

# World Energy Scenarios 2019

- WEC partnership with PSI and Accenture
- Highlight at the 24<sup>th</sup> World Energy Congress in Abu Dhabi
  - more than 4,000 delegates including heads of states and CEOs
  - 250 speakers (including PSI), 70 sessions
- **3 scenarios of the energy system** with regional-socioeconomic factors; continuation of 2013 and 2016 studies

## Modern Jazz (market oriented)

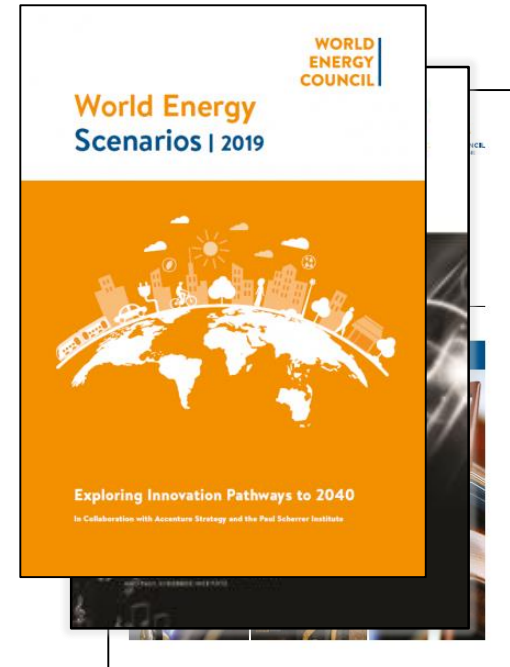
- Market chooses technologies
- Tech innovation & digitalisation
- Energy access for all

## Hard Rock (fragmented policies)

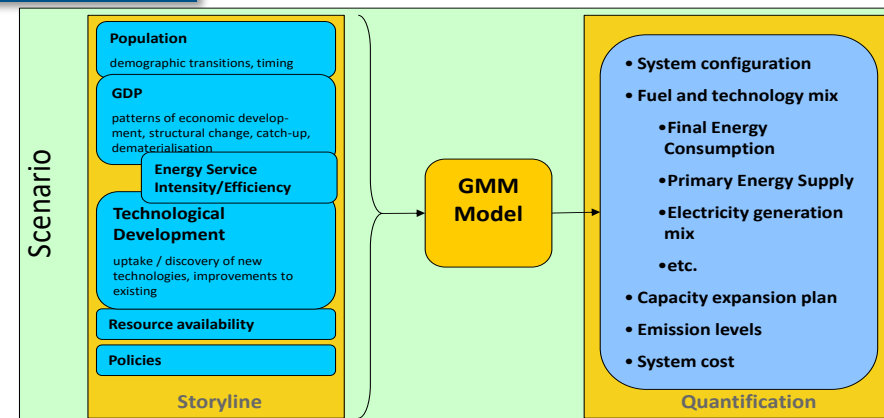
- Low global cooperation
- Focus on energy security
- Best fit local solutions

## Unfinished Symphony (regulation oriented)

- Strong policies focusing on sustainability
- Unified climate action
- Targeted support for technologies

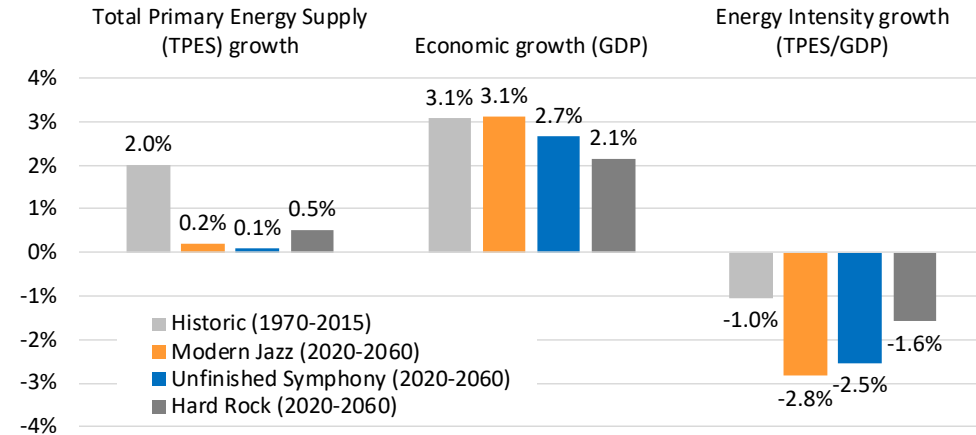


- **Analytical tool for quantification:**  
PSI's energy system model **GMM**
  - Cost optimal model with resources, energy flows, energy technologies and demand sectors in 17 regions

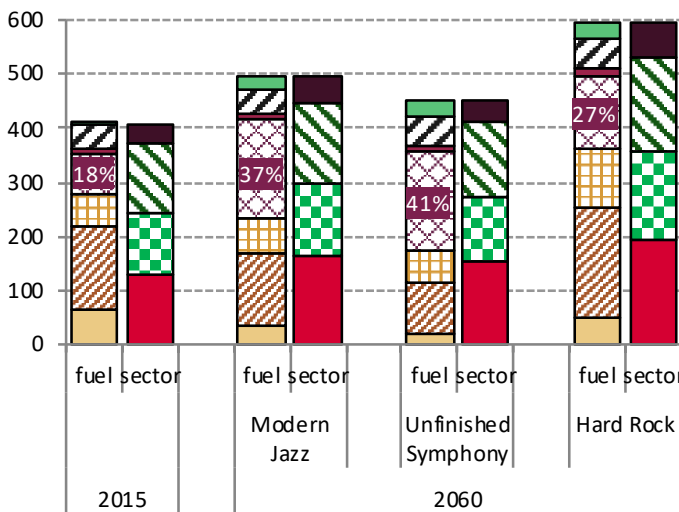


# Energy demand and supply mix

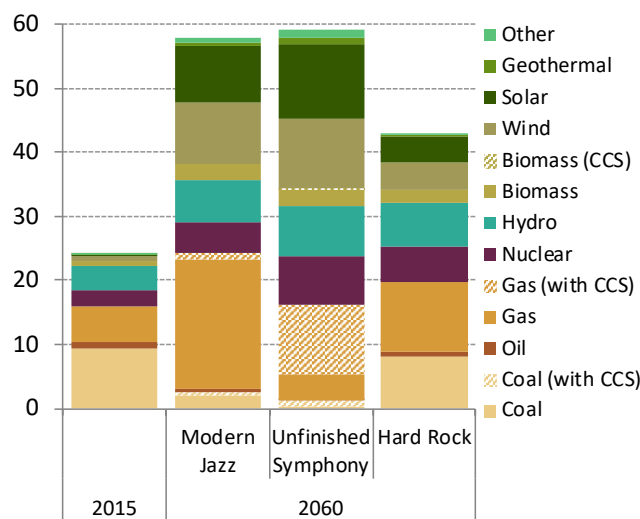
- Compared to historic developments, slower energy demand growth due to:
  - Efficiency gains
  - Changes in demand patterns
- Peak in per capita demand before 2030
- Fossil share declines: 80% (2015) to 60%/50%/70% (2060, Jazz / Symph. / Rock)
- Major consumption growth in electricity



Final energy consumption (EJ/yr.)

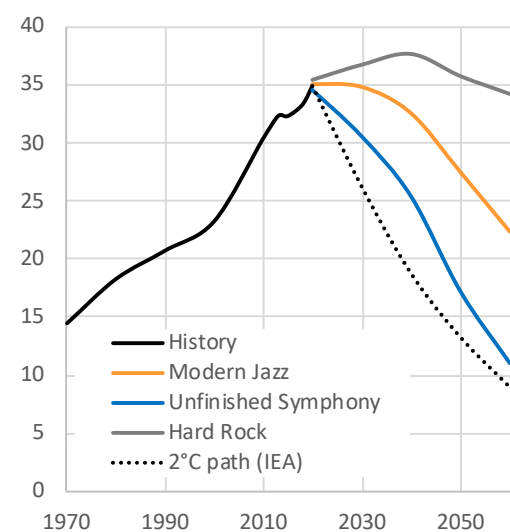


Electricity generation (PWh/yr.)



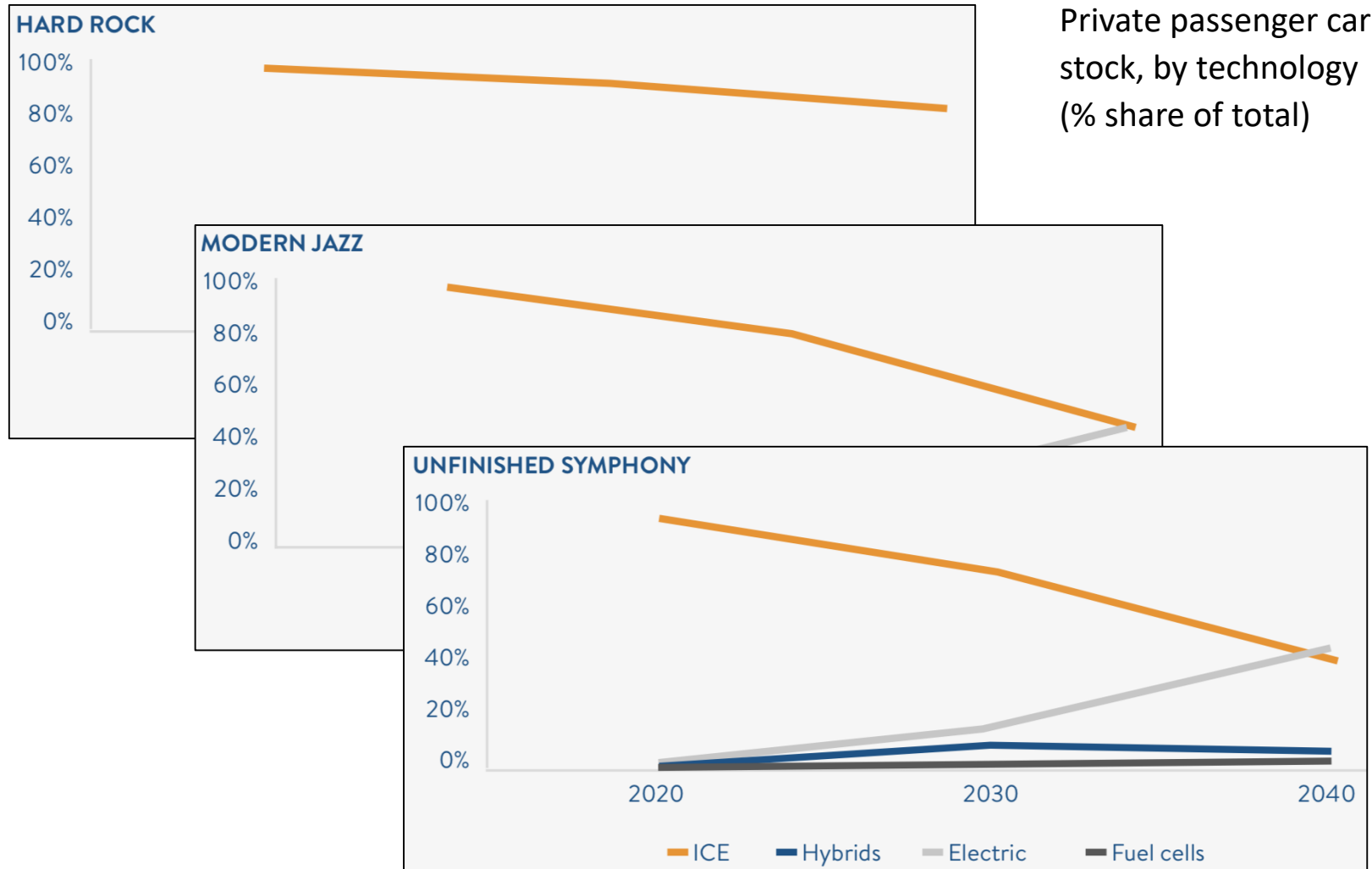
- More low-carbon electricity: 34% (2015) → 60%/93%/55% (2060)
- Investments in power generation: 42/49/35 trillion USD<sub>2010</sub> (2020-2060)

CO<sub>2</sub> emissions (from energy, GtCO<sub>2</sub>)



- Jazz on a +2.5°C pathway
- Symphony slightly above +2°C
- Hard Rock heads towards +3°C

# Private passenger car fleet: cost parity of ICE's and EV's in 2030, crossover point on stock occurring around 2040



# Nuclear: Installed Capacity in GW

## Modern Jazz (market oriented)

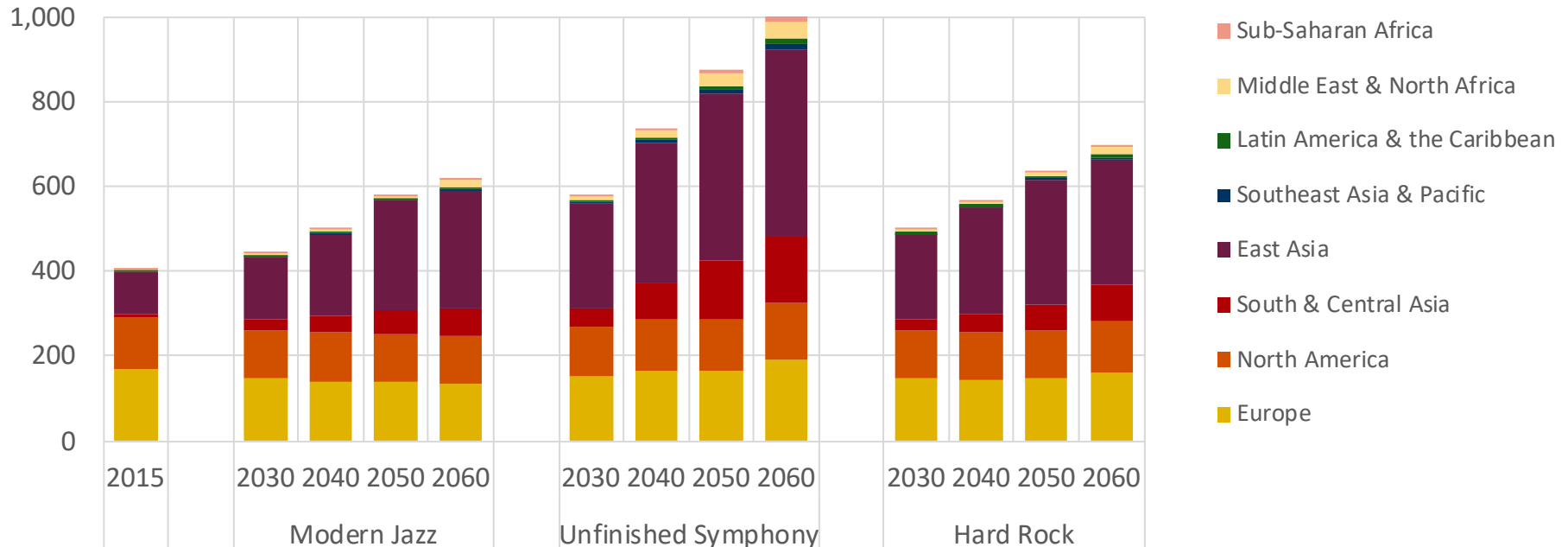
- limited market for large-scale projects
- slowly emerging, regional CO<sub>2</sub> markets
- some nuclear plants under construction are not commissioned

## Unf. Symphony (regulation oriented)

- nuclear growth is enabled by states because of security of supply (quasi-domestic)
- internationally convergent, more stringent CO<sub>2</sub> price

## Hard Rock (fragmented policies)

- nuclear growth is enabled by states in response to security of supply concerns
- low economic growth hampers investments



- China in 2060: +180 GW in Jazz, +320 GW in Symphony, +200 GW in Hard Rock from 2015
- India in 2060: +50 GW in Jazz, +140 GW in Symphony, +70 GW in Hard Rock from 2015
- Cumulative undiscounted investment in new nuclear capacity (2020-2060, in billion USD<sub>2010</sub>):
  - Jazz: 2150 , Symphony: 3620, Hard Rock: 2580