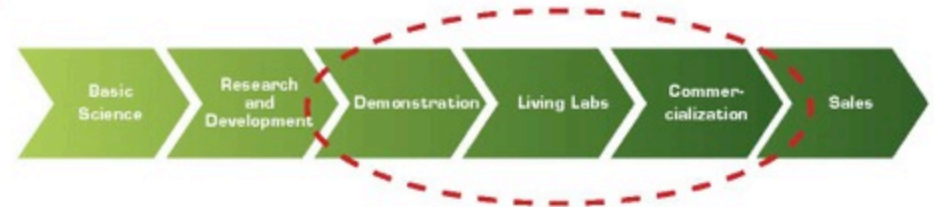
**Educational institutions**

**Networks**

**Entrepreneurship**

## Model

Green Tech Center helps to launch green technologies & services on the market.

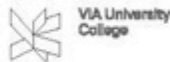


# Green Tech Center Partners

## Investors



## Research & Education



## Government Partners



## Utility Companies



## Networks & Clusters



## Companies



## Green Tech Center byggerierne

30 green  
companies and  
200 employees



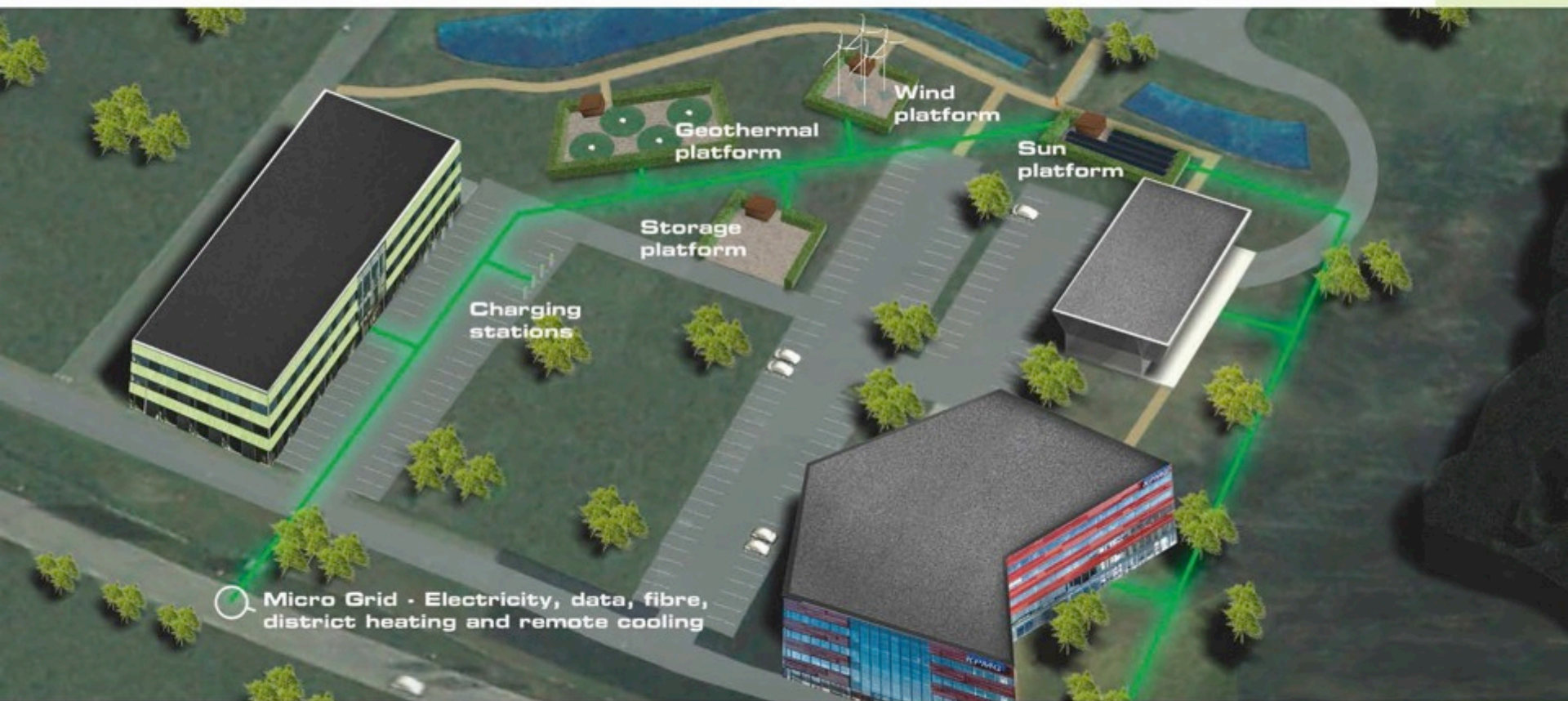
Prototype  
workshop,  
starts ups etc.



**Green Tech Center**  
Smart Grid Living Lab

# Energy Park with Testing & Demonstration Facilities

- Micro Grid Living Lab



16,000 m<sup>2</sup> energy park with integrated micro-energy infrastructure for electricity, data, fibre, district heating and cooling to ensure realistic testing and demonstration facilities for products and services in the Smart Grid systems of the future.

# Living Labs



## Green Tech Center

Online energy data from:

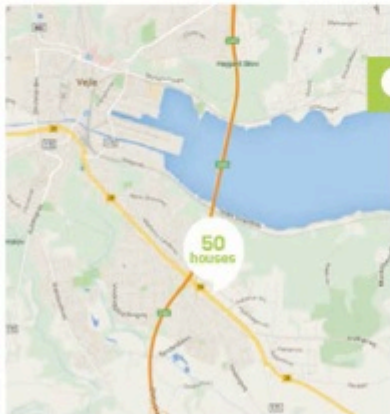
- Advice House (5,500 m<sup>2</sup>)
- Green Tech House (3,800 m<sup>2</sup>)
- Green Tech Lab (1,200 m<sup>2</sup>)
- Green Tech Park (16,000 m<sup>2</sup>)



## Business Living Lab

Online energy data from:

- Cooling warehouses
- Factories
- Storage building
- ect.



## Village Living Lab

Online energy data from  
a village of 50 houses



## City Living Lab

Our vision is to make energy data  
of the entire city of Vejle and its  
50,000 citizens available

<http://www.greentechcenter.dk/DK>

# Start Up Service

## Main Partners

Municipality of Vejle, Green Tech Center

## Target Groups

Start Ups and young companies

Spin-off companies, e.g. from universities, large companies etc.

## Services

Desk rental

Acquire a professional business plan

Comprehensive business analysis

Business model programme

Internationalization and go-to-market analysis

Mentoring and matchmaking programmes

Events and thematic meetings

## Admission

Parties with a keen interest in greentech

Businesses with growth potential

Interested in networking



**Green Tech Center**  
Smart Grid Living Lab



**Green Tech Center**  
Smart Grid Living Lab

# Networking

## Main Partners

CLEAN, Green Tech Center, University of Southern Denmark, IDA, Erhvervsakademiet Lillebælt, VIA University College, SDE College, Danish Energy Association, BRIC Denmark, Confederation of Danish Industry, State of Green, Green Network, Insero E-Mobility, NASA AMES, Berkeley University, Lawrence Berkeley National Lab, NYS Smart Grid Consortium

## Target Groups

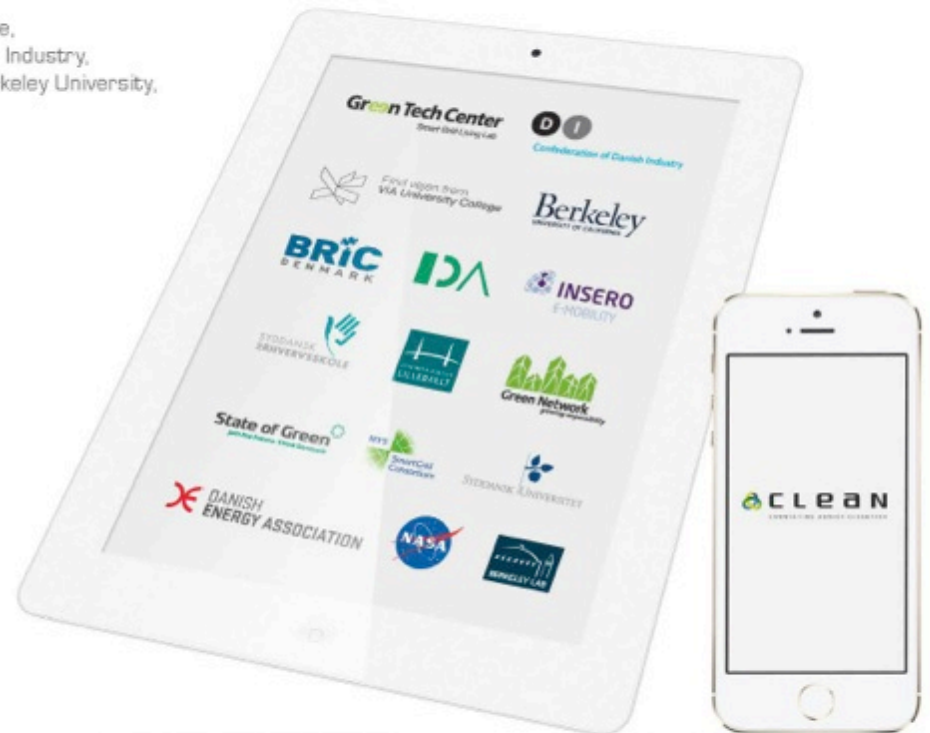
Business  
Universities  
Educational institutions  
Authorities

## Services

Free monthly newsletter  
Workshops and conferences  
Free access to BRIC Denmark  
Networking event  
Meet-and-greet with our partners

## Admission

For Green Tech Center tenants and partners



## Triple Helix Knowledge & Innovation

### ● Main Partners

CLEAN, Green Tech Center, University of Southern Denmark,  
IDA, Danish Energy Association, Erhvervsakademiet Lillebælt,  
VIA University College, SDE College, Municipality of Vejle,  
Confederation of Danish Industry

### Target Groups

- Business
- Universities
- Educational institutions
- Authorities

## Services

- Triple Helix projects
- Matchmaking
- Conferences
- Workshops
- Living Lab learning
- Knowledge sharing

## ● Admission

For Green Tech Center tenants and partners



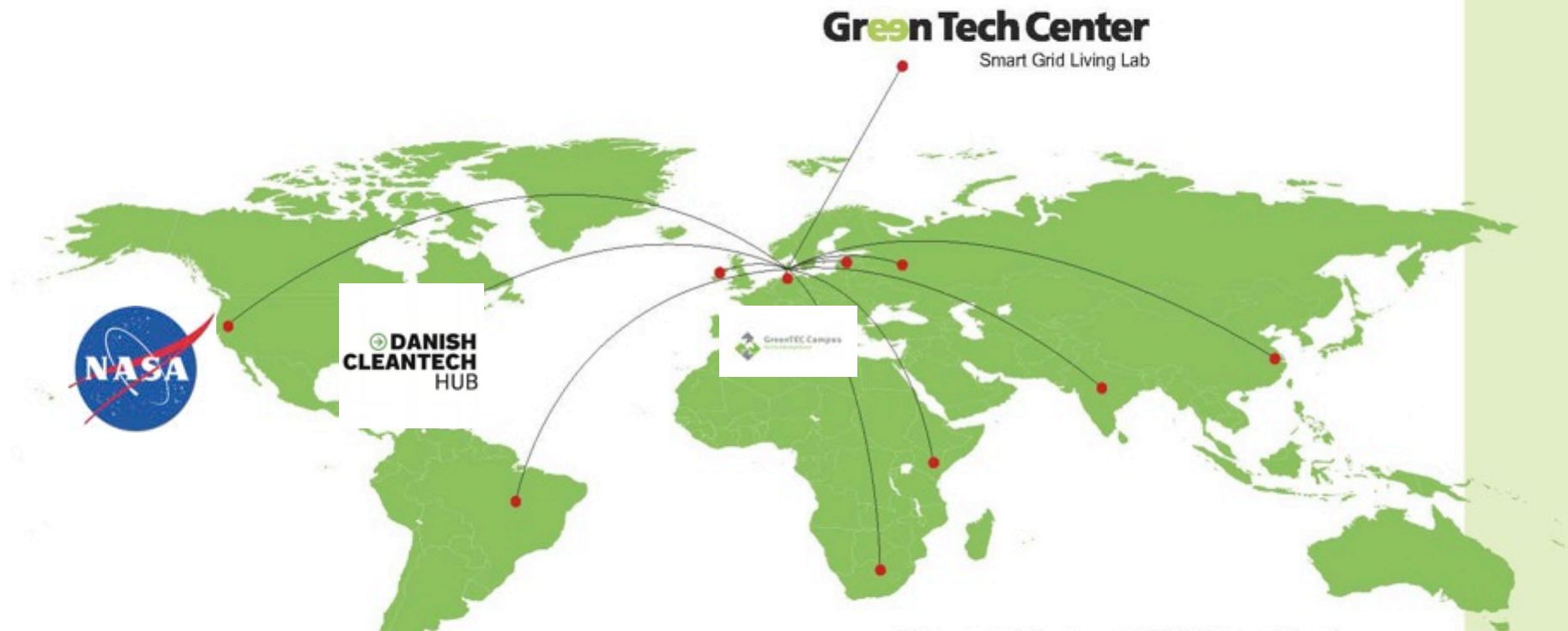
# Venture Capital



Via our network we are initiating conferences, workshops, matchmakings and individual meetings with investors and Business Angels to help new green technologies gain a foothold on the global market.

# International Platforms

## International Networks



**Green Tech Center**  
Smart Grid Living Lab

**DANISH  
CLEANTECH  
HUB**

**GreenTEC Campus**  
GreenTEC Campus

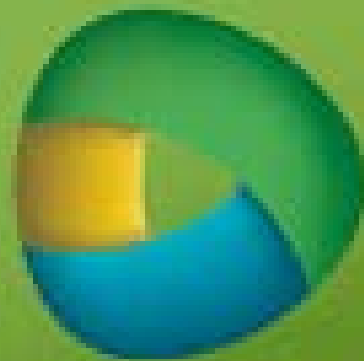


We are striving to establish international partnerships/platforms around the world in order to:

- Support sharing of best practices in the greentech field
- Help launch new technologies on new markets
- Support international research and projects

# Vejle – part of the 100 resilient cities





# RESILIENCE LAB DENMARK

ENERGY WATER DATA

AN INNOVATION COLLABORATION  
ON SUPPLY RESILIENCE  
IN THE CITIES OF THE FUTURE

PIONEERED BY:





## LIVE LAB CITY YEAR 2050

**1 SIMULATION OF VEJLE IN YEAR 2050**  
We intend to simulate the challenges and possibilities that the city of Vejle may face in 2050 as the result of a full implementation of the global energy and environmental objectives as well as the changes in population, data and climate that the city may expect in the next 35 years within the following fields:

► Energy      ► Water      ► Data

**3 SHOULD WE AIM AT PREVENTING OR MINIMIZING THE INCONVENIENCE OF THESE POTENTIAL INCIDENTS?**  
It is our intention to develop preventive solutions that could:

**2 POTENTIAL INCIDENTS IN THE CITY IN 2050:**  
On the basis of simulations of the expected circumstances in 2050 and in close cooperation with consumers, companies, authorities and organisations, we will identify the consequences of these potential future incidents divided into the following categories:

**4 TESTING & DEMONSTRATION OF SOLUTIONS IN THE LIVE LAB OF VEJLE**  
We aim to implement the solutions in either the entire city of Vejle or parts of it in order to assess the overall effect and the consequences based on one single holistic scenario which reflects everyday factors such as people, life, movements etc. in a realistic way.

# Green Tech Center Center of Excellence

Join  
the  
network

