Exploring opportunities for European Deep Dive / Business model innovation scenarios applications

Europe Regional Meeting

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Chair of World Energy Scenarios, World Energy Council
17 October 2017

Agenda

1. Scenarios programme and where we are
2. EU 31 Perspective – key findings
3. Exploring Deep Dive & Business model innovation focused application opportunities
    - Key benefits and opportunities for MCs and Members
    - What it takes to run Deep Dive / Focused application
    - Next steps to bring it forward

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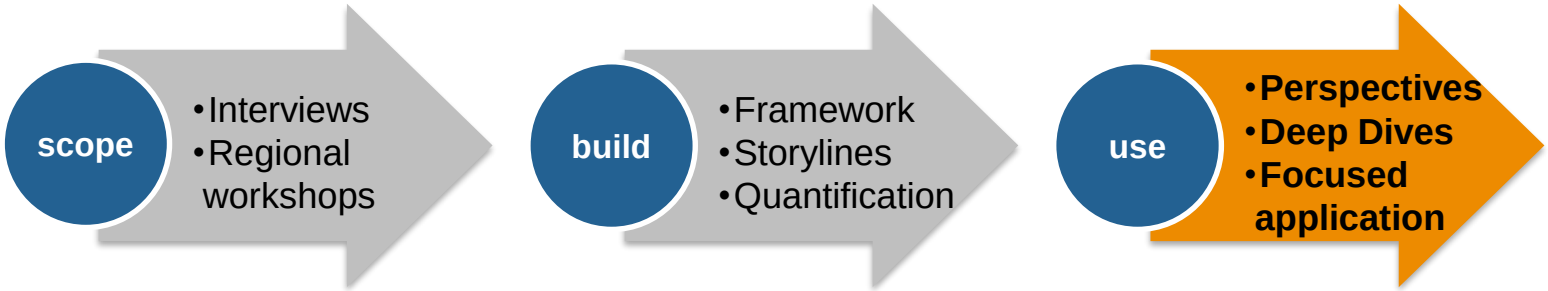
World Energy Scenarios: 3 year work cycle



WHAT WE HAVE DONE BY 2016

Global Energy Scenarios 2016

- Grand Transition
- Three Scenarios
- Energy landscapes
- Key messages

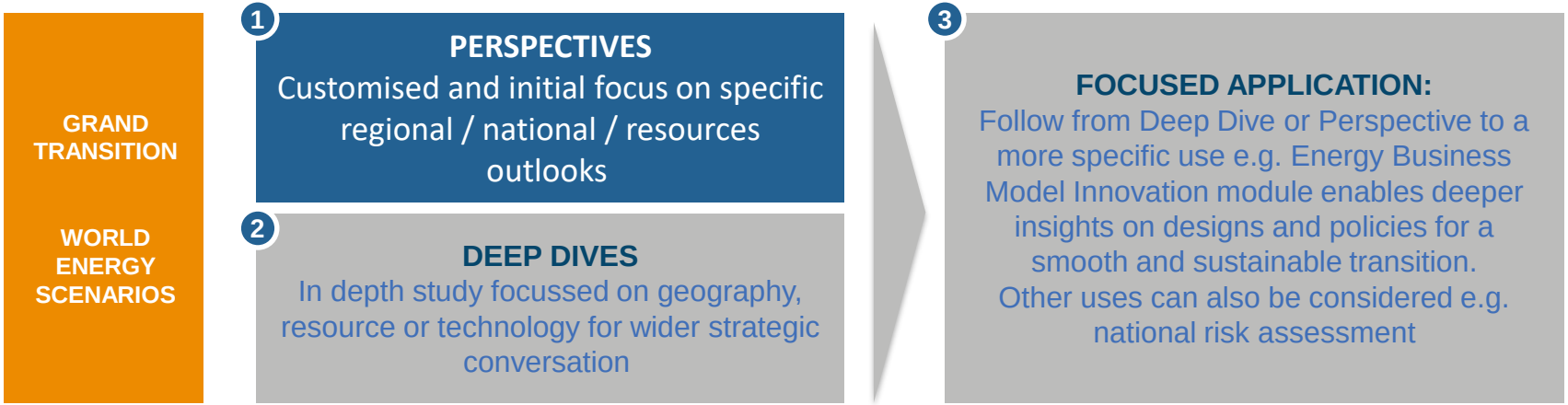
"Launched with great success at the Istanbul Congress"

2017+ OVERARCHING THEME

- Extending the rollout of existing content
- Widening scenarios application
- Giving consideration to the scope of future work in 2018-2019

Using scenarios an example: general & focused European region application – options for moving forward*

- Presentation on EU 31 sub-region has been completed
- Key findings were presented in EC Energy Directorate Brussels in February 2017



**Other formats and themes can be considered based on the interest of MCs*

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Pre-determined Elements of the Grand Transition

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Population doubled since 1970, and will grow substantially more slowly in the next 45 years – rising by around 40% – leading to slower growth in the labour force.

New technologies, including the full diffusion of information technology, automation, more productive resource technologies, and health technologies will have the potential to reshape economic and social options

The shift to a multi-polar world as Asia increases its weight in the global economy and world politics – a reflection of growth in population, productive capacity and the emergence of a large urbanised middle class.

Global and national agendas will be shaped by the need to avoid crossing planetary boundaries, with particular focus on the danger zones: climate change, biodiversity, excess Nitrogen/Phosphorous flows and deforestation.

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Key uncertainties

Pace of innovation and productivity

Development of international governance and geo-political change

Priority given to sustainability and climate change

Selected ‘tools for action’—the balance between the use of markets and state directed policy

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Three alternative pathways

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Modern Jazz

Market-driven approach to achieving individual access and affordability of energy through economic growth.

- Market mechanisms
- Technology innovation
- Energy access for all

Unfinished Symphony

Government-driven approach to achieving sustainability through interanationally coordinated politics and practices.

- Strong policy
- Long-term planning
- Unified climate action

Hard Rock

Fragmented approach driven by desire for energy security in a world with low global cooperation.

- Fragmented policies
- Local content
- Best-fit local solutions

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EU 31– a regional perspective at a glance:
Some key findings

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1. EUROPE's PRIMARY ENERGY DEMAND will continue to decline in Modern Jazz and Unfinished Symphony--a bounce back in Hard Rock occurs around 2040; note that per capita energy demand has already peaked.
2. DEMAND FOR ELECTRICITY in EUROPE will rise 27-36% to 2060. The significant increase of renewables with a share of nearly 46% in the electricity system will require substantial infrastructure investments and systems integration to deliver benefits to all consumers.
3. THE PHENOMENAL RISE OF SOLAR & WIND ENERGY will continue at an unprecedented rate and create both new opportunities and challenges for energy systems.
4. DEMAND HAS PEAKED FOR COAL & OIL IN EUROPE have the potential to take the world from "Stranded Assets" to "Stranded Resources" – and Europe's assets will be first
5. TRANSITIONING GLOBAL TRANSPORT forms one of the hardest obstacles to overcome in an effort to decarbonise future energy systems.
6. LIMITING GLOBAL WARMING to no more than a 2°C increase will require an exceptional and enduring effort, far beyond already pledged commitments, and with very high carbon prices.

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Deep Dive / Business model innovation as potential focus

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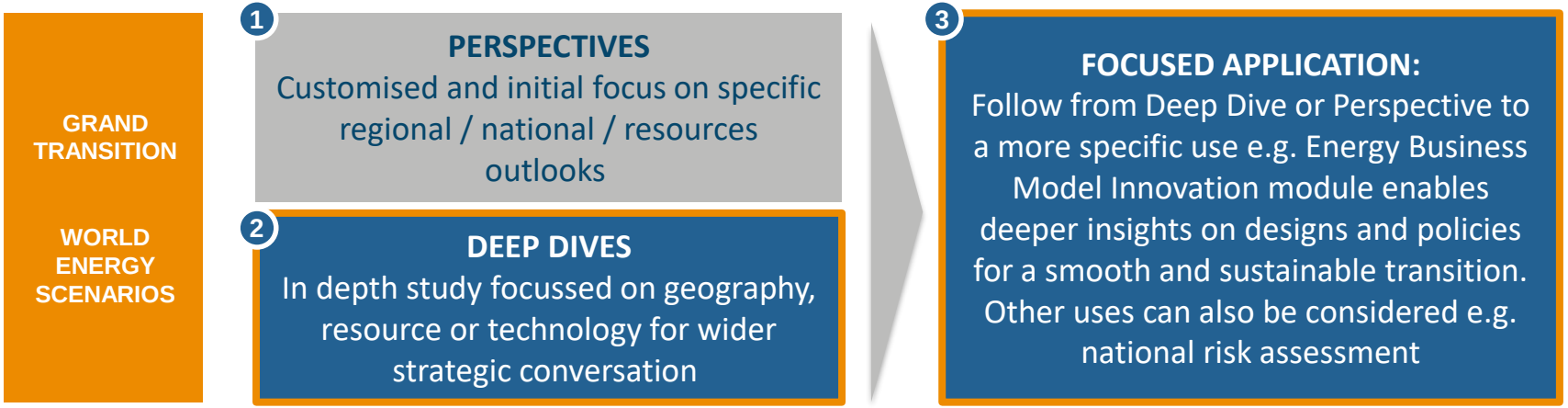
- Deep Dive and Business model innovation case studies can be a natural development of EU 31 Perspective and become next potential scenarios application focus to consider



Other formats and themes can be considered based on the interest of MCs

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Mexico case study
Highlighted insights

- **31 new and emerging energy business models were** identified as relevant at a global level
- **26** were further assessed within the **Mexican context** using **t**he **Energy Trilemma** framework

KEY INSIGHTS

- Energy Reform in Mexico offers the **flexibility to adapt** to different scenarios
- Business models fostering **Environmental Sustainability** were found relevant in all Mexican scenarios.
- At least **3 of the 26** new & emerging energy business models in the Mexico case were found to be highly relevant in all three scenarios
- The government may play a **key role** in orienting segments and stakeholders of the energy value chain to become innovators or followers.

NEW QUESTIONS have been identified and could be relevant for other regions, including:

- Which trends from other industries could be incorporated to the energy sector?
- Which investments in infrastructure and resources should be prioritised to implement emerging business models?
- In which segments of the value chain should governments increase investment for the development of innovative technologies and identification of new operating models?

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Mexico case study

List of emerging & new business models identified

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ENERGY EQUITY

- Battery Carrier**
- Extension of electricity network through a community trust
- Gas to wire model in gas field areas with shortage of gas pipelines
- Renewable energy powered domestic devices
- Solar steam steriliser of surgical equipment for marginalised communities

ENERGY SECURITY

- Cognitive exploratory system powered by open access data
- Platform to connect O&G industry players to accelerate developments
- Specialised energy headhunting
- Trader and logistics integrator powered by fintech
- Uberisation of O&G operations (well as a customer)

ENERGY PLUS

- Flying cars network**
- Mobile recharging stations
- Pre-payment electricity smart meters and payment system
- Wireless electricity solutions for electronic devices**

ENVIRONMENTAL SUSTAINABILITY

Energy efficiency and mitigation of CO_2 emissions

- Energy intelligence provider
- Smart battery integrator
- Smart house from brick to appliance
- Ridesharing system enabler
- Service provider for industrial carbon abatement/ energy efficiency**
- Software platform for carbon abatement
- Zero waste business

Clean energy penetration

- Power generation based on Enhanced Geothermal System
- Bio-fuel production from selected waste
- Nuclear fusion power stations**
- Electricity generation stations powered by human mechanical energy
- Electricity generation system for the agriculture sector
- Enabler for green energy projects requested by cooperatives
- Platform that provides power generation forecasts from renewables
- Platform to connect renewable energy players to accelerate development
- Platform to give freedom of energy choice to electricity customers
- Renewable energy procurement through reverse auctions

Oil and Gas
Electricity
Both

Technology driven
New business model
** Lowest relevance for Mexico

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Mexico case study – Business Model Canvas

Gas to wire model in gas field areas with shortage of gas pipelines

Description: Monetization model developed by a third-party company that installs modular power plants for upstream O&G players in gas fields, in areas where electricity transmission networks is more extensive and dense than gas pipeline systems, to generate electricity and sell it through the grid. The model addresses infrastructure shortage of gas pipelines for both conventional and unconventional developments

Case studies:

alphabet energy™

CUSTOMERS

O&G players that:

- Are operating in fields with gas resources and storage of pipeline infrastructure

VALUE PROPOSITION

- Allows monetization of gas resources without gas pipeline infrastructure
- Increases access to electricity generated by the modular power plants

KEY RESOURCES

- Gas fields without gas pipeline infrastructure
- Modular combustion turbines power plants
- Regulatory framework to connect small power plants to electrical grid

KEY PARTNERS

- Electricity consumers; residential and commercial properties

COST STRUCTURE

- Manufacture of the modular combustion turbine power plants and its maintenance
- Marketing and sales costs
- Power lines to deliver the electricity generated
- Fee for gas consumption from the O&G operator

REVENUE STREAM

- Electricity sale through the grid

Mexico case study – Business Model Canvas

Smart house from brick to appliance

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Description: Energy information provider that bridges information gap, allowing energy conscious industrial/commercial/residential consumers to make smarter decisions when building/remodeling their buildings from design (e.g. selecting high efficient materials) to furnish (e.g. selecting high efficient appliances)

Case studies:

smarthome Home Automation Superstore

CUSTOMERS

Individuals who:

- Have medium/ high income level
- Have middle/ high energy consumption level
- Are environmentally conscious

Companies that:

- Are environmentally conscious
- Want to leverage innovative/ environmentally friendly adoptions to boost their brand

VALUE PROPOSITION

- Increases energy efficiency
- Reduces energy costs by leveraging highly efficient solutions

KEY RESOURCES

- Up-to-date information about energy efficient solutions

KEY PARTNERS

- Company that develop high-efficient materials/appliances
- Construction companies

COST STRUCTURE

- Technological platform and its maintenance
- HR costs associated to keeping personnel specialist in energy efficiency solutions
- Import/manufacture the technological devices
- Marketing and sales costs

REVENUE STREAM

- Fee for designing/ implementing high efficiency energy solution
- Sale the technological devices
- advices

Mexico case study
The way forward

- Encouraging the development of a **new case studies** to assess the relevance and the ease of implementation of new and emerging energy business models within another country or region,
- Developing **evaluation toolkit** for better use of business model innovation to engage with diverse stakeholders and creating the culture for the use of scenarios,
- Promoting wider application of scenarios for **testing** vulnerabilities to existing business models, **evaluating** of new and emerging business models and **designing** “fitter” business models,
- Strengthening the **platform for stakeholder’ collaboration** to encourage an open and independent dialogue to address policy and social risks,
- Creating the **“library of new and emerging business models”** through continues scenarios application and stakeholders’ engagement.

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Deep Dive / Business model innovation

Key benefits & opportunities for MCs and Members

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FOR MEMBERS COMMITTEES

- Contributing to a deeper understanding & insights of regional energy sector's future that are relevant to national policy making, and contributing to public-private co-operations
- Gaining credibility and strengthen national and regional profile
- Engaging and gaining visibility with a wider range of stakeholders

FOR MEMBERS

- Benefiting from strategic knowledge sharing
- Developing of a shared position during a stakeholder engagement workshops
- Deepening understanding of the impact of the various scenarios on their country or region
- Testing existing business models of own organisation, evaluating new business models which are already emerging and designing new 'better' business models (in Business model innovation)

Deep Dive / Business model innovation

What it takes to run the new scenarios application for MCs

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	PERSPECTIVE	DEEP DIVE	BUSINESS MODEL INNOVATION
LEADING THE PROJECT	Identify an **individual high-level champion** to oversee the complete process		
WORKSHOPS	1-2	2-3	2-3
BUDGET & RESOURCES	**Modest budget & resource** to support: - workshop/s - event/s - drafting of the final report	**Additional budget & resources** to support: - additional modelling - workshop/s - event/s - drafting of the final report	**Additional budget & resources** for: - additional analysis - workshop/s - events - drafting of the final report
DURATION	~4-6 weeks	~3-6 months	~3-6 months
COMMUNICATION & OUTREACH	Prepare a **plan for wider stakeholder engagement** to gather input for the customised report and to develop recommendations for next steps		
LONDON OFFICE SUPPORT	Coordination & facilitation, quality control, process toolkit and support in designing workshop / events		

Next steps to bring ideas forward

- Define and secure MCs interest in Deep Dive / Business model innovation
- Specify particular regional focus
  - Germany, Sweden, Italy, Austria, Russia, Eastern Europe, other?
- Identify potential high level champion to lead the project
- Explore opportunities to secure funding – development institutions, corporates, etc.
- Leverage regional dialogues and stakeholders engagement
- Regional MCs events / workshops – to be defined

The decision on launching and running the Deep Dive or new cases on Business model innovation will be confirmed in next Studies Committee in April 2018

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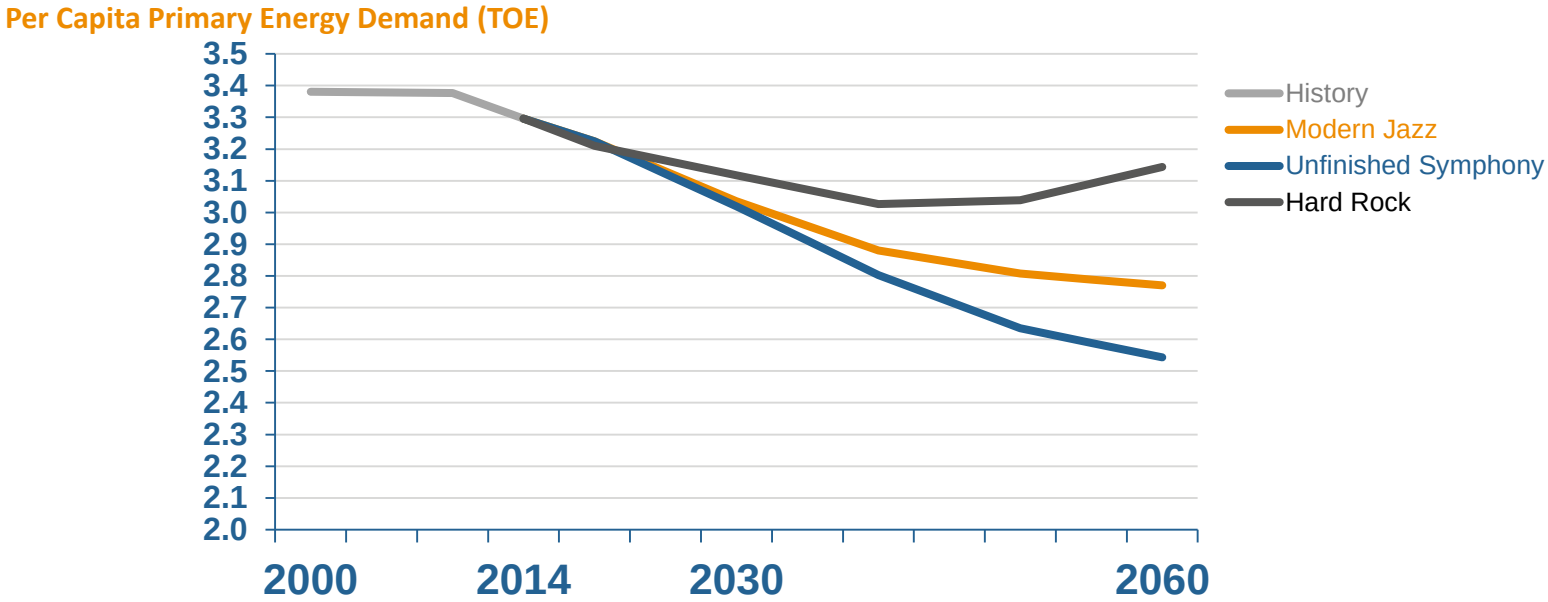
ANNEX

1 EUROPE's PRIMARY ENERGY DEMAND…

…will continue to decline in Modern Jazz and Unfinished Symphony--a bounce back in Hard Rock occurs around 2040; note that per capita energy demand has already peaked.



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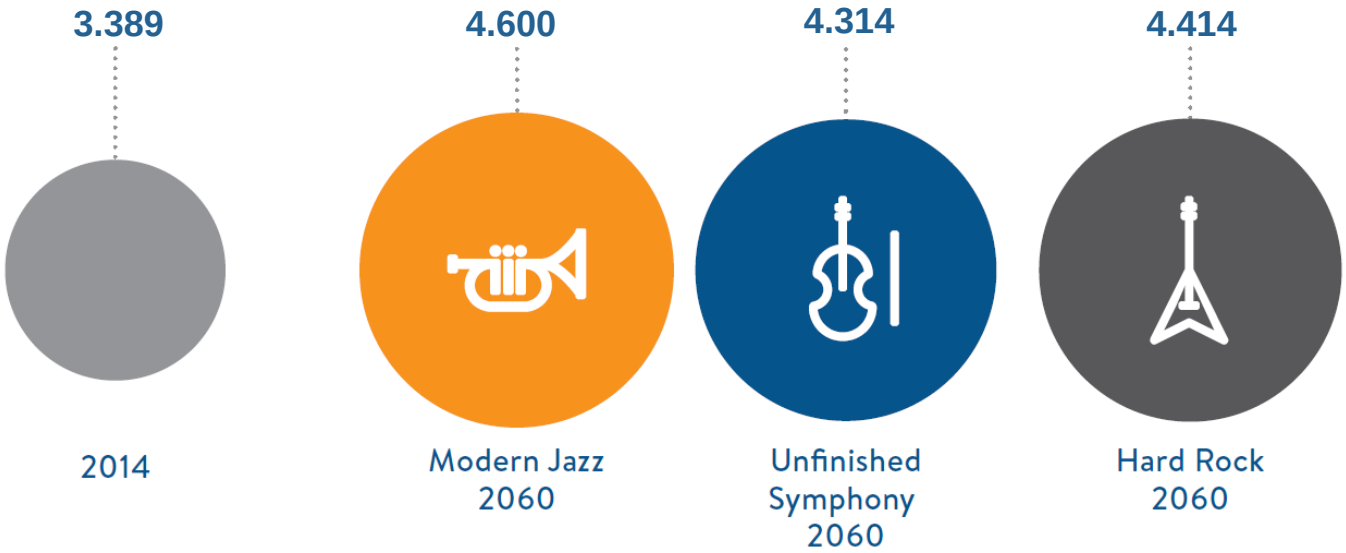
Source: World Energy Council, Paul Scherrer Institute, Accenture Strategy

2 DEMAND FOR ELECTRICITY in EUROPE…

…will rise 27-36% to 2060. The significant increase of renewables with a share of nearly 46% in the electricity system will require substantial infrastructure investments and systems integration to deliver benefits to all consumers.

Electricity Generation
(TWh)



3 THE PHENOMENAL RISE OF SOLAR & WIND ENERGY

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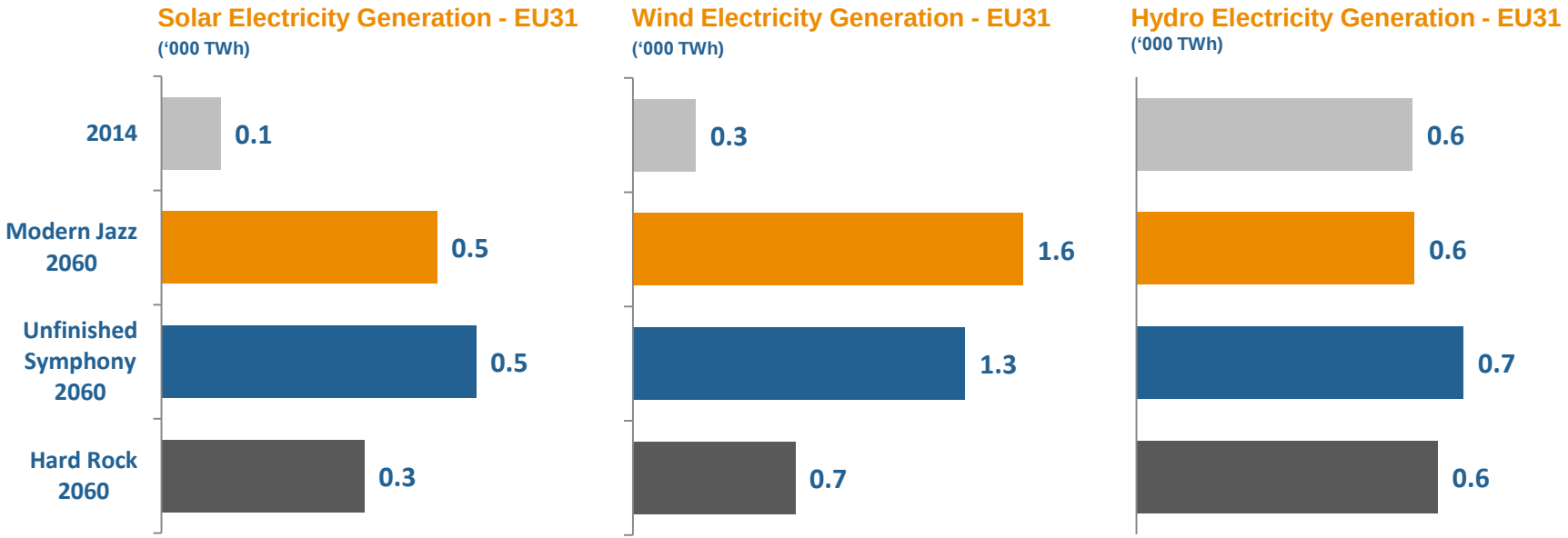
…will continue at an unprecedented rate and create both new opportunities and challenges for energy systems.



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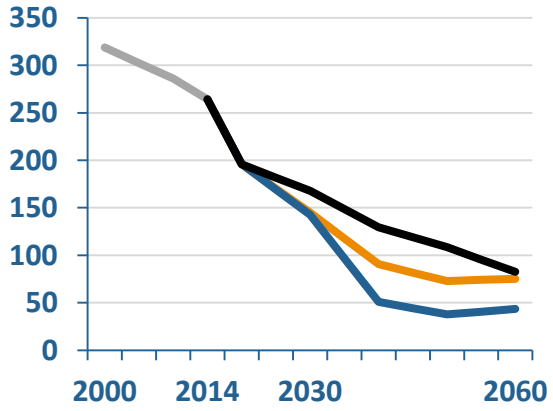
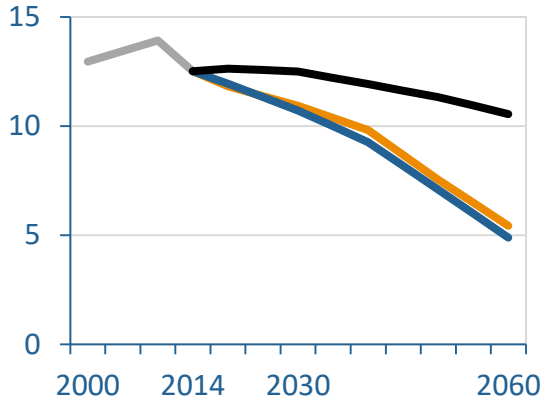
4 DEMAND HAS PEAKED FOR COAL & OIL IN EUROPE

…have the potential to take the world from “Stranded Assets” to “Stranded Resources” – and Europe’s assets will be first

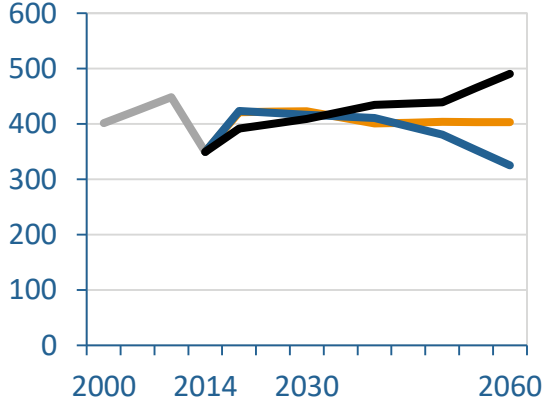
Coal Demand – EU31
(MTOE)



Oil Demand – EU 31
(mb/d)



Natural Gas Demand – EU31
(MTOE)



History | Modern Jazz | Unfinished Symphony | Hard Rock

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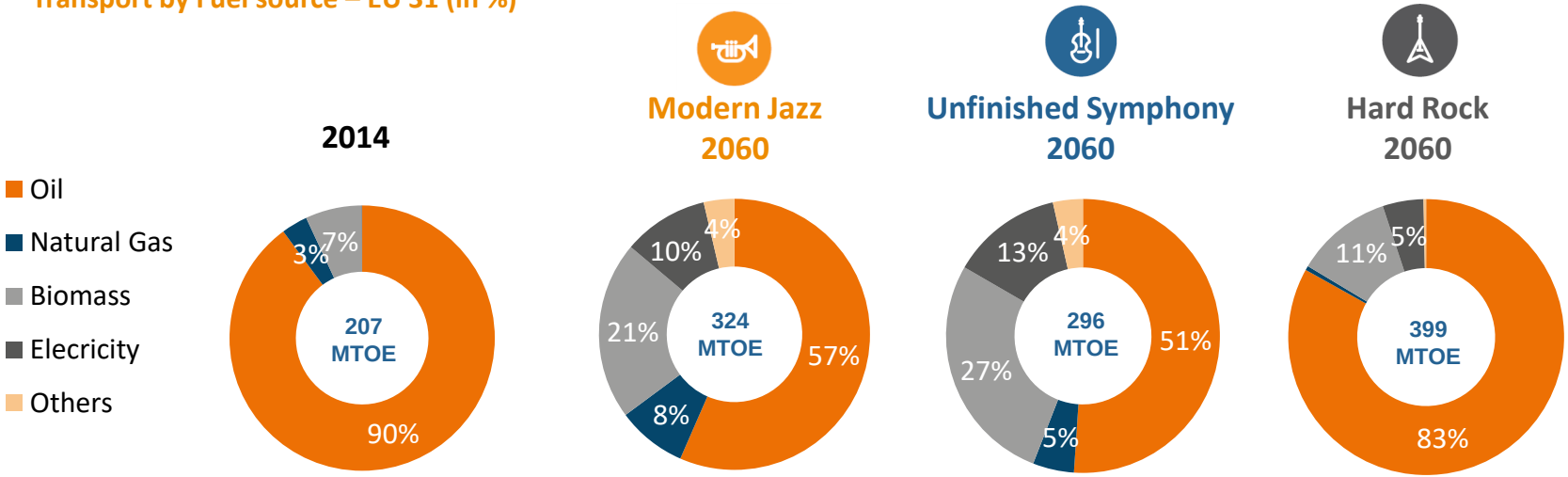
5 TRANSITIONING GLOBAL TRANSPORT…

…forms one of the hardest obstacles to overcome in an effort to decarbonise future energy systems.

Transport by Fuel source – EU 31 (in %)



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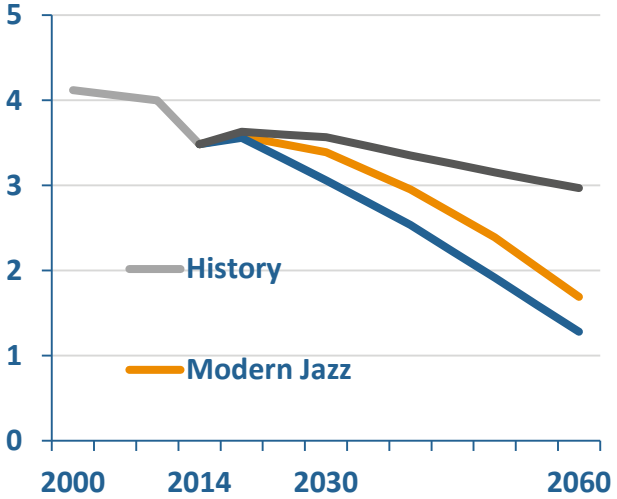
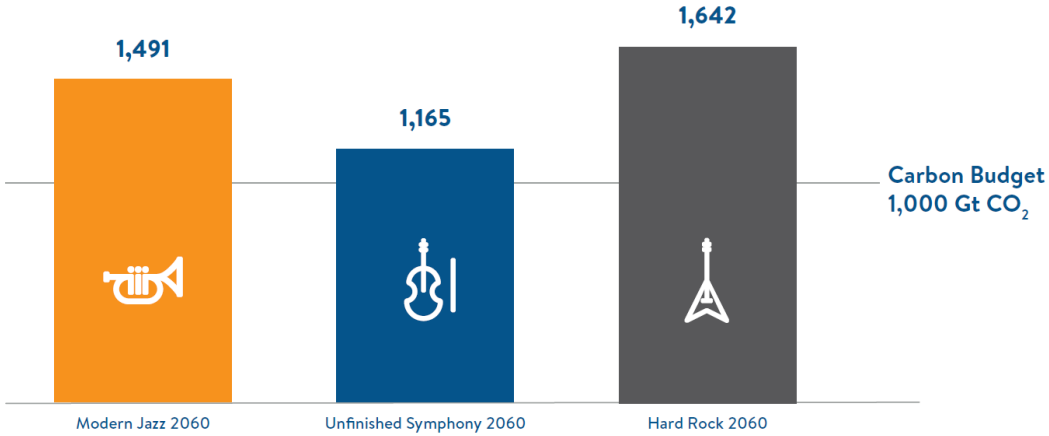
6 LIMITING GLOBAL WARMING…

…to no more than a 2°C increase will require an exceptional and enduring effort, far beyond already pledged commitments, and with very high carbon prices.

Annual Carbon Emissions – EU31
(Gt CO_2)



Cumulative Carbon Emissions 2015-2060 (GtCO2)



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Source: World Energy Council, Paul Scherrer Institute, Accenture Strategy

7 ENERGY TRILEMMA IN 2060

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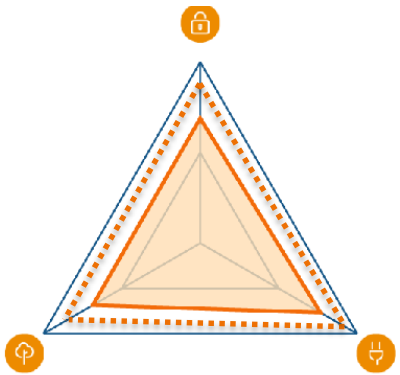
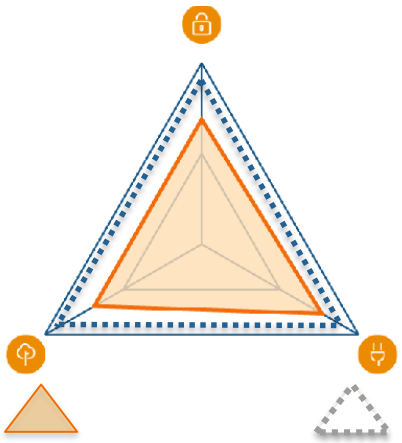
Modern Jazz
2060

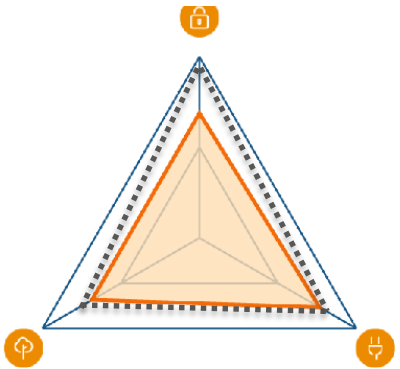


Unfinished Symphony
2060



2014 2060

Hard Rock
2060



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