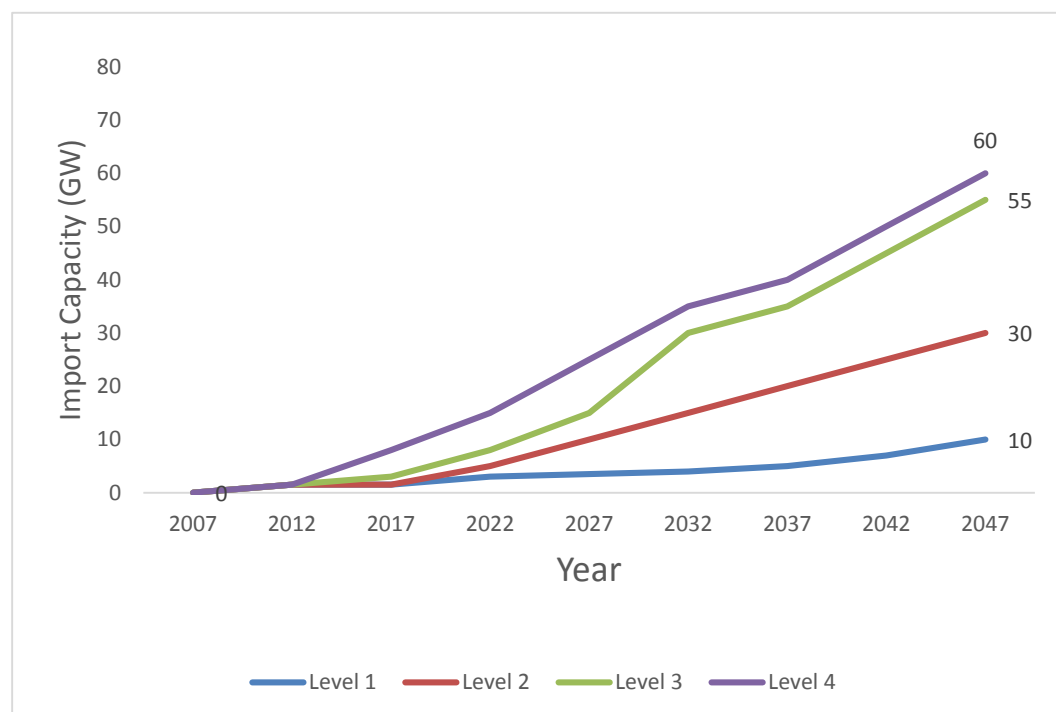


CROSS BORDER ELECTRICITY TRADE (IMPORT)

Presently India is importing 1.5 GW hydropower from Bhutan, and also exporting around 500 MW to Pakistan; 120-150 MW to Nepal and around 500 MW to Bangladesh. During 2017-22, import has been projected at 8 GW mostly from Bhutan, and possibly Nepal as well. Options of power export/imports from Myanmar, Bangladesh, Pakistan and Sri Lanka are also being explored. The inter-connection with India's neighbors is important from future import/export/balancing viewpoints. This analysis captures only the contracted electricity imports and exports. The recent SAARC agreement on a south Asian grid will enable this trade.



LEVEL 1

Level 1 assumes that India's integration with regional grids is poor. One implication of this is, that India is unable to tap the hydro potential in the Himalayan States, that may have helped balance our grid. Resultantly, imports continue to be low, as projects planned are delayed. An increase in electricity imports of 3GW during 13th Plan (2017-22) is likely as some of the under construction projects will be completed and thereafter will reach 7GW by 2042 and 10GW by 2047.

LEVEL 3

Level 3 assumes aggressive growth in imports and assumes India imports maximum power from Bhutan and Nepal and will meet its 8GW target envisaged in 13th Plan by 2022; India will import 30GW by 2032 as it is assumed that 75 Hydro Electric Projects (HEP) with a capacity of 25GW proposed in Bhutan will be completed by 2030 and will export electricity to India. Electricity import will be 55GW by 2042 as it is assumed that Nepal will commission its 23GW HEP projects and will export to India. This will be maintained at same level till 2047.

LEVEL 2

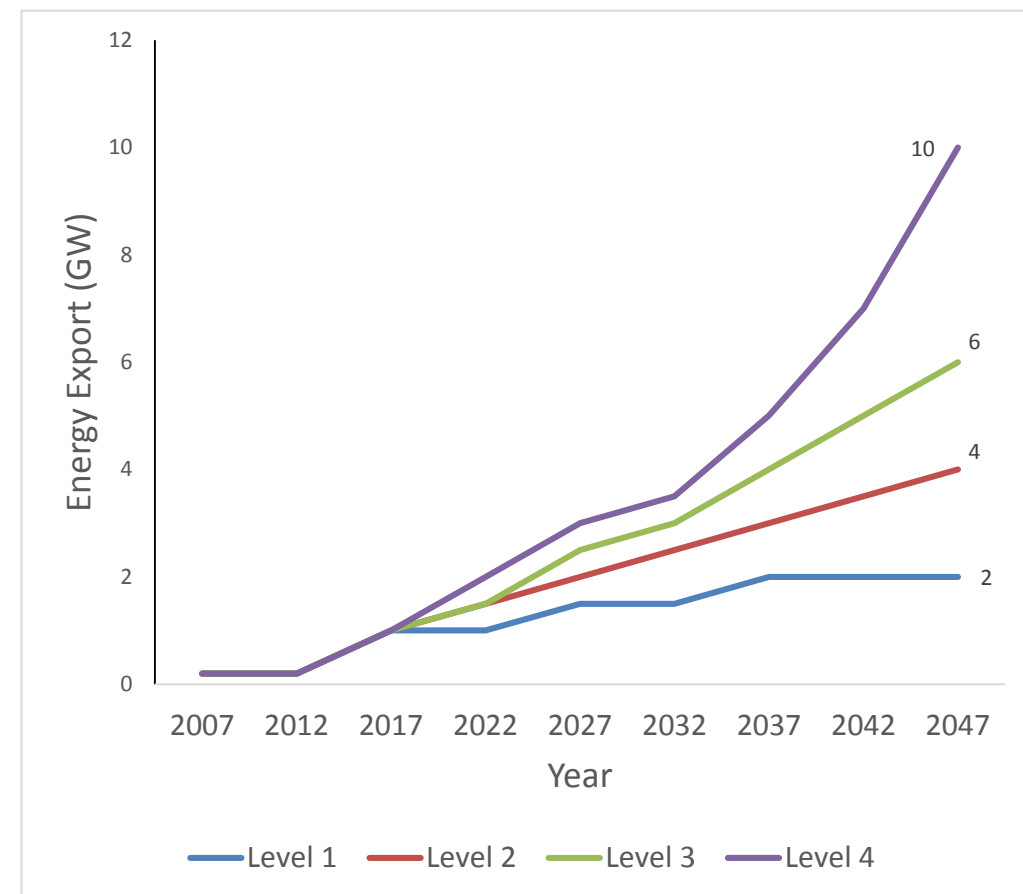
Level 2 assumes imports continue to grow at a moderate pace, planned projects will be completed but India will not be able to achieve its target of 8GW envisaged in 13th Plan. It will import 5GW by 2022 and thereafter maintain a steady growth rate of 5GW in every 5 yearly periods thereafter with cumulative capacity reaching 30 GW in 2047.

LEVEL 4

Level 4 assumes optimistic growth in imports and assumes power import from other countries apart from Bhutan and Nepal as well. Target of 8 GW envisaged in 13th Plan will be achieved in 12th Plan itself. It is assumed that Nepal will explore its economical hydro potential of 42GW and export large volumes of electricity to India. Imports may go up to 50 GW by 2042 and will reach 60GW by 2047.

CROSS BORDER ELECTRICITY TRADE (EXPORT)

Presently India is a net exporter to Bangladesh, Nepal and Pakistan. It is assumed that by 2022, the situation will change, and Nepal (and Bhutan) will be net exporter of electricity to India, whereas only Pakistan and Sri Lanka will remain as a net importer from India. This is likely to help stabilize the Indian grid and balance excess generation, particularly of RE origin.



LEVEL 1

Level 1 assumes that export continues to be low as India will be focusing more on meeting domestic demand. Electricity export will be of 1.5GW during 14th Plan (2022-27) as some of the under construction projects in Pakistan and Bangladesh will be completed (thereby, obviating the need to import electricity), and thereafter will reach 2GW by 2037 and remain same till 2047.

LEVEL 2

Level 2 assumes export continue to grow at a moderate pace and it is assumed that phase 1 of bipolar High Voltage Direct Current (HVDC) line between India and Sri Lanka will be completed in 13th Plan. India will continue to supply to Pakistan and Bangladesh. Indian electricity exports rise to 2GW by 2022 and reach 4GW by 2047.

LEVEL 3

Level 3 assumes aggressive growth in export, India will export 1.5 GW during 13th five year plan. With accelerated completion of pending projects between Bangladesh and Pakistan, phase 1 & 2 of bipolar HVDC line between India & Sri Lanka completed during 13th & 14th five year plan, India will export 2.5GW by 2027, 5GW by 2042 and 6 GW by 2047.

LEVEL 4

Level 4 assumes optimistic growth in exports and assumes power export to Bangladesh, Pakistan, Sri Lanka. It is assumed that proposed transmission infrastructure and power stations projects will be completed and lot many projects will be allocated for export of power to various countries. India will export 7GW by 2042 and 10GW by 2047.