CHINA 2050: A FULLY DEVELOPED RICH ZERO-CARBON ECONOMY

DEMAND-SIDE DECARBONIZATION

DEMAND REDUCTION, ENERGY EFFICIENCY IMPROVEMENT, AND FUEL SWITCH

SUPPLY-SIDE DECARBONIZATION

TECHNICALLY AND ECONOMICALLY FEASIBLE

ELECTRICITY

- 16%: Characteristic for 2050 grid PV
- 15%: Subsidized small-scale PV
- 40%: Hydro + 20 GW: Optics + market power stabilizing
- Energy storage: flexible grid provision
- 10%: 100% = 7,100 GW

HYDROGEN

- 500MM: 520GW: max electricity price and electric power capital cost for electrolysis to achieve cost parity with coal gasification without CCS
- 360 GW: electricity produced from hydro

CARBON CAPTURE & STORAGE

- 150 Gt: practical capture capacity
- 100 Gt: total CCS capacity required per annum, with 90% capture efficiency to leave only 110 Mt residual emission

BIOMASS

- 17 EJ/a: max potential biomass resource, considering 84% used
- 110 Mt: biomass potential supply by source

Fossil fuels

- Hydro + nuclear power standing by

<table>
<thead>
<tr>
<th>Source</th>
<th>Biomass &amp; others</th>
<th>Solar</th>
<th>Hydro</th>
<th>Wind</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy crops</td>
<td>100% = 17 EJ</td>
<td>100% = 110 Mt</td>
<td></td>
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<tr>
<td>Crop straws</td>
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<tr>
<td>Natural gas</td>
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<td>Wind</td>
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</tbody>
</table>

POLICY INSTRUMENTS

Support R&D and early-stage deep decarbonization technologies in energy storage, hydrogen production and storage, biofuels, Power-to-X, etc.

INVEST HEAVILY AND CONTINUALLY IN THE ELECTRICITY TRANSMISSION SYSTEM, HIGH-SPELICAL NETWORKS, AND VEHICLE CHARGING INFRASTRUCTURE.

Meeting these energy demands in a zero-carbon fashion will require a major change in the mix of energy supply, with massive direct or indirect electrification, use of biomass and CCS, and significant reduction of fossil fuel.

Final energy mix in a zero-carbon scenario

<table>
<thead>
<tr>
<th>Sector</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Beverage</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Industry direct electrification</td>
<td>0%</td>
<td>8%</td>
<td>21%</td>
<td>52%</td>
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<td></td>
</tr>
<tr>
<td>Building direct electrification</td>
<td>0%</td>
<td>18%</td>
<td>39%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport direct electrification</td>
<td>0%</td>
<td>1%</td>
<td></td>
<td></td>
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<tr>
<td>Electricity for hydrogen and H2 processes for ammonia</td>
<td>0%</td>
<td>2%</td>
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</tbody>
</table>

TOTAL COST TO DECARBONIZE < 1% CHINA’S GDP

With minimal cost to end-users

For more information: www.energy-transitions.org

SUPPORT INNOVATIONS

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INVEST HEAVILY AND CONTINUALLY IN THE ELECTRICITY TRANSMISSION SYSTEM, HIGH-SPELICAL NETWORKS, AND VEHICLE CHARGING INFRASTRUCTURE.

Guide and incentivize central and local governments and also SOEs to stimulate demand for low-carbon products.