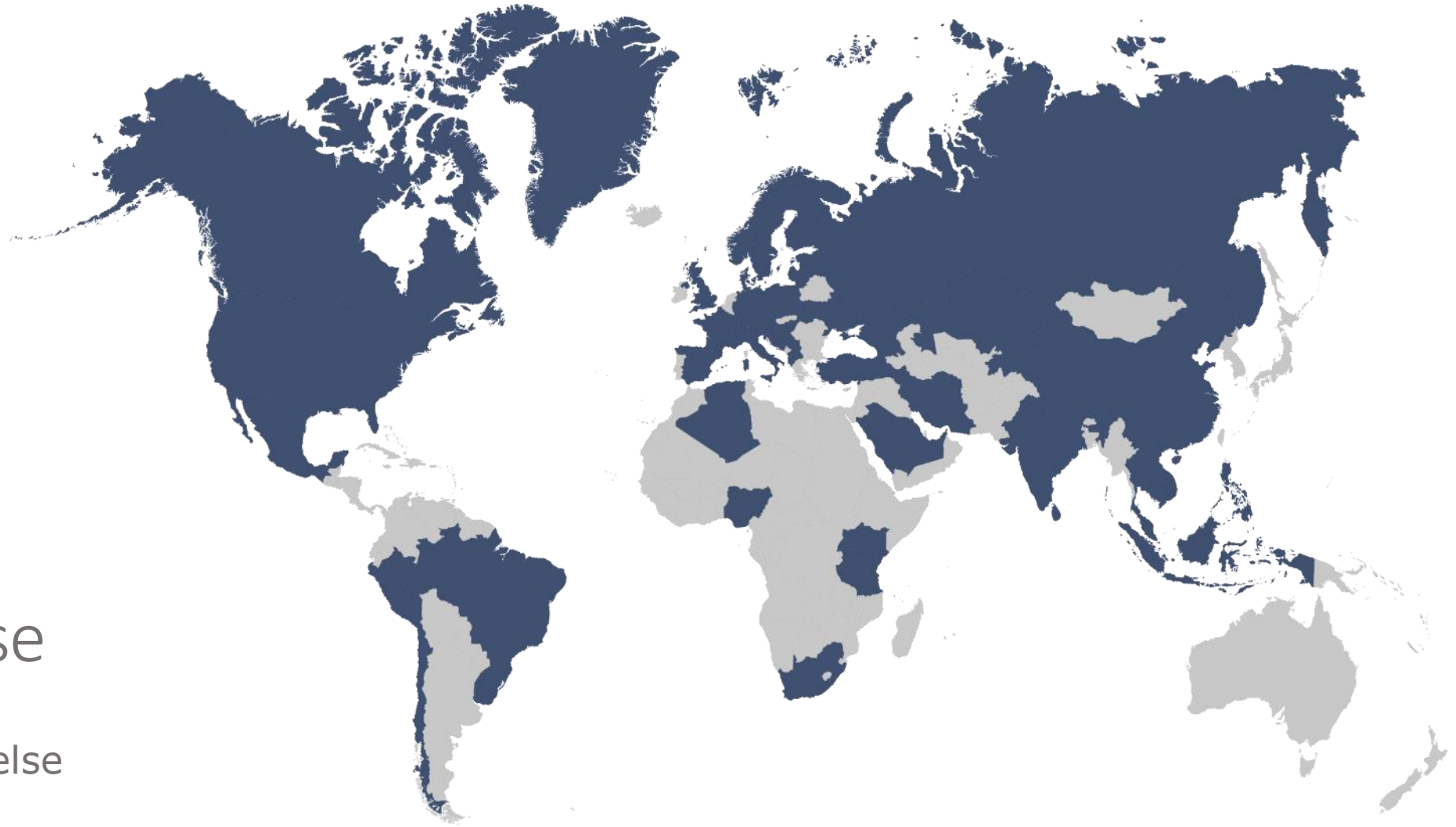
AFRY

Nordisk base med sterk global tilstedeværelse



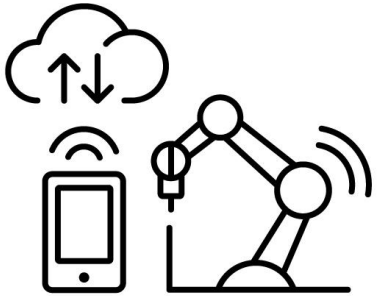
Vår tilstedeværelse

ADVANSIA
PART OF AFRY

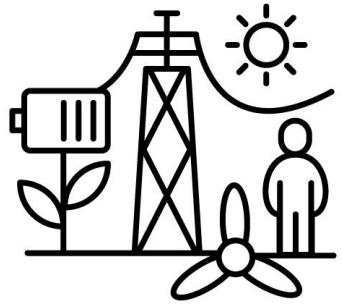
Våre løsninger ivaretar globale trender

SMART CITIES
AND INFRASTRUCTURE

FUTURE
MOBILITY

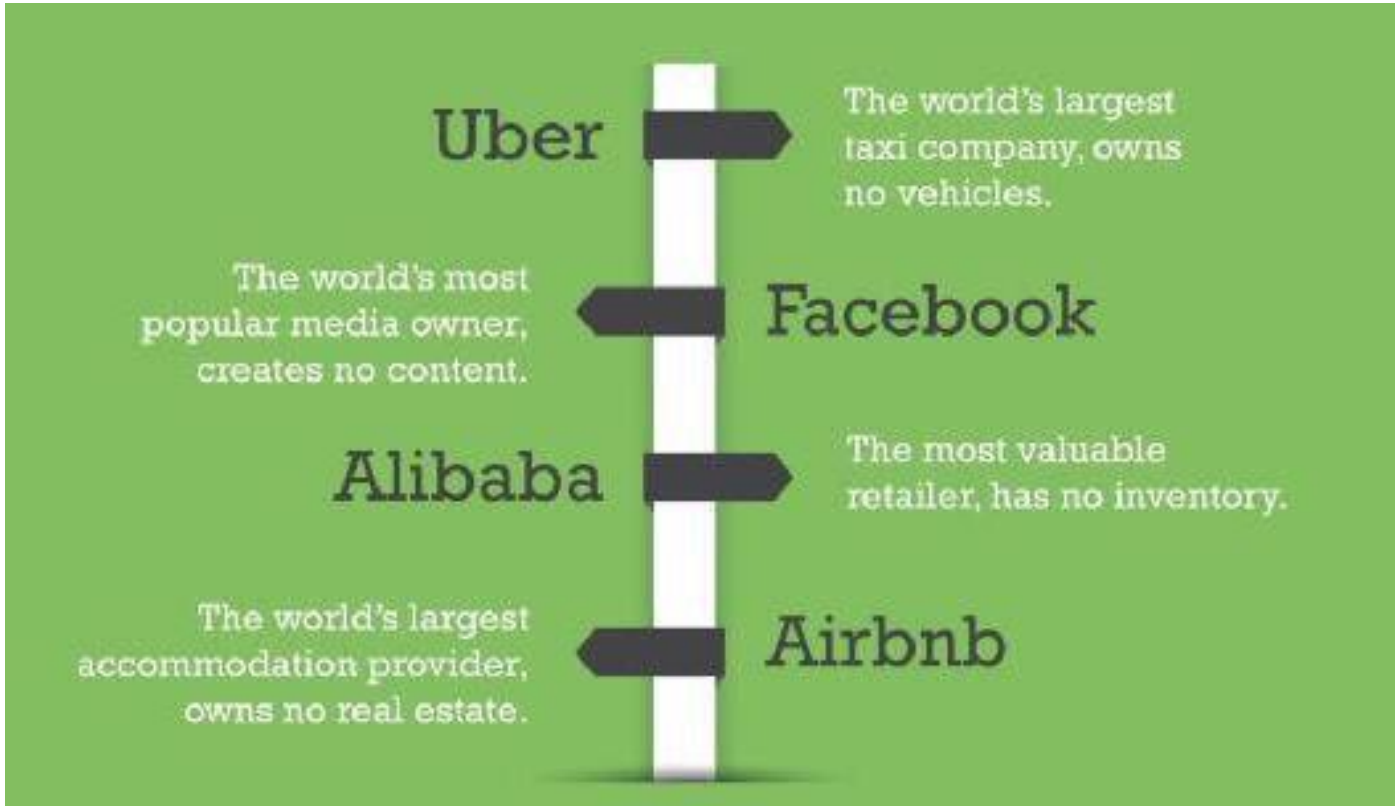


INDUSTRIAL
DIGITALIZATION



CHANGING ENERGY
MARKETS

Den enkleste måten å forutsi framtiden på, er å skape den!
-nest best er å tilpasse seg



Påstand:
70% av jobbene i 2040 er ikke oppfunnet ennå

ADVANSIA

Hvordan jobber vi ifm. bærekraft?

Definering av våre ambisjoner:

- AFRY: **Making Future**
- AFRY: **Leading solutions for generations to come**
- Hvem har vi på vårt lag; ansatte, kunder, samarbeidspartenere for å bidra til overordnede mål?

2020park Elnett21 BEYONDER TOOL THE OCEAN OPPORTUNITY LAB ROBOTIC INNOVATION

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Fokus – velge å ta en egen posisjon

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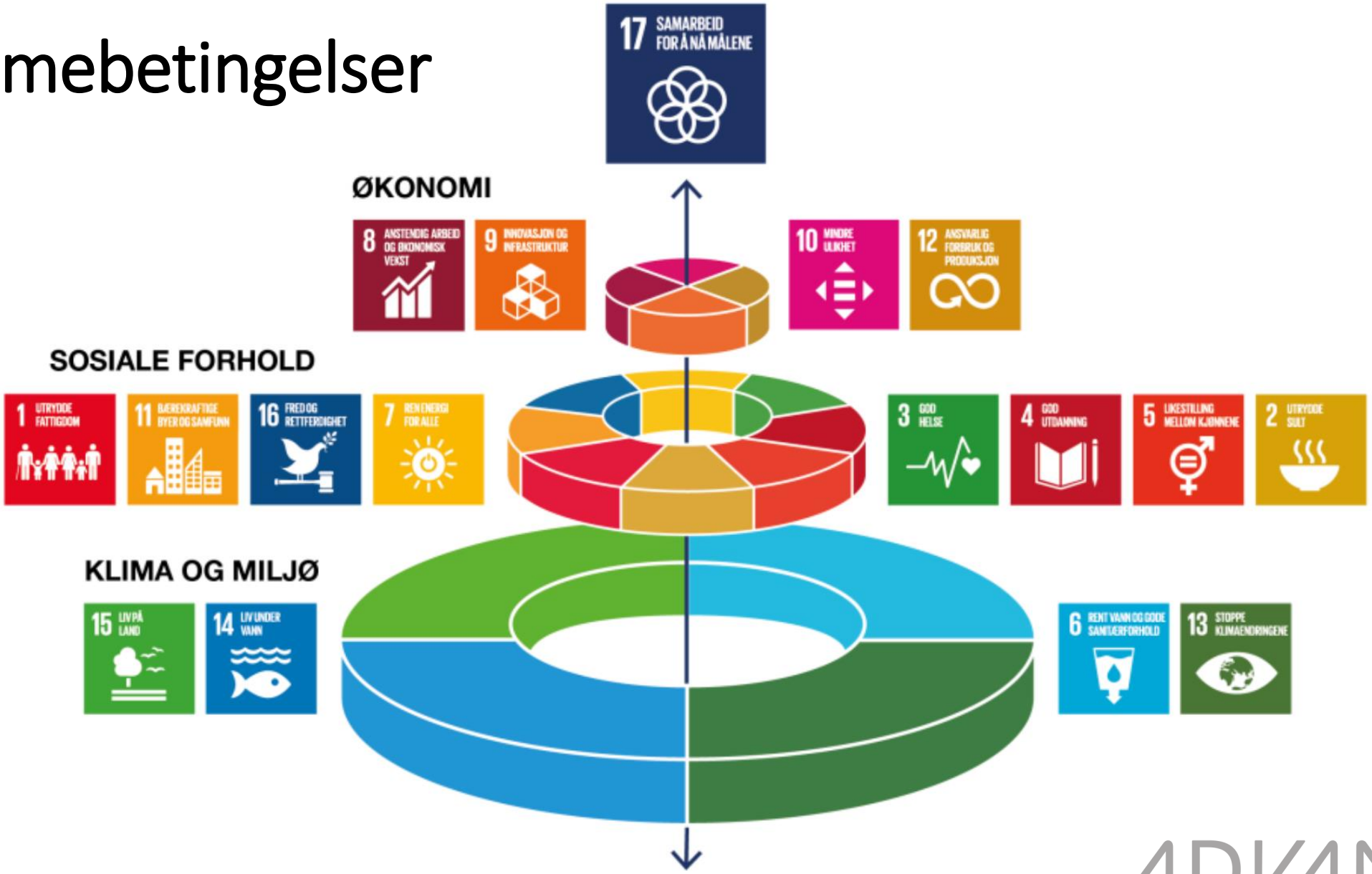
Rammebetingelser



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A goal without a plan is just a wish

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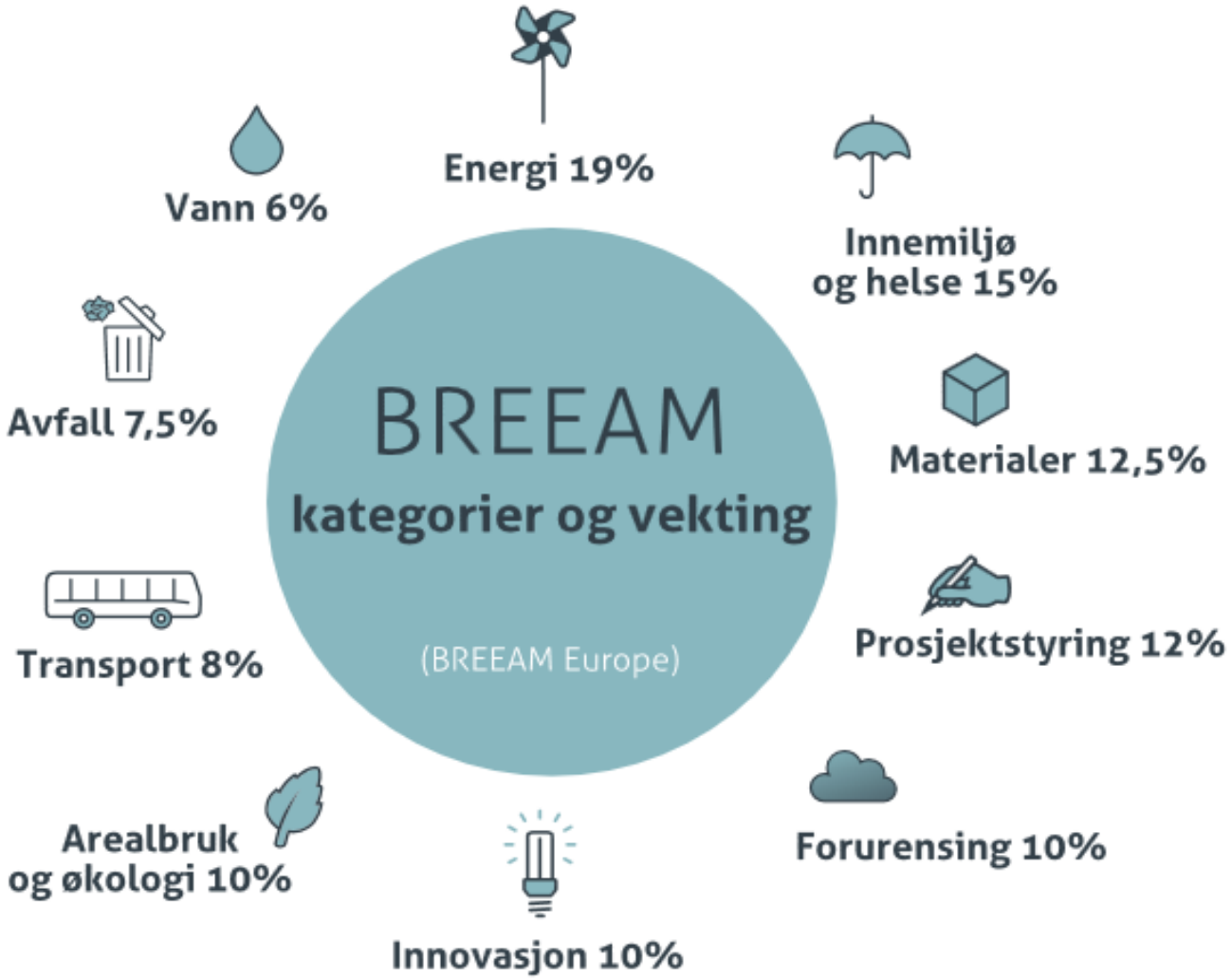
Viktige suksesskriterier i Forusparken, 2020park

1. Tydelige ambisjoner for Prosjektet co/Byggherren
2. Dyktige medspillere i kjerneteamet; Golder, DARK, Prosjektil og Sweco
3. Forankring av Prosjektmål i hver enkelt medarbeider og firma visjon (viktig øvelse)
4. Forankring i overordnede rammebetingelser øker suksesskriteriene

BREEAM – Building Research Establishment's Environmental Assessment Method

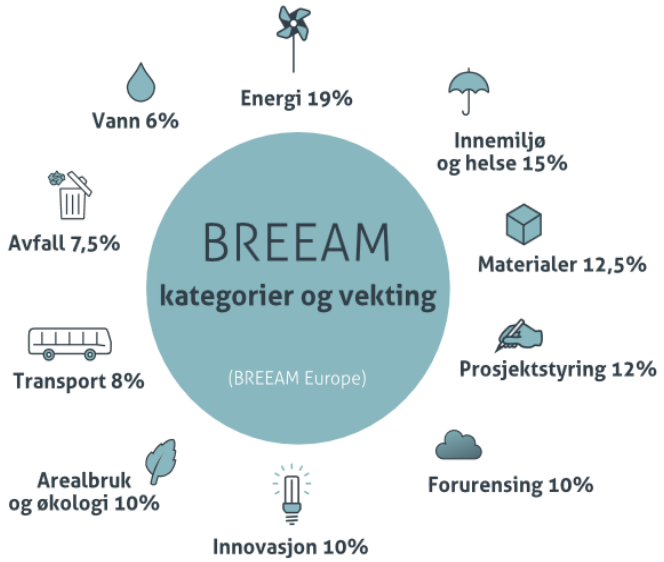


- Verdens eldste og mest brukte miljøklassifiserings-system (BRE, 1990)
- Klima- og miljøambisjoner
- Dokumentasjon av tiltak jf 11 av FNs bærekraftmål

ADVANSIA

BREEAM Communities

- 3 steg (interim sertifisering = steg 1)
- 5 hovedområder
- 10 kategorier
- 40 emner – vektet – noen teller mer enn andre



Step 3
Designing the details

Step 2
Determining the layout

Step 1
Establishing the principles

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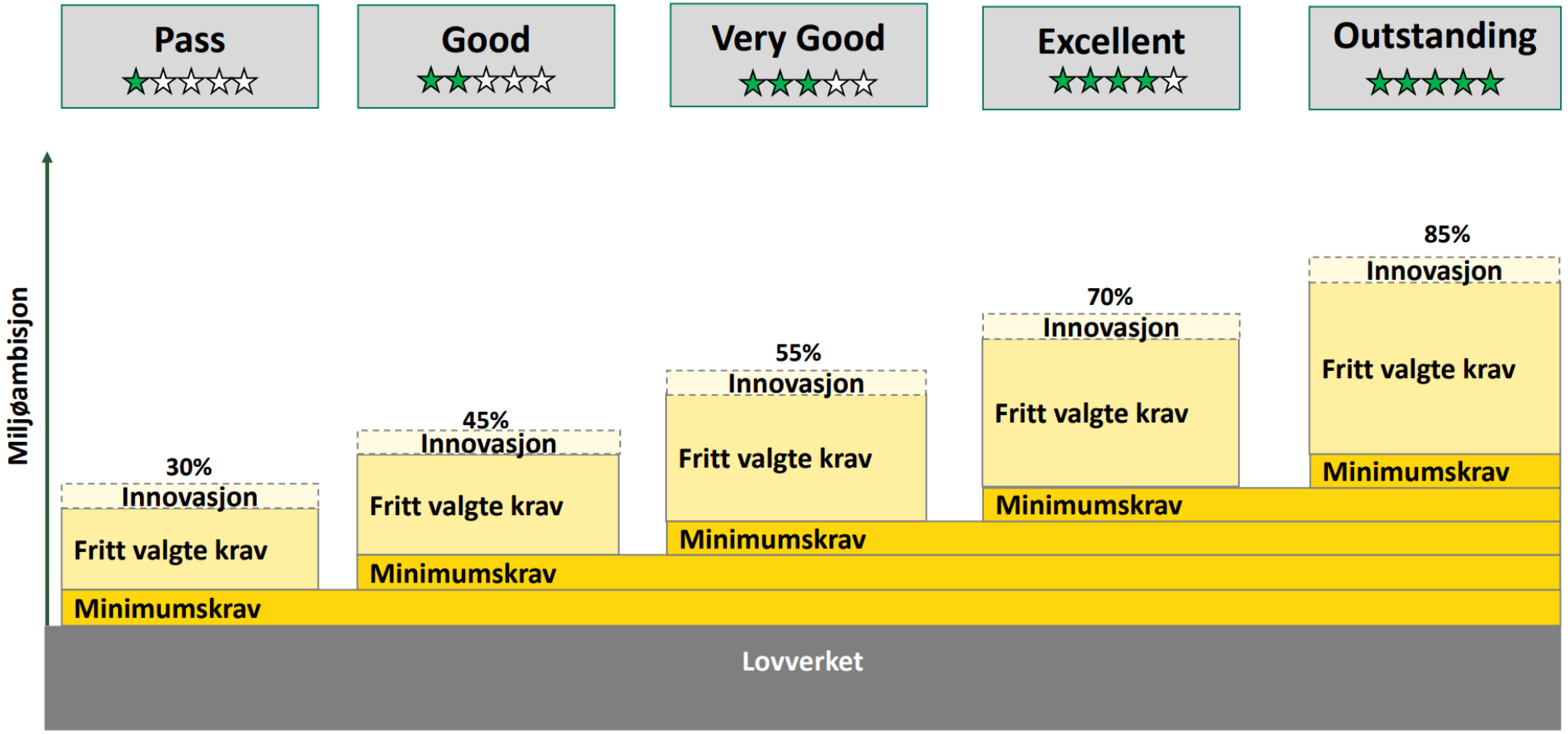
BREEAM – Building Research Establishment's Environmental Assessment Method

Man kan velge det nivået som passer prosjektet



Fra arealplanlegging til samfunnsbygging

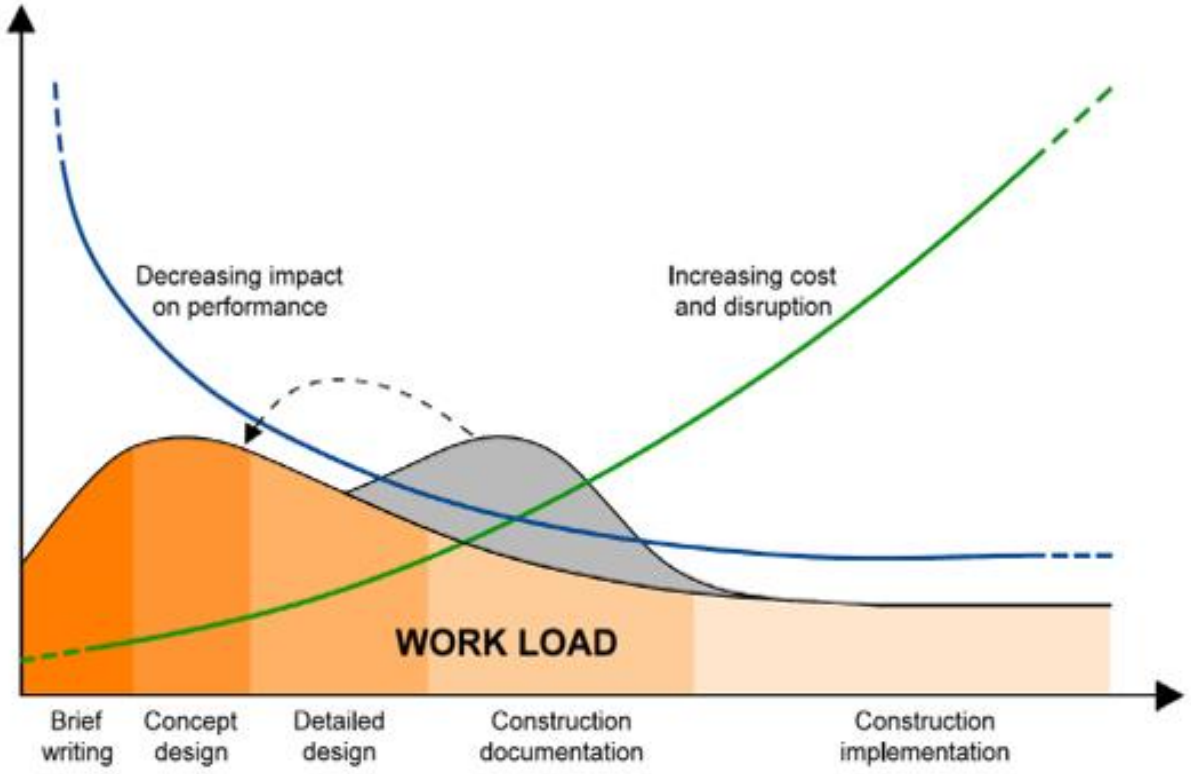
- Valg om sertifisering bør tas tidlig; innen oppstartsmøte og planvarsel
- Kan miste mange poeng som kanskje var enkle å ta grunnet tidsaspekt og rammeverk
- Ikke komplett sammenfallende med norske krav og prosesser
    - Koordinator må holde kontroll på forskjeller og ekstra krav
    - Basert på norske reguleringskrav, er det mulig å nå en «pass» uten å gjøre mer enn bekrefte forhold i reguleringsplanen. **Dette er en god kick-start på sertifiseringen!**

Dokumentasjon

- Omfattende dokumentasjonskrav tidlig – utover myndighetskravene i norsk planprosess

- Større kostnadspådrag tidlig - dette må kunne håndteres finansielt av BH
  - Ikke større kostnader til slutt

- Kostnadskontroll underveis
- Støtte- og tilskuddsordninger



Eksempel på 1 av 40 emner BC

Alt dette skal svares ut og godkjennes, som tillegg til reguleringsarbeidet og -dokumentasjon:

Compliance Notes

RE 01 – Energy strategy

Step	Category	Mandatory standards	No. of credits available
1	Resources and energy	Yes (criterion 1)	11

Aim

To recognise and encourage developments designed to minimise operational energy demand, consumption and carbon dioxide emissions.

Assessment Criteria

The following is required to demonstrate compliance:

Mandatory requirements

1. An energy strategy has been written for the proposed development by an energy specialist.

One to ten credits

2. Criterion 1 is achieved.
3. The developer commits to implementing recommendations in the energy strategy that will result in a reduction in carbon dioxide emissions associated with baseline energy demand. Credits are available for the following percentage reductions:

Credits	Reduction in CO_2 emissions
1	3.6%
2	9.9%
3	17.7%
4	26.7%
5	36.9%
6	47.9%
7	59.8%
8	72.5%
9	85.9%

rategy should include the following as a minimum:
tion of the baseline energy demand and associated emissions for a
Regulations Part L compliant development calculated using approved
Regulations compliant energy modelling software and other
g to cover site-wide consumption. This should include:
- a breakdown of the site wide heating, cooling and electricity demand
- emissions for both regulated and unregulated energy use
- emissions associated with street lighting and other electrically powered street furniture

endations for reducing energy use and associated emissions beyond levels through implementation of energy efficient measures
g:
- site layout
- use of topography
- shading
- solar orientation
- use of daylighting
- wind management
- use of natural ventilation.

unities to further reduce emissions through the use of decentralised ncluding:
- connection to existing or future heat distribution networks
- installation of site wide communal heating and cooling networks
- utilisation of combined heat and power (CHP) systems, including any opportunities to extend beyond the site boundary

Ref	Terms	Description
		based on the National Calculation Methodology (NCM) for non-domestic buildings. Unregulated emissions should be established using BREDEM (BRE Domestic Energy el) or similar methodology for Dwellings and using CIBSE guidelines (CIBSE e F) or other established industry benchmarks for non-domestic buildings. lations will be required for non-building related energy usage such as street ng.
		ssions through the installation of local (on- (LZC) energy sources including details of m LZC energy source
		re included as part of the development, the installation of low or zero carbon nologies can be used to offset emissions arising from regulated and gulated energy consumption. The LZC technology can be installed on-site, -site (which includes dedicated renewable energy generated near to the site is provided for all or part of the community). e.g. decentralised energy eration linked to a community heat network or renewables connected via a ite wire arrangement or off site via the provision of accredited external wables (see CN6).
		heat/electricity from the system impact of the potential specification in sions opriate to the site and energy demand of C sources will be integrated with and posed decentralised energy networks other technologies ngs resulting from energy efficient design energy and the installation of LZC energy
		he purpose of this BREEAM issue accredited external renewables are wable energy schemes located off-site, but within the UK, which: Are accredited renewables (as defined by the Energy Act 2004). These will be Renewable Energy Guarantee of Origin (REGO) certified Create new installed generation capacity, designed to meet the loads of the development (i.e. not just units of carbon) Provide additional capacity to that already required under the Renewables Obligation
		or a recognized qualification for and installations of low or zero carbon any low or zero carbon technology or
		e time of writing, BRE Global are not aware of a mechanism for accrediting off- enewables and therefore of any renewable energy schemes that meet the e definition; though some ESCOs may achieve these criteria. BREEAM definition of 'Accredited External Renewables' differs from and should e confused with the term 'Allowable Solutions'. The term Allowable Solutions s part of the proposed Zero Carbon definition for buildings. Furthermore t constitutes an 'Allowable Solution' is not yet defined (at the time of writing). an official definition of Zero Carbon and Allowable Solutions is confirmed by rnment for non domestic buildings, BRE Global will advise accordingly on the ribution of Allowable Solutions toward achieving the BREEAM 'credits'.
		ction of the baseline energy demand and ations Part L compliant development ations compliant site-wide energy ergy demand and associated emissions e approach to non-regulated energy uses. vailable to simulate and report upon the ated carbon emissions of new ign process. These help to forecast the built as well as the output of the various energy solutions proposed. Please contact BRE Global when selecting an approved energy model for the project. Calculations for regulated building energy consumption may also be performed using draft figures from SAP and SBEM ratings (these can be obtained by modelling a number of representative building types based on a developer's standard specification or by using existing ratings already calculated for existing developments with similar building types.
		nologies eligible to contribute to achieving the criteria of this issue must luce energy from renewable sources and meet all other ancillary requirements efined by Directive 2009/28/EC of the European Parliament and of the Council 3 April 2009 on the promotion of the use of energy from renewable sources amending and subsequently repealing directives 2001/77/EC and 3/30/EC (www.eur-lex.europa.ue/). following requirements will be met: Where not provided by accredited external renewables there must be a direct supply of energy produced to the development under assessment. Where covered by the Microgeneration Scheme (MCS), technologies under 50kWe or 45kWth must be MCS (or equivalent) certified products installed by MCS (or equivalent) certified installers. Combined Heat and Power (CHP) schemes above 50kWe must be certified under the CHPQA standard.
CN4	Baseline Energy Demand. See criterion 1	The energy strategy must include a prediction of the baseline energy demand. This should include both regulated emissions and emissions not covered by Building Regulations (unregulated emissions). The baseline regulated emissions should be based on the Target Emission Rate (TER) calculated through the Approved Building Regulations SAP methodology for dwellings, and calculated through the Approved Building Regulations methodology

GOLDER

2020 PARK

COVER LETTER OF APPENDIX TO BREEAM COMMUNITIES REPORT

Credit-ID	RE 01	Technical manual version: SD202 - 1.1: 2012
Prepared by	Tiril Jeanette Seldal, Sweco Norge AS	Energy advisor
Date	Assessment stage	Bespoke criteria?
27.06.2018	Interim	Yes
Mandatory requirement met? (if any)	Maximum points available	Expected points
x Yes □ No □ N/A	11	4-6

Description of conformity with the assessment criteria:

Mandatory requirement
1.An energy strategy has been written by an energy specialist.
An energy strategy, "RE01 – Energistrategi" is made by an energy specialist. Only the mandatory requirements are met in this stage.

One to ten credits
2. Criterion 1 is achieved.
3. The developer commits to implementing recommendations in the energy strategy that will result in a reduction in carbon dioxide emissions associated with baseline energy demand. Credits are available for the following percentage reductions:

Credits	Reduction in CO2 emissions
1	3.6%
2	9.9%
3	17.7%
4	26.7%
5	36.9%
6	47.9%
7	59.8%
8	72.5%
9	85.9%
10	100%

Eleven credits
4. Criterion 1 is achieved and the development is 'carbon neutral' (receiving 10 credits above).

5. The developer commits to implementing recommendations in the energy strategy that will result in a 'carbon negative' development (see Additional Information section).

P:\626\98055041 2020PARK reguleringsarbeid\07 Beregninger\RIEne RE01 - 1

on
at from a proc
of this BREEAM
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other LZC tech
sibility study a
e local authorit
eting its annu

ear or onsite facility is connected to the development, via a private wire angement, which is demonstrably removing materials that are re-usable d recyclable to prevent their incineration.

current uncertainty over their impact on biodiversity, global food on and greenhouse gas savings, plus the ease of interchangeability fossil fuels, BREEAM does not recognise or reward building systems first generation biofuels manufactured from feedstocks e.g. biofuels manufactured from sugars, seeds, grain, animal fats etc. BREEAM will recognise systems using second generation biofuels (biofuels from lignocellulosic biomass feedstock using advanced technical processes) or biofuels manufactured from biodegradable waste materials e.g. biogas, or locally and sustainably sourced solid biofuels e.g. woodchip, wood pellets where these are not interchangeable with fossil fuels or first generation biofuels.

AFRY PART OF AFRY

BREEAM Community vs. reguleringsplan

- 15 av totalt 40 emner i BC sammenfaller og **kan** oppnås i sin helhet innen standard norsk planprosess – dette ref komparativ analyse utført av Rambøll (grønne ref figur under) = Da kan man få en karakter som «pass».
- Det krever dog ekstra innsats i form av arbeid med dokumentasjon og redegjørelser som skal illustreres i form av eksempel på emnedokumentasjon i senere slide
- For å få poeng for gule og røde emner øker innsatsen betraktelig = karakter over nivå «pass»

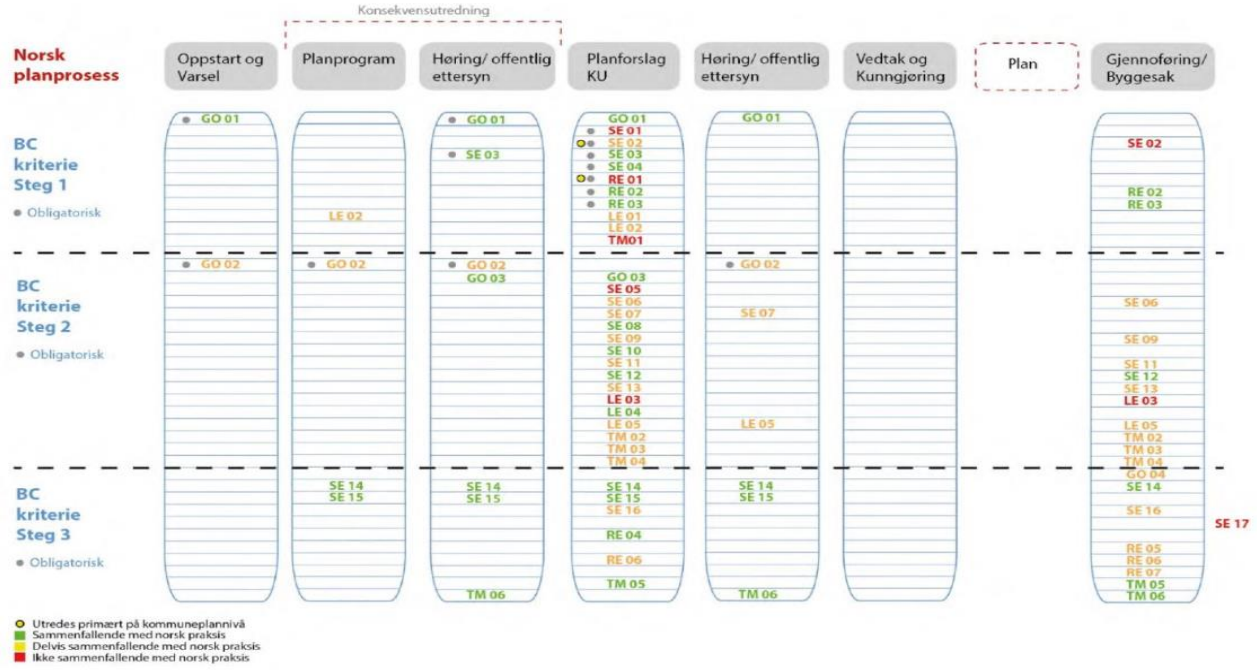

Table - 1 : BREEAM Communities 2012 steps, categories and assessment issues

Step 1	Step 2	Step 3
Governance		
GO 01 – Consultation plan	GO 02 – Consultation and engagement GO 03 – Design review	GO 04 – Community management of facilities
Social and economic wellbeing		
SE 01 – Economic impact SE 02 – Demographic needs and priorities SE 03 – Flood Risk Assessment SE 04 – Noise pollution	SE 05 – Housing provision SE 06 – Delivery of services, facilities and amenities SE 07 – Public realm SE 08 – Microclimate SE 09 – Utilities SE 10 – Adapting to climate change SE 11 – Green infrastructure SE 12 – Local parking SE 13 – Flood risk management	SE 14 – Local vernacular SE 15 – Inclusive design SE 16 – Light pollution SE 17 – Training and skills
Resources and energy		
RE 01 – Energy strategy RE 02 – Existing buildings and infrastructure RE 03 - Water strategy		RE 04 – Sustainable buildings RE 05 – Low impact materials RE 06 – Resource efficiency RE 07 – Transport carbon emissions
Land use and ecology		
LE 01 – Ecology strategy LE 02 – Land use	LE 03 – Water pollution LE 04 – Enhancement of ecological value LE 05 – Landscape	LE 06 – Rainwater harvesting
Transport and movement		
TM 01 – Transport assessment	TM 02 – Safe and appealing streets TM 03 – Cycling network TM 04 – Access to public transport	TM 05 – Cycling facilities TM 06 – Public transport facilities

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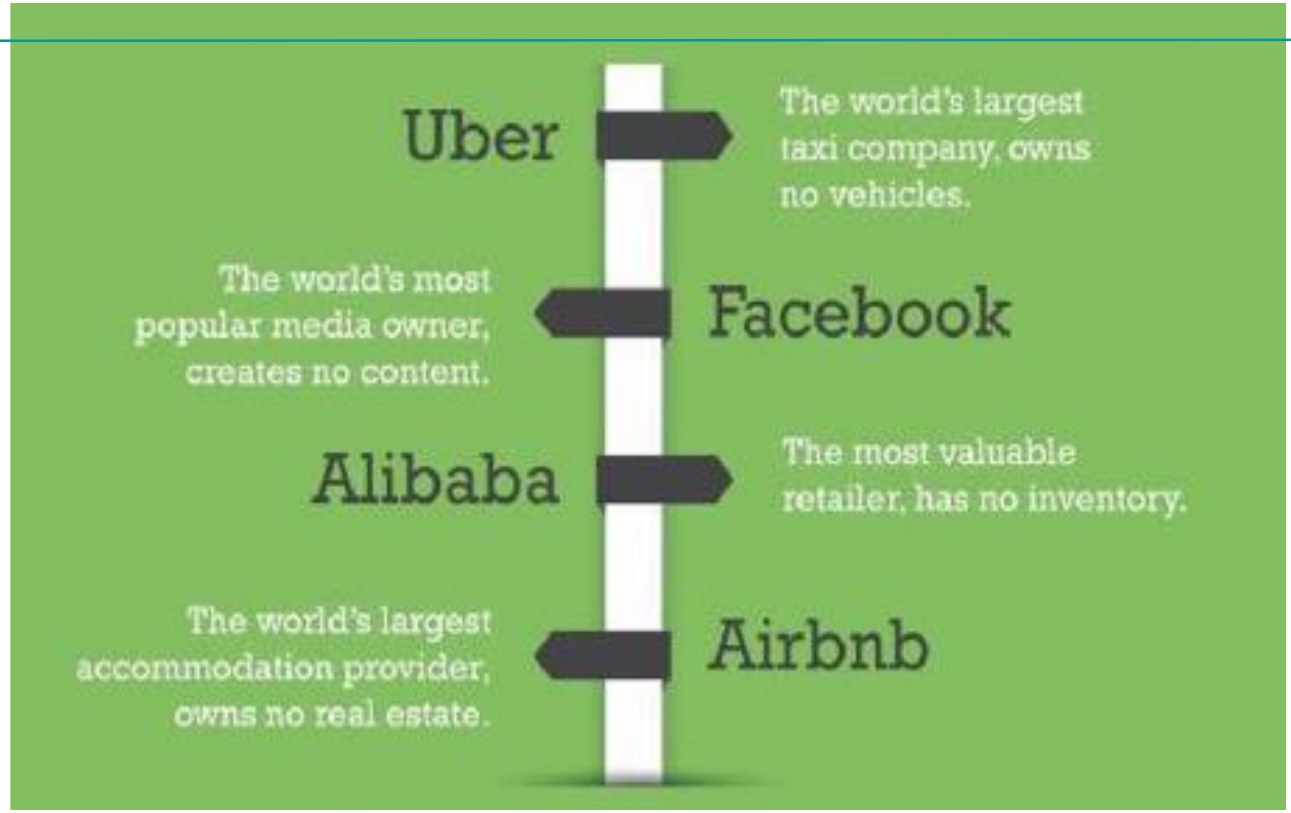
Innovasjoner

- Innovasjonspoeng – 1%
  - Stor gevinst – men store krav
  - Nasjonal og internasjonal overføringsverdi
  - Løsninger som går videre fra det som er kjent i dag
- Vi oppnådde 4 poeng av maksimalt 7
- Krever en fremtidsrettet og aktiv utbygger



Den beste måten å forutsi fremtiden på er å skape den!
Det nest beste er å tilpasse seg den:

Innovasjoner

- Elektromagnetiske Felt (EMF)
- Batteriteknologi og smartnett
- Adaptive lighting – Liquid Light
- Robot og app system for drift og forvaltning

2020park

BEYONDER™

ROBOTIC INNOVATION

LIGHT BUREAU
PART OF AFRY

ADVANSIA

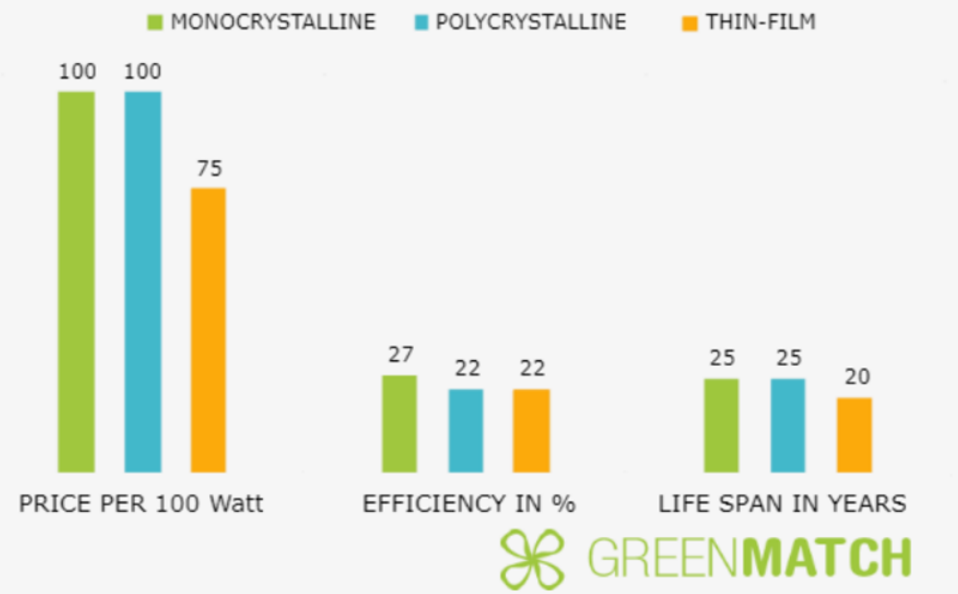
Solar panels

Key to profitability, effect and storage possibility for energy

What Types of Solar Panels Are Most Efficient?

There are numerous types of solar panels. The most common types of solar panels are:

- **Monocrystalline solar panels**
- **Polycrystalline solar panels**
- **Thin-film solar panels**



Monocrystalline Solar Panels

Monocrystalline solar panels, also called single-crystalline cells are manufactured from the purest silicon. A crystal of this type of silicon is grown in a complex process to produce a long rod. The rod is then cut into wafers that will make the solar cells. Monocrystalline solar panels are known to deliver the highest efficiency in standard test conditions when compared to the other 2 types of solar cells. The current delivered monocrystalline solar panel efficiency stands at 22-27%. You can recognise a monocrystalline panel by the rounded edge and the dark colour.

Polycrystalline Solar Panels

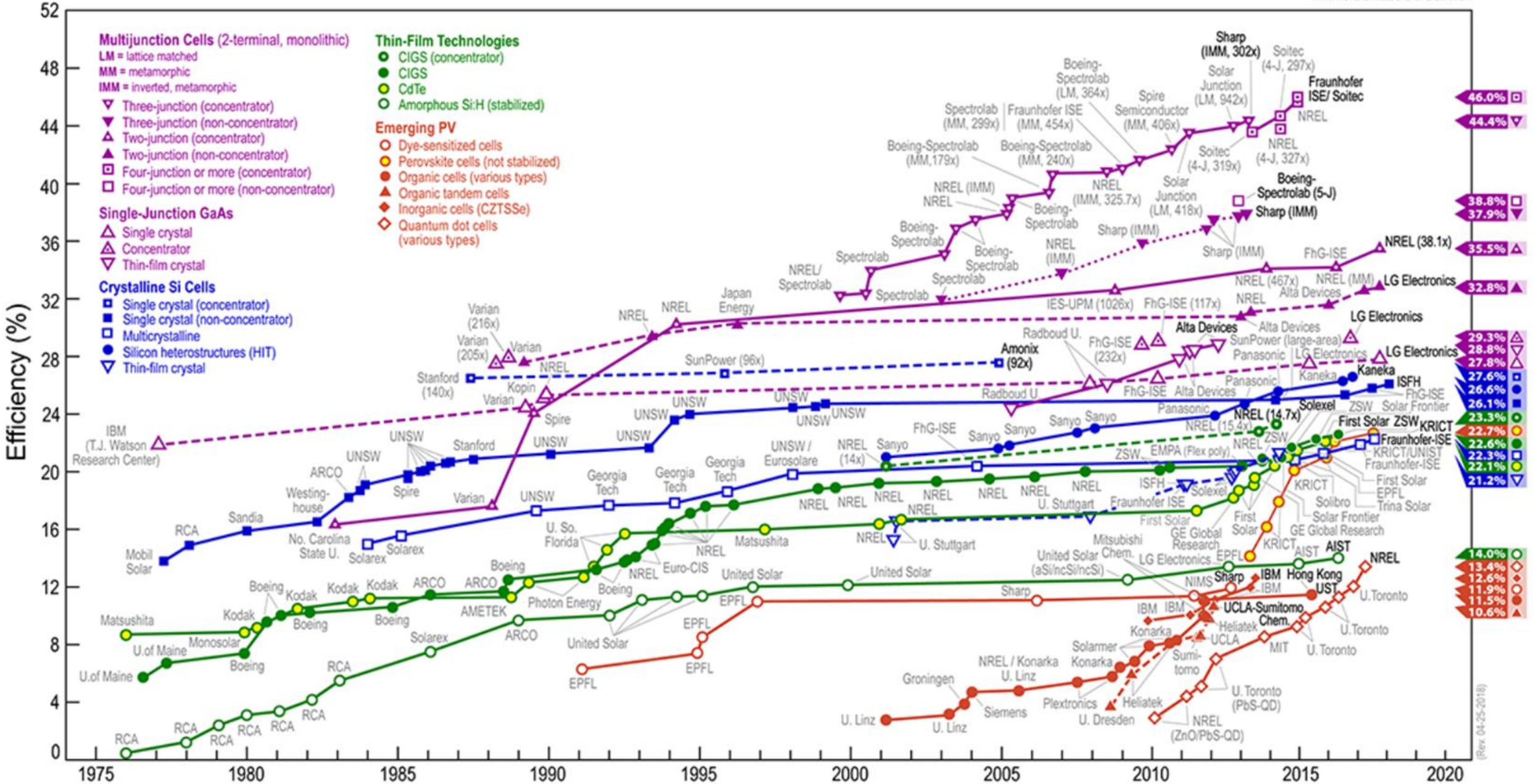
Solar panels made of **polycrystalline solar panels, also called multi crystalline cells** are slightly less efficient than those made up of monocrystalline solar cells. This is due to the nature of production. The silicon is not grown as a single cell but as a block of crystals. These blocks are then cut into wafers to produce individual solar cells. The current delivered polycrystalline solar panel efficiency stands at 15-22%.You can recognise a polycrystalline solar panel by the square cut and blue speckled colour.

Thin Film Solar Panels

Thin film solar panels are made by covering a substrate of glass, plastic or metal with one or more thin-layers of photovoltaic material. Thin film solar panels are usually flexible and low in weight. It is known that thin film solar panels degrade somewhat faster than mono and polycrystalline solar panels. Production of this kind of panels is less complex, thus their output is 5% less than monocrystalline solar panel efficiency. Normally, thin film cells deliver between 15-22% solar panel efficiency.

Thin film solar panel technology is **closing the efficiency gap** with more expensive types of solar panels, therefore thin film solar panels are installed on large scale projects and in record breaking solar power plants.

Best Research-Cell Efficiencies



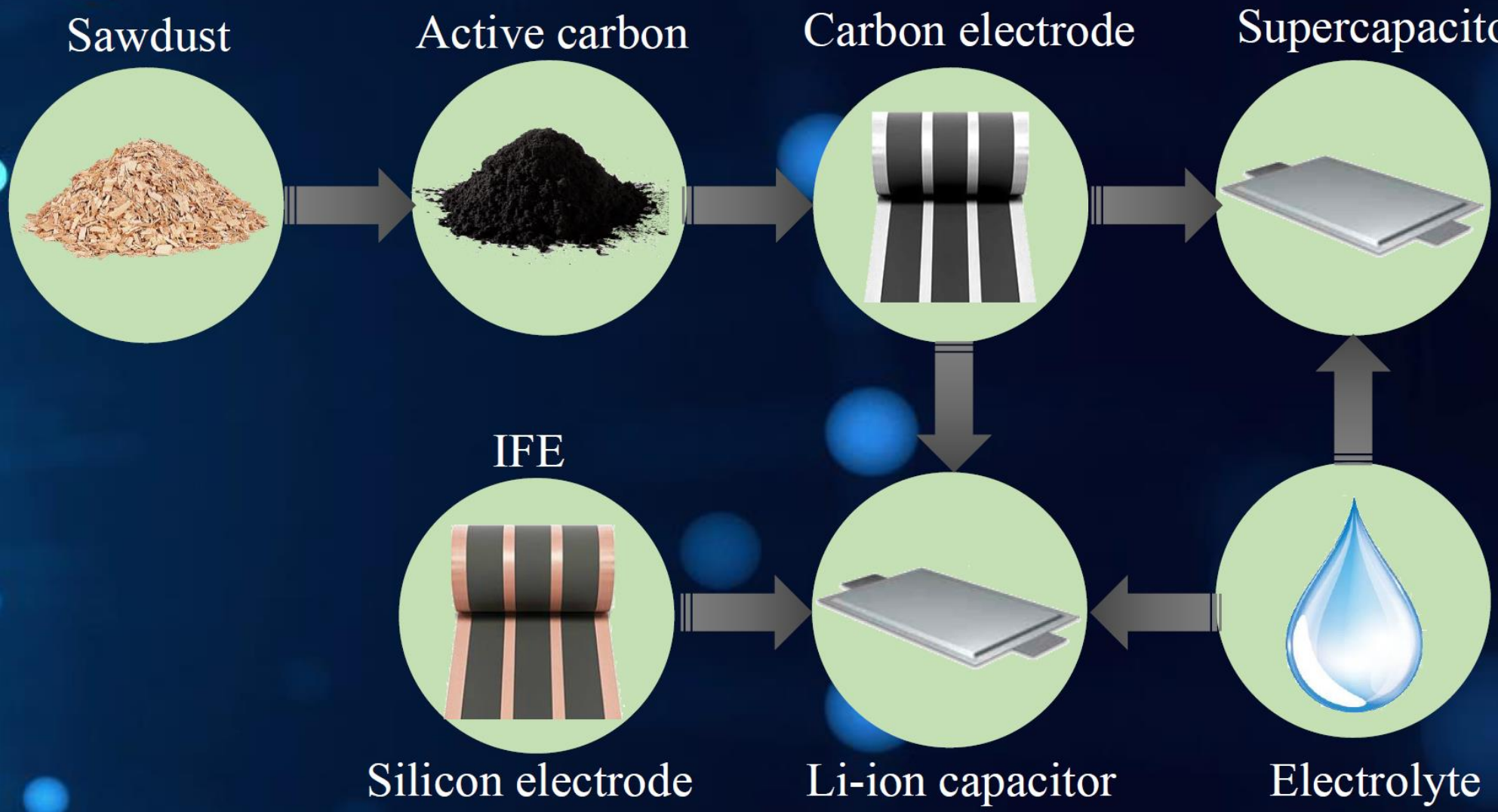
Challenges of Electrical Energy Storage System

The characteristics of Li-ion batteries and supercapacitors are complementary to each other.

Is there an electrical energy storage technique which can combine the advantages of Li-ion batteries and supercapacitors together ?

BEYONDER

Beyonder's Product Development Approach



BEYONDER™

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Liquid Light – adaptive lighting

LIGHT BUREAU
PART OF AFRY

Light Bureau is an award-winning Lighting Design & Consulting studio. Established in 1999, we specialise in Strategic Light Consulting, Project Design & Delivery and Product Development.

We work worldwide with architectural design partners and clients who value innovative application of lighting techniques & technology, design integrity and a collaborative working style. Based in London & Oslo and wholly independent, our international team draws from a range of disciplines enabling us to provide a diversity of light related solutions.

Our value lies in our ability to produce User-Centric Designs whilst meeting the manifold needs of all stakeholders. At the core of our design approach is what we call Resourceful Creativity. This, in conjunction with execution excellence, is how we produce Light as Craft™.

ADVANSIA

Mobile roboter (AIV)

Løsninger for optimalisering av intern logistikk

ADVANSIA
PART OF AFRY

forus

Om Forus Virksomhet på Forus? Jobbe på Forus? Presse English

Best i verden på bærekraft

Del artikkelen på

2020park har oppnådd miljøsertifiseringens svar på Nobel-prisen - BREEAM Community Outstanding - for planene med Forusparken og fått den høyeste poengscoren i verden.

Fikk etterlengtet godkjennelse midt i krisen

Runestad Investering har jobbet lenge for BREEAM Community-sertifisering av Forusparken. Godkjennelsen kom midt i corona- og oljekrisen.

VIL UTVIKLE: Adm. direktør Monica Runestad i 2020park og Fredrik Skadal, finansdirektør i ...

Næringseiendom

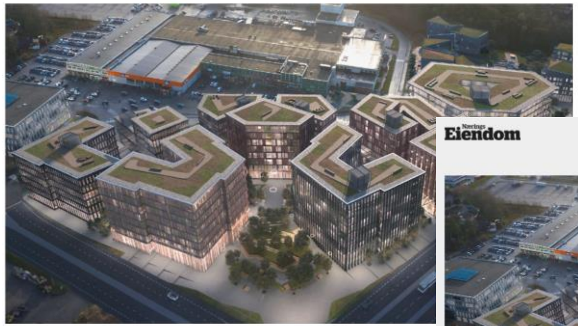
Kristin Vidhammer

Forusparken i Stavanger har i mai fått godkjent sertifiseringen BREEAM Community Outstanding, som ett av tre prosjekter i verden.

FORUS NÆRINGSPARK

Fire innovative tiltak skal gi Stavanger verdens mest miljøvennlige bydel

Det nye næringsområdet på Forus sikter mot verdens høyeste klima-sertifisering.



TU Bygg

STRÅLEVERN

Advansia vil overgå myndighetenes anbefalinger om strålevern

Prosjekterer næringspark for maks 0,3 mikrotesla elektromagnetisk stråling.

KNUT BJØRHEIM BYGG 2. JULI 2020 - 13:56

Eiendom

LOKALER GUIDER NYHETER BLOGG

Fått den høyeste poengscoren i verden

2020park har oppnådd miljøsertifiseringens svar på Nobel-prisen, BREEAM Community Outstanding, for planene med Forusparken og fått den høyeste poengscoren i verden.

2020park er første aktør i Norge og blant de fem første i verden som har fått sertifisering på dette nivået. Poengscoren på 93,2 er den høyeste BREEAM Community-scoren i verden med god margin.

AUTOMATISERING

Den nye næringsparken i Stavanger vil ansette roboter til vakthold og varelevering

Skal overvåke byggene på innsiden. Droner tar seg av det utvendige.

– Det er veldig gledelig at de har oppnådd Breeam Outstanding. Vi trenger noen slike fyrtårn som går foran, sier han til Aftenbladet.

Også daglig leder Katharina Bramslev i Grønn Byggallianse, som er den norske forvalteren av Breeam ordningen, er full av lovord over at 2020Park på Forus har oppnått høyeste sertifiseringsnivå Outstanding (for designstadiet) i BREEAM Communities.

- Det er kun 1-2% av sertifiserte prosjekter som oppnår Outstanding, så dette står det respekt av, sier Bramslev.

- For å få et slikt sertifikat må utbyggerne vise at de jobber systematisk og helhetlig med både sosial, miljømessig og økonomisk bærekraft i hele utviklingsområdet. Det er dette som er framtiden og slik som fremoverlente utbyggere må tenke for å tiltrekke seg fremtidig arbeidskraft og være en god nabo, sier Bramslev.

TU Bygg

2020PARK PÅ FORUS

Næringspark vil ha norske «superbatterier» uten kobolt eller andre sårbare råstoffer

Batteriene har en helt annen strømstyrke og langt kortere ladetid enn litiumionebatterier.

KNUT BJØRHEIM BYGG 16. JUNI 2020 - 12:00

Enhver utbygger med miljøambisjoner må legge til rette for egenproduksjon av energi og utjevning av effekttopper, slik at kraftnettet ikke overbelastes når stadig mer skal over på

Stavanger Aftenblad Meninger Sport Kultur TIPS 05150 MENY

Lokalt BLI ABONNENT LOGG INN

Verdensmester i bærekraft på Forus

Forusparken er neste byggetrinn i utbyggingen av 2020Park. Bygget helt i venstre bildekant er alt oppe. Nå er nye 100.000 kvadrat av utbyggingen i startgropa. Foto: DARK

2020Park har oppnådd toppkarakteren Breeam Outstanding for sitt planlagte prosjekt Forusparken på den gamle tomta til Tou Bryggeri på Forus.

Takk for meg!

Dinah Laland
Dinah.laland@advansia.no
Tlf: 959 37 086

ADVANSIA