



**ASIA CLEAN
ENERGY FORUM 2018**

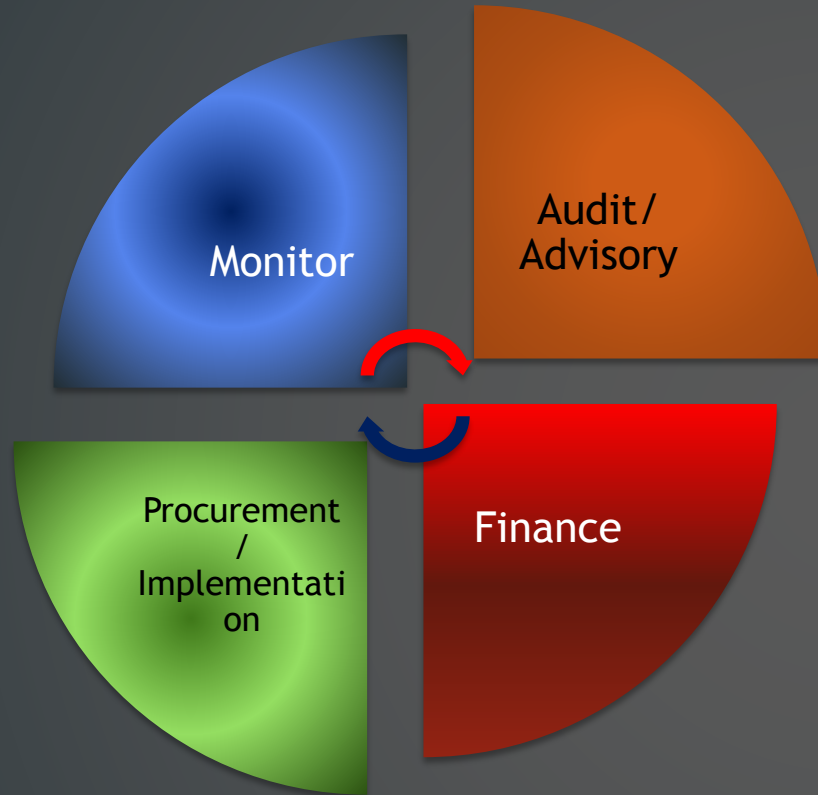
Manila, Philippines 4-8 June 2018

DANISH ENERGY EFFICIENCY PARTNERS

FIXED SAVINGS EPC CONCEPT - An Innovative EE model

4 - 8 JUNE 2018

EE INVESTMENT PORTFOLIO



- Danish Energy Efficiency Partners (**DEEP**) is founded by Danish Energy Management Group and the Danish Investment Fund (IFU) with funding from the Danish Climate Investment Fund (DCIF)
- **One stop shop** for design, implementation and finance of EE projects
- Investment size expected to reach **USD 100 Mill. over the next 5 years**
- Target: more than 1.5 Mill. sqm. of building area for the SEA region





Inspired by Danish Green Cities

- City of Aarhus, Denmark targets CO₂ neutrality by 2030
- Danish Energy Management undertakes retrofitting of 1 Mill. m² of public buildings in the city
- Planned investment Approx. USD 100 Mill. over the next 5 years in Aarhus alone
- Danish Energy Management manage project implementation in > 10 cities with investments of > USD 200 Million

CO2030
with
Aarhus
Danish for progress



INVESTMENT GRADE AUDIT



- Investment Grade Audit (IGA) needs to be carried out to ensure overall building load profile, equipment performance and savings potential.
- The audit will identify **areas for improvement** in all buildings and more importantly, set the **BASELINE** for potential energy savings calculation and **INVESTMENT** purposes.
- Only then, the overall savings profile can be estimated, calculated and presented.
- IGA will be tied through a **MoU**, between DEEP and building owner

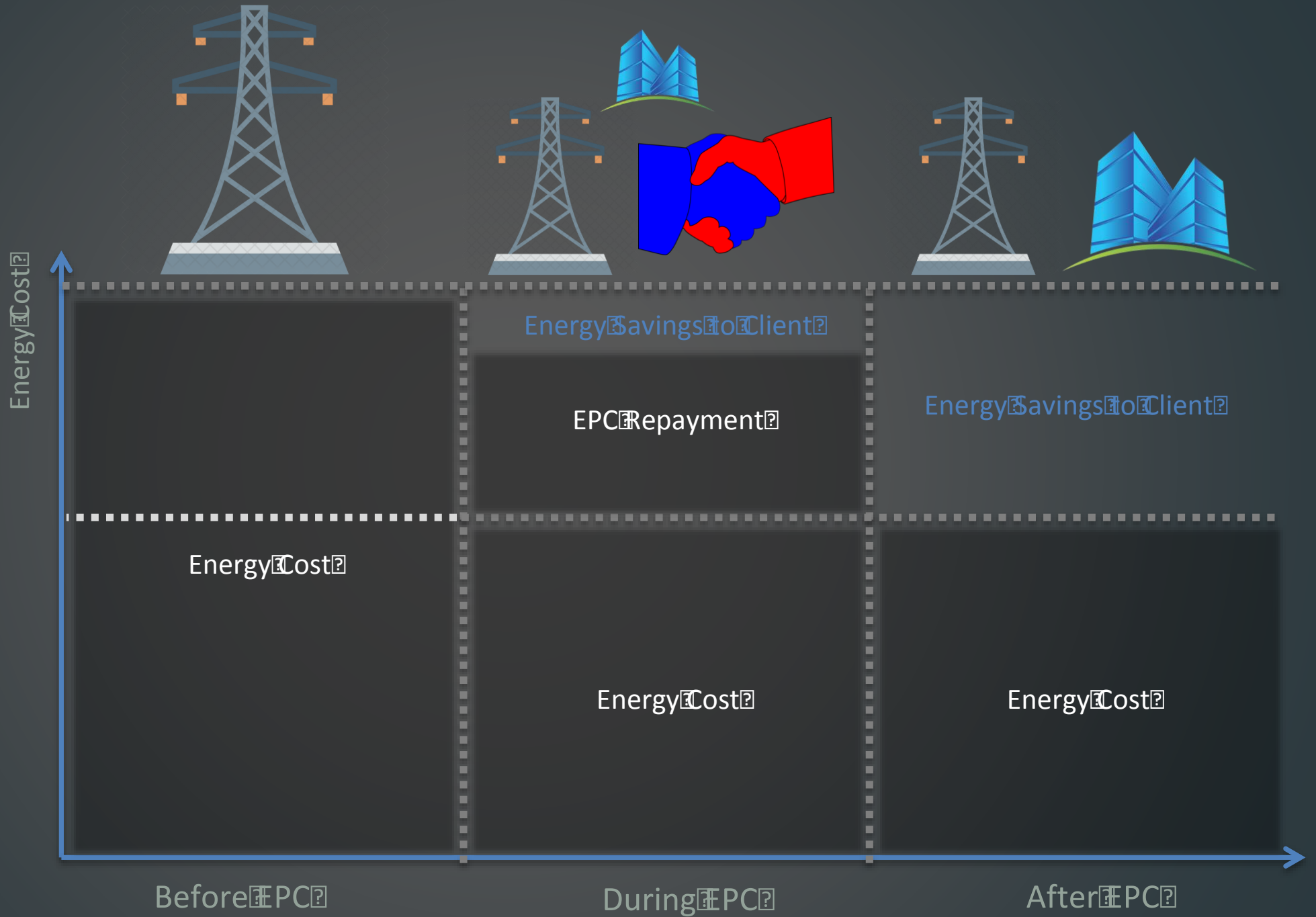
CORE CONCEPT OF

EPC

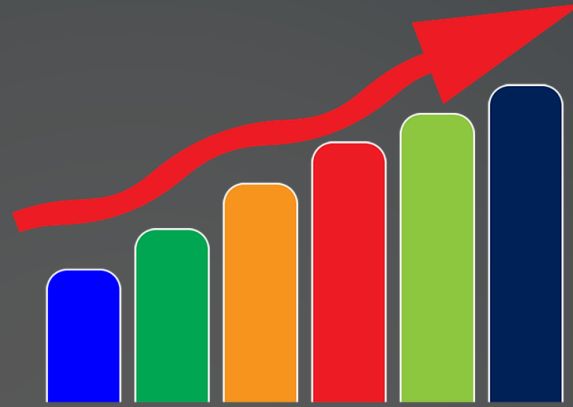


- Savings are calculated at the point of Testing and Commissioning, through **IPMVP methodology** and fixed for the remaining contractual period
- Monthly electricity bills can be used for guidance / cross-check
- Concept allows for energy efficiency measures that are **less attractive**, to be implemented as well
- Concept allows for buildings with very **little energy efficiency potential** (poor payback on investment), to be retrofitted as well
- Concept allows for **improvement in indoor climate conditions** - better cooling, better luminance, better air exchange
- **100% of investment from DEEP**

BASELINE, PROJECT AND POST-PROJECT



ADVANTAGES OF FIXED CONCEPT



- EPC fee is regarded as the repayment of the investment made in the buildings
- Fixed EPC fee ensures payments are “affordable” - since it is aligned to performance guarantee and actual savings on-site
- Fixed EPC fee ensures a structured way to budget for paying ESCOs
- Possible indexation of fee based on historical increase of electricity prices - to cover less attractive or feasible measures!

CORE CONCEPT OF EPC

Energy Performance Contract

Schedule B
Indicative
Energy Savings

Baseline Usage
X
Performance
=
Savings

Schedule C

Indicative
Payments

Contract signing
Pre-Implementation



Schedule E
Performance
Guarantee

Performance
Test

On-site

Factory

Installation and
Commissioning



Rev Schedule B
Final
Energy Savings

Baseline Usage
X
Performance
=
Savings

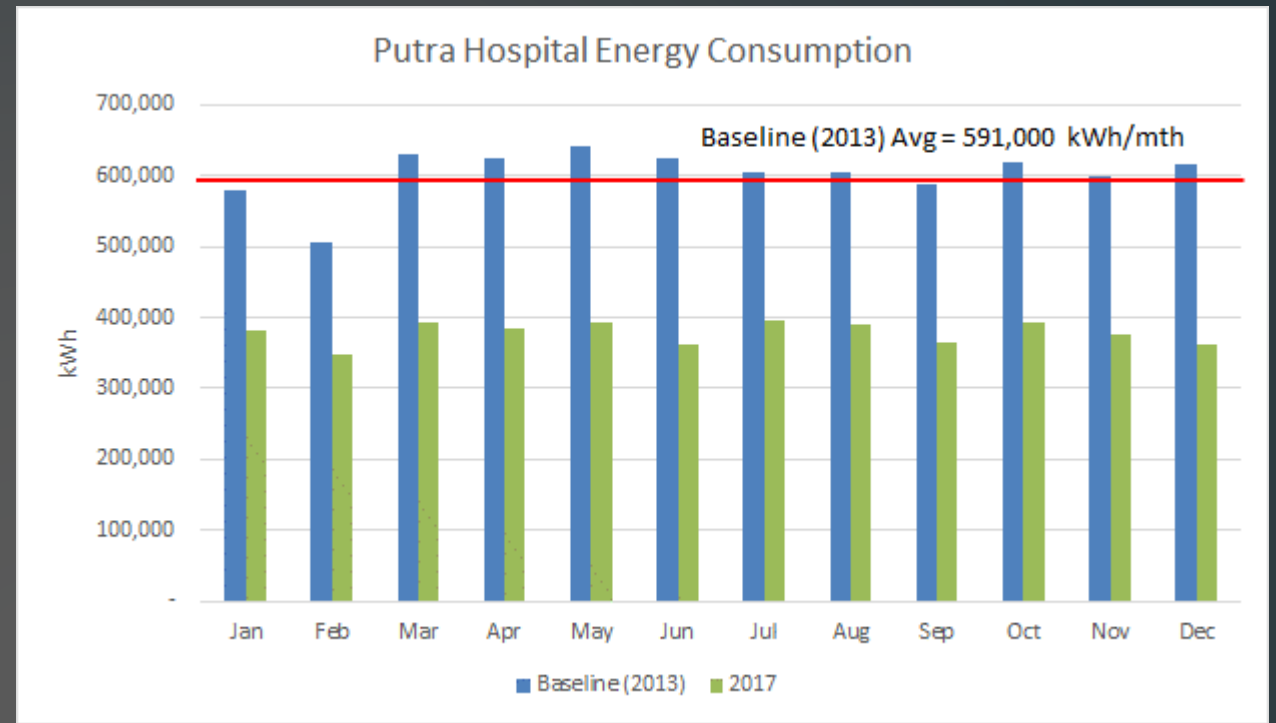
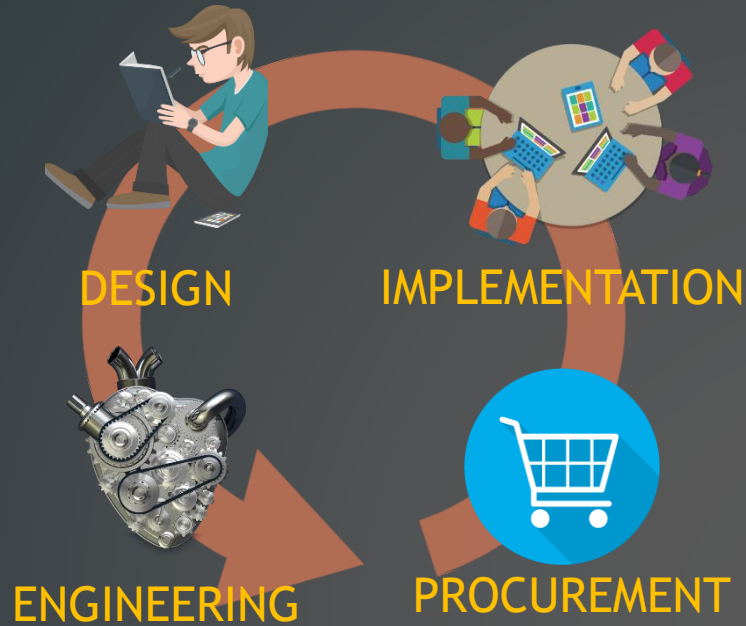
Schedule C
Final
Payments

Final Revised Contract
Post Installation

Steering Committee Meeting

Monitoring Activity

EXAMPLE CASE - HOSPITAL IN MALAYSIA



Energy efficiency measures included;

- Cooling system upgrade
- Air-side retrofit works
- Hot-water system redesign, installation and commissioning
- Lighting retrofit works
- Optimization of measures

EXAMPLE EE MEASURE



Danfoss Turbocor magnetic (mag-lev) intelligent compressors (3 units per chiller)

Flooded-type evaporator

Btu meter to calculate energy output from chiller

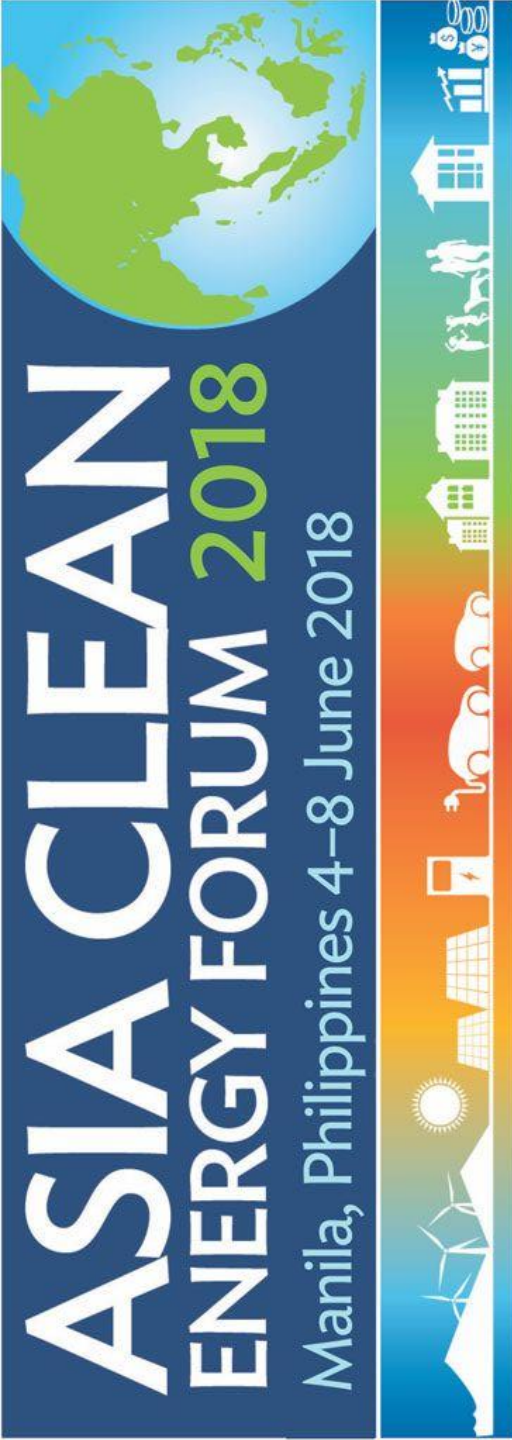
Danfoss economizer - to optimize performance at peak loads

2 units x 390 RT
Mag-lev, oil-free
Tested efficiency at 6.5 (full-load; 0.47 & 0.56)
Operating efficiency expected to be > 6.9
Project commenced: 21/03/2016
Project completed: 13/09/2016

Project Positives

- Increase in **lux** across all 3 buildings - at additional no cost!
- Increase in **thermal comfort** across all 3 buildings - ...
- **Cleaner systems** as an overall - better profiling of building!
- More **spares** and **less maintenance**
- Increase in **reliability and warranty**
- **Cloud monitoring system**, across most/all installations
- Increase in productivity and generate **positive behavioral change!**
- New asset, better value for lease and increase in **building value**
- **Reduction in CO2** emission and Greener operations!





Thank You and Regards



Danish Energy Efficiency Partners