



**A TRADITION OF  
INDEPENDENT  
THINKING**



**University College Cork, Ireland**  
Coláiste na hOllscoile Corcaigh

## 2020/21 Academic Year Energy Review

# Annual Energy Performance Review

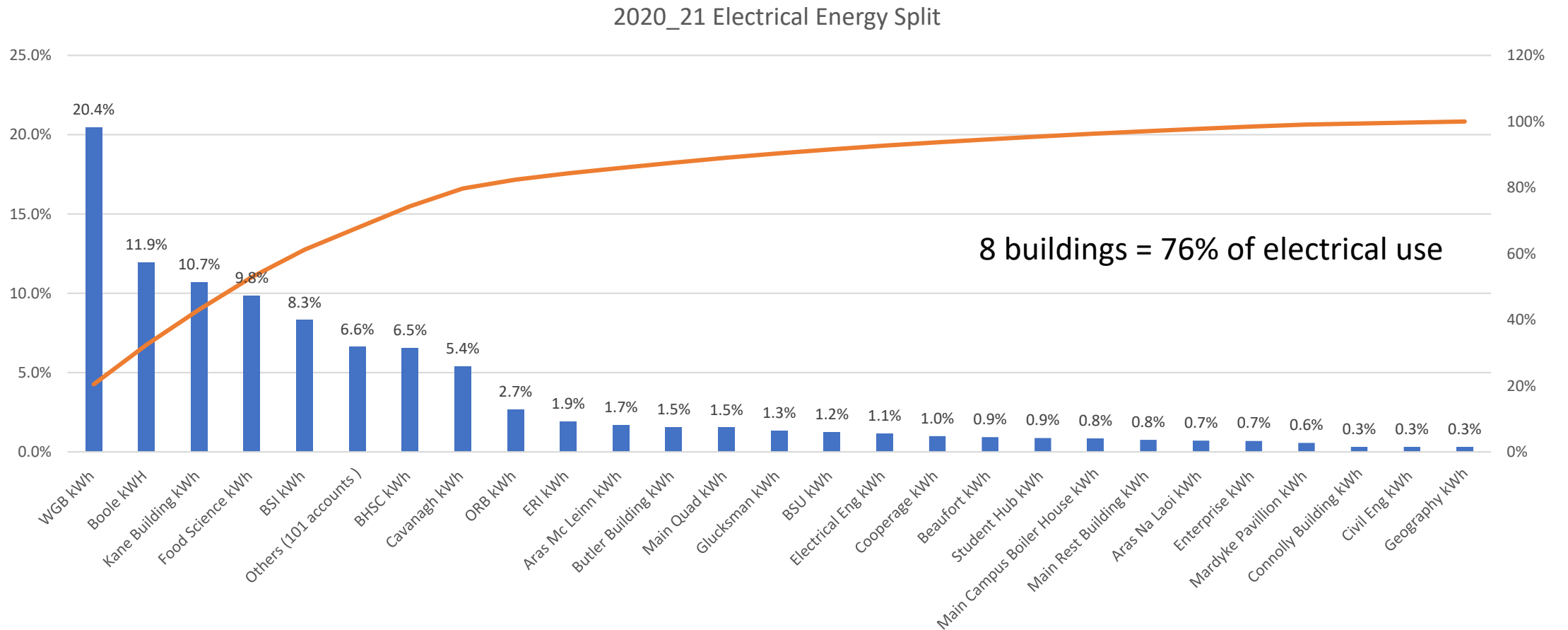
1. Review actions from previous annual energy review.
2. Summary of 2020/21 energy performance.
3. Energy Projects over 2020/21.
4. Energy management objectives, targets and resources for 2021/22.
5. Review effectiveness of energy management system.

# 20/21 Energy Performance Statement



Scope	2020/21 Target	2020/21 Actual	2019/20	2018/19 Baseline
Electrical GWh	19.5	17.3	17.1	19.98
Gas GWh (normalised)	20.3	23.3	18.6	20.6
Total	39.8	40.6	35.7	40.58

# 2020/ 21 Electrical Energy Split



# Electrical Performance Review

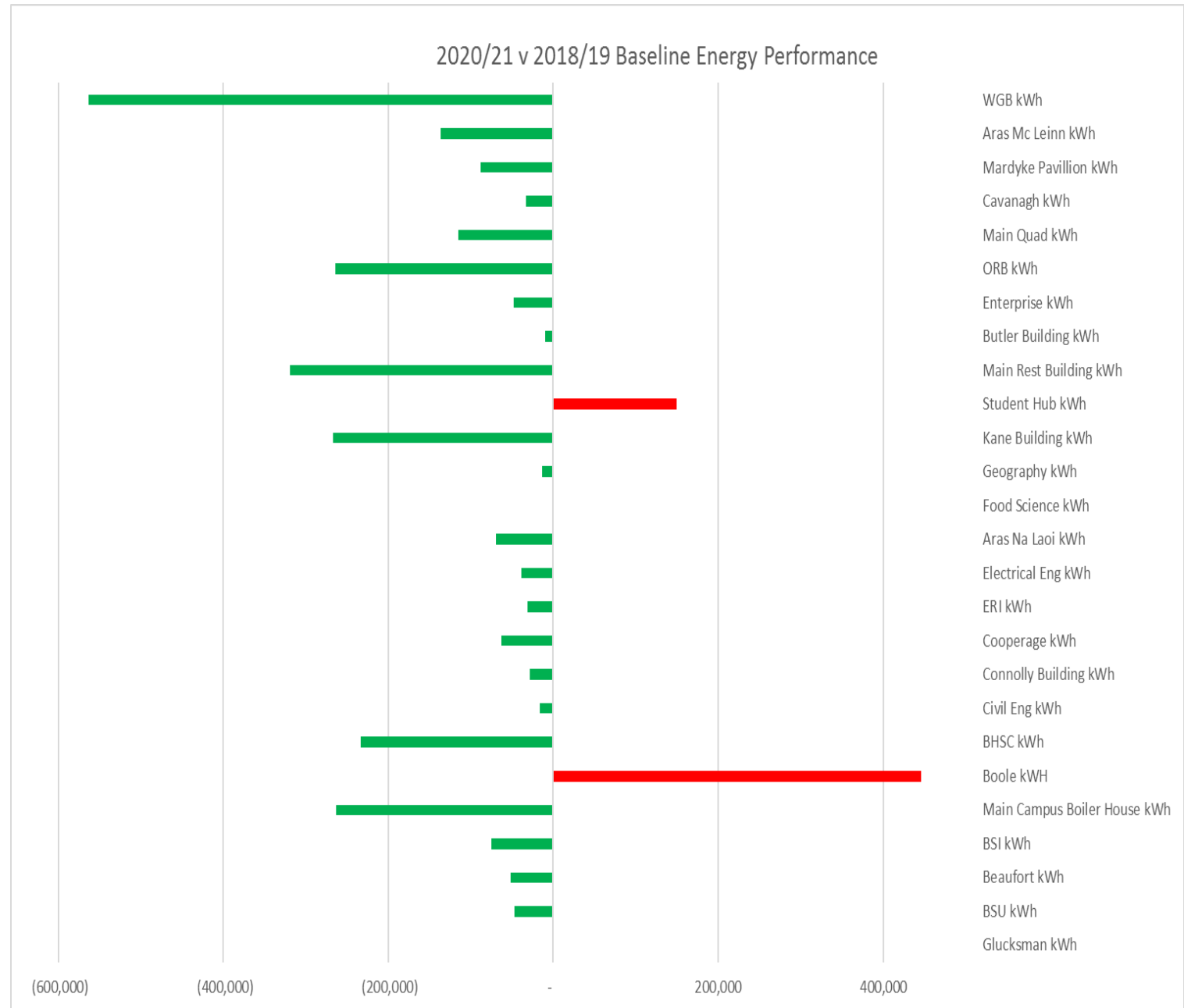
## 2020/21 Highlights:

Consumption 14% below 2018/19 levels.

Boole and Student Hub increased from 2018/19 levels.

(Student Hub not operational over 18/19)

All other Accounts reported reductions.

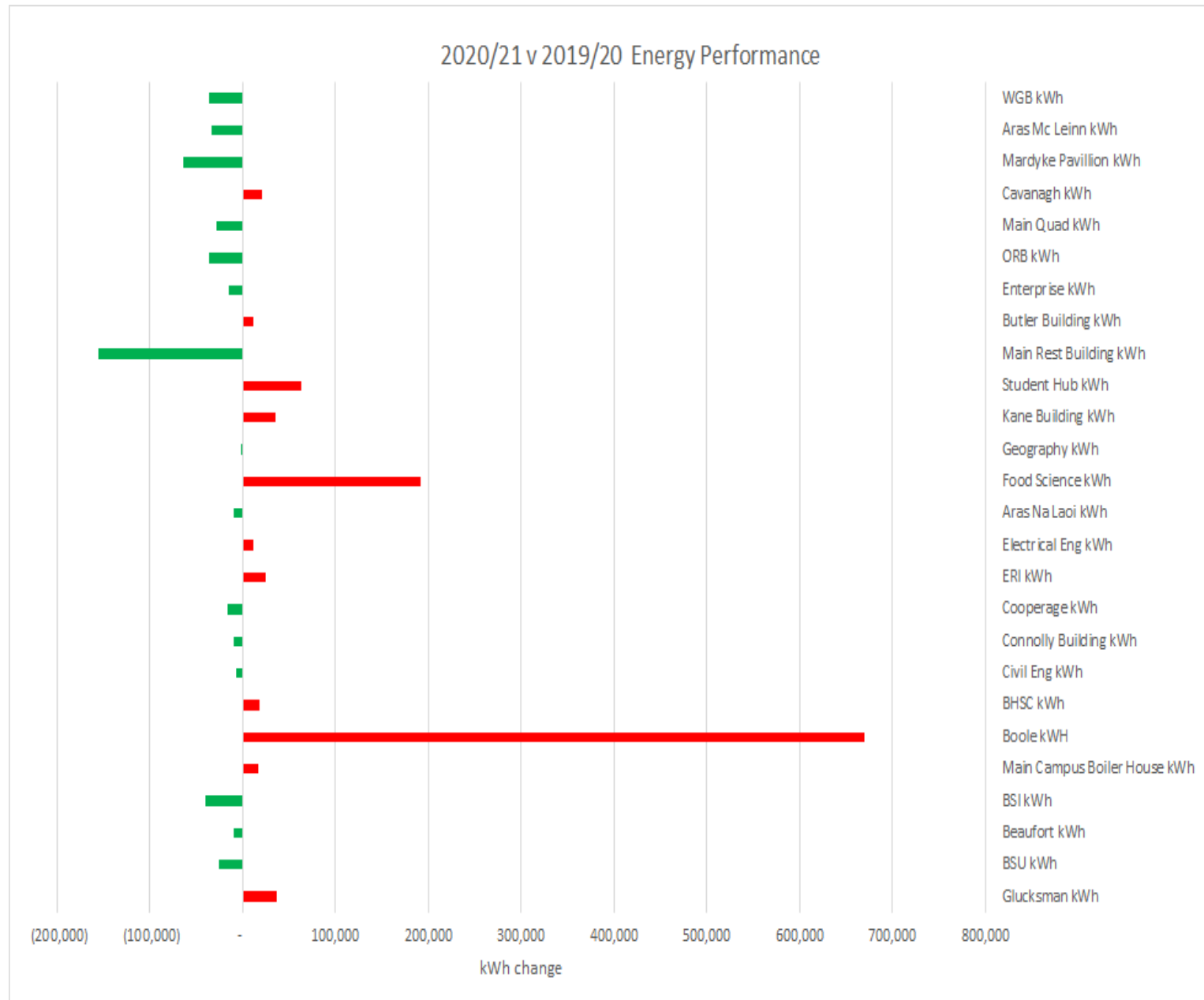


# Electrical Performance Review

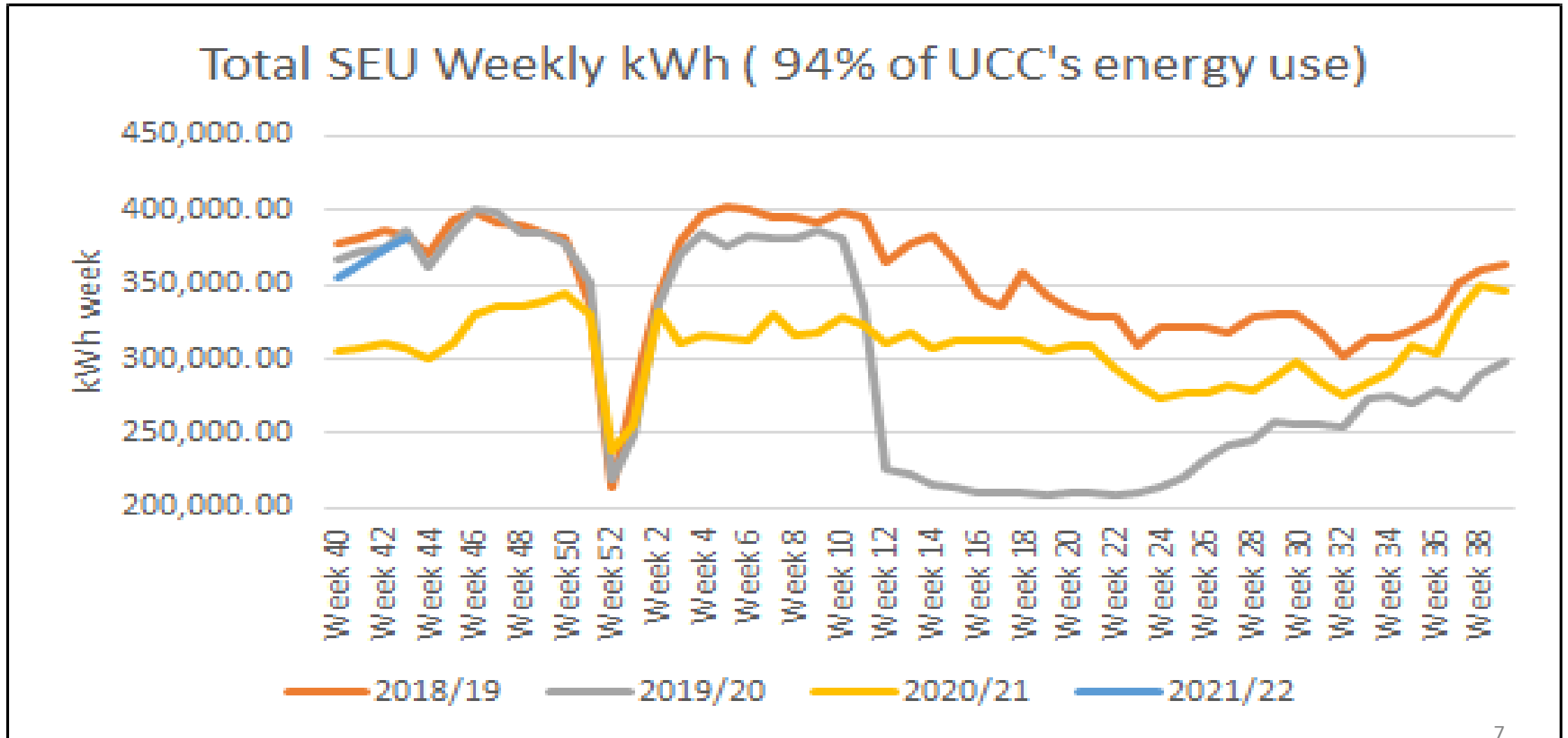
## 2020/21 Highlights:

Consumption increased by 1% from 19/20 levels.

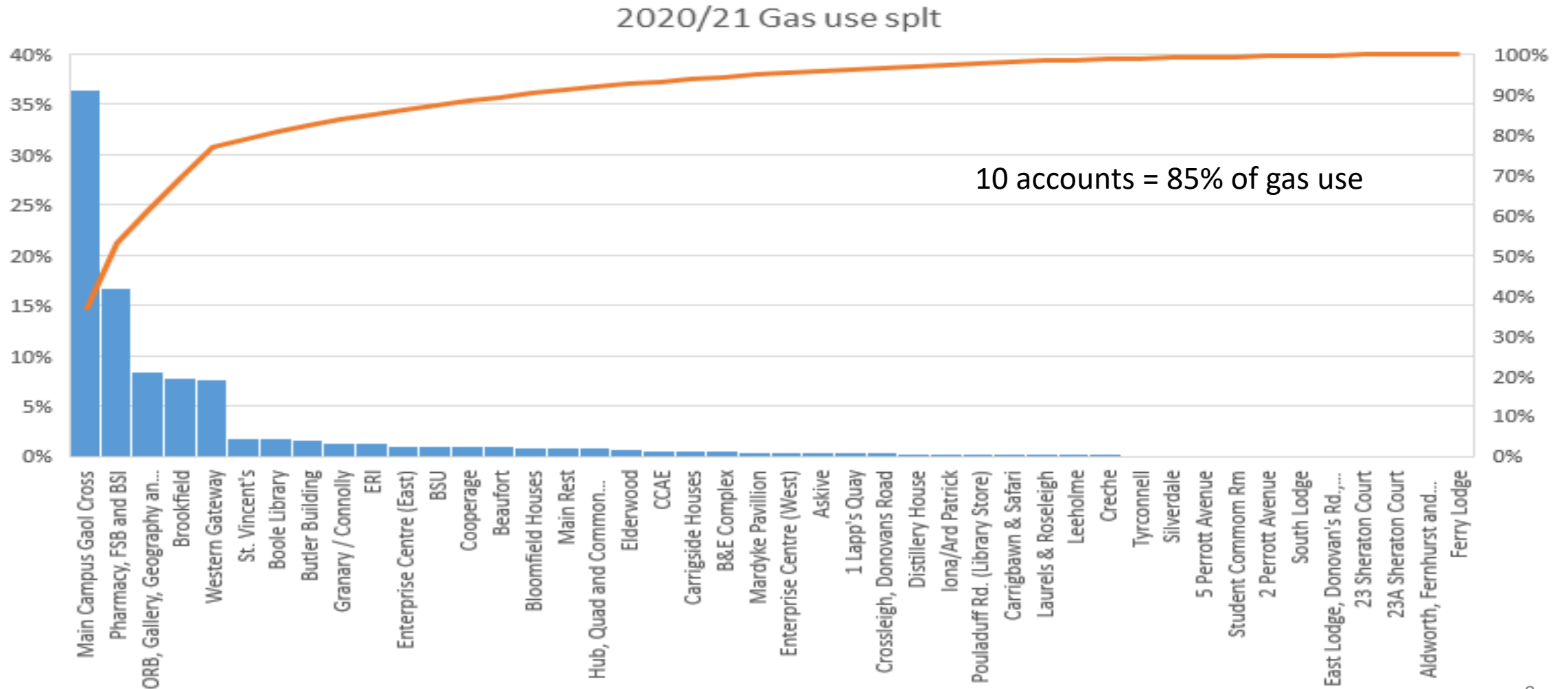
11 accounts increased over the year.



# Current Electrical Performance – Back to normal



# 2020/ 21 Gas Use Split



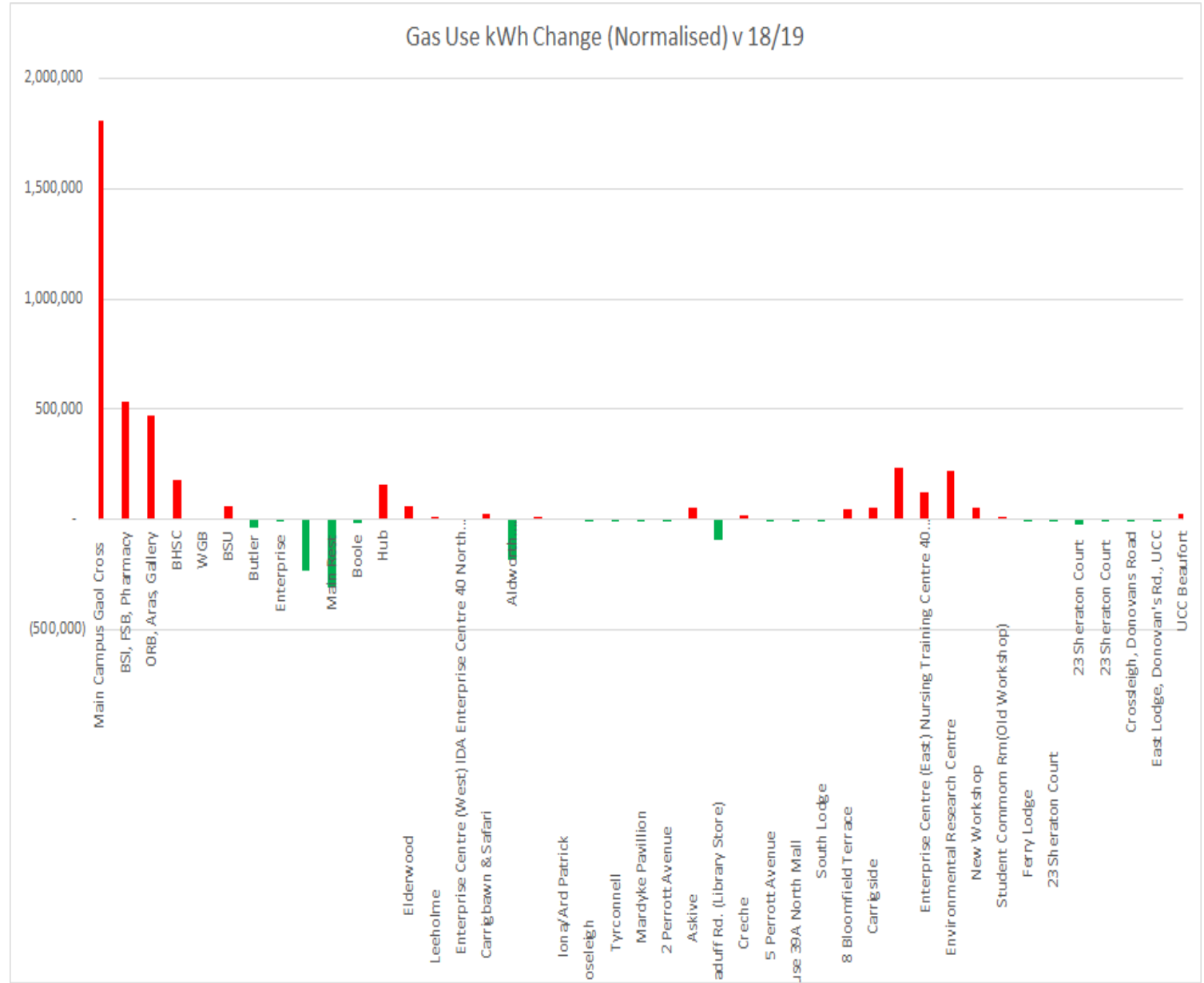


# Natural Gas Performance Review

## 2020/21 Highlights:

Consumption 11% above 2018/19 levels.

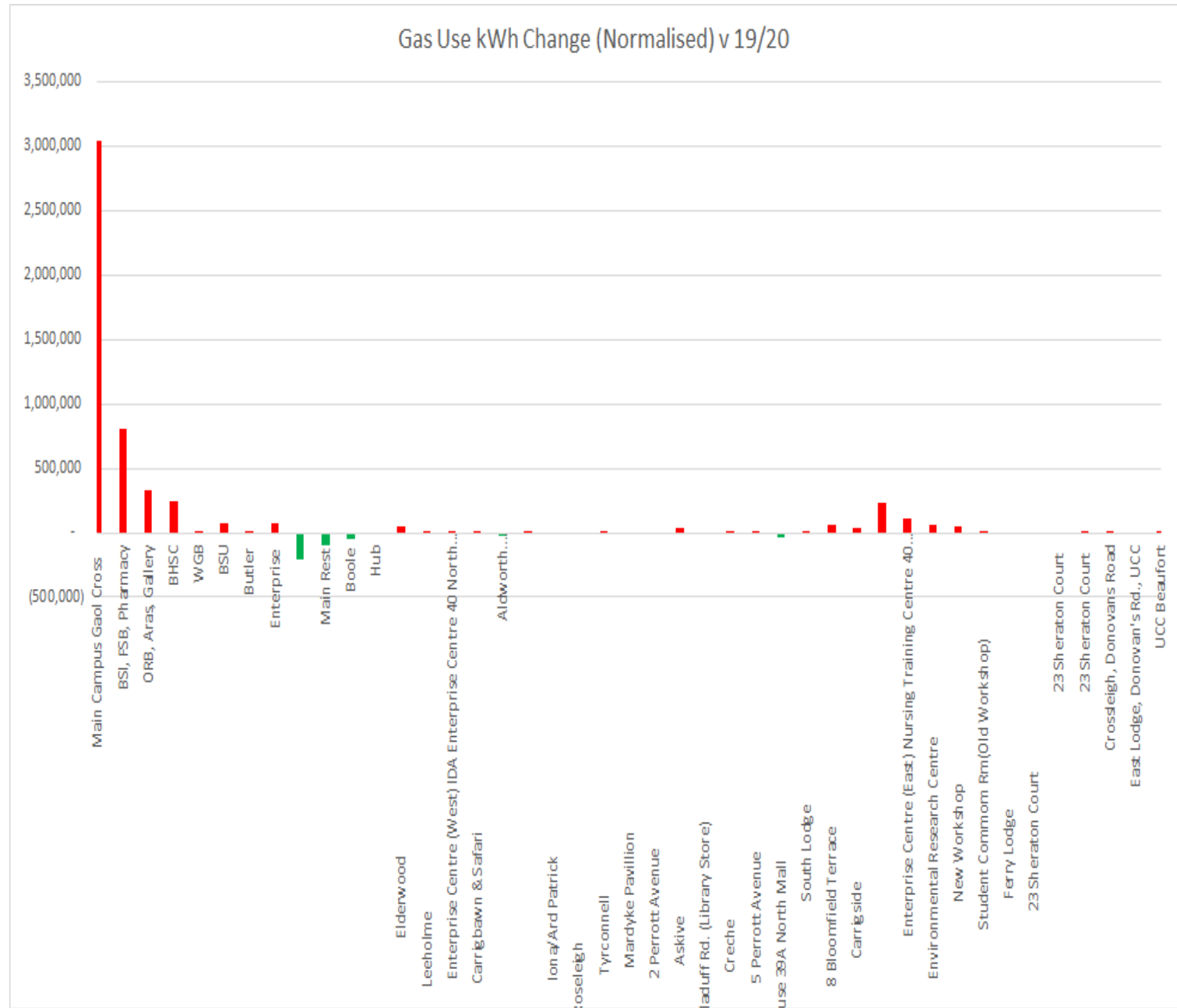
Significant increase on District Heating use due to ventilation loads.



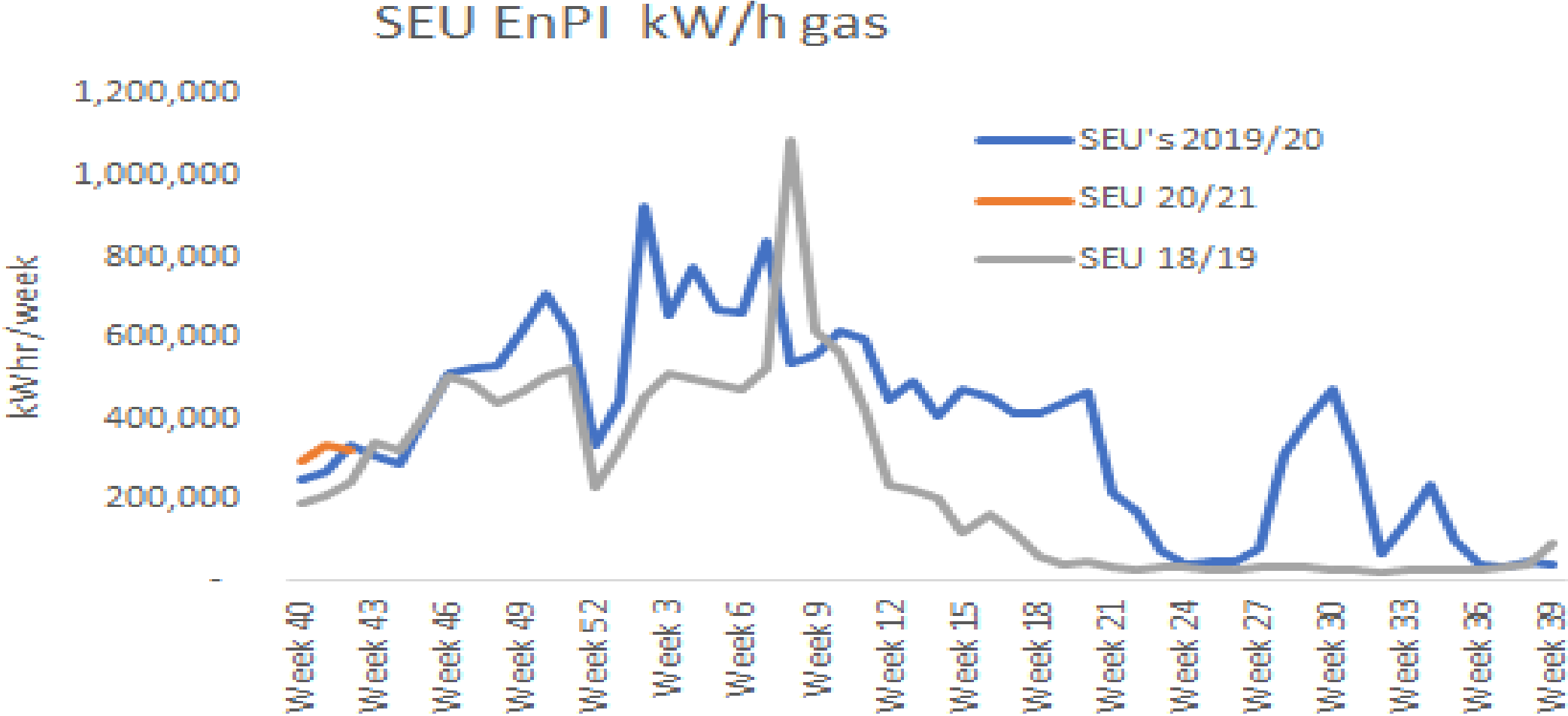
# Gas Performance Review

2020/21 Highlights:

Consumption increased by 20% from 19/20 levels.

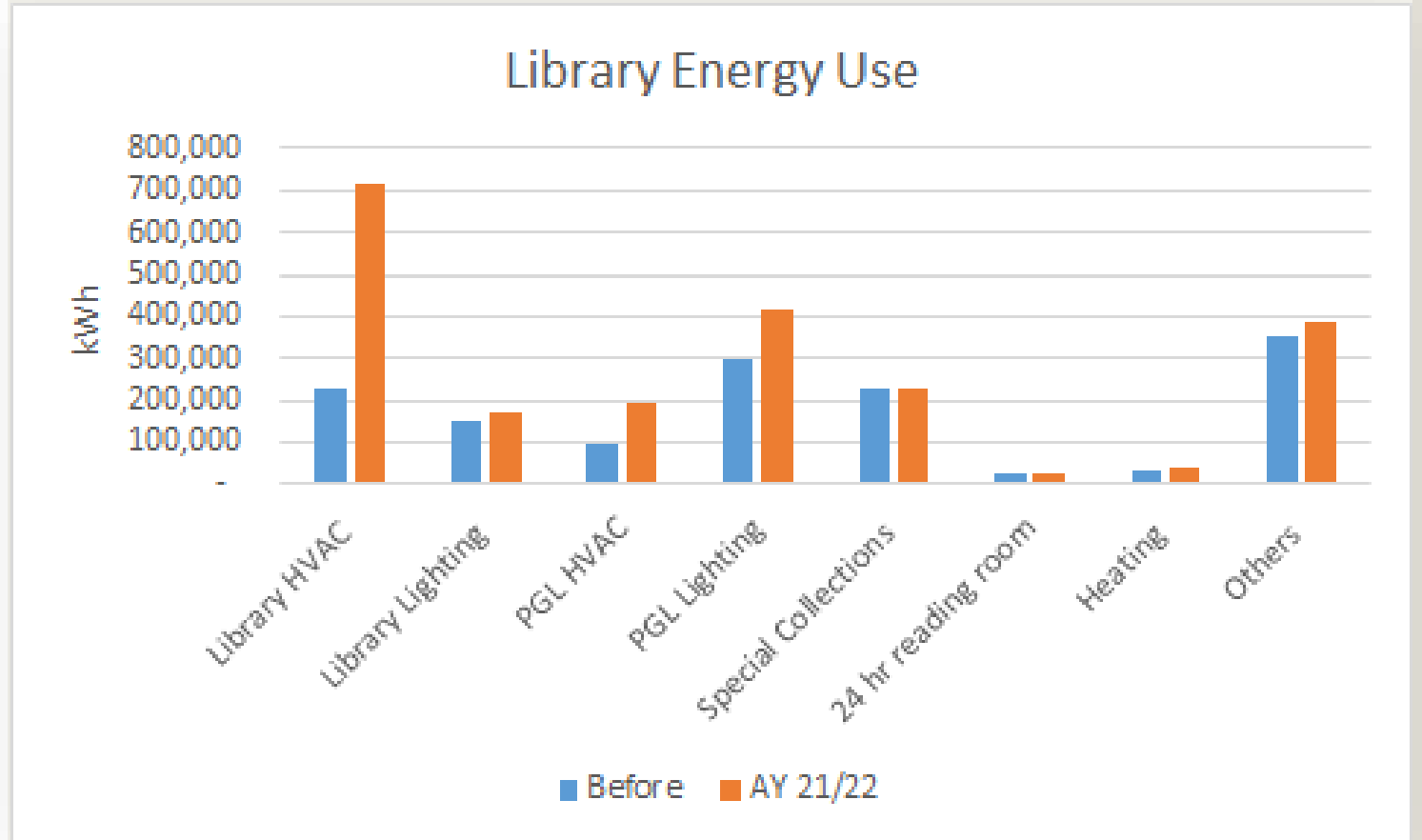


# Current Gas Performance – Increases continue.



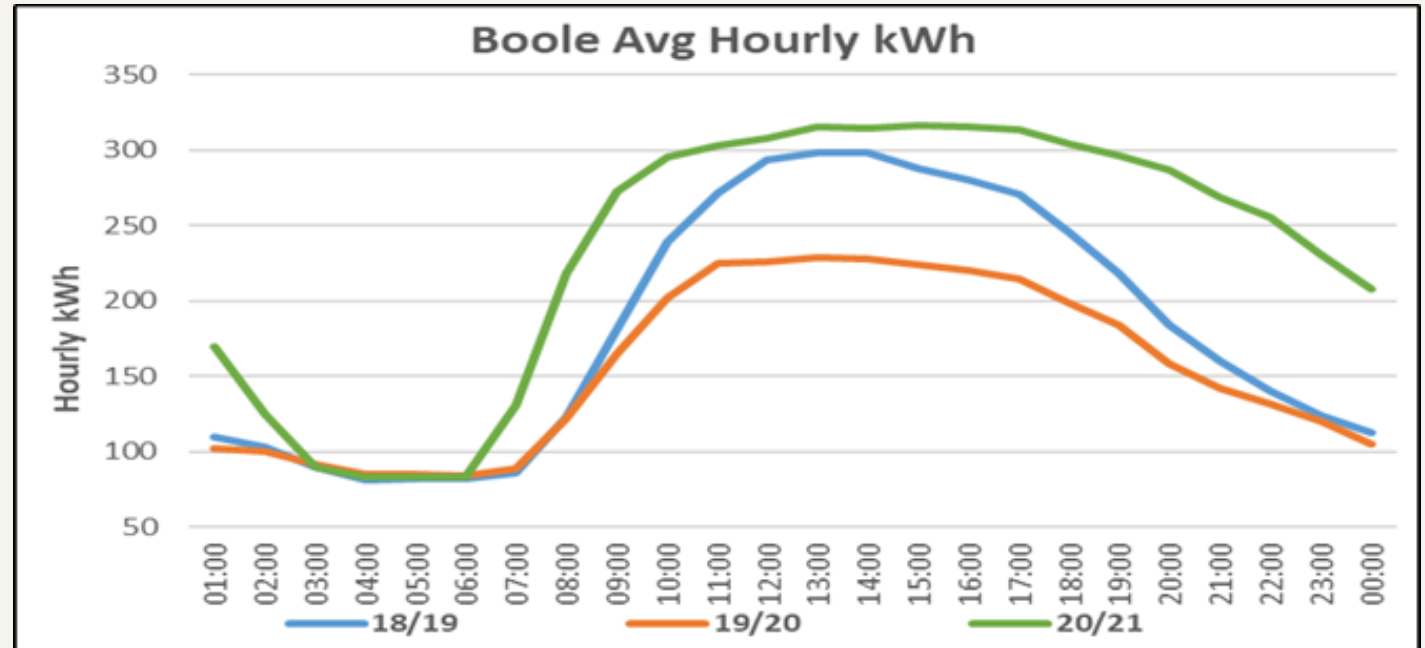
## Focus on the Boole Library

- Library electrical energy use increased by 480,000 kWh from 18/19.
- Increase driven by:
  - COVID ventilation protocols.
  - Increase in building opening hours.

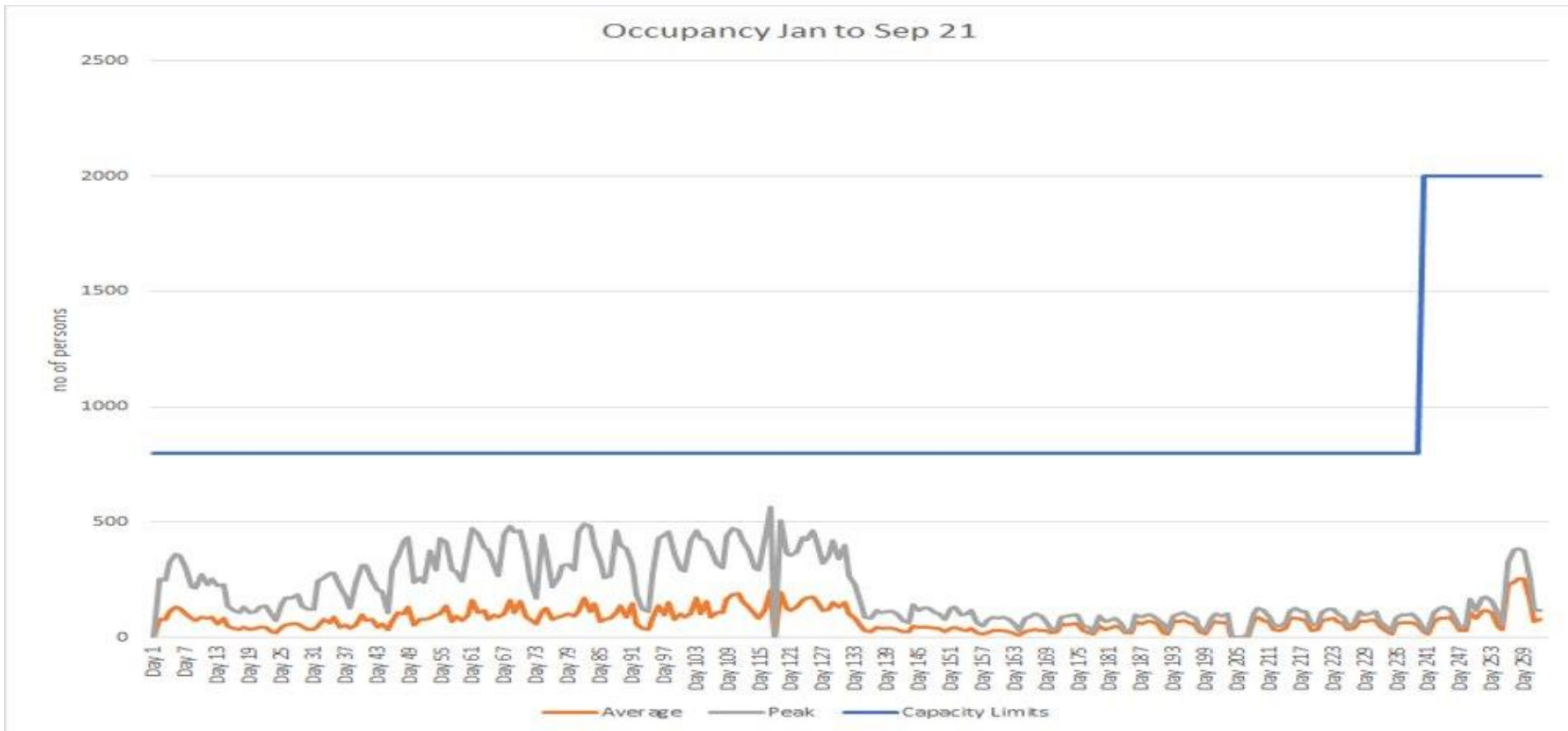


## Focus on the Boole Library

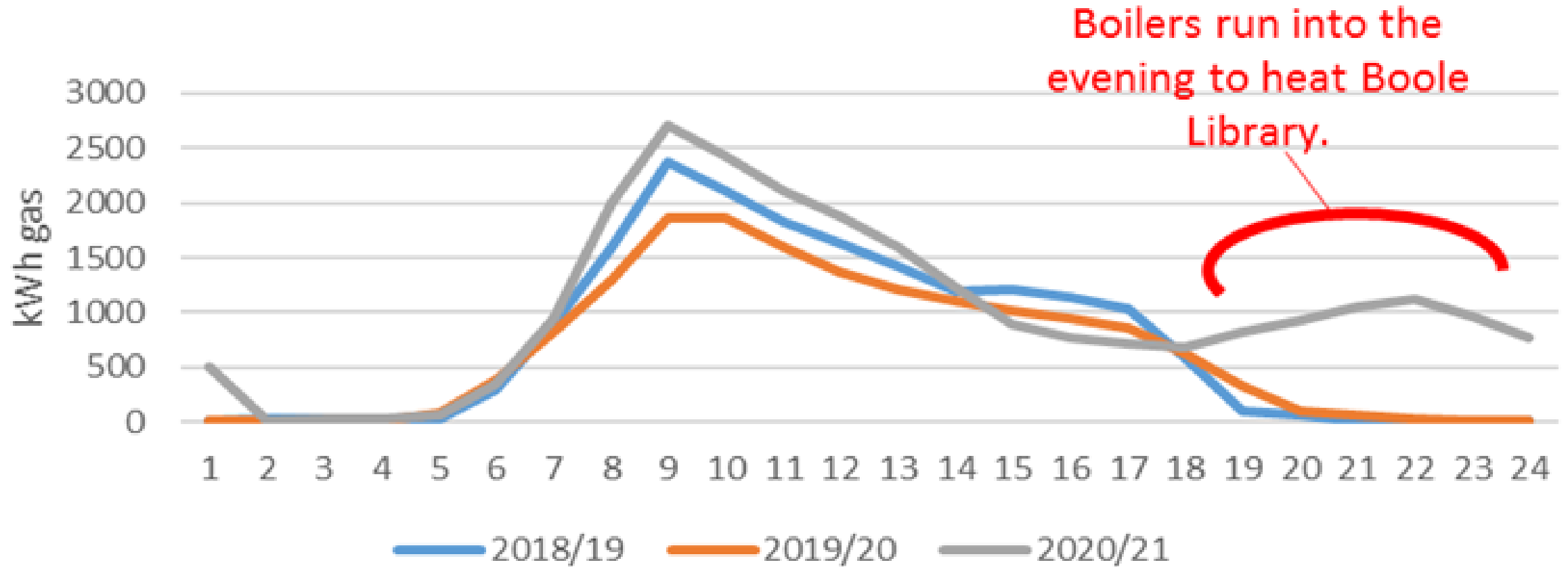
- Before COVID:
  - Units controlled by CO2 - Target 800 ppm. - Fans ramp up and down depending on demand.
  - Running times adjusted to suit occupancy patterns and building opening:
    - Units run typically 80% of the time during start of term times ( Oct & Jan).
    - Units run 10% of the time during summer months – windows opened.
    - Units run 100% of the time coming up to exam times.
    - Heat recovery in place - building typically looked for heating until 11.00 and then the heat generated from the occupants was recovered to provide heat.
- Now:
  - Units controlled by CO2 - Target to maintain 600 ppm. - Fans ramp up and down depending on demand.
  - Running times adjusted to run 2 hours before, during and 2 hours after closing.
  - Units now run 06.00 - 03.00 7 days a week.



# Typical Occupancy Use per Day – Jan – Sept 21



# 2018/21 Steam Boilers Hourly kWh



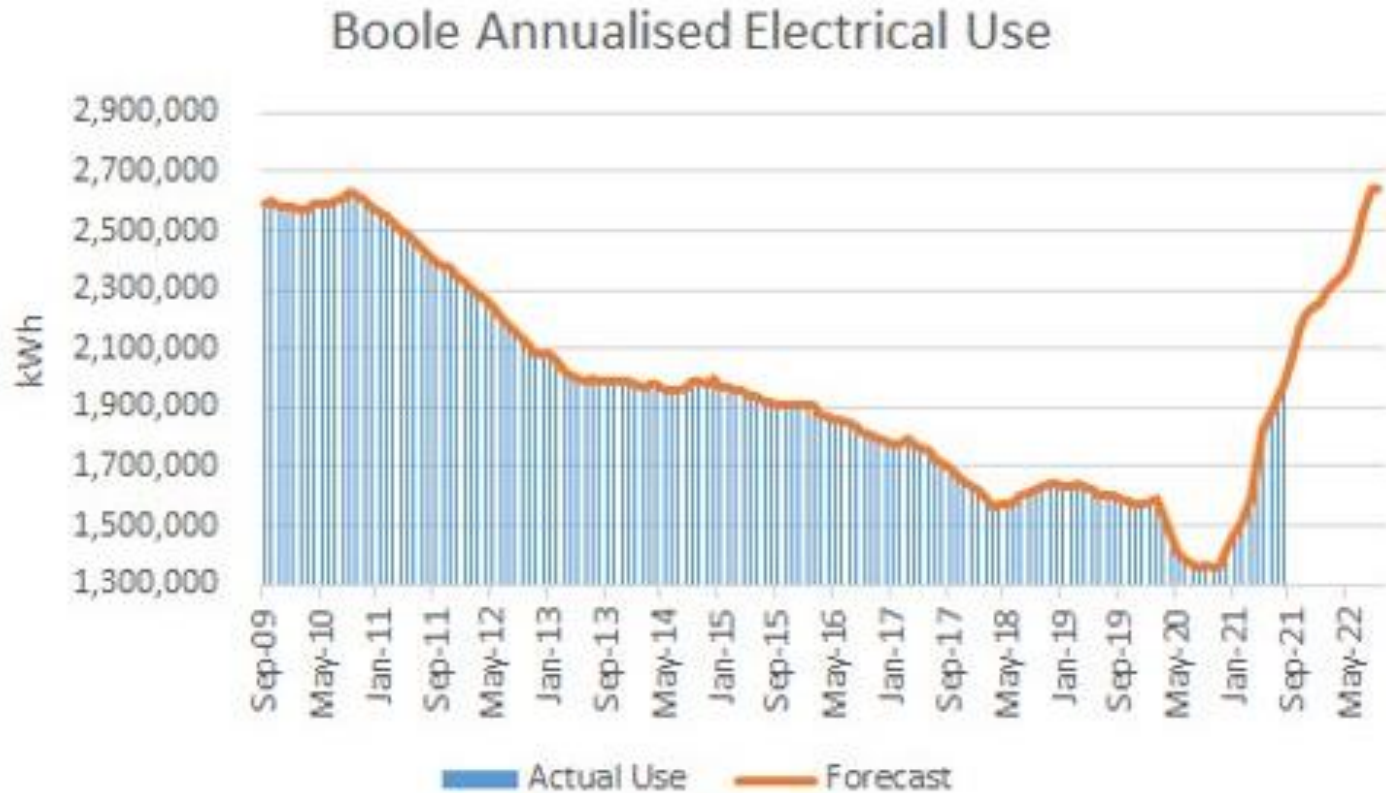
2020/21 Running time of the boilers increased by 48%, mainly driven by the needs of the Library.

# COVID Protocols v Revised opening hours forecast

Item	Service	Areas served	Expected Energy Increase	COVID Energy Related	Opening Hours Related
AHU 5	Fresh air supply	Q/ Q-1, PC labs and Boole 5 / 6	200,160	154,485	45,675
AHU 6	Fresh air supply	Q+1 to Q+3	206,017	165,417	40,600
Lighting	Lighting	Q-1 to Q+3	49,720	-	49,720
AHU 20	Air Supply	PGL South 1-3	48,436	38,286	10,150
AHU 21	Air Supply	PGL North 1-3 inc offices	48,436	38,286	10,150
AHU 22	Air Supply	Quad Reading Room	8,000	1,000	7,000
Lighting	Lighting	PGL Areas	113,504	-	113,504
		Others - ie heating pumps, general services	86,440	-	86,440
		Total increase	760,713	397,474	276,799



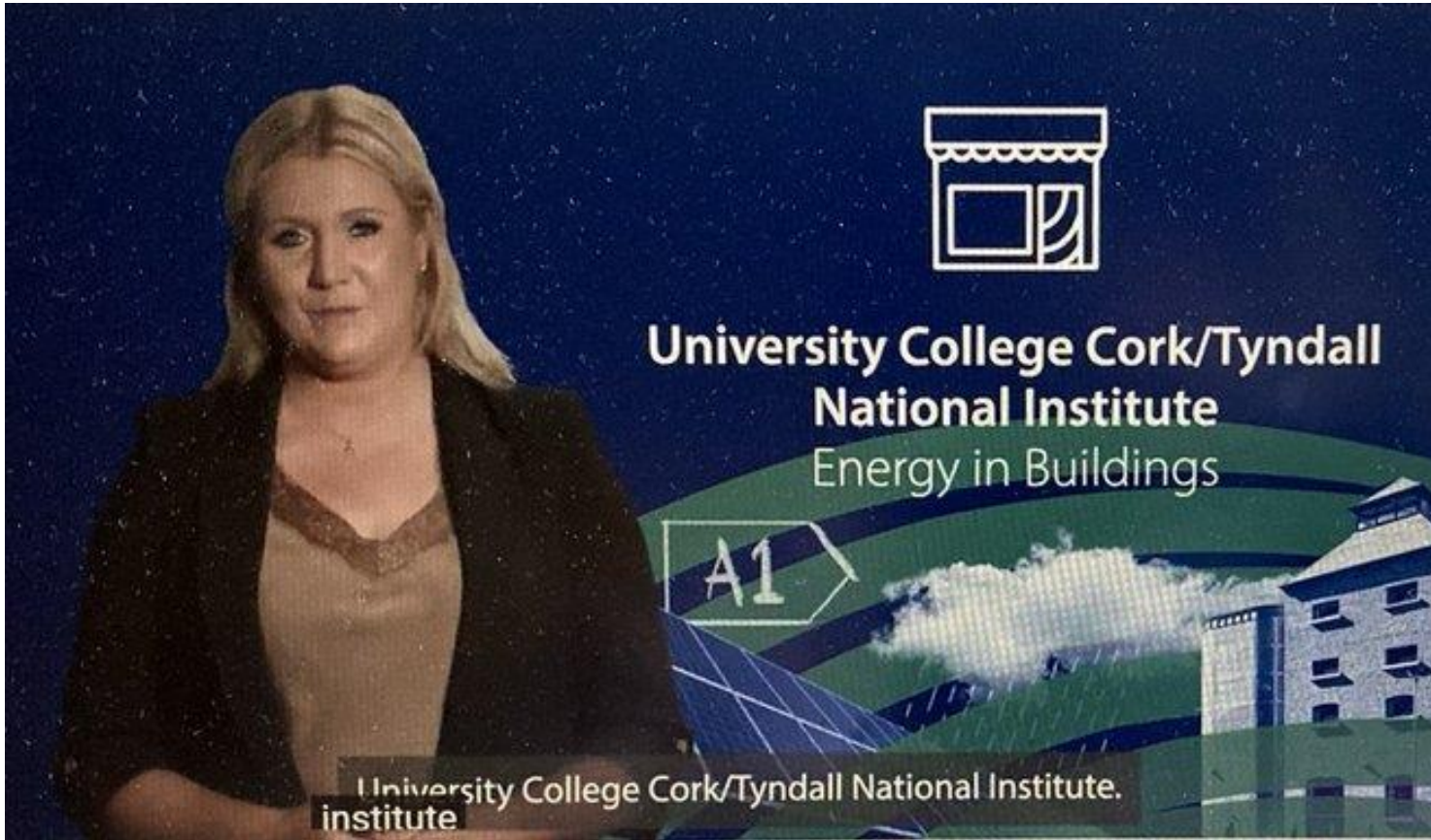
# Energy Impact for 21/22



- Significant increase in both electrical and gas use projected for AY 21/22.
- Increase driven by:
  - COVID ventilation protocols.
  - Increase in building opening hours.
- Expected that Library will be responsible for 5% increase in UCC's energy use and hit highest annual Library use on record.
- Estimated €200,000 cost increase in electrical / gas use.
- Working with the Library team to minimise energy impact.

# 2020/21 Energy Action Plan - Update

Electrical Conservation Projects completed.	Gas Conservation Projects completed.
Lighting controls upgrade in BSI Lab building completed – 25,300 kWh savings pa.	BMS optimisation of Hub, CCA, Lapps Quay and Pavilion.
Pharmacy Dryer replacement. - 7800 kWh savings pa.	ORB ASHP Project funding approved.
Hub BMS optimisation.	Block A Boiler Upgrade started.
Migration of Kane and CCAE BMS platforms.	Heat Recovery Units – Connolly / West Wing.
Upgrade of Siemens / Trend platforms to allow remote access.	ERI Boiler installation.
ORB ASHP Project funding approved.	FSB – Heat Pump study completed.
SEU Weekly Communications / Energy Blogs	Civil Eng Heat Exchanger replacement.
Summer closure of CB Rooms. - 35,000 kWh avoided.	Main Rest steam valve replacement.
Ventilation Fingerprint survey completed.	Boiler upgrades in Glucksman and Perrot Ave.



## Some notable achievements

- HEA Pathfinder for ORB Heat Pump:
  - ASHP to meet 56% of buildings heat load.
  - Energy reduction of 52%.
  - Fully funded and nearing completion.
- Tyndall Phase 3 SEAI Energy in Buildings Award
  - Ireland's oldest A rated building.
  - Super win for all.
- HEA 2021 Pathfinder:
  - Deep retrofit and GSHP.
  - Selected for Stage 2A.
- Suite of Design Documents generated by CP / Eng Services.

# 21/22 Energy Forecast



Scope	2021/22 Forecast	2018/19 Baseline
Electrical GWh	21.98	19.98
Gas GWh (normalised)	30.9	20.6
Total	52.88	40.58

- Electrical estimated to increase by 10% as COVID ventilation protocols remain and buildings return to full occupancy.
- Large jump on gas consumption, mainly driven by the district heating load and ventilation protocols.

# Electrical Energy Projects Planned

## Lighting Upgrades:

- Boole emergency exits.
- Boole lecture hall & PC labs/ Pharmacy / Kane Lecture .
- WGB Atria presence / lux control.

## HVAC:

- Ventilation upgrades / install (Civil Eng / West Wing / Connolly).
- Boole Heat Recovery.
- Glucksman GSHP
- ERI GSHP
- ORB ASHP

## Audits:

- Appointment of Powertherm under EEOS to complete Technical Audits of SEU's.

## Controls / Metering:

- ERI / BSI (AHU) BMS migration.
- Glucksman / Boole BMS Tender.
- Block A FSB BMS replacement.
- ResourceKraft - Metering validation / platform expansion.

## Renewables

- PV Tender exercise for pay as you generate model.
- Optimise ORB Arrays.

# Gas Projects Planned

## Equipment:

- ERI GSHP replacement.
- Glucksman GSHP replacement.
- Block A Food Science replacement.
- ORB ASHP completion.

## Audits:

- Appointment of Powertherm under EEOS to complete Technical Audits of SEU's.
- Roadmap for decarbonisation of heating systems.

## Controls / Metering:

- Continue to optimise systems to run at 50-55 degrees.
- Expand control platform to houses / other accounts
- Glucksman / Boole BMS Tender.
- Block A FSB BMS replacement.
- ResourceKraft - Metering validation / platform expansion.

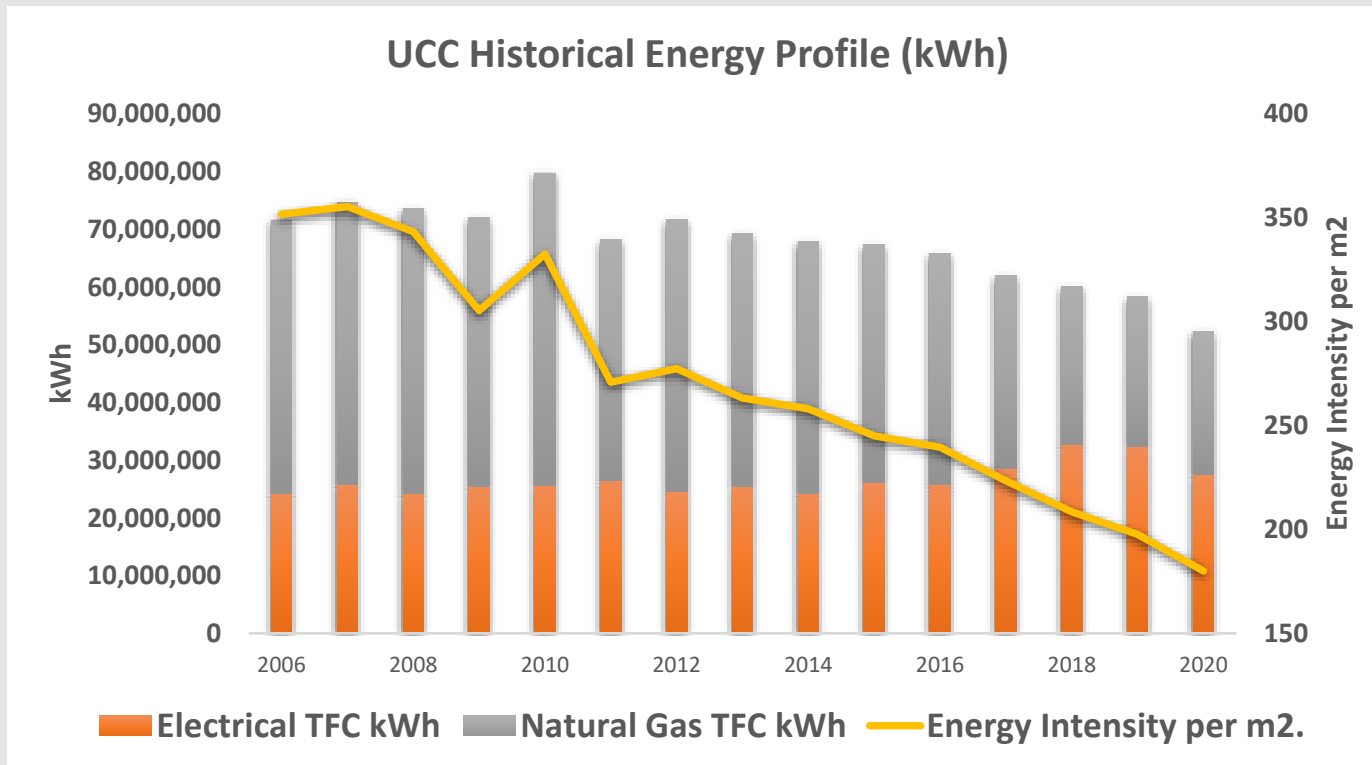


# Resources

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- Capital Resources.
  - Energy conservation projects continue to be supported and funded.
  - Devolved Grant - Used to replace EOL equipment with more energy efficient systems.
  - Continue to use grant aid / pathfinder programs and other innovative ways of funding projects.
  - Saver saves scheme continues to be supported.
- Personnel.
  - EEOS funding approved for additional Technical resource ( 1 week per month) to undertake EED / Technical Audits.

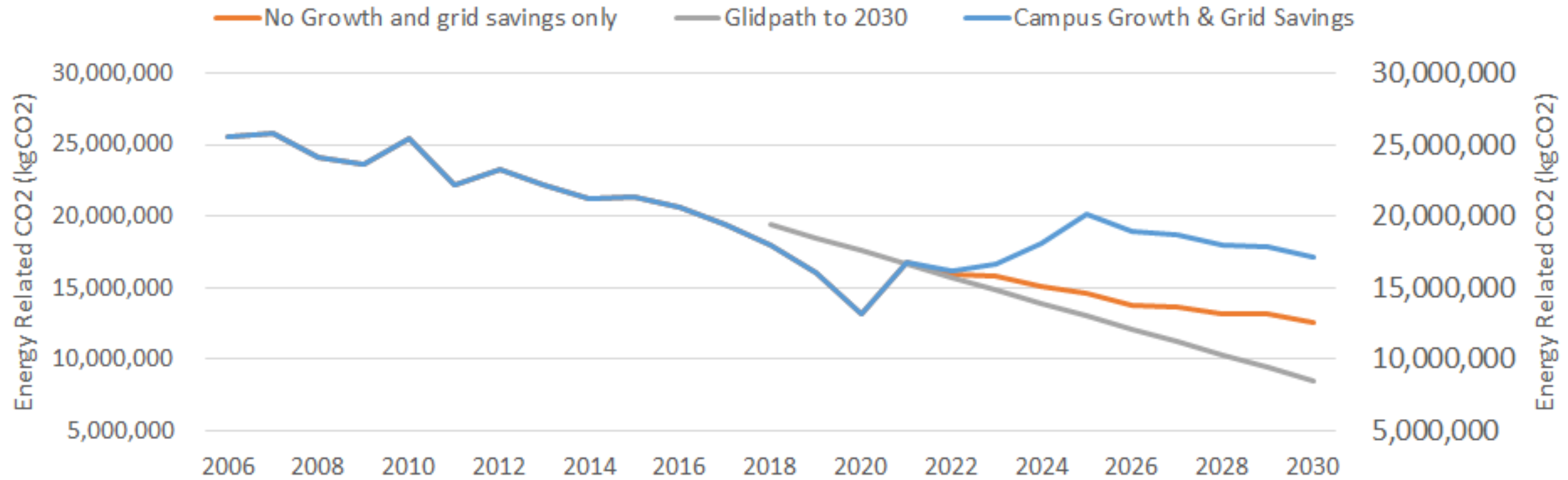
# Effectiveness of the Energy Management System



- 10th year of certification.
- Recertified to 2018 standard.
- 27% reduction in final energy use despite a 43% increase in footprint.



# Energy Related CO2 Forecast for UCC



## The CO2 Challenge for 2030

# The kWh Challenge for 2030

