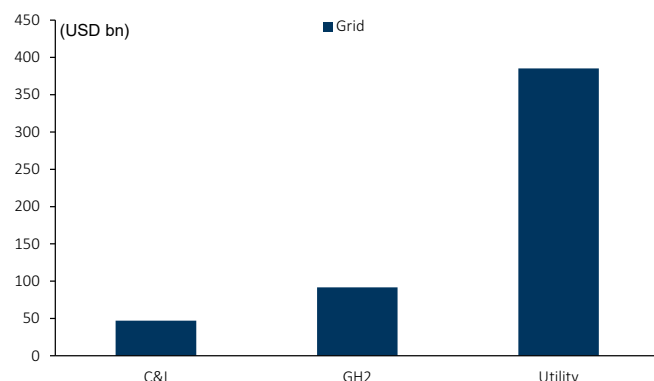


Exhibit 56: FY24-50E transmission capex - network expansion

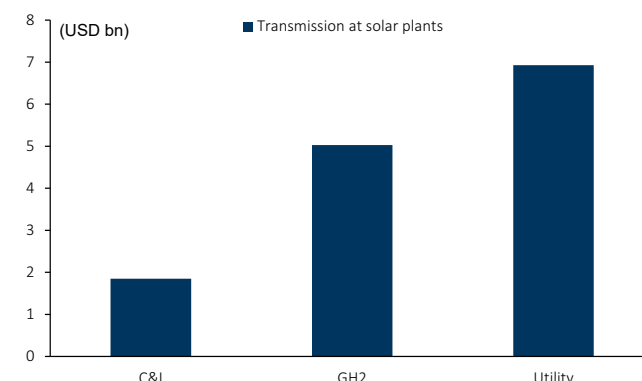
Breakdown of grid capex by end-user - GSe



Source: Goldman Sachs Global Investment Research

Exhibit 57: FY24-50E transmission equipment capex - solar projects

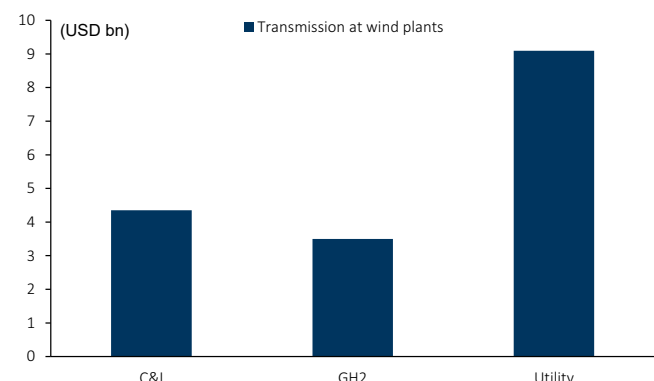
Breakdown of transmission evacuation capex for solar projects - GSe



Source: Goldman Sachs Global Investment Research

Exhibit 58: FY24-50E transmission equipment capex - wind projects

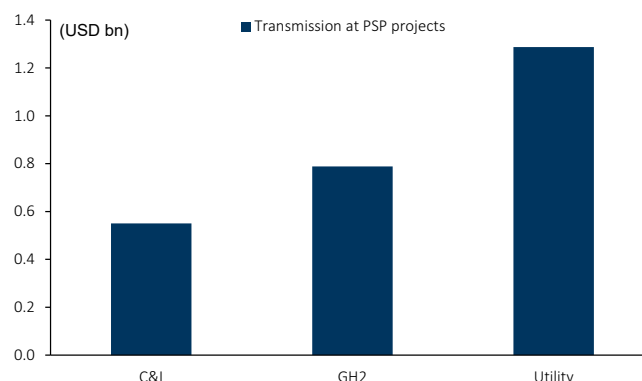
Breakdown of transmission evacuation capex for wind projects - GSe



Source: Goldman Sachs Global Investment Research

Exhibit 59: FY24-50E transmission equipment capex - pumped storage projects

Breakdown of transmission evacuation capex for pumped hydro storage projects - GSe

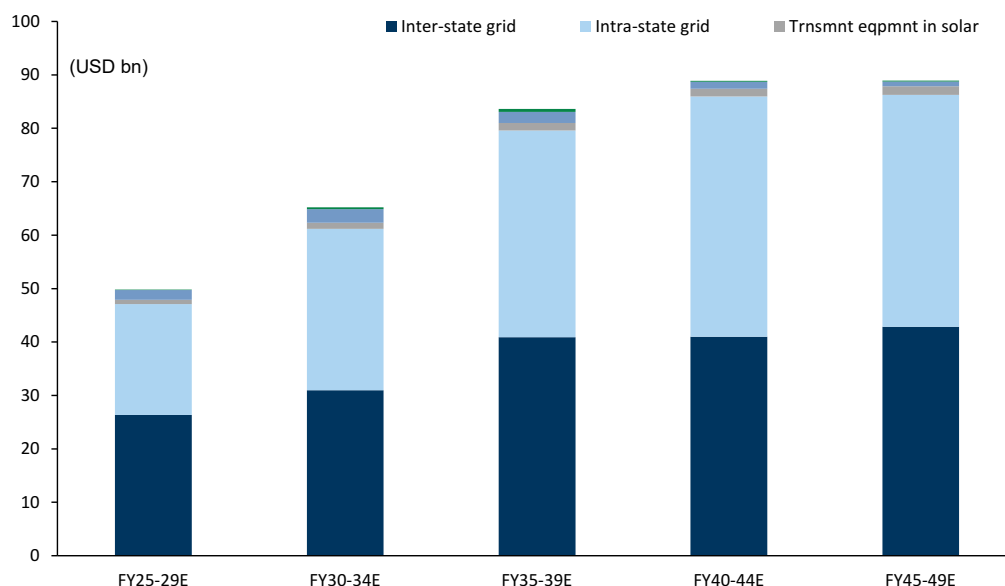


Source: Goldman Sachs Global Investment Research

Utility-scale TAM to be initially driven by national grid upgrade, with state grid upgrades picking up later:

We expect utility scale grid capex to be driven by national grid upgrades in the medium term, as planned renewable capacity additions will require transmission infrastructure creation for generation evacuation. However, over the longer term, we anticipate larger investments in state grid upgrades to accommodate expansion in consumers' load profile (cooling, EV charging, e-cooking etc.) and rise in distributed generation (rooftop solar, vehicle-to-grid etc.).

Exhibit 60: Expect inter-state grid to lead the capex revival initially, followed by pick up in intra-state build out to match voltage upgrade

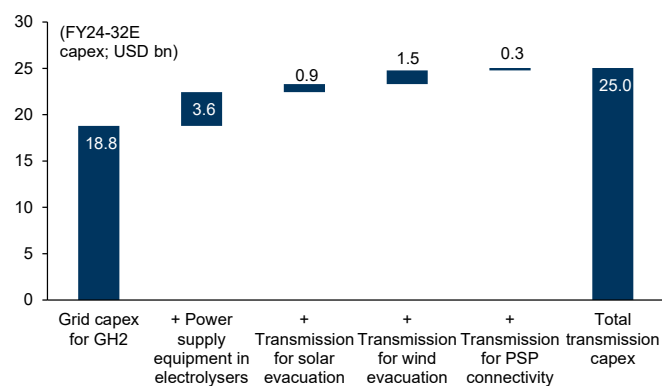


Source: CEA, Goldman Sachs Global Investment Research

Transmission to contribute fifth of the GH2 capex pie; will be among the earliest ordering beneficiary:

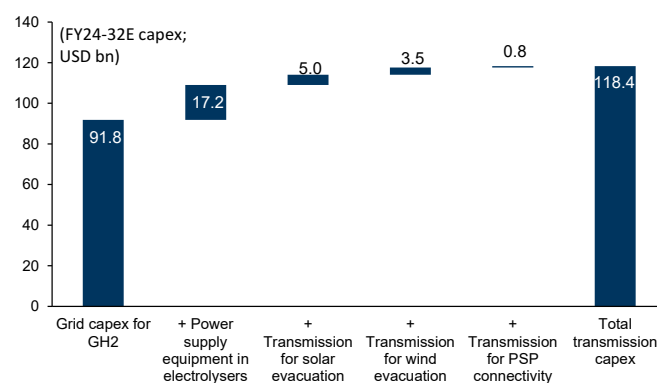
We forecast power transmission to be one of the key beneficiaries of India's GH2 foray, constituting almost a fifth of the overall capex requirement of c.USD520bn by FY50E. As per our estimates, power transmission accounts for 18% of the upstream GH2 capex and will materialise early in the cycle, given transmission is one of the longest lead items in execution. The opportunity size will be even larger for transmission / power supply equipment manufacturers as they will have a play in electrolyser manufacturing as well, with c.25% of alkaline electrolyser capex being attributable to power supply equipment like transformers, rectifiers, AC-DC converters etc.

Exhibit 61: We estimate GH2 linked transmission capex between FY24-32E at USD25bn...



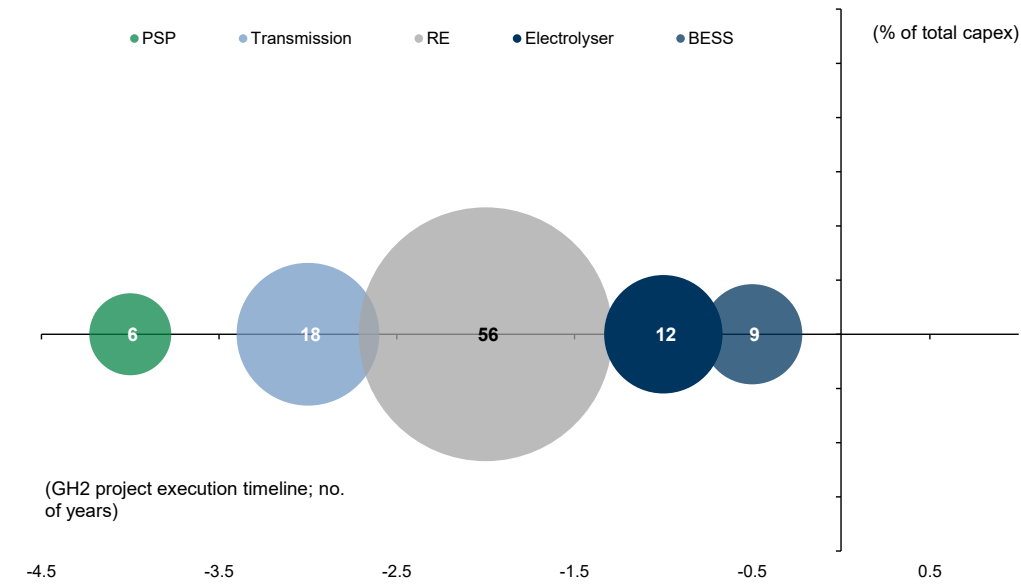
Source: CEA, Goldman Sachs Global Investment Research

Exhibit 62: ...and USD118bn between FY24-50E



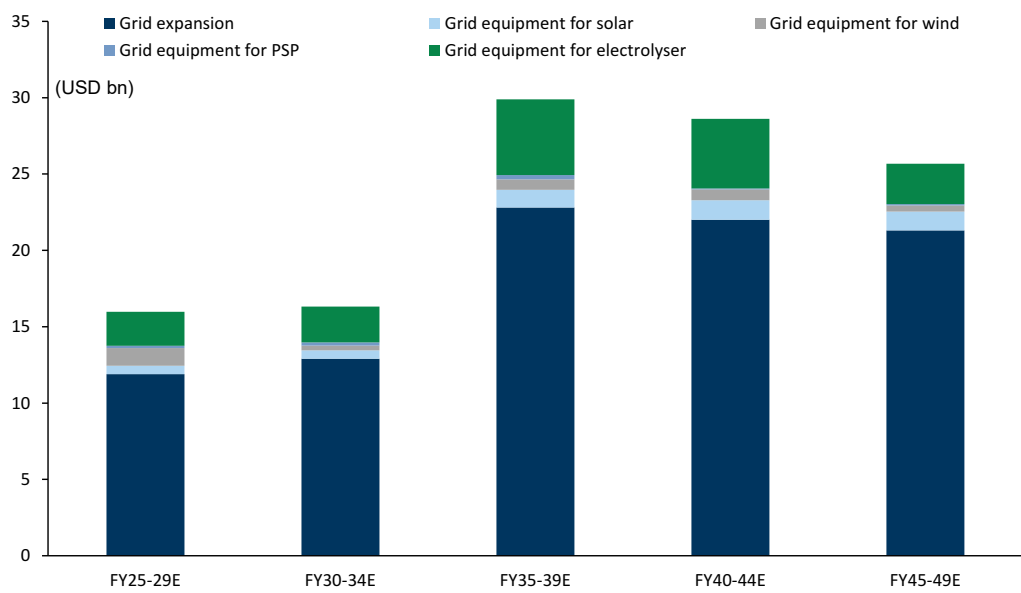
Source: CEA, Goldman Sachs Global Investment Research

Exhibit 63: We estimate transmission to constitute 18% of upstream green hydrogen capex, which we expect to materialise at least 2-3 years before the beginning of green hydrogen production



Source: Goldman Sachs Global Investment Research

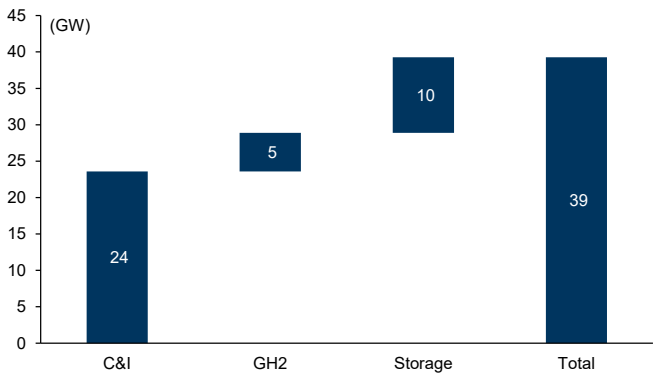
Exhibit 64: Power supply equipment in electrolyzers also provide a material TAM for transmission equipment manufacturers, apart from the grid expansion capex



Source: CEA, Goldman Sachs Global Investment Research

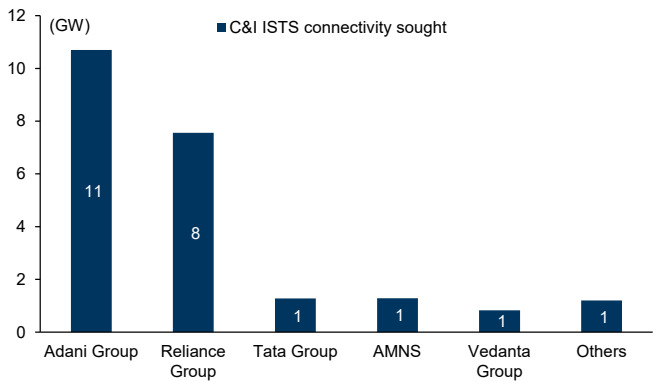
C&I decarbonisation beginning to create transmission upgrade demand: Lastly, our detailed analysis of transmission demand from the fast growing corporate decarbonisation (C&I) segment strengthens our belief on its increasing importance in transmission planning. Our analysis reveals c.40GW grid access demanded by non-utility load centers, which will require significant transmission capacity upgrades. We estimate transmission capex requirement of USD8bn between FY24-32E and USD47bn by FY50E, if India was to shift its existing industrial load completely to renewables. Our estimates do not factor the growth in industrial power demand during the transition.

Exhibit 65: Since the implementation of green open access norms, c.40GW non-utility load has sought central grid access - yet to be fully factored in the government’s transmission plans



Source: Grid India, Data compiled by Goldman Sachs Global Investment Research

Exhibit 66: Adani Group leading among corporates in seeking grid connectivity, followed by Reliance Industries



Source: Grid India, Data compiled by Goldman Sachs Global Investment Research

Case study: How Reliance Industries' Jamnagar Refinery CTU connectivity grant was a landmark event in India's energy transition journey

While corporate decarbonisation via direct renewable energy supply gained prominence post implementation of green open access regulations in FY23, we identify CERC's approval for central grid connectivity to Reliance Industries' (RELI.BO; Buy) Jamnagar Refinery as a landmark event in India's energy transition journey.

What happened? - Central Electricity Regulatory Commission (CERC) approved Reliance's request for central grid connectivity for procurement of 500MW renewable power for its Jamnagar Refinery in Jan'22. To enable this, CERC also allowed construction of a dedicated transmission line and directed the Central Transmission Utility of India (CTUIL; government designated grid planner) to *ensure development of the transmission network, and to provide "non-discriminatory" open access to its transmission system (i.e., ISTS) for use by any licensee or generating company or a consumer.*

Why was it a landmark? - This order set the precedence for allowing central grid access to large power consumers (100MW+ demand) by establishing a dedicated transmission system, helping them completely bypass state distribution companies. Previously, state governments / DISCOMs would discourage large, lucrative industrial consumers from procuring electricity over open access, by imposing exorbitant charges on their transmission & distribution infrastructure usage.

How did it change India's energy transition landscape? - In our opinion, this order led to 2 fundamental changes:

1. By allowing bypassing of state discoms, it opened an entirely new business model for renewable power developers in India. We covered it in detail in our **Generation coverage initiation note**, flagging it as a c.300GW economically viable transition opportunity.
2. More importantly, when viewed in conjunction with India's central grid charge waiver for new and renewable energy projects, it lays the groundwork for our India Energy Transition Stack (Exhibit 14), where we highlight how India is leveraging its large, integrated central electricity grid to implicitly incentivize renewables for attaining global new energy cost leadership.

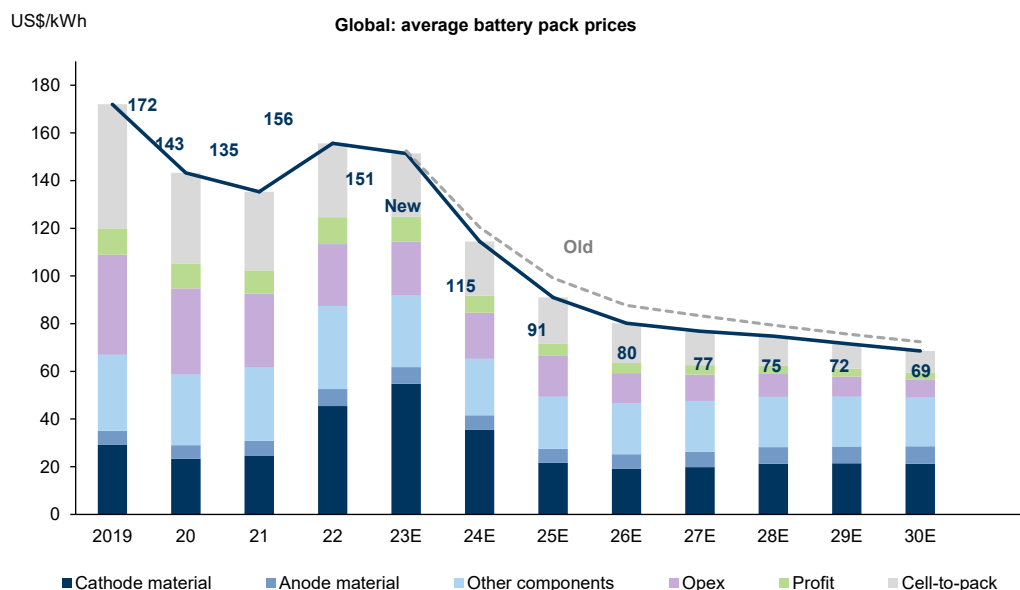
#6 Battery Storage cost decline could break our thesis; transmission equipment shortage could delay it

What can break our thesis?: While global shortage in transmission equipment manufacturing capacity could delay materialisation of our transmission TAM, we believe a sharper than expected decline in global battery prices could affect our TAM estimate itself by -

- 1. Improving line utilisation:** RE has a much larger transmission intensity than fossil fuel based power generation capacity as inherently low utilisation factors mandate over-building of generation capacity, in turn requiring larger evacuation infrastructure. Inexpensive battery attachment to renewable capacity would lead to improved line utilisation, thereby reducing overall transmission capacity requirement.
- 2. Reducing renewable overbuild requirement:** Currently, intermittency of a renewable only power supply system leads to overbuilding of capacities to ensure load profile matching. This, in turn leads to larger transmission capacity build out, especially in a hybrid solar-wind system where the capacities are located in different geographical areas.

What is needed for that to happen: GS's Global Batteries team estimates 9%+ compound annual decline in LFP battery pack prices over CY22-30E, which is already beginning to translate into **sharp reduction in battery storage tariffs** in India.

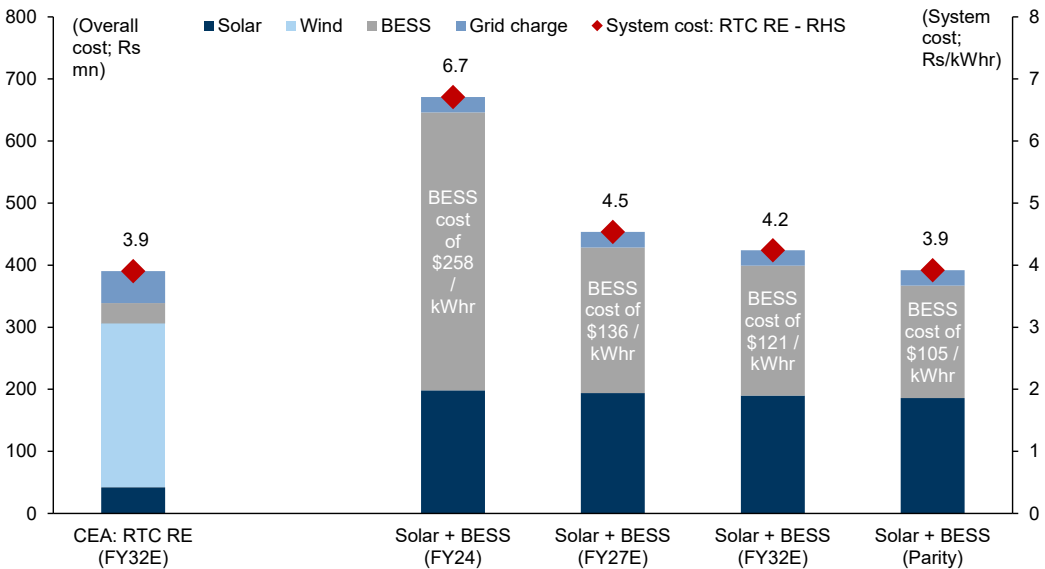
Exhibit 67: GS Global Batteries team expects battery pack prices to reach USD69/kWh by CY30E



Source: Company data, Wood Mackenzie, SNE Research, BNEF, Goldman Sachs Global Investment Research

However, for a solar + battery storage system to make the current over-sized wind solar system (in 3:1 generation ratio) unviable, BESS cost needs to decline from c.USD250/kWhr currently to USD105/kWhr when factoring end of transmission cost waiver and USD90/kWhr, if the grid charge waiver were to continue.

Exhibit 68: At system cost level, we estimate BESS capex needs to decline to USD105/kWhr (from c.USD250/kW currently) for a combination of solar and battery storage to make current oversized-wind based RTC systems redundant



*BESS - Battery Energy Storage System, RTC RE - Round the Clock Renewables; our calculation assumes no grid charge waiver on any renewable or storage capacity

Source: CEA, Goldman Sachs Global Investment Research

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Reg AC

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Growth is based on a stock's forward-looking sales growth, EBITDA growth and EPS growth (for financial stocks, only EPS and sales growth), with a higher percentile indicating a higher growth company. **Financial Returns** is based on a stock's forward-looking ROE, ROCE and CROCI (for financial stocks, only ROE), with a higher percentile indicating a company with higher financial returns. **Multiple** is based on a stock's forward-looking P/E, P/B, price/dividend (P/D), EV/EBITDA, EV/FCF and EV/Debt Adjusted Cash Flow (DACF) (for financial stocks, only P/E, P/B and P/D), with a higher percentile indicating a stock trading at a higher multiple. The **Integrated** percentile is calculated as the average of the Growth percentile, Financial Returns percentile and (100% - Multiple percentile).

Financial Returns and Multiple use the Goldman Sachs analyst forecasts at the fiscal year-end at least three quarters in the future. Growth uses inputs for the fiscal year at least seven quarters in the future compared with the year at least three quarters in the future (on a per-share basis for all metrics).

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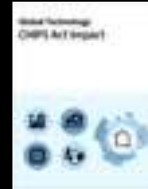
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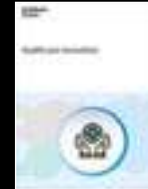
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