

INSAG FORUM 2020

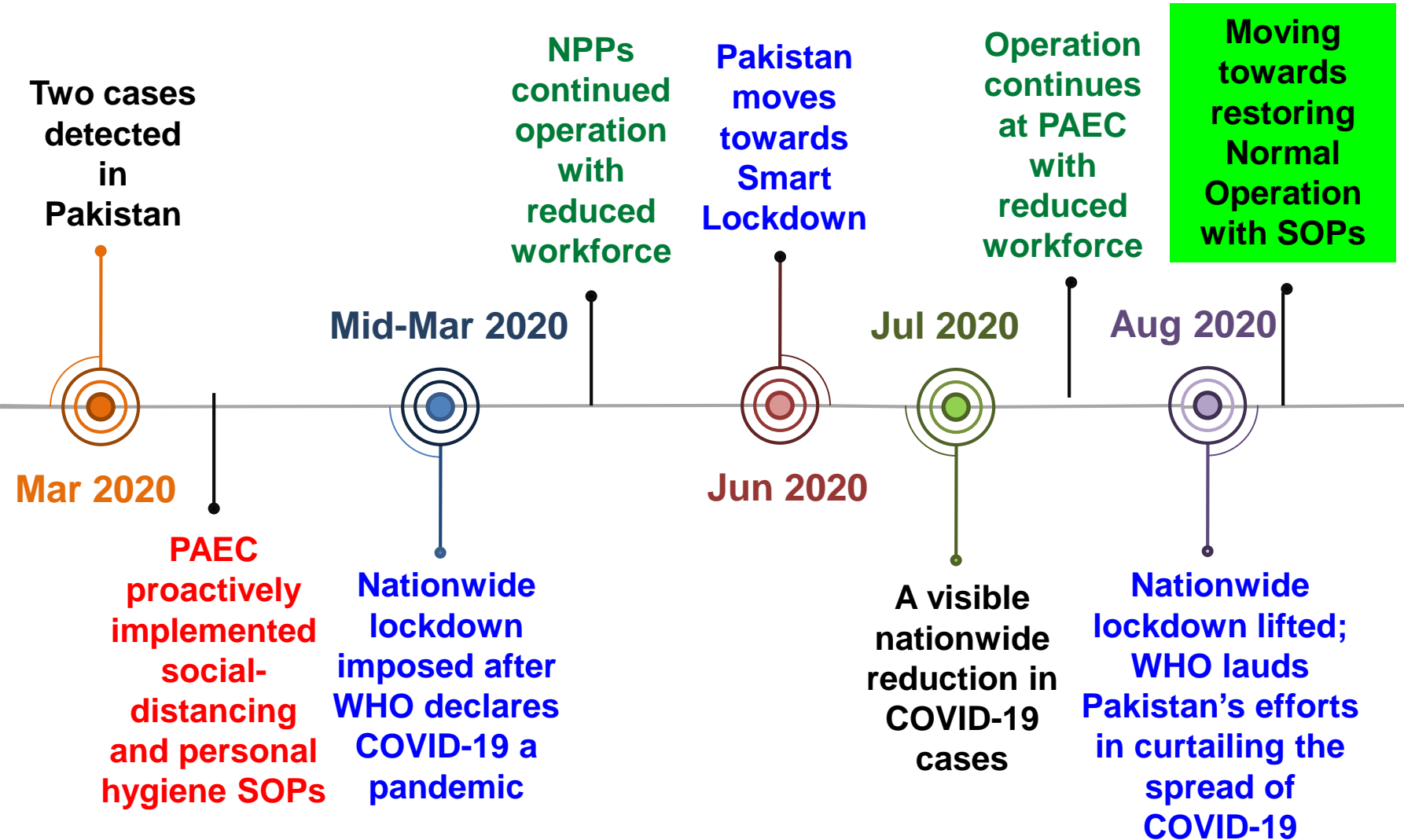
**COVID-19 and
NUCLEAR POWER
in PAKISTAN**

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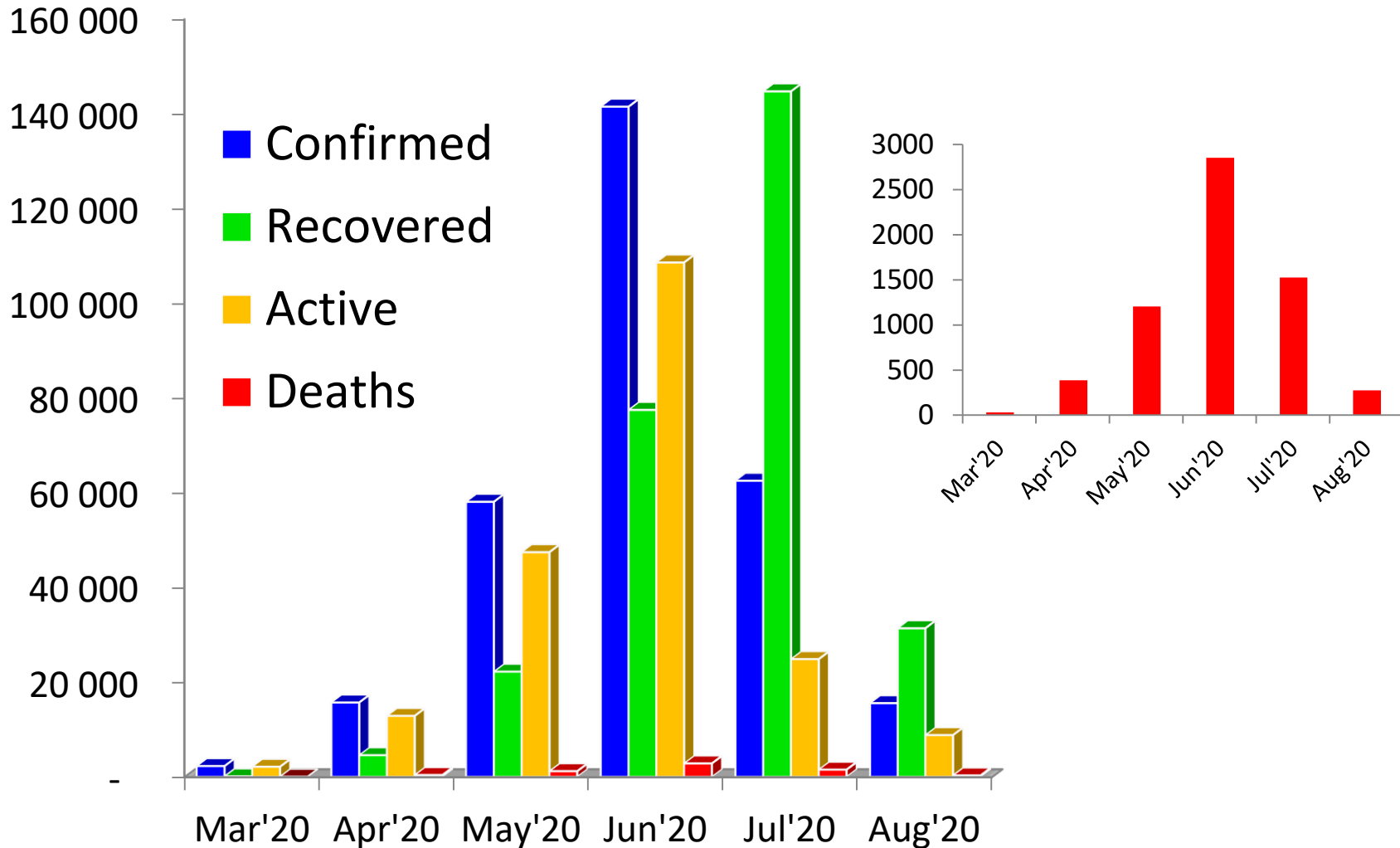
Impact of COVID-19 Pandemic on Nuclear Power Program in Pakistan

1. Statistics of Covid-19 pandemic in Pakistan
2. Nuclear power program of the country
3. SOPs implemented to minimize COVID-19 impact
4. Measures taken by the regulator (PNRA)
5. Nuclear power plant performance during the pandemic
6. Lessons learnt
7. IAEA assistance to Pakistan during COVID-19
8. Fulfilling Corporate Social Responsibility (CSR)
9. Conclusions

1: COVID-19 in Pakistan: Trajectory



1: COVID-19 in Pakistan: Statistics



2: Nuclear Power Plants in Pakistan

Pakistan Atomic Energy Commission (PAEC) is solely responsible for building and operating NPPs in Pakistan.

OPERATING PLANTS

1X137 MW KANUPP (CANDU) since 1972

4X325 MW plants (LWR) at Chashma (C-1/C-2/C-3/C-4) built during the last 30 years.

UNDER CONSTRUCTION PLANTS

A twin unit (2X1100-MW) K-2/K-3 near Karachi, expected to come on-line in 2021 and 2022, respectively.

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

The SOPs developed focused on three main areas:

- Keeping the running nuclear power plants operational
- Planning and managing refueling outages which fell due
- Maintaining activity at the under construction plants

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

Guiding rules for the COVID-19 measures

- Prioritize the tasks that must be carried out
- Select essential staff
- Establish physical and virtual boundaries
- Minimize movement across boundaries
- Ensure social distancing
- Provide physical protection equipment
- Develop and publicize SOPs
- Motivate people to develop Corona culture
- Set up oversight groups: local and at the headquarters

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

Measures to Minimize Impact on Workforce

- ❑ Central Coordination center established for implementation of COVID-19 SOPs.
- ❑ Handbooks issued in English and national language Urdu, which included Covid-19 SOPs, precautionary slogans and other necessary information.
- ❑ Employees regularly briefed about COVID-19 measures.
- ❑ For general shift, duty hours shortened to the possible extent.

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

Measures to Minimize Impact on Workforce

- ❑ Thermal Screening at plant entrance.
- ❑ Separate facility for collection of samples and forwarding to the main COVID-19 Testing Facility.
- ❑ Workers with “Positive” results isolated immediately and effectively quarantined as per SOPs.
- ❑ Contact tracing practice adopted from the beginning of the pandemic.
- ❑ Portable foot-operated hand sanitizers installed at different spots.

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

Measures to Minimize Impact on Workforce

- ❑ Spot marking at plant locations to ensure social distancing
- ❑ Ensuring use of physical protection equipment by all employees and workers at site.
- ❑ Hand washing sinks installed at various locations.
- ❑ Buildings and vehicles disinfected periodically.
- ❑ Disposable boxes of meals arranged for workforce at site during work.

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

Keeping the Plants Operational

a. Work Force:

A workforce comprising necessary operation and maintenance sorted out.

Living facilities provided at site for essential workforce (O&M, Health Physics, Chemistry, etc.).

Extra medical staff round-the-clock at plant and colonies.

b. Spare Parts Management:

Due to supply-chain disruptions, PAEC opted for air-lifting of spares rather than the conventional sea transportation.

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

Managing the Refueling Outages (1/2)

- ❑ To cater for RFOs of Chashma plants, temporary Work Control Station set up for dealing with maintenance and RFO workers regarding Work Authorizations.
- ❑ C-4 was the first plant to undergo RFO during COVID-19. The RFO was shortened by from 34.2 days to 29.8 days by deferring some not-so-urgent jobs.
- ❑ C-2 RFO has commenced from September with SOPs in place. However it would be as per Plan A. i.e., 2700 Jobs in 48 days.

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

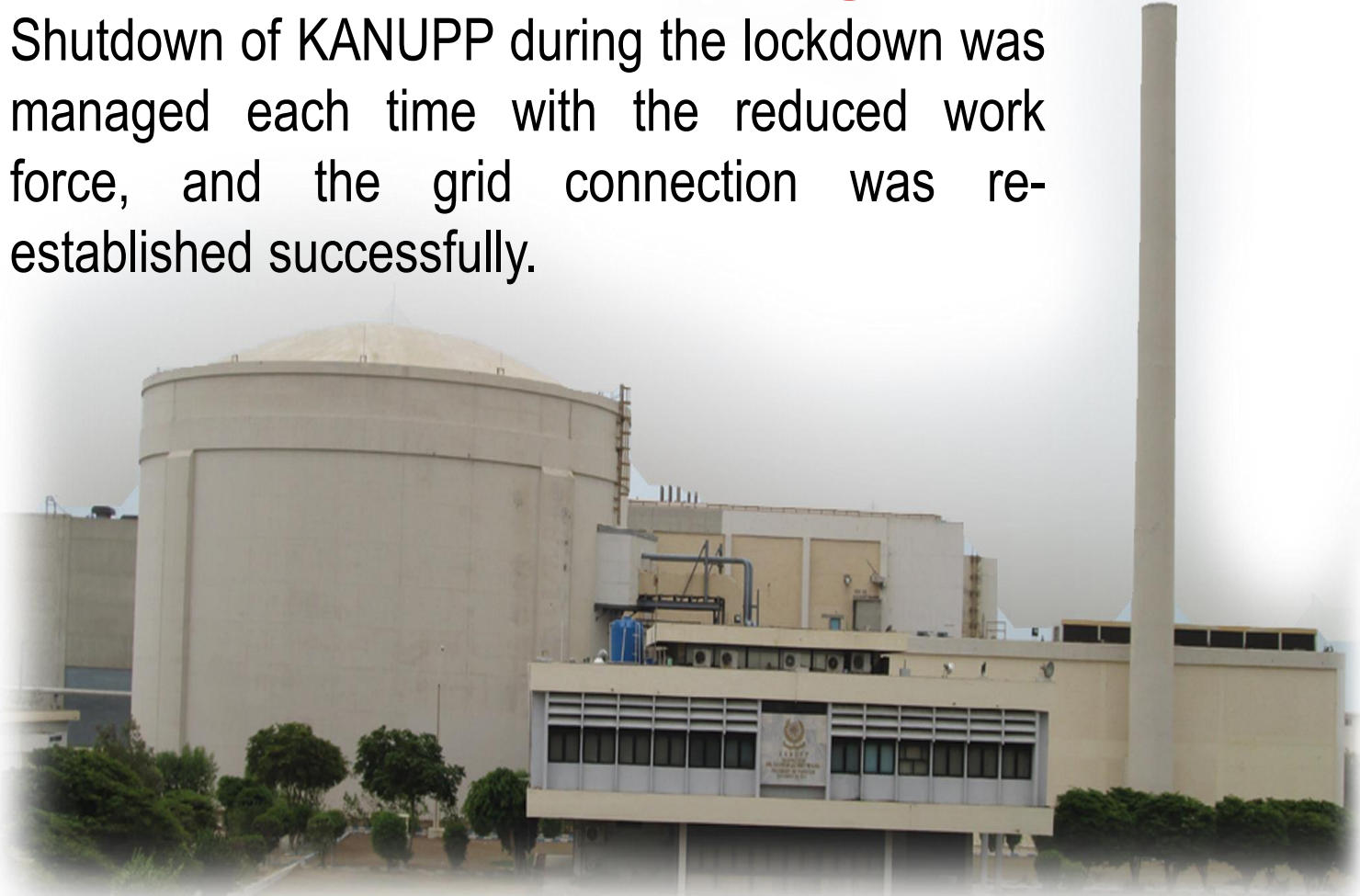
Managing the Refueling Outages (2/2)

- ❑ Workers called to report for quarantine at plant guest houses in batches on different days as per schedule.
- ❑ Initial screening of each worker on arrival.
- ❑ Strict housekeeping measures in quarantine where meals were provided in disposable boxes.
- ❑ Lectures/trainings regarding COVID-19 measures at the time of joining.
- ❑ Commutation of workers to plant facilitated as per SOP and temperature screening on daily basis.

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

KANUPP Shutdown Management

Shutdown of KANUPP during the lockdown was managed each time with the reduced work force, and the grid connection was re-established successfully.



3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

Managing Activity at Under Construction Plant (1/2)



Work on the K-2/K-3 project slowed down initially because most of the Chinese work force were on the ‘Chinese New Year’ vacation when pandemic began to make impact, but the pace picked up gradually by flying in the contractor’s personnel in special planes and under SOPs.

3: SOPs implemented to minimize the impact of COVID-19 at Nuclear Power Sites

Managing Activity at Under Construction Plant (2/2)

- ❑ In addition to standard SOPs, a meeting room with glass partitions equipped with sound system prepared for meetings with the foreign contractors.
- ❑ A temporary isolation boundary created between the areas of work under PAEC scope of work and CZEC scope of work.
- ❑ The pace has picked up gradually, and the 'Hot Functional Test' of K-2 has recently been completed.
- ❑ However, the grid connection of the two plants is now delayed by 5-6 months, with part of the delay occurring because of the pandemic.

4: Measures Taken by the Regulator (PNRA)

Inspection and Enforcements:

Power Plants

- ❑ Inspection plan for Nuclear Power Plants (NPPs) modified to focus on important activities (routine inspections suspended).
- ❑ For under construction NPPs, PNRA inspectors resided at site.
- ❑ More “record points” inspections were performed instead of “witness points” inspections to minimize physical presence.
- ❑ Any necessary inspection/surveillance visits were carried out with necessary protective measures.

4: Measures Taken by the Regulator (PNRA)

Inspection and Enforcements:

Radiation Facilities

- ❑ Inspections of Radiation Facilities (RFs) were suspended due to travel restrictions and closure of various radiation facilities due to lock down.
- ❑ Confirmed safety and security status of radiation facilities containing category-I to III sources by self-assessment performed by licensee.
- ❑ Regulatory inspections were conducted for operational facilities containing category-I to III sources with necessary protective measures.
- ❑ Online training courses conducted through video conferencing.



Social Distancing



Temperature Screening



Hand Washing



Awareness at Work



Disinfecting assembly area



Social Distancing in Meeting



Social Distancing in MCR

5: Performance of Chashma Plants during the Pandemic



Capacity Factor from Jan 01-August 31, 2020
C-1=74.49% C-2=100.30% C-3=98.35% C-4=86.24%
C-4 completed 424 Days of continuous operation during Covid-19

6: Lessons Learnt

- ❑ To the extent possible, it is important to share COVID-19 plans with those on the front line, and not implement things just through executive orders. That is very important to win the cooperation of the staff.
- ❑ Attention must also be paid to the mental health and psychological well-being of those under stress for reasons of isolation or doing extra duties.
- ❑ With only a reduced staff is available, steps special attention must be paid to ensure that essential rotational training of the staff is not compromised.

7: IAEA Assistance During Covid-19

- ❑ Pakistan is among the 12 countries which provided extra budgetary funding to TC footnote-a/ Project, “Strengthening Capabilities of Member States in Building, Strengthening and Restoring Capacities and Services in Case of Outbreaks, Emergencies and Disasters” through which the COVID19 emergency assistance is being delivered throughout the world,
- ❑ Under this program **05 sets of COVID-19 detection equipment** are being installed at various locations of the country which include hospitals, and Power plants.

8: Fulfilling Corporate Social Responsibility

- ❑ PAEC made no layoffs or salary cuts to employees, permanent or daily-wagers, whatsoever.
- ❑ In fact bonus pay was given to the essential staff and to the employees responsibly adhering to the SOPs.
- ❑ Hand sanitizing and NaClO solutions manufactured and packed indigenously at plant site.
- ❑ Safety kits, i.e., masks, sanitizers, gloves, distributed to offices and residential colonies free of cost or on subsidized rates.
- ❑ Availability of edibles and sanitary products ensured within its residential areas at subsidized rates;
- ❑ Complimentary disinfection of residential areas.

9: CONCLUSIONS

- ❑ PAEC Nuclear Power Setup has responded to the unprecedented challenge with a high-level of preparedness and flexibility while ensuring continuity of power supply, safety culture and employee welfare.
- ❑ Operating plants and the regulator activities are gradually returning to normal with some precautionary measures in place. RFOs and under construction plants still have the same SOPs in place because of large third party interventions.
- ❑ The good performance of nuclear during COVID-19 has demonstrated that nuclear power is resilient in nature, and can deliver in the time of crisis without compromising the safety of nuclear power plants.

Thank You