



Three EPR in construction at less than 500km off Belgium

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EDF GROUP

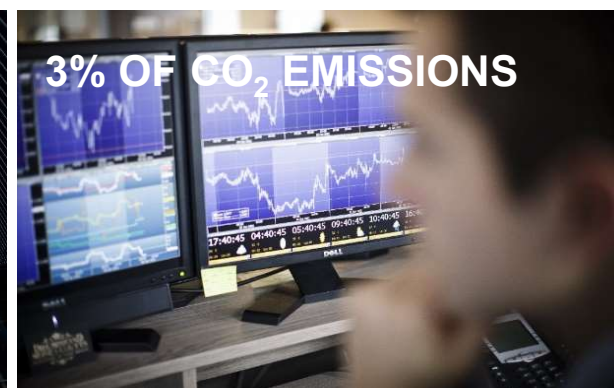
KEY FIGURES OVERVIEW



EDF produces around 22% of the European Union's electricity, primarily from nuclear power

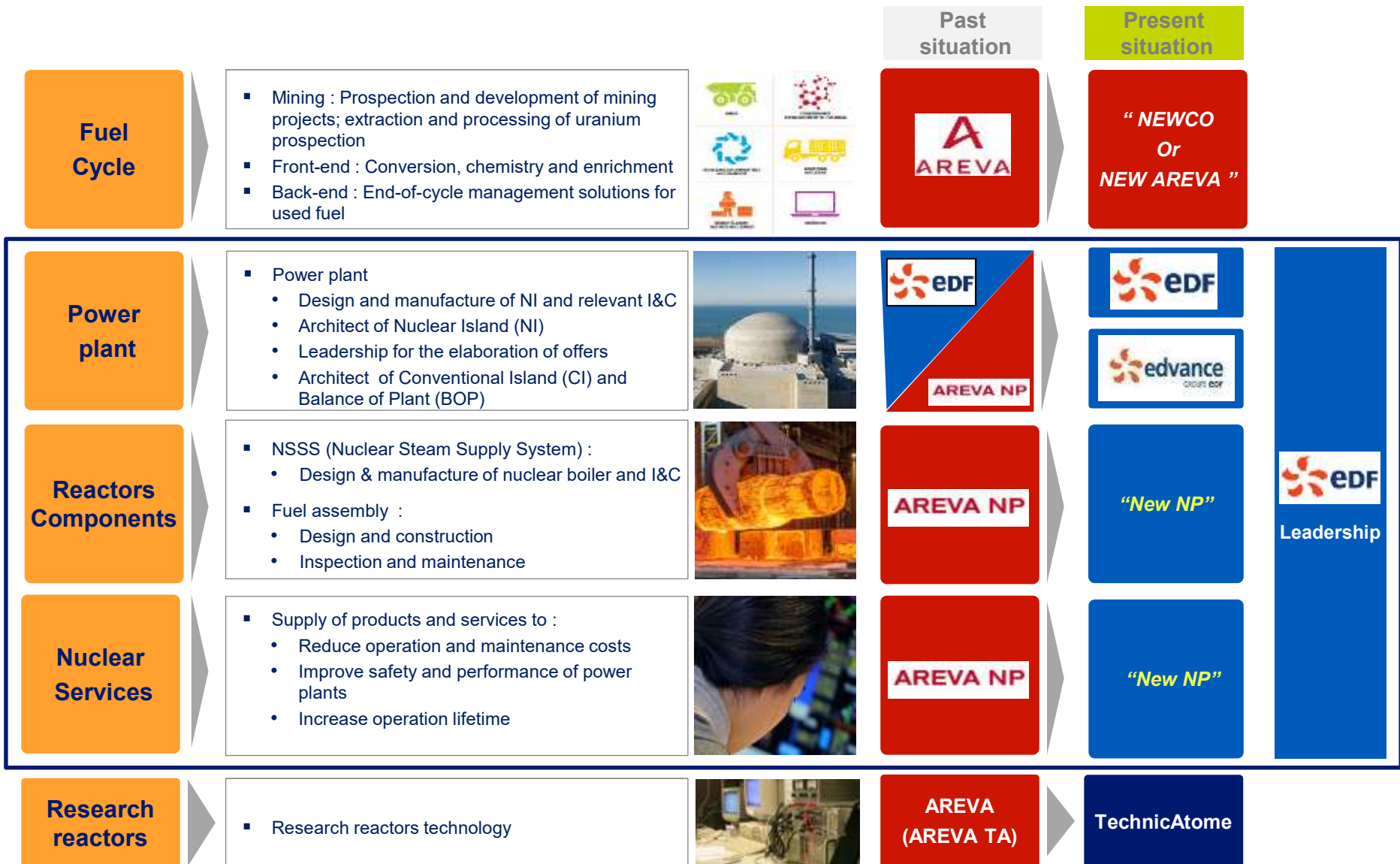
FRENCH NUCLEAR LANDSCAPE

SOCIO ECONOMICAL BENEFITS



FRENCH NUCLEAR SECTOR RATIONALIZATION :

REACTOR ACTIVITIES UNDER THE LEADERSHIP OF EDF



THE OWNER OPERATOR MODEL APPLIED TO THE EPR

4. RESPONSIBLE OPERATOR

- Training
- Owner's group expertise and Peer Reviews
- Technology optimisation
- Safety Performance
- Pre-operation /commissioning

3. PROJECT MASTERING

- Planning / Industrial scheme
- Final Investment Date Contracts
- First Concrete Date Conditions
- Owner's scope



1. CRITERIA

- Safety Principles
- Licenseability
- Stiting
- Adaptations from reference
- Scaling from FOAK to NOAK
- Technology availability
- Public acceptance

2. TECHNOLOGY MASTERING

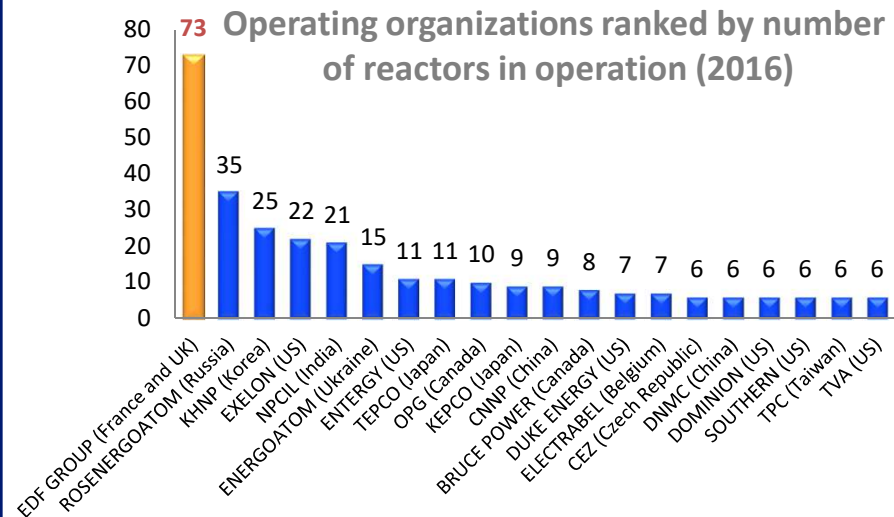
- Vendor's role
- Owner Operator's role from FOAK to NOAK
- Localisation Objectives
- Partnerships
- Project Management

DESIGNING, BUILDING, OPERATING AND MAINTAINING THE LARGEST FLEET WORLDWIDE

40 years of Operation and Maintenance

EDF : World's leading nuclear power plant operator

- 58 reactors in France, (63 GWe)
- 15 reactors in the UK (9GWe)
- ~ 2000 reactor-years of experience operating the French fleet



EDF International experience on project delivery

5 ongoing EPR Units



Flamanville 3
France



Taishan 1
China



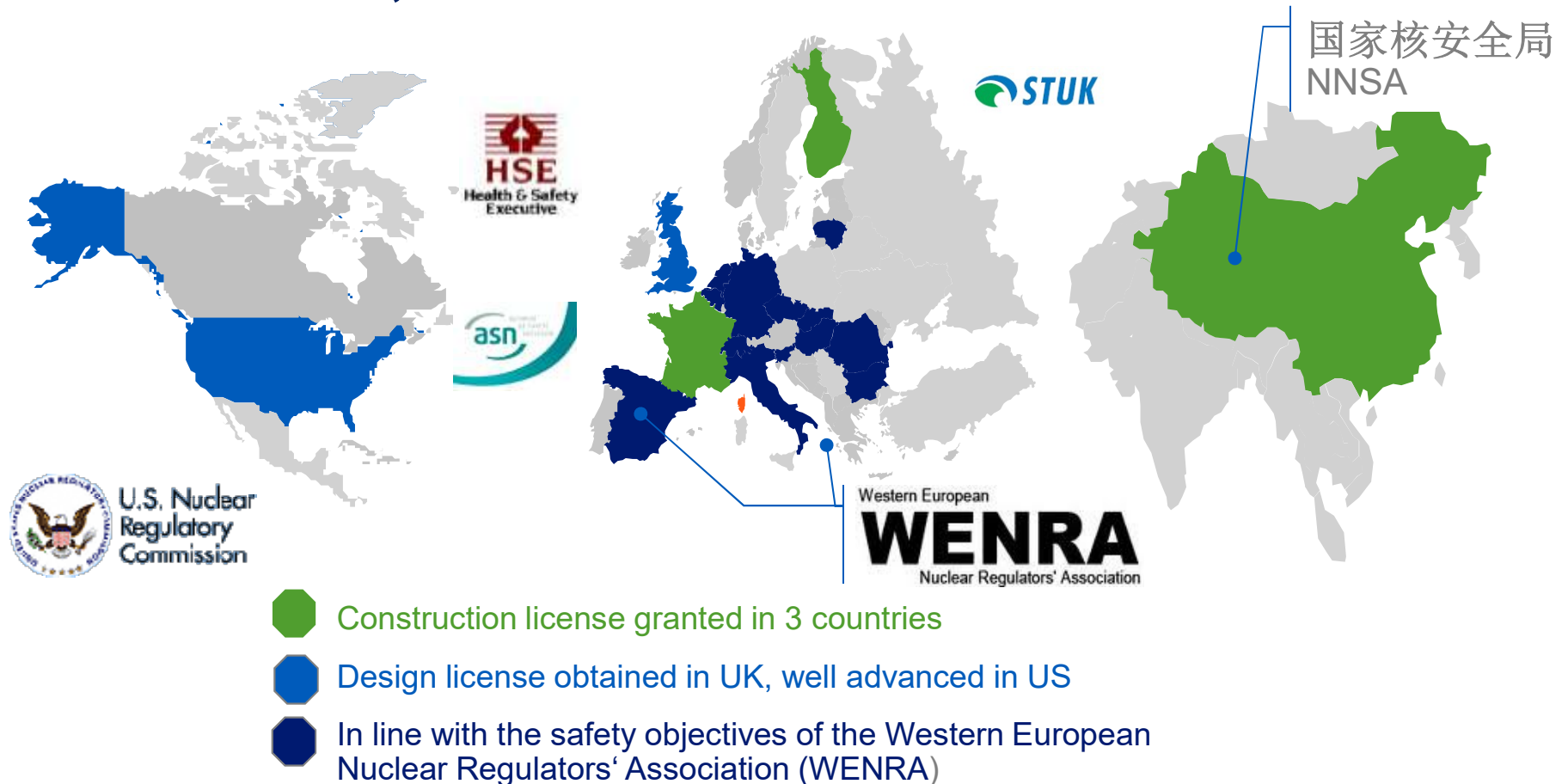
Taishan 2
China



HPC 1&2
United Kingdom

**An EPR Owners Operators Group :
EDF, EDF Energy, TNPJVC, TVO**

A DESIGN ALREADY ASSESSED AND LICENSED BY VARIOUS INDEPENDANT BODIES AND SAFETY AUTHORITIES, WORLDWIDE



A smoother licensing phase supported by experienced team involved in numerous licensing contexts

40 YEARS OF KNOW HOW TRANSFER AND LOCAL INDUSTRY DEVELOPMENT

Areas of support	Knowledge and learning sharing		Examples
Skills development	40+	years of successful human capacity building guidance and cooperation with fellow countries since 1970's.	 
Localization	45y	years of local industries development , both NPP (engineering, manufacturing, and construction) and fuel cycle – through technology transfer and skills development, including R&D support, to create high quality jobs locally.	     
Education and training (all types)	55+	partnerships with top universities worldwide. set up of joint training centers.	   
NPP operation	850+ 346	trainees from foreign operators trained over the last 30 years. reactors supported, out of the 435 in operation (i.e. 80% of nuclear global fleet), with products and services.	      

EPR FLAMANVILLE 3 : THE REFERENCE PLANT



GENERAL INFORMATION

- EPR Reference Plant for export
- First EPR reactor in France
- Power output : 1,650 MW
- EDF as Owner & Operator



September 2015

New schedule



August 2017

Nuclear circuit cleaning



End 2018

First fuel loading and start-up operations to begin

CURRENT STATUS

March 2016

Welding of 1st Primary Circuit



SCHEDULE

End 2017

Cold tests to be concluded

2nd Quarter 2019

Connection to the grid



EPR FLAMANVILLE 3 : ON TIME DELIVERY



Fuel rack installation within the pool



Reactor pressure vessel circuit cleaning



Turbine and alternators in rotation



Pump station for trains 1&2 transferred to the operating team

SUPPLY CHAIN

AREVA LE CREUSOT FACTORY: OPEN & TRANSPARENT

09/2015

ASN, the regulator, approves a test program on bottom and vessel head of EPR Flamanville

12/2016

Submission AREVA NP report to ASN

28/06/2017 :

ASN considers that the mechanical characteristics of the pressure vessel bottom head and closure head are adequate

A CONSTANT DIALOGUE BETWEEN INDUSTRY AND THE REGULATOR ASN TO DELIVER IN DEPTH ANALYSIS AND EXPERTS' CONCLUSIONS

19/10/2016

ASN requires that inspections be carried out within the next three months on the steam generators of five EDF reactors in which the steel contains a high carbon concentration
EDF has confirmed that it will carry out these inspections

20/09/2017

ASN asks EDF to extend the scope of the review to include cast (not only forged) components, as well as other important – but non-nuclear – components manufactured in Le Creusot site and today installed on reactors in operation

05/12/2017 :

ASN considers that restart of the reactors concerned can be envisaged



EPR HINKLEY POINT C: A NEW BUSINESS MODEL FOR NEW NUCLEAR THAT INSPIRES OTHER COUNTRIES



GENERAL INFORMATION

- First nuclear construction project in the UK in 30 years
- A certification process: GDA requirements for reference plant EPR Flamanville 3 adaptations
- Contract For Difference guarantying a fixed price of electricity for 35 years
- Chinese partnership - EDF as co-owner and operator
- A First Of A Kind in many ways
- Power output: 1,630 MW each



September 2016
Final contracts signed

2026 :
COD Unit #2

CURRENT STATUS

October 2013
UK Governments
agrees Contracts For
Difference for HPC

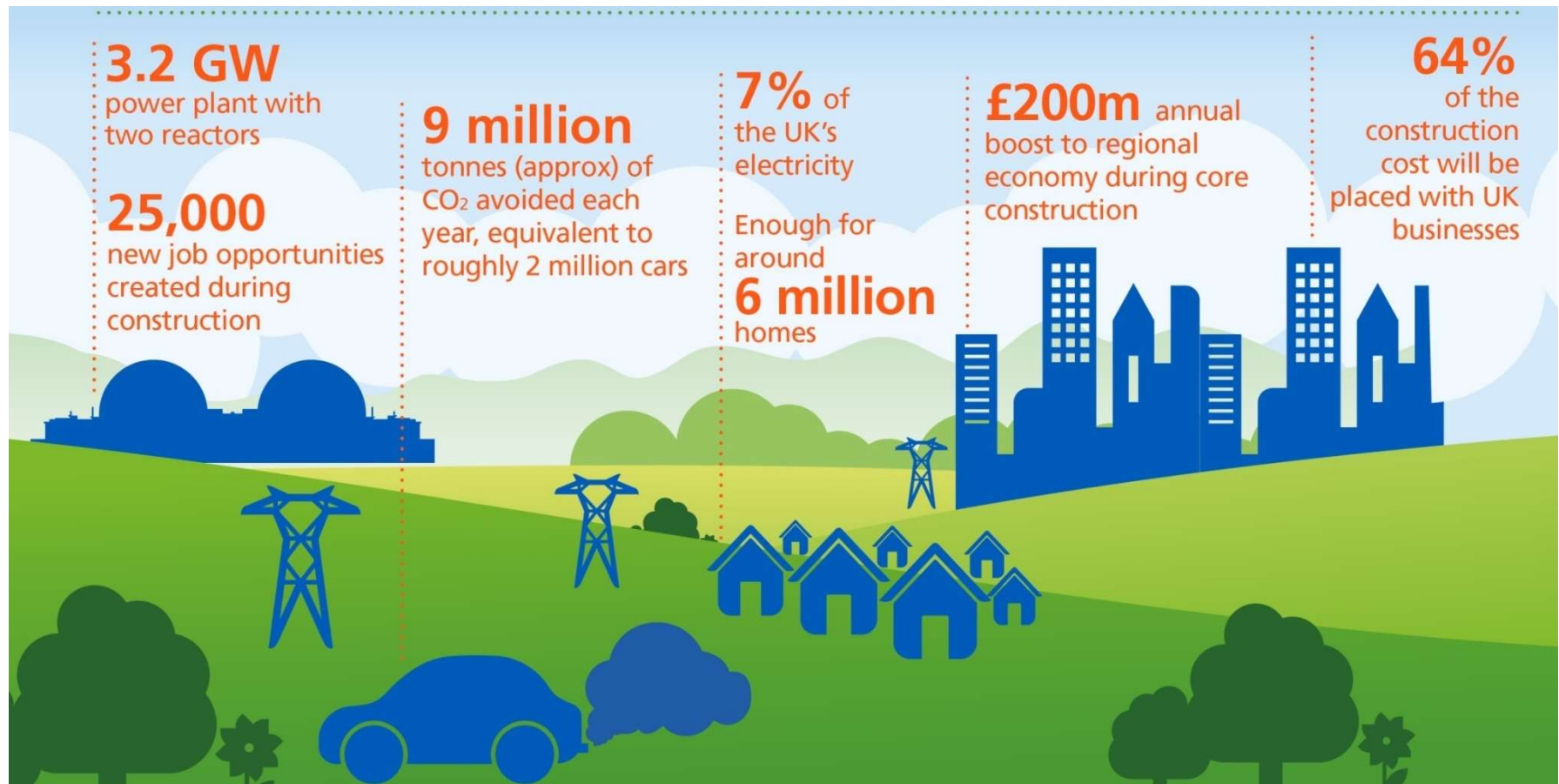
March 2017
First concrete successfully
poured for power station
galleries

SCHEDULE

2025 :
COD Unit #1



SOCIO ECONOMICAL BENEFITS HPC EXAMPLE



THANK YOU

I'm building
a low carbon
future