

# CII ENERGY AWARD

24-26<sup>th</sup> August 2021

## Intel Technology India Pvt Ltd

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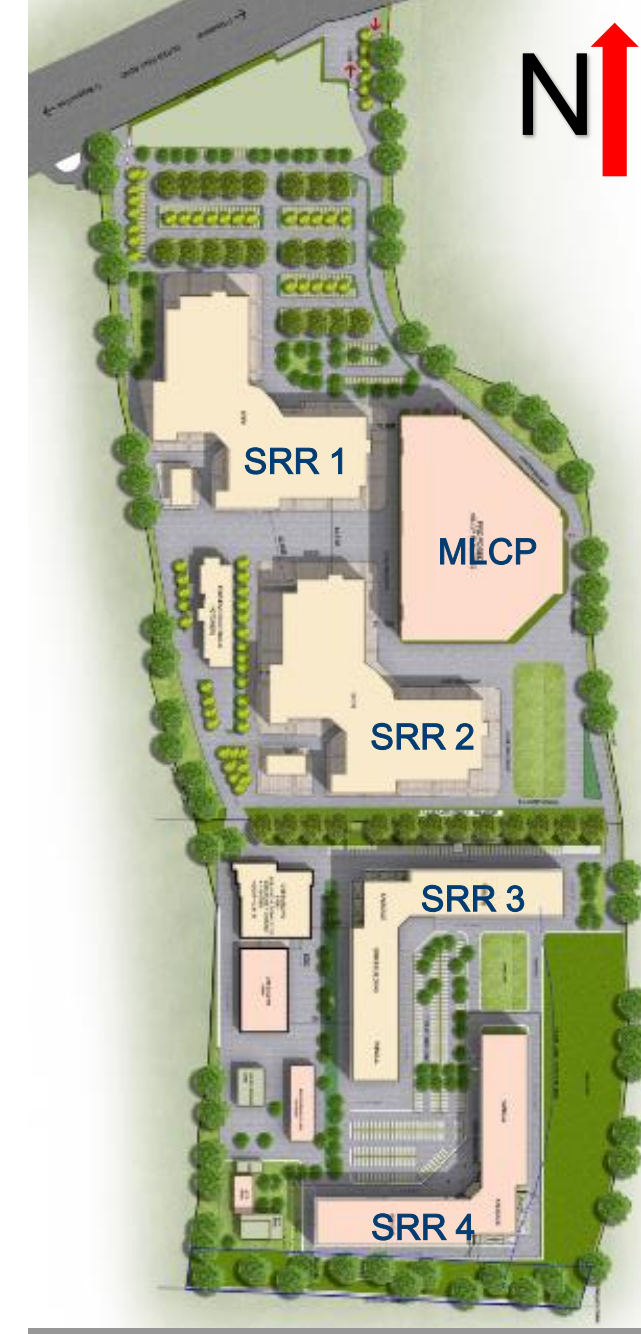
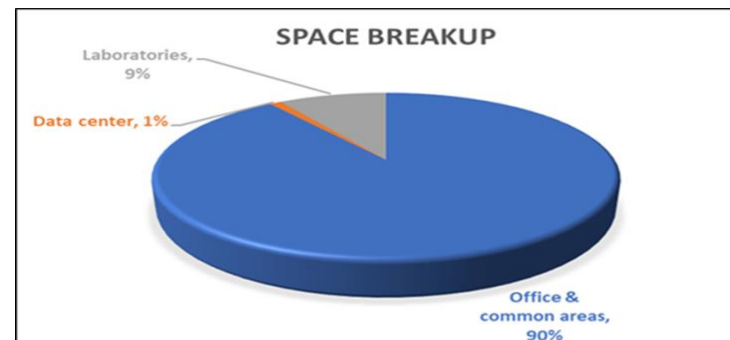
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# Intel India-SRR Campus Overview

- The SRR ( Sarjapur Ring Road) campus located in Bengaluru, Karnataka is one of Intel's largest semiconductor Design & Engineering centers for products that cater to the Desktop, Mobile, Servers, Network communications, Embedded & IOT markets
- Campus area: 42.28 Acres Built-up area: 244864 sqm.

Building Name	Built up area sqm	Usage
SRR1	22085	Office, Common areas, Data Centre, Laboratories & Utility rooms
SRR2	22044	Office, Common areas, Data Centre, Laboratories & Utility rooms
SRR3	62147	Office, Common areas, Laboratories & Utility rooms
SRR4	61772	Office, Common areas, Laboratories & Utility rooms
SRR5	75399	Multilevel Car Park- MLCP
SRRK	1417	Central Kitchen

Weekly Operating Hours		
Office	Data Centre	Laboratories
9 hours/ 5 days	24 hours/ 7 days	24 hours/ 7 days

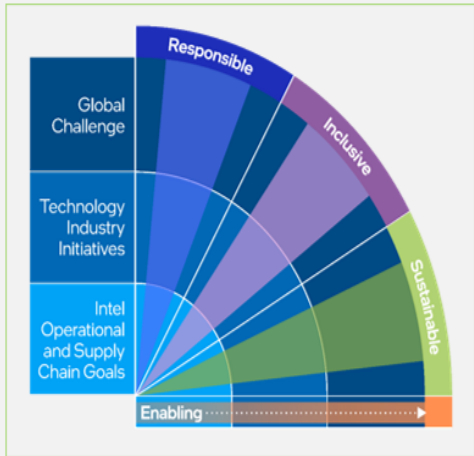


# Intel Corporation 2030 RISE strategy & Goals

## Toward 2030: Intel's RISE Strategy and Goals

Intel's Purpose: To create world-changing technology that improves the lives of every person on Earth

Intel's CSR Approach: To mitigate risks, reduce costs, build brand value, and apply our technology to help address society's most complex issues



### Responsible

Lead in advancing safety, wellness, and responsible business practices across our global manufacturing operations, our value chain, and beyond

### Inclusive

Advance inclusion across our global workforce and industry, and expand opportunities for others through technology, inclusion, and digital readiness initiatives

### Sustainable

Be a global leader in sustainability and enable our customers and others to reduce their environmental impact through our actions and technology

### Enabling

Through innovation technology and the expertise and passion of our employees, we enable positive change within Intel, across our industry, and beyond



## 2030 RISE: Sustainable Goals, Initiatives, and Global Challenges

### GLOBAL CHALLENGE:

Achieve carbon neutral computing to address climate change.

### TECHNOLOGY INDUSTRY INITIATIVES:

**Sustainable Manufacturing.** Create a collective approach to reducing emissions for the semiconductor manufacturing industry and increase the use of technology to reduce climate impact in global manufacturing.

**Sustainable Chemistry.** Enable greener and circular chemistry strategies across the technology industry value chain by transforming chemical footprint methodology.

### OPERATIONAL AND SUPPLY CHAIN GOALS:

**100% Green Power.** Achieve 100% renewable energy use across our global manufacturing operations.

**Energy Conservation.** Conserve 4 billion kWh of energy.

**Emissions Reductions.** Drive a 10% reduction in our absolute Scope 1 and 2 carbon emissions as we grow, informed by climate science.

**Product Energy Efficiency.** Increase product energy efficiency 10x for Intel client and server microprocessors to reduce our Scope 3 emissions.

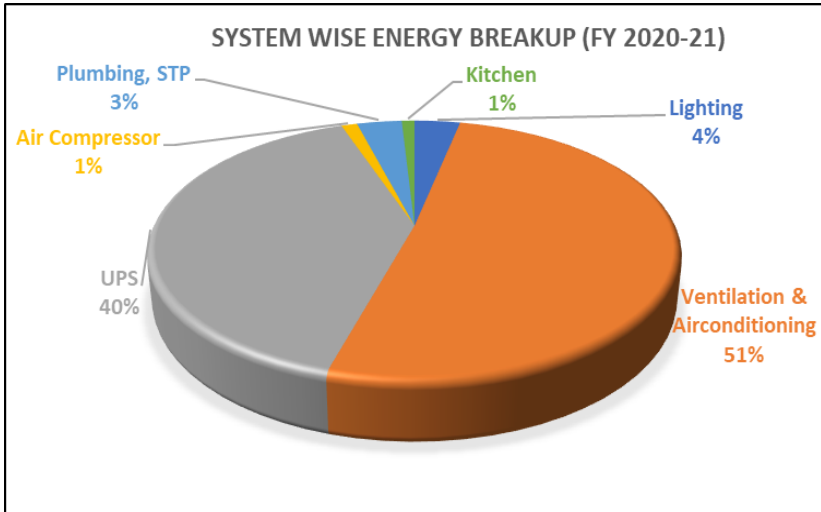
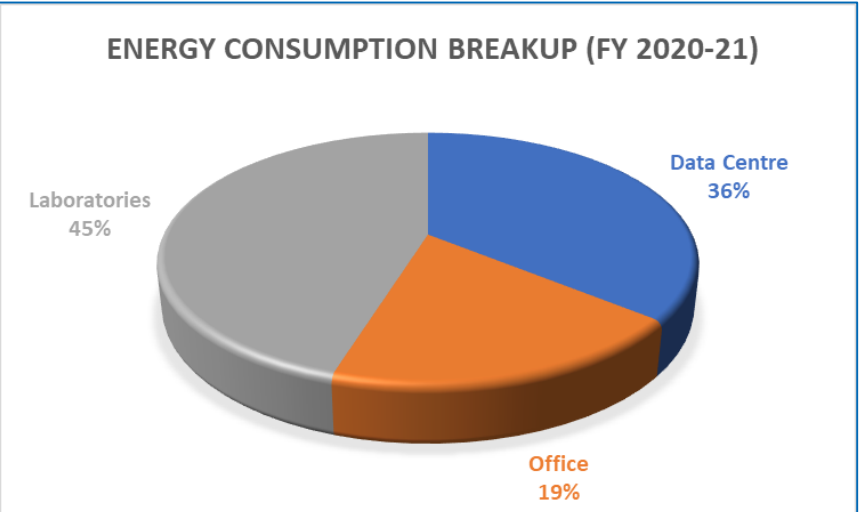
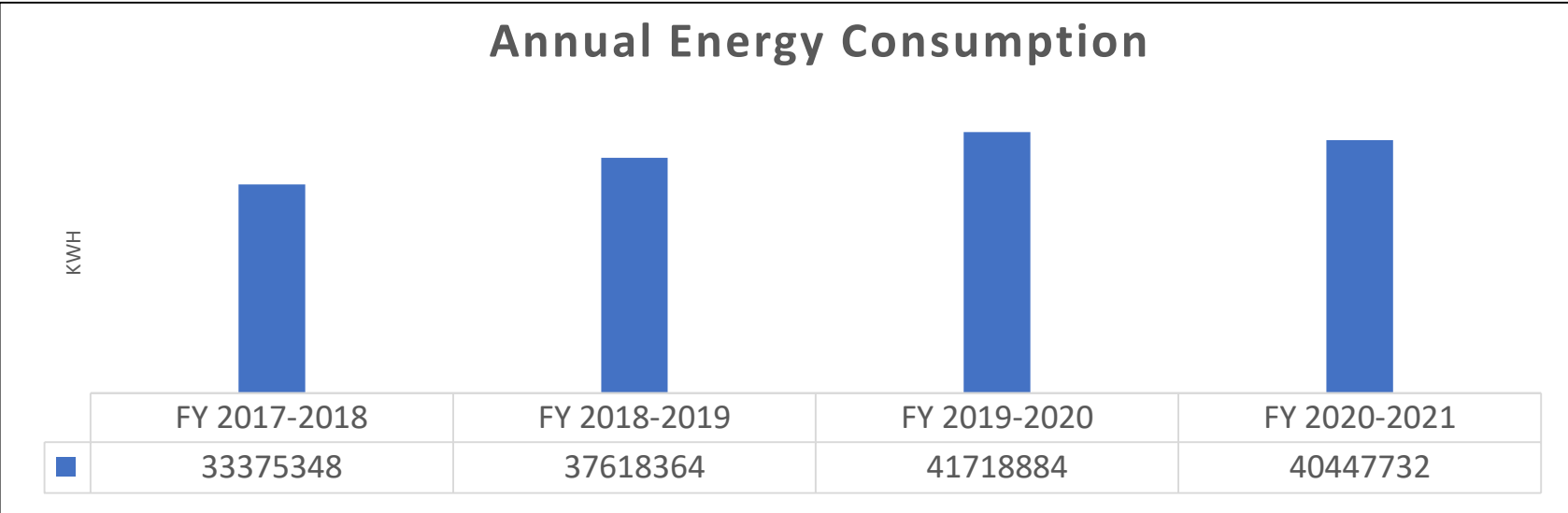
**Net Positive Water.** Achieve net positive water use—by conserving 60 billion gallons of water and funding external water restoration projects.

**Zero Total Waste to Landfill.** Achieve zero total waste to landfill and implement circular economy strategies for 60% of our manufacturing waste streams in partnership with our suppliers.

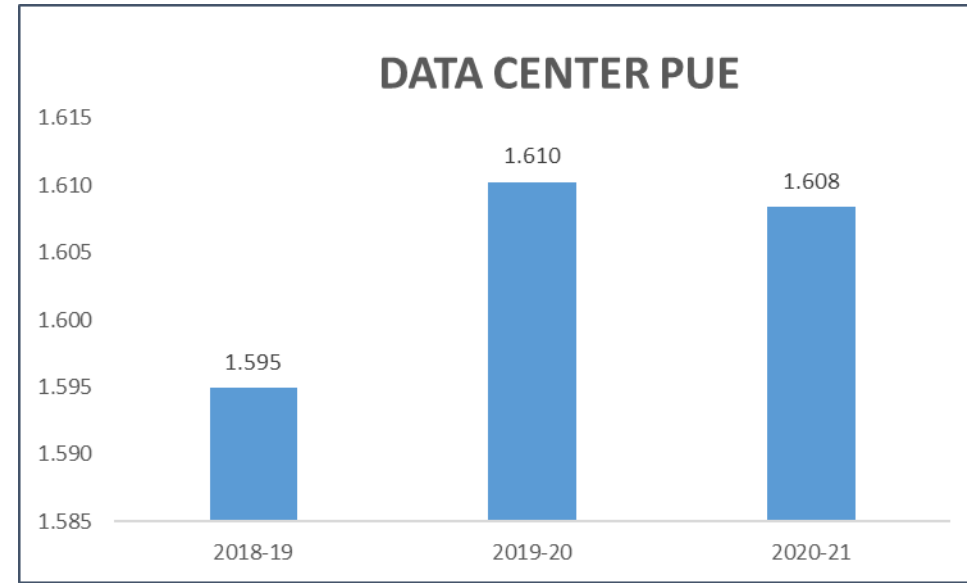
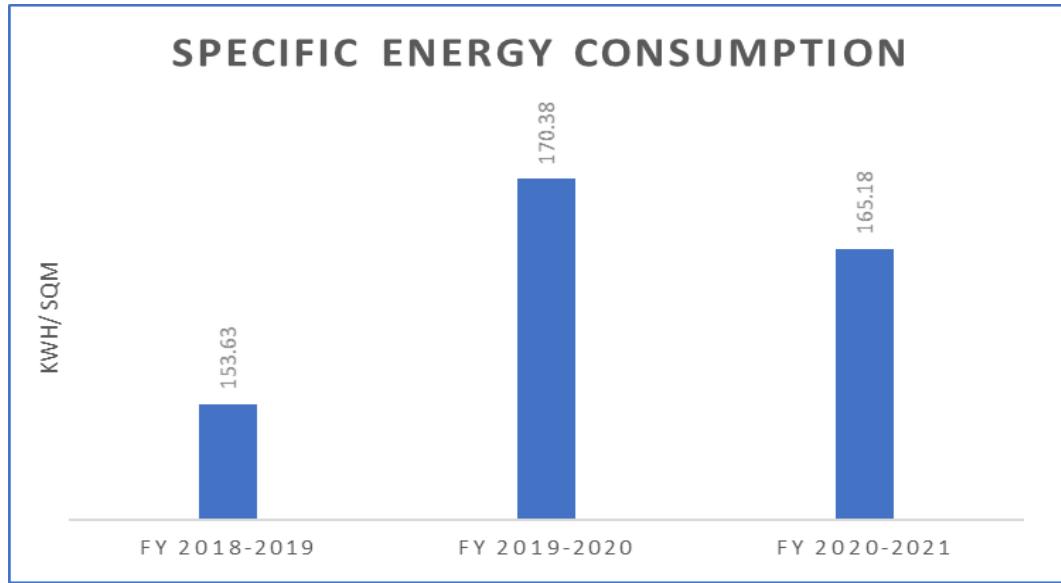
# Energy Consumption Overview



**Architectural features: SRR3& SRR4 buildings**  
 Roof(R40ci) U- 0.027Btu/h-sft-°F  
 Walls (Spandrel Glass) U- 0.764Btu/h-sft-°F  
 Windows: U- 0.34Btu/h-sft-°F , SHGC( including frames)- 0.54; VLT- 67%.  
 Louvers provide shading.



# 3 years Specific Energy Consumption (SEC)



Being a semiconductor Design & Engineering site, the campus infrastructure is built to cater to Office, Laboratories & Data Centers requirements.

- Laboratories support the semiconductor Engineering and Validation activities. They are energy intensive, with few laboratories requiring services like Process chilled water, vacuum & Oil Free Compressed air.
- Onsite Data Centers caters to the compute requirements of the design teams.
- Office area includes the employee seating, collaboration spaces, Health & well being spaces, Dining services & other backend facilities & services.

# SEC Variance Drivers

- Significant increase in YoY laboratory energy demand driven by growth in Engineering & Validation activities/ projects.
- Data center IT & facility energy use optimization in FY 2020-2021.
- Office energy demand dropped in FY 2020-21 -Work from home due to pandemic & energy optimization efforts.
- Head count growth- more employees accessing onsite infrastructure remotely in FY 2020-2021.
- Airconditioning load- Average summertime ambient temperature in Bengaluru, increased by 1-2 Deg C compared to 2018.

Variance drivers	FY 2019-2020 (% change from previous year)	FY 2020-2021 (% change from previous year)
SEC Variance	▲ 11%	▼ 3%
Drivers		
Active carpet Area	▲ 1%	No change
Headcount	▲ 1%	▲ 10%
Data center	▲ 8%	▼ 2%
Laboratories	▲ 12%	▲ 67%
Office	▲ 20%	▼ 28%

***Laboratories consume 45% of the overall energy in the campus, while the rest 55% energy consumption is from Office(19%) & Data centers(36%). The increase in Laboratory energy consumption in 2020-2021, was offset by the reduction in Data Center & Office Energy consumption.***

# Benchmark

SEC of Intel SRR campus (KWH/ sqm)	165.18			
	Value	Difference	Location	Source
National Benchmark (KWH/ sqm)	190.91	25	Bengaluru	CII database
Global benchmark (KWH/sqm)	152	-13.18	APAC	Internal Benchmarking program

- Our Sustainability goals for the campus are aligned with our Corporate RISE 2030 goals, both in the near term and long term. Annual sustainability goals are published at the beginning of every year.
- Ongoing efforts for SEC reduction include, asset monitoring and replacement of aging assets with high efficiency systems, operational improvements, leveraging IoT/ automation to make data driven decisions and reduction in Data Centre & laboratories energy use ( power & cooling).

FY 2021-2022 Energy Conservation project roadmap			
Project Title	Description	Annual Electrical savings (Million KWH)	Investment in Million INR
Data center PUE reduction	Upgrading Precision Aircon units – replacing DX with chilled water units	0.6	10
Chiller plant optimization	~15% reduction in plant KW/TR using 3rd party optimization software with Machine learning capabilities.	1.12	47

# Energy savings projects implemented in last 3 years

The list of major Energy Conservation projects deployed over the last 3 years are provided below :

Towards the end of 2018, ~62000 sqm of space(SRR4) was added to the campus to support the business growth

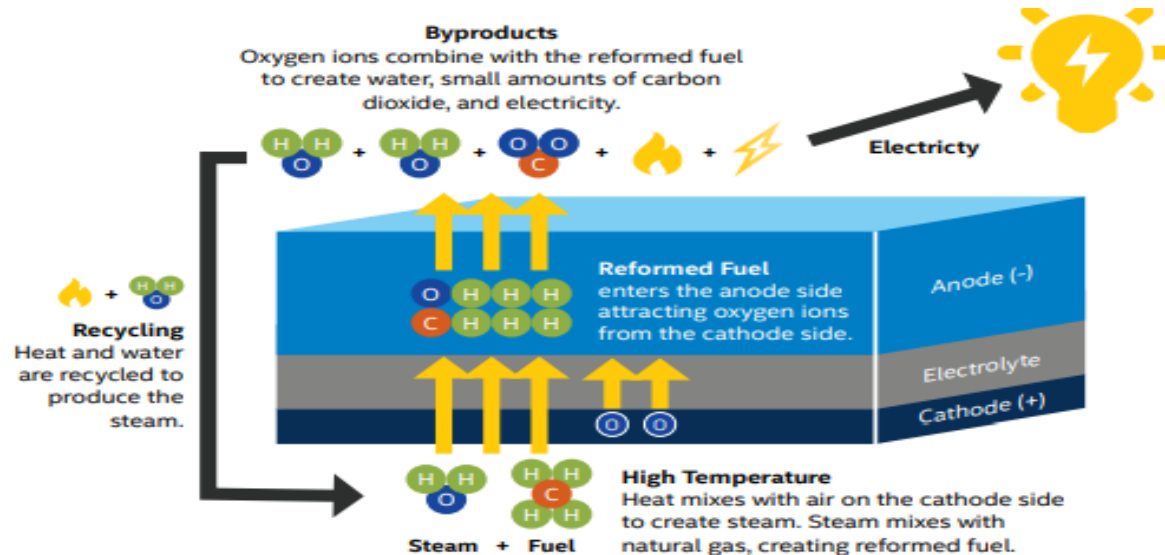
Year	# of Energy conservation projects	Investment (Million INR)	Electrical savings (Million KWH)	Savings ( Million INR)	Impact on SEC (Electrical)
FY 2018-2019	2	12.1	0.53	4.8	0.8% reduction
FY 2019-2020	2	203.2	4.5	37.06	3% reduction
FY 2020-2021	1	0	0.26	2.3	0.5% reduction



# Innovation- Onsite Power Generation with Solid

## Oxide Fuel Cells

1. Fuel cells are a clean & reliable source of power that converts fuel directly into power, without combustion.
2. The Fuel cells convert Natural gas (Chemical Energy) into Electricity through Electrochemical reactions, with 60%+ electrical efficiency.
3. Low CO2 emissions(50% lesser than onsite DG and source energy of Grid) and virtually zero NOx & SOx emissions..
4. Customizable to suit space needs & power needs; Modular (250KW modules) & scalable to support future energy demand increase.
5. High reliability ( >99.998% uptime). Can replace UPS for mission critical applications.
6. Can be easily replicated & deployed in about 6 months time, where Natural Gas infrastructure is available.
7. Synchronizes with both Grid & Backup DG. Can be configured for both Grid parallel & Grid independent mode.



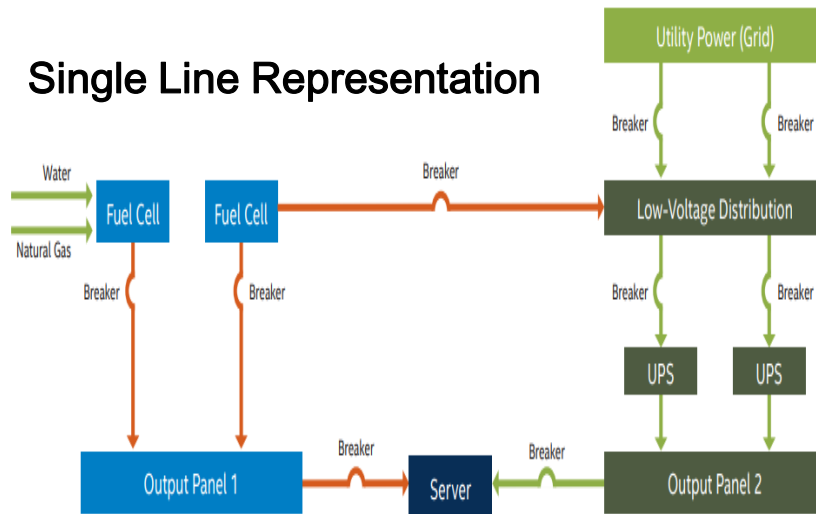
# Fuel Cell application in SRR campus



- Intel India is the first company to deploy fuel cells in India starting 2016.
- Utilities and Engineering teams explored multiple options to support campus power infrastructure expansions & zeroed in on fuel cells based on its benefits
- 4MW of installed capacity, that supports ~65% of the campus electricity consumed.
- Capacity scaled over last 5 years in a modular fashion to support campus growth.
- System acts as primary source and is synchronized with grid and back up DG.

System is configured, to feed power directly to Data Centre (one source), bypassing UPS.

## Single Line Representation



Benefits	Energy reduction
UPS elimination in one of the 2 power sources to the Data Centre.	12% from UPS conversion losses avoidance in Data Centre
Decentralized distribution- Locating the fuel cell source closer to the load .	3.65% Reduction in 11KV substation transformer conversion losses and cable losses

# Renewable & Alternate energy Technologies @

**FUEL CELL to support 100% of datacenter electric demand**



**SOLAR PV rooftop covers 100% of BUILDINGS roof space**



**BIO-ENERGY system to treat 100% organic & food waste**



**MOTION POWER for off grid lighting**



**SOLAR THERMAL supplies 100% domestic hot water supply**



**SOLAR CHILLERS delivers 100% heating and cooling demand for the kitchen**



# Renewable Energy resources

Year	Technology (Electrical)	Type of Energy	Onsite/ Offsite	Installed Capacity (MW)	Generation Million KWH	% of overall Electrical Energy
FY 2018-2019	Solar PV	Electricity	Onsite	0.721	1.08	2.87
			Offsite	2.1	2.18	5.8
FY 2019-2020	Solar PV	Electricity	Onsite	0.725	1.06	2.54
			Offsite	2.1	2.06	4.94
FY 2020-2021	Solar PV	Electricity	Onsite	0.725	1.04	2.57
			Offsite	2.1	2.48	6.13

Year	Technology (Thermal)	Type of Energy	Onsite/ Offsite	Installed Capacity (Kcal)	Generation Million Kcal	% of overall Thermal Energy
FY 2018-2019	Solar Thermal	Heat	Onsite	292400	366	100
	Solar refrigeration	Heat	Onsite	53320	49.6	100
	Biogas	Bio Energy	Onsite	277900	9	15
FY 2019-2020	Solar Thermal	Heat	Onsite	292400	401	100
	Solar refrigeration	Heat	Onsite	53320	49.6	100
	Biogas	Bio Energy	Onsite	277900	7	4
FY 2020-2021	Solar Thermal	Heat	Onsite	292400	90	100
	Solar refrigeration	Heat	Onsite	53320	34.7	100
	Biogas	Bio Energy	Onsite	277900	1.3	<1

# Utilization of Renewable Energy sources

	FY 2018-2019	FY 2019-2020	FY 2021-2021
Capacity added (MW)	3.4	0.004	0
Investment made in Million Rupees	20	0.5	0
Power Generation in Million KWH	3.26	3.12	3.52
RPO Obligation	Not applicable	Not applicable	Not applicable
Unit Total Capacity (MW)	3.4	3.4004	3.4004

In September 2020, Intel Corporation also became a member of RE100, a global coalition of businesses committed to 100% renewable electricity use.

# Waste Management

## Onsite Biogas plant

- 200 Kg/ day capacity The cafeteria & kitchen food waste is converted to Biogas onsite.
- The gas generated is used in the kitchen( displaces about 3-4 commercial LPG cylinders in a day )

## Water Recycle/ Reuse

- More than 45% of the campus water needs are met from recycling
- Domestic wastewater- >400 KLD MBR STPs to treat water and use for flushing, irrigation & cooling tower make up post tertiary treatment.
- >2300 m3 of Rainwater collection tank, that is used for irrigation & cooling tower make up, post filtration.

	FY 2018-2019	FY 2019-2020	FY 2020-2021
<b>Fuel</b>	<b>Biogas</b>	<b>Biogas</b>	<b>Biogas</b>
<b>Quantity used MT/year</b>	2.974	2.151	0.413
<b>GCV Kcal/kg</b>	4500	4500	4500
<b>Heat value Million Kcal/year</b>	9	9	1.3
<b>Waste fuel as % of total energy use</b>	15	4	<1

# GHG emissions & Indoor air quality

Intel's emissions calculations are based on Global Reporting Initiative Standards, World Resource Institute/ World Business Council for Sustainable Development's The Greenhouse Gas Protocol & internal criteria defined by Intel management. GHG Emission reporting is publicly available in the CDP questionnaire response

Emission-Metric Tons CO2e (India)	Scope 1	Scope 2	Scope 3
FY 2017 (Jan- Dec)	25000	16000	Not Calculated
FY 2018 (Jan- Dec)	9000	12000	Not Calculated
FY 2019 (Jan- Dec)	11100	16300	Calculated Corporate wide
FY 2020 (Jan- Dec)	In progress	In progress	In progress

**Goals:** Our 2030 RISE goal requires every site to drive 10% reduction in our absolute Scope 1 & Scope 2 emissions between 2020 and 2030. Emission reduction strategies would be focused on continued investment in Renewable energy, equipment optimization and Energy conservation

## Indoor Air Quality (IAQ) management:

1. Outside air management for Air Handling Units using motorized dampers that modulate based on CO2 levels
2. IAQ management is part of building enhanced commissioning program

# Teamwork, Employee involvement & monitoring

The campus has a dedicated Energy Manager.

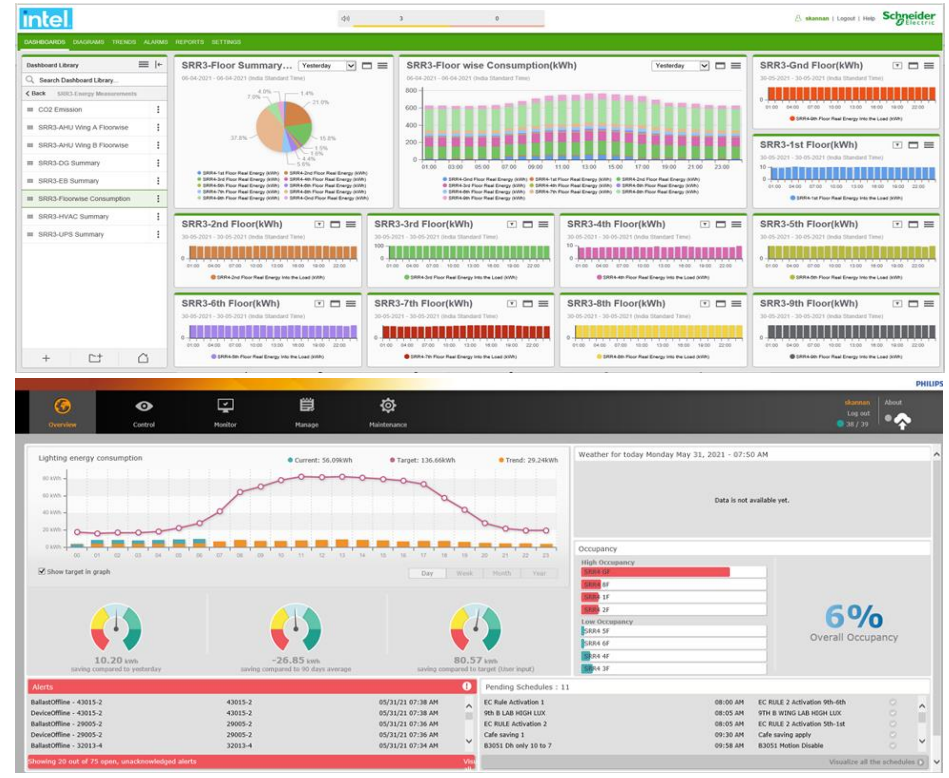
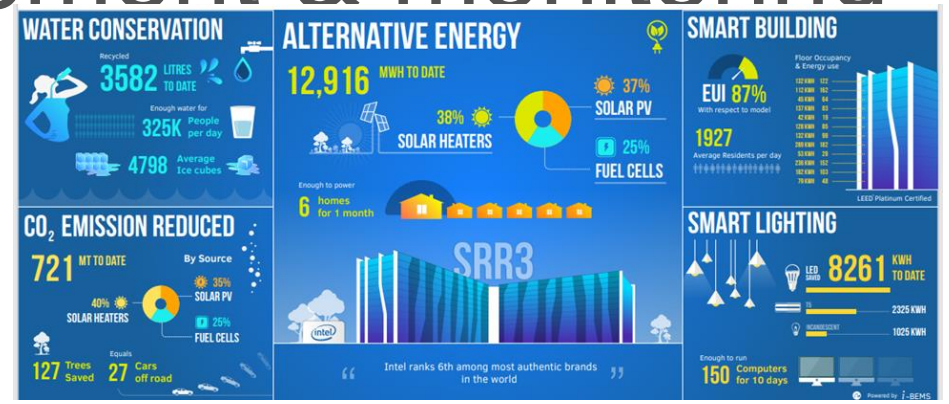
Annual Energy conservation budgets are available for projects that meet the internally laid out NPC criteria.

Trainings: Inhouse & external trainings are provided to employees on a regular basis.

Kaizen/ Operational improvements: implemented:

Dynamic set point management for AHU; Compressed air system leak assessment.; End user engagement/ awareness programs.

Smart building /IoT use cases- Smart lighting; Fault detection & diagnostics for HVAC; Energy/ water usage dashboards & analytics





# ISO50001 implementation

- Intel India SRR campus is not ISO 50001 certified.
- Globally, we have received 3<sup>rd</sup> party accreditation for 5 out of the 12 manufacturing sites.
- The Intel Code of Conduct, Climate Change Policy, Global Water Policy, and Environmental, Health, and Safety Policy guide our sustainability strategy and help us set goals. Our Corporate Energy management systems follows the ISO 50001 Energy management standards. Our campus energy management program structure & process is based on the ISO50001 guidelines
- Design centers , like the SRR campus in India would be certified in the coming years.

Investment on Energy conservation projects in FY 2020-2021 : No capital investments made toward Energy Conservation due to the pandemic( lockdown). No cost efforts, to optimize facility systems were carried out.

# Learnings from CII awards 2020/ other programs

## Brushless DC (BLDC) motors

- Retrofit of existing 3 phase squirrel cage induction motors with plug fan & BLDC motors for Air handling Units ( AHU).
- Till date 68 EC fans have been installed in our campus
- More than 40% energy saved from the conventional AHU.
- Additional benefits include – lesser noise & improved reliability with fan grid.
- All the new installations require EC fans as a minimum requirement.
- The benefits of this technology has been shared with our Regional & Global teams for proliferation
- This project was a key take away from one of the CII trainings , attended by Intel India's energy conservation team.

# Awards/ Certifications

Building	SRR Campus wide certifications
SRR1	USGBC LEED Gold (O&M)
SRR2	USGBC LEED Silver (O&M)
SRR3	USGBC LEED Platinum ( New Design & Construction)
SRR4	USGBC LEED Platinum ( New Design & Construction)
SRRK	USGBC LEED Gold ( New Design & Construction)

Sustainability awards won by Intel Corporation in 2020 & Q1 2021.
3BL Media. 100 Best Corporate Citizens
Brave Blue World. 2020 Lighthouse Award for Water Stewardship
CDP. "A" Water Security Rating, "A-" Climate Change Rating, Supplier Engagement Leadership Rating
Center for Resource Solutions. Renewable Energy Markets Asia Award
Corporate Knights. Global 100 Most Sustainable Corporations
Dow Jones Sustainability Index. North America Index
EcoAct. Sustainability Reporting Performance of the DOW 30
Fortune. World's Most Admired Companies
ISS. 1 rating in both Environment & Social QualityScore
JUST Capital. Top Companies for the Environment
MSCI. World ESG Leaders Index
Newsweek. America's Most Responsible Companies
Sustainalytics. Member, Global Sustainability Signatories Index
US Environmental Protection Agency. Green Power Partnership
Wall Street Journal. Top 100 Most Sustainably Managed Companies

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