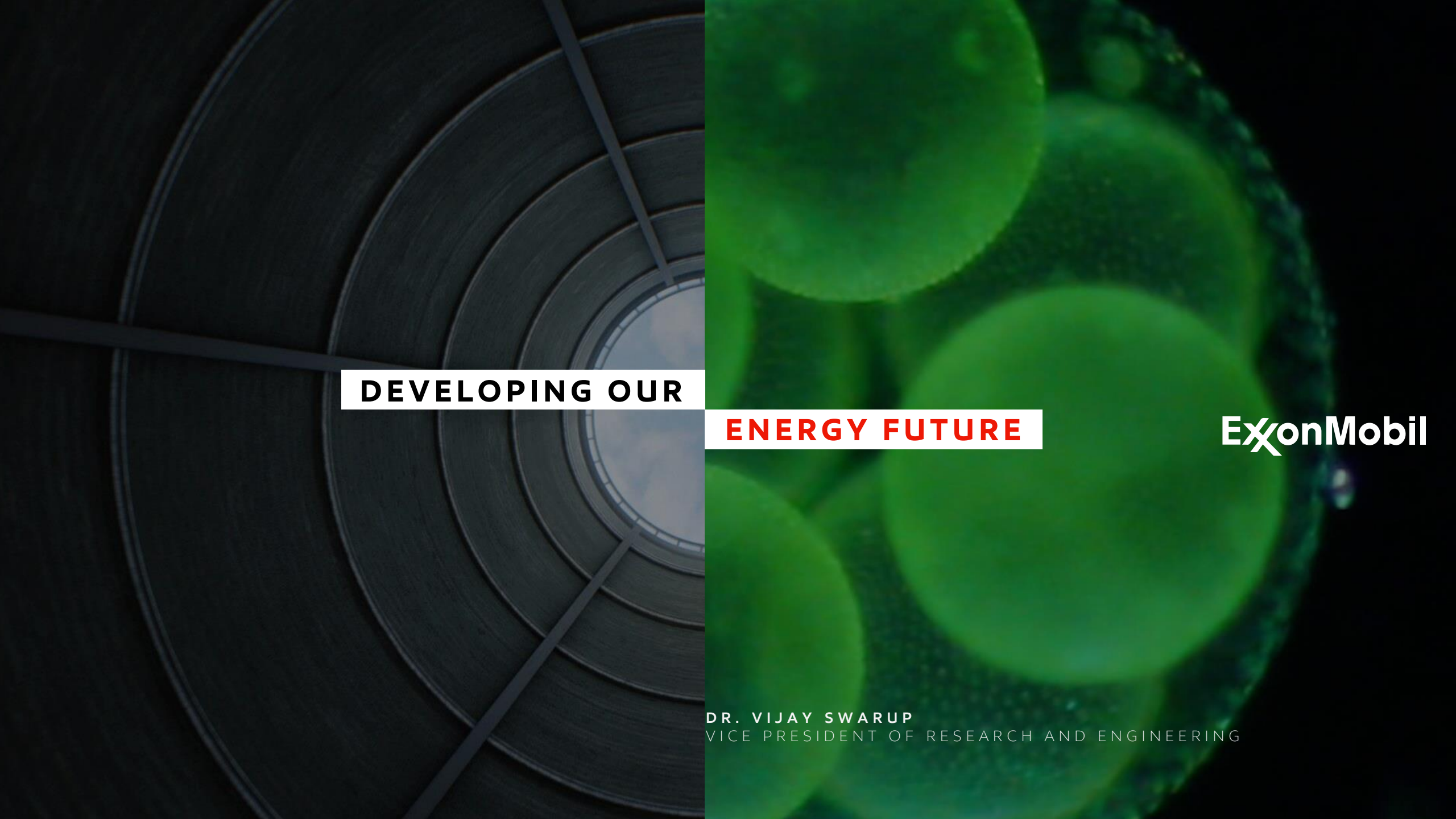




DEVELOPING OUR

ENERGY FUTURE

ExxonMobil

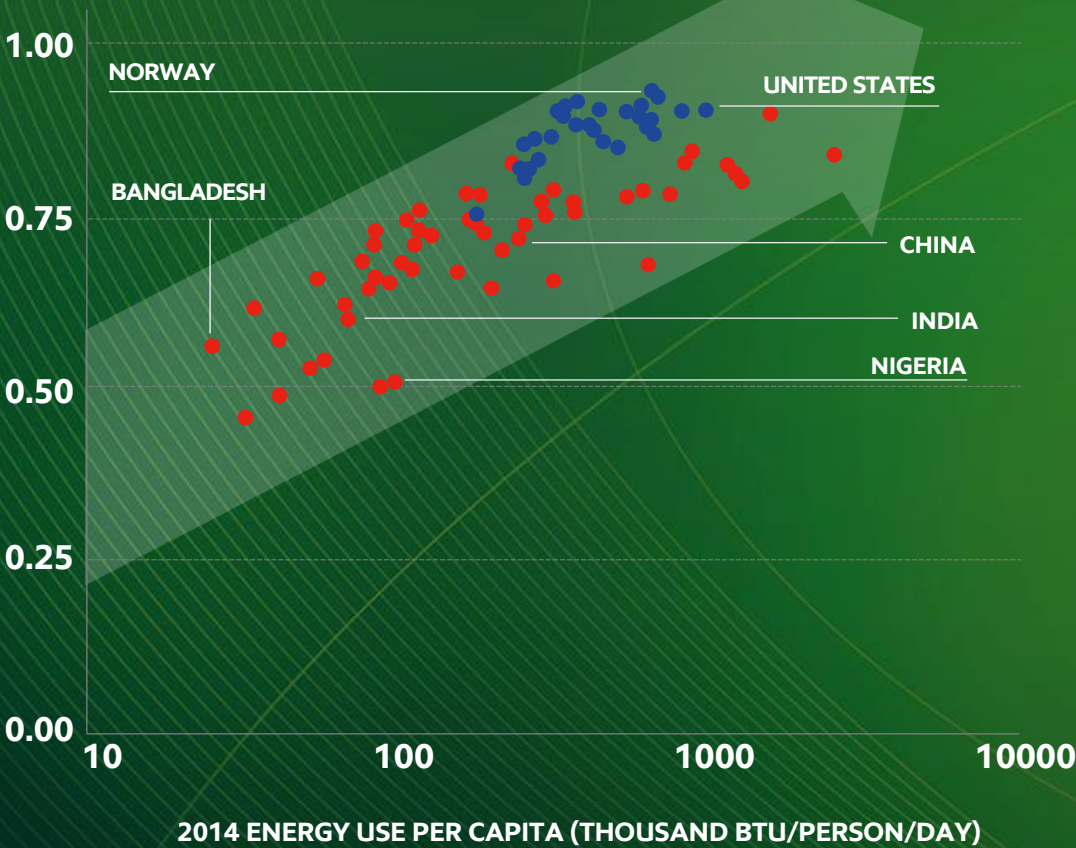
DR. VIJAY SWARUP
VICE PRESIDENT OF RESEARCH AND ENGINEERING

THE DUAL ENERGY CHALLENGE

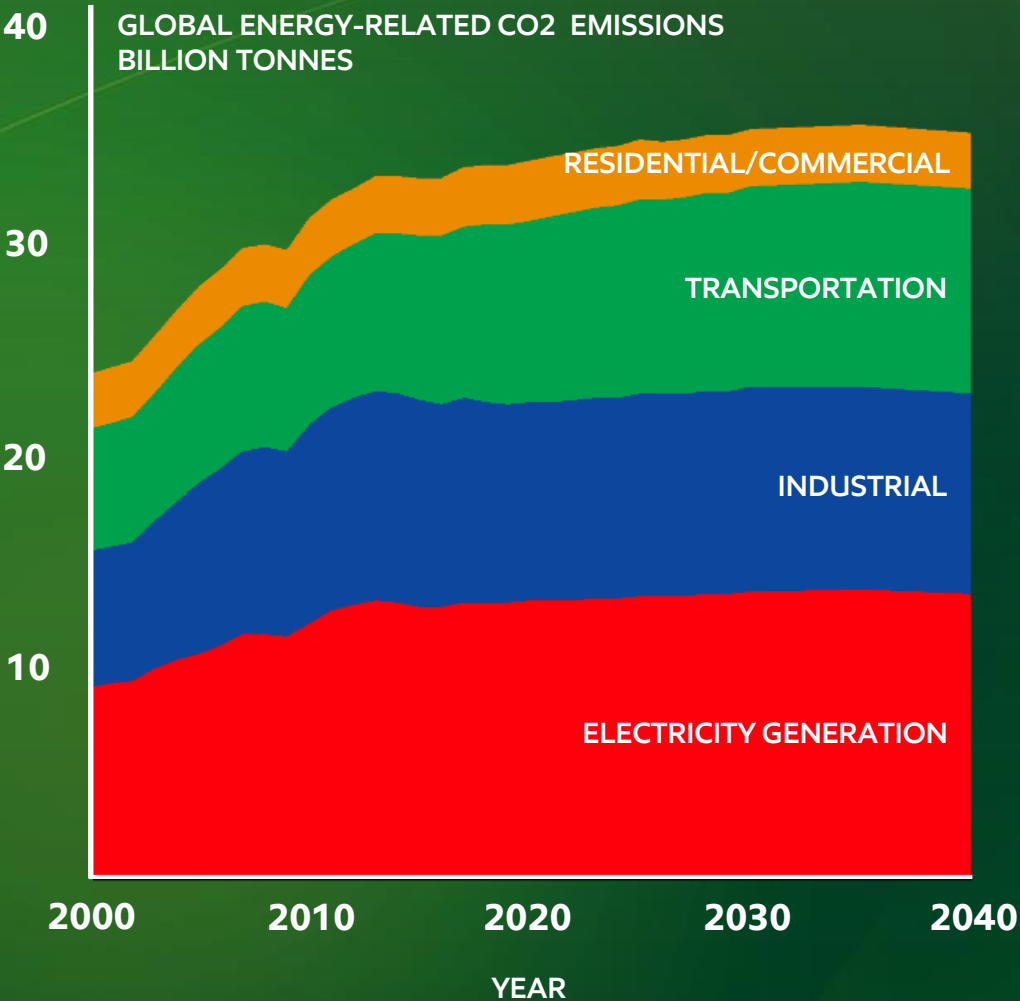
IMPROVING LIVING STANDARDS DRIVES ENERGY DEMAND

U.N. HUMAN DEVELOPMENT INDEX

2014 INDEX



SECTORS ACCOUNTING FOR MOST OF THE WORLD'S EMISSIONS



Sources: United Nations, ExxonMobil Energy Outlook 2019, ExxonMobil estimates

34 OF THE 40 NEEDED TECHNOLOGY AREAS CURRENTLY NOT ON TRACK

● Power

- Renewable power
- Nuclear (↓)
- Solar PV
- Natural gas-fired
- Onshore wind
- Coal-fired
- Offshore wind
- CCUS in power
- Hydropower
- Bioenergy
- CSP
- Geothermal
- Ocean

● Industry

- Chemicals
- Iron and steel
- Cement
- Pulp and paper
- Aluminium
- CCUS in industry & transformation

● Transport

- Electric vehicles
- Fuel economy
- Trucks & buses
- Transport biofuels
- Aviation
- Shipping
- Rail

● Buildings

- Building envelopes
- Heating
- Heat pumps
- Cooling
- Lighting
- Appliances & equipment
- Data centres & networks

● Fuel supply

- Methane emissions from oil and gas
- Flaring emissions

● Energy integration

- Energy storage (↓)
- Smart grids
- Direct air capture (new)
- Hydrogen
- Demand response

CONVENTIONAL TECHNOLOGY DEVELOPMENT DONE IN SERIES

Discovery



Development



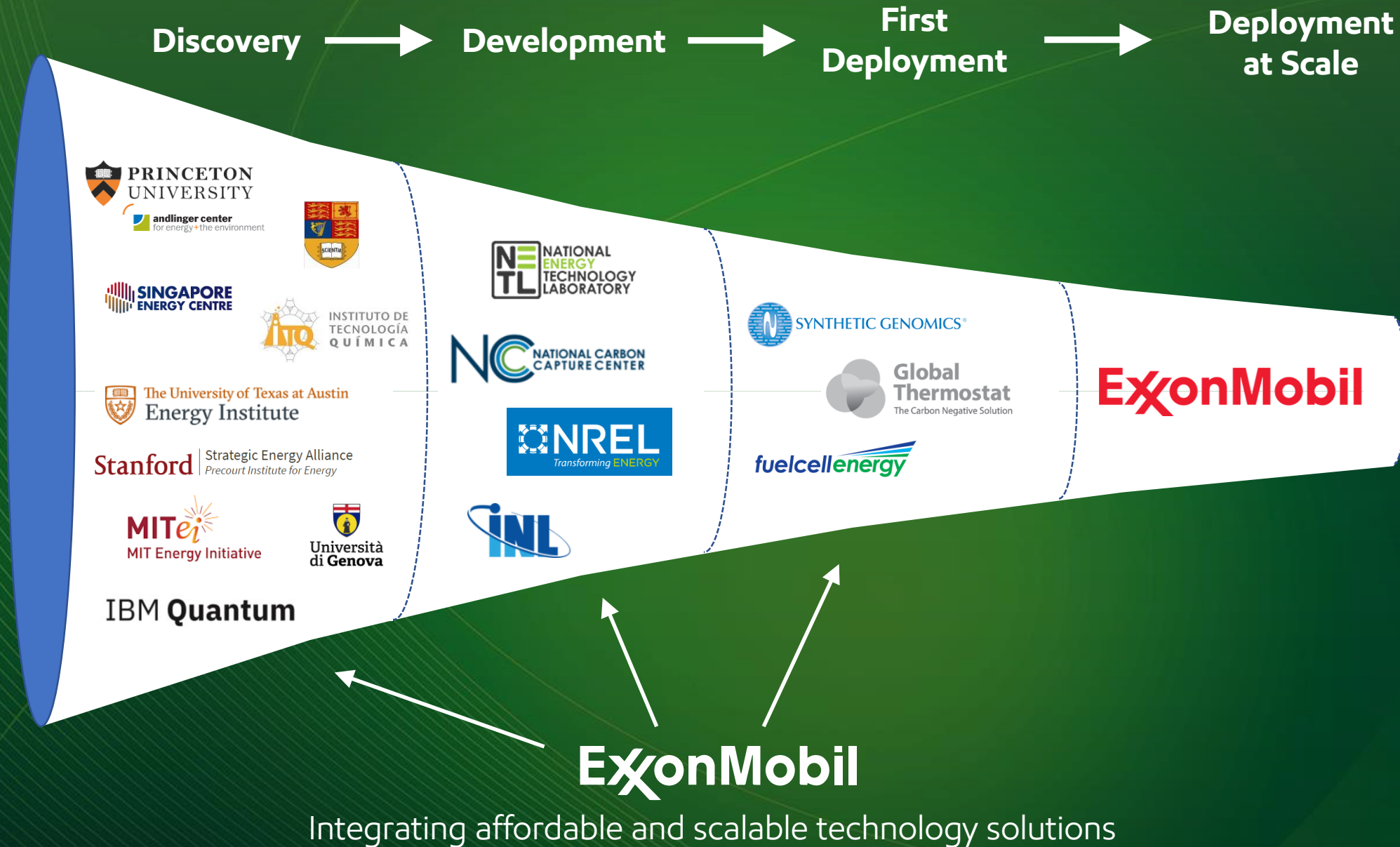
First
Deployment



Deployment
at Scale



COLLABORATION CRITICAL TO SOLVE THE DUAL CHALLENGE



ExxonMobil