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Comments/ Suggestions On X-factor

X- Factor Implementation Challenges & Suggestions

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1. **X- factor implementation will have huge impact on revenues:** The revenue loss by the RE Generators, as per the 41-week study submitted by Grid India goes upto 48.2%, **making project returns negative.**

2. **Over-injection balancing a challenge:** Schedules can be revised from the 7^{th}/8^{th} time-block, translating to a lead time of approximately 1.75 to 2 hours; real-time market opens one hour before delivery, which is too late for managing short-term renewable deviations.

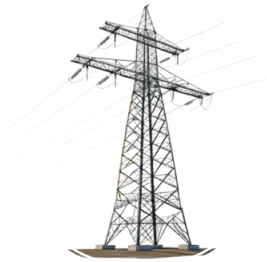
3. **Weather related national challenges:** Indian weather models operate at spatial resolutions of approximately 4 km, and is updated 4 times a day, which is not enough to capture the sudden wind gusts and clouds, resulting in high deviation.

4. **Suggestions for implementing X factor are two fold:**
   i. Regional Aggregations of Schedules
   ii. Creation of imbalance/ancillary market

Suggestions On BESS Market

1. Regional Level Aggregation

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Regional Grid



GSS 1



GSS 2



W1/S1



W2/S2



W3/S3

Mandatory
Regional level aggregation

Reduction of DSM impact on WS generators

2. Large BESS Installation in RE Rich Substations

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Ancillary Services Despatch: PRAS & SRAS

National Transmission Charges Pool

PRAS/SRAS receivables against each BESS to D&A pool and adjusted from cost paid by W/S gencos to BESS

2. BESS participates in PRAS/SRAS-(RLDCs)

BESS Cost Part of Transmission Charges Pool ;

1. BESS manages W/S imbalances and has capacity for ancillary services (decided by RLDC)



Large BESS under TBCB – Optimal Mwhr



W1/S1



W2/S2



W3/S3

i. BESS fulcrum for developing national PRAS/SRAS market in 3 – 5 yrs

ii. Revenue to BESS to progressively come from ancillary markets reducing impact on W/S Gencos eg Hornsdale BESS, Australia (Annexure I)

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ANNEXURES

Annexure I- Hornsdale Grid-Scale BESS (Australia)

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Hornsdale Power Reserve (HPR) - one of the world's landmark grid-scale lithium-ion battery projects; it can inject power during frequency dips, absorb power during over-generation, and deliver fast, precise stabilisation essential for a renewables-dominant system

It was commissioned initially at 100 MW / 129 MWh in 2017;

Secured a long-term, **fixed contract** from the South Australian government (~AUD 4.2 million per year for 10 years). Remaining revenue through sale in ancillary market.

The SA Govt. reserved **70 MW / ~29 MWh** (24 mins) of the battery capacity for grid contingency events.

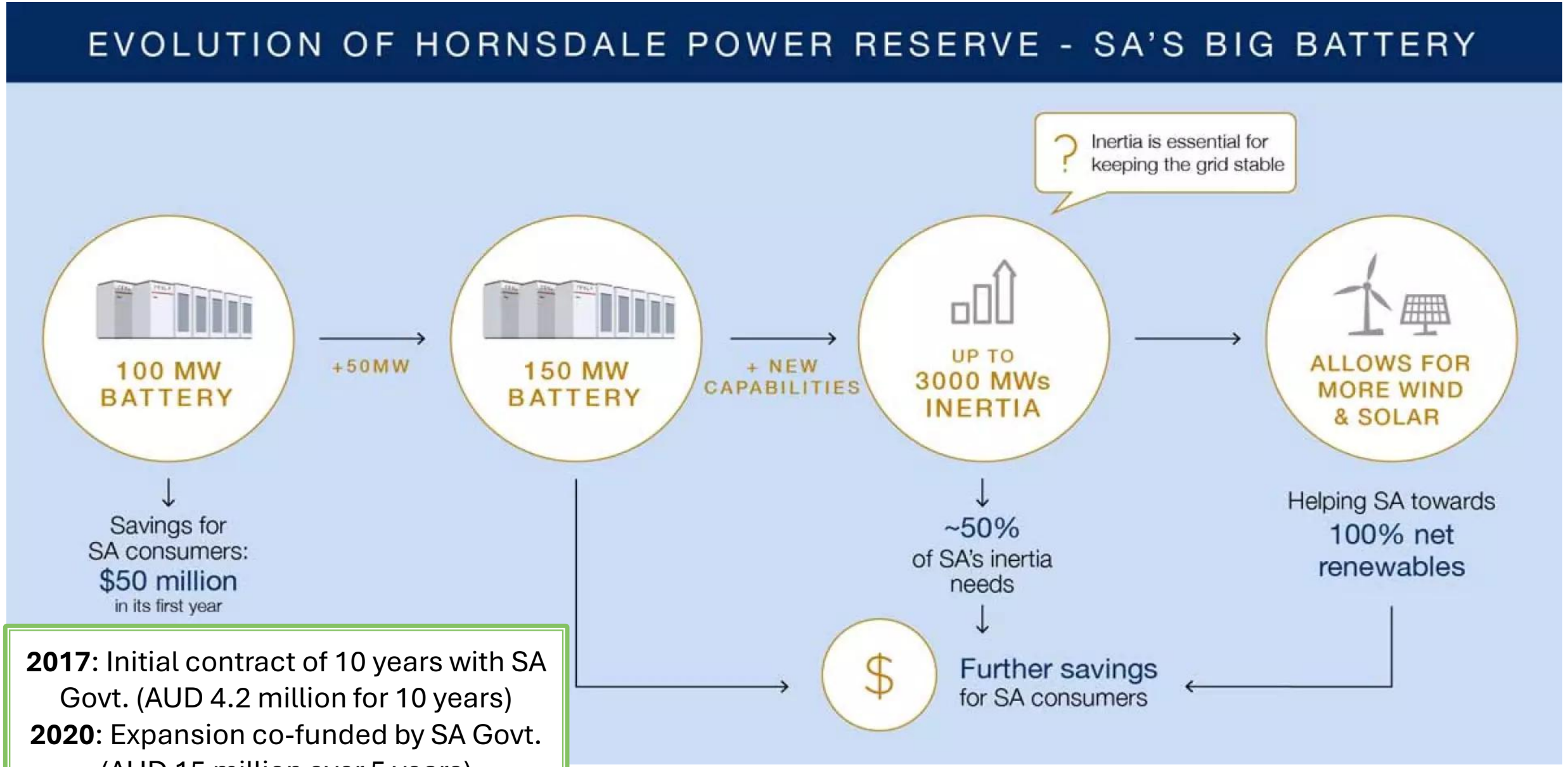
In 2020, HPR expanded to ~150 MW / ~193–194 MWh;

SA Govt. co-funded this expansion and committed AUD 15 million (over 5 years)

In addition to FCAS markets, HPR made inertia contributions. Most of the profit earned was from **market-driven activities** (FCAS + arbitrage)

Annexure I- Hornsdale Grid-Scale BESS (Australia)

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2017: Initial contract of 10 years with SA Govt. (AUD 4.2 million for 10 years)
2020: Expansion co-funded by SA Govt. (AUD 15 million over 5 years)

Annexure-2 Suggested Amendments in the Current Regulations (1/2)

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Section	Details	Suggested Changes
45.(11).(b) IEGC	Scheduling of WS seller and ESS by QCA	Make regional level aggregation (from PSS level) mandatory for all RE IPPs to reduce DSM commercial impact
9.(6) Ancillary Service Regulation	Procurement of SRAS	Allow BESS to declare SRAS compensation amount that can exceed competitively discovered tariff
CERC Ancillary Service Regulation, 2022 & IEGC, 2023	New Additions	i. Allow BESS to be **compensated suitably for providing PRAS** **ii. RLDC to overall supervise operation** of BESS including dispatch during grid contingency for PRAS/SRAS iii. RLDCs to intimate list of RE Rich Substations and MWhr of BESS requirement **iv. First priority of Despatch** to adjust RE Developers imbalance, except during grid contingency.
8.(18)DSM Regulation, 2024	Charges for Deviation	**i. First priority of Despatch** to adjust RE Developers imbalance, except during grid contingency. ii. RE Developers to be **exempted from DSM during grid contingency priority of BESS**

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THANK YOU