Green Hydrogen from Chile
IRENA Innovation Week 2018

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CORFO’S INNOVATION STRATEGY – GREEN HYDROGEN

- 1st local consumption:
  - Introduce green hydrogen in the industrial customers (Today worldwide: Ammonia 54%, Refinery 25%, steel and glass 3%; food industry 2%)
  - Dual Combustion and Fuel cells in Mining fleets (shipping fleets and public transport)
  - Energy Storage

- 2nd Long term ➔ supply international demand (i.e. Japan)
TECHNOLOGICAL CONSORTIUM – HYDROGEN IN MINING TRUCKS

DUAL HYDROGEN-DIESEL COMBUSTION FOR MINER EXTRACTION TRUCKS

5-year budget: MMUSD 20 (MMUSD 5.8 Corfo contribution)

FUEL CELLS FOR MINING FLEETS, ON UNDERGROUND MINING

5-year budget: MMUSD 2.2 (MMUSD 1.1 Corfo contribution)
INNOVATION FOR A 100% RENEWABLE ENERGY SYSTEM.

Chile has the opportunity, even by 2023, to produce hydrogen at a competitive price due to the low cost of PV energy.

### LCOH \([$/kg_{H2}]\)

<table>
<thead>
<tr>
<th></th>
<th>100 % RES - 2023</th>
<th>100 % RES - 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCOH(<em>{bajo}) basado en LCOE(</em>{H2, bajo})</td>
<td>1.80</td>
<td>1.30</td>
</tr>
<tr>
<td>LCOH(<em>{alto}) basado en LCOE(</em>{H2, alto})</td>
<td>3.03</td>
<td>2.86</td>
</tr>
</tbody>
</table>

Source: Chilean Solar Committee, 2018: *Opportunities for the development of a solar hydrogen industry in the regions of Antofagasta and Atacama: Innovation for a 100% renewable energy system.*
Estimated LCOH production in Chile 2018

The results indicate that the most efficient production mechanism in terms of LCOH is through the supply of FV (8-18h) for both electrolysis technologies (PEM and Alkaline).

The alkaline electrolyser is more competitive for this case study (on-grid) with 2.65 US$/kg for 2018 and 1.69 US$/kg for 2025.

### Estimated LCOH production in Chile 2025

<table>
<thead>
<tr>
<th>System Type</th>
<th>LCOH2 USD/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEM-CSP</td>
<td>3.29 (-32%)</td>
</tr>
<tr>
<td>PEM-PV</td>
<td>3.05 (-25%)</td>
</tr>
<tr>
<td>ALK-CSP</td>
<td>3.52 (-33%)</td>
</tr>
<tr>
<td>ALK-PV</td>
<td>3.20 (-24%)</td>
</tr>
<tr>
<td>PEM-CSP</td>
<td>3.75 (-32%)</td>
</tr>
<tr>
<td>PEM-PV</td>
<td>3.58 (-25%)</td>
</tr>
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Bottling the Sun