Conditions of a Sustainable Transformation
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Ambitious goal requires smooth interplay of six areas to achieve sustainable renewable transformation

‘Ultra-High’ Levels of Renewables

- **Cost-effectiveness**
  - Clean and cost-effective generation mix

- **System reliability**
  - Grid modernization
  - Ancillary services

- **Technology innovation**
  - DER, EE
  - Big data

- **Smart regulation**
  - Policies, incentives
  - Equitable tariffs
  - Market design

- **Consumers**
  - Affordability
  - ‘Prosumers’

- **Business models**
  - Both from new players and utility

Industry, consumers and regulators need to cooperate in the transformation journey

Source: BCG analysis

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### Key challenges to be aware of and transparently address during the journey

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-effectiveness</td>
<td>Cost-effectiveness and steps of renewable increase</td>
</tr>
<tr>
<td>System reliability</td>
<td>Reliability, resiliency and investment costs</td>
</tr>
<tr>
<td>Technology innovation</td>
<td>Conventional, centralized and distributed technologies</td>
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<tr>
<td>Business models</td>
<td>Regulated utilities and new market players</td>
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<tr>
<td>Consumers</td>
<td>Consumers and prosumers</td>
</tr>
<tr>
<td>Smart Regulation</td>
<td>All above plus speed, fairness and costs</td>
</tr>
</tbody>
</table>
**Regulatory initiatives to embrace transformation do impact both business models and revenue models**

<table>
<thead>
<tr>
<th>Traditional Revenue Model</th>
<th>New Revenue Model</th>
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<tbody>
<tr>
<td>UK RIIO</td>
<td>NY REV</td>
</tr>
<tr>
<td>Denmark (public ownership)</td>
<td></td>
</tr>
<tr>
<td>Massachusetts</td>
<td>Hawaii PSIP/DGIP</td>
</tr>
<tr>
<td>Illinois</td>
<td>California DRP OIR</td>
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<tr>
<td>California AB327</td>
<td>EU 3rd Energy Package</td>
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**Business model (role of IOU)**

- **Transformational change, not incremental**
- **Stress industry capabilities**
- **Uncertainty, hence need scenarios and flexible path forward**
- **Internal and external alignment imperative**

No clear solution yet but ongoing initiatives will provide critical learnings for transformation

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Transformation example: Utility defined vision and path towards a clean and affordable energy future for Hawai'i

- National leader in renewable energy
- 100% renewable share by 2045
- Highest penetration of rooftop solar in US
- ~3x installation growth by 2030
- Affordable energy for all customers
- ~20% bill reduction by 2030
- Community solar

Source: Hawaiian Electric website

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