Restricted, Sensitive (Normal)

# ENVIRONMENTAL SUSTAINABILITY

### **CHI INNOVATE 2024**

Sengkang

General Hospital

KK Women's and

Children's Hospital

# SingHealth

**Defining Tomorrow's Medicine** 

Sustainability as SingHealth's way of life







National Cancer Centre Singapore





National Neuroscience Institute



stional SingHealth Community Hospitals

### 01

### **Health Care Delivery**

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**Good Clinical Practice** Green Building and Innovation

Renewable Energy

**Sustainable** Transportation

Water Efficiency



### **Health Care Supply Chain**



**Sustainable Procurement** 

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### **Build the** Culture of **Sustainability**

Waste

Management

Desflurane Use

Reducina



# SINGHEALTH **ENVIRONMENTAL SUSTAINABILITY** DECARBONISATION PLANS



**Defining Tomorrow's Medicine** 

Sustainability as SingHealth's way of life



#### Reduction of waste by repairing damaged linen

Linen with small tears in them are repaired by stitching embroidery pieces over the holes; or converted into smaller pieces of linen

- Reuse approximately 30% of the damaged linen
- Reduce about 1.25 tonnes of waste
- Save estimated \$47,000 annually

GREENGOV.SG REPORT FOR FINANCIAL YEAR 2022



#### Reducing waste in hospitals

Hospital linens such as patient pyjamas, towels and linen wrappers are subject to wear and tear over time. In 2021, Sengkang General Hospital had approximately 13,000 pieces of damaged linens, which typically would have been disposed of as general waste. The staff came up with the idea to repair damaged linen and convert them into smaller linen. This initiative enabled the hospital to reuse approximately 30% of the damaged linen and reduce about 1.25 tomes of waste, saving an estimated \$47,000 annually.



Examples of embroidery patterns used to repair damaged linen

#### Pilot study utilising recirculation air during non-operational hours for operating theatres (30 OTs)

From 8pm to 6am and 24 hours



**Potential Energy savings** 

~ 4.5 / 11.25 GWh yearly



CO<sub>2</sub>e mission savings<sup>1</sup>

~ 2,363 / 5,906 tonnes CO<sub>2</sub> e yearly



Mature rain trees required to offset CO<sub>2</sub>e impact<sup>2</sup>

~ 118K / 295K trees yearly



### Smart IOT Lighting System

Achieved an impressive **75% additional energy savings** over its current T8 LED lighting system in one of its carpark projects by initiating a groundbreaking AI Smart lighting revolution.

#### Sustainable Impact

Drive a positive environmental impact through cutting-edge energy management solutions.

#### **Smart Technology**

Utilize advanced sensors for precise individual control and real-time monitoring.

#### **Incredible Savings**

Realize unparalleled efficiency and significant cost reductions throughout the transformation journey.

\$0 Capital ExpenditureReduced Carbon Footprint

# Improve Safety & ExperienceHassle Free Installation

#### LED

By utilizing high-quality LED chips with a luminous efficiency of 160 lm/w, it consumes less power while providing the same level of illumination compared to other LEDs in the market.



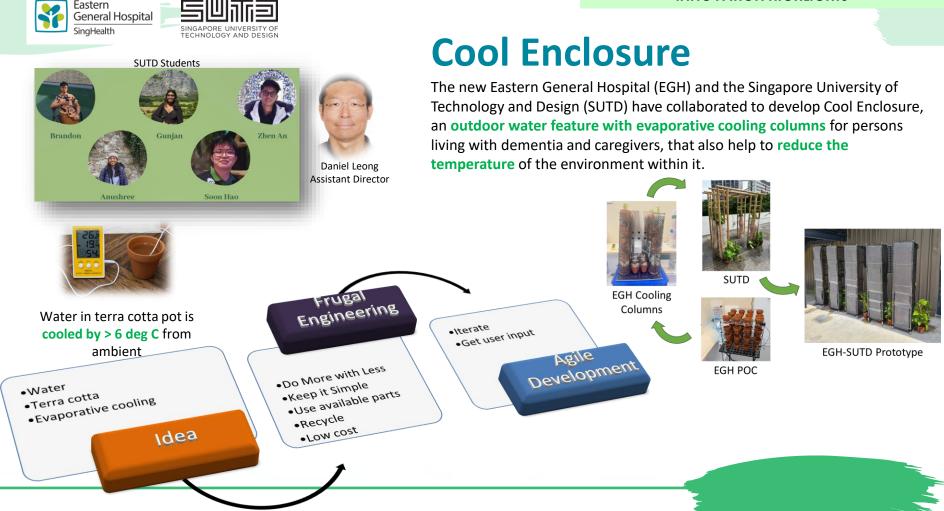
#### Radar

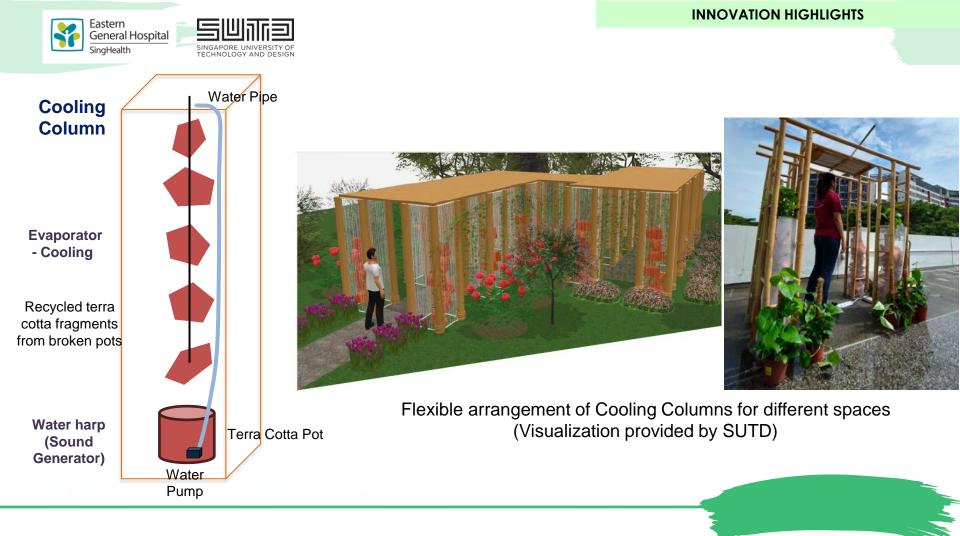
With a 5.8GHz radar, it offers an adjustable sensing radius of up to 6 meters to suit various environments.

#### Bluetooth

Built on the latest Bluetooth Mesh technology for wireless networking, it employs wireless networking with a communication **range of approximately 60 meters**. It supports both local and remote control, offers seamless dimming, and allows for device grouping.

#### **INNOVATION HIGHLIGHTS**

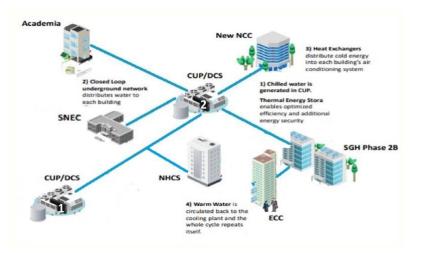




# Green Building Design and Innovation & Renewable Energy

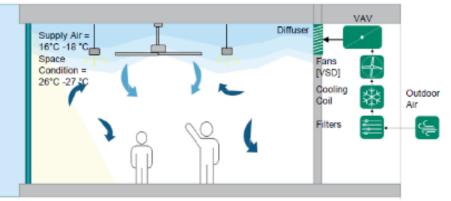


#### Singapore General Hospital Campus District Cooling System



Solar Photovoltaic (PV) system for SingHealth Institutions

### Eastern General Hospital Campus Hybrid Cooling System





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### 01 Healthcare Delivery: Good Clinical Practice



### Sustainable clinical practice is KEY to reduce use of resources

- □ Avoid unnecessary intervention
- Sub-cutaneous medications
- Teleconsultation to reduce travel
- Disease prevention: vaccination, alcohol, smoking, weight management

### **Good Practices**

- $\rightarrow$  Preparation
- $\rightarrow$  Procedure
- $\rightarrow$  Equipment and solid waste
- $\rightarrow$  Waste management

- □ Prevent complications:
- Optimisation of chronic illness
- Appropriate antibiotic prophylaxis
- Good surgery preparation and systems and care pathways
- Expertise and training
- Good clinical care and rehabilitation



# 01 Waste Reduction



### **Preparation for Surgery**

- Paperless OT: listing to surgery
- □ Review of surgical sets to remove unnecessary instruments
- Avoid unnecessary interventions: non-indicated antibiotics, catheterization by going to toilet before surgery, histology
- Open gowns and gloves for right number of people

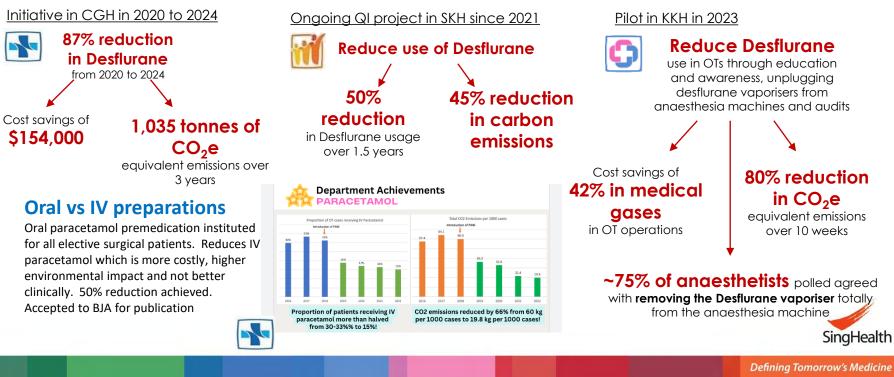


Saves water and hand towel



### Reducing Desflurane Use (Medical Gases) and Others

- Anaesthetic gases used in OTs are potent greenhouse gases with global warming potential (GWP) of Desflurane at approximately 40-50x that of sevoflurane
  - However, desflurane still has its clinical relevance



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# 01 Waste Reduction



### **Intraoperative Equipment**

- Surgeon preference list for each surgery with frequent updates
- Separate essential and optional items
- Open sets and equipment: open when needed
- □ Opt for Reusable instead of single use
- Sutures instead of clips



Pour only sufficient lotion for skin cleansing preparation

### "Don't open it unless you need it!" principle



Keep within shelf life of 7 days



#### **REDUCE WASTE AND SINGLE USE**

### 01 Waste Reduction F&B in OT









- Buffet with reusable utensils
- □ Request desired amount
- Only 1 waste bin required



#### Reusable Lacquer Bento Boxes





#### **OT Scrub Brushes Recycling Project**

collate all brushes

container







Located at MC L8, 9, 10 ٠ **Collaboration Space** 

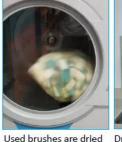




**Recycled** container placed at each scrub sink for disposal of used brush



At the end of the day. OTCT collects and into a main recycled brings to ES



in a laundry bag in the dryer weekly/once bag is full



Dried brushes are stacked into recycled container



Do your part in saving the planet int to you by the SKH Green Comm

#### Uses

- 1. Self collection by staff for personal use
- 2. Acupuncture clinic for safety measures:
- Count
- Injury ٠

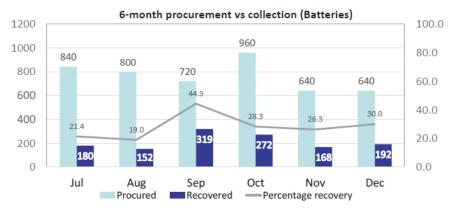




SingHealth







No. of batteries recovered from recycling 1283 ÷ No. of batteries procured 4600 x 100% = 27.89%

With this initiative, OT is buying lesser batteries. Cost savings in 6 months is \$769.80





#### why vi-Cap?

Capnography systems pose the threat of cross contamination between patients.

American Society of Anaesthesiologists (Patient Monitoring Safety Standards)\* requires clinicians to monitor capnography waveform to ensure proper and adequate ventilation of patient undergoing anaesthesia and sedation.

The capnography sampling line should include an anti-microbial filter to prevent cross infection between patients and not contaminating the capnography system.

\* when a capnography system is available.





As advocates of sustainability, N&E has created Vi-Cap by upcycling syringes collected from hospitals in Singapore, thus supporting circular economy.

#### What is unique about Vi-Cap?

Vi-Cap represents an advancement in the safe use of the capnography system.

Vi-Cap is a first-in-the-world, standalone, sterile, non-invasive, single use antibacterial/viral (N95) filter attached to the side stream monitoring line of the capnography system to reduce cross-contamination between patients, as the capnography system is not routinely changed between cases.

#### What are the benefits?:

1. Easily attachable to side stream monitoring system.

2. Prevents cross -contamination between patients.

#### Components

N95 Filter, Vikang99, Barrel, Teflon Holder

#### Indications for use

To be used on patients who benefit from capnography monitoring.

All patients undergoing surgical procedures with monitored anaesthesia care, and especially when sedative, anxiolytic, or analgesic medications are administered for patients' safety and comfort.

Duration of effectiveness:

24 hours: One-time use.

#### Certifications:

1) Microbial Cleanliness Test (Bloburden) (BS EN 14683:2019 /ISO 11737-1:2018)

2) Sub-micron Particulate Filtration Efficiency (PFE) at 0.1 Micron

3) SARS Cov-2 Antiviral Activity (ISO 18184:2019)

4) Proven Antibacterial Activity (EN 1276:2009) against Staphylococcus aureus ATCC 6538, Escherichia coli ATCC 10536. Pseudomonas aeruginosa ATCC 15442. Enterococcus faecium ATCC 6057. Salmonella typhimurium ATCC 13311 with more than 5 log reduction

Refer to www.vikang.com for more tests.

HSA Risk Classification:

Class A

Wholesale Manufacturer:

N&E Innovations Pte Ltd. Singapore



Defining Tomorrow's Medicine



Repurpose the gowns wrappers to line the "Kick about Basin" and the Swab Recycled disposable diathermy quiver used to contain ampoules and act as cushion to deliver the ampoules from Pharmacy to OT and vice versa via pneumatic tube.





Repurpose instrument packaging trays as anaesthetic trays



To prevent staff from getting injured by the POP Saw Blade. Empty Mikrozid wipes container is used to cover the POP Saw Blade









Reusing Ophthalmic Pack's Packaging for patients to store their shoes and clothes.



from Basin set are repurposed for storing documents.

Plastic covers





Repurpose OT waste to Good Use



# 01 REPURPOSE





Gift Wrappers & Christmas Decorations Promoting Upcycling Through Competitions Nurses Day Decorations











Joy @ Work Activities – Bingo Game 2021



# **RECYCLING: Waste Segregation**





### Make Recycling Accessible



### **Recycling bins in all pantries**

Previously, there was only one recycling bin to the left of Anaesthetic workstation, which filled up quickly

OTS worked with ES department to provide larger bins, reducing trips to empty the bin





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### 01 **RECYCLING: Waste Segregation** Make Recycling Easy with Guide







We have the bins, but we need to be disciplined and USE them appropriately







#### Reduction of Biohazard waste by 23%

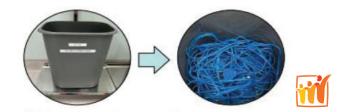




100

73.8

#### **Collection & Recycling of Electrocautery Cables**



Electrocautery cables are cut and removed from the hand-pieces and pads respectively, wiped down and placed into the allocated bins before sending to vendor for recycling.



—% Recovered

#### 6-month collection (Qty of electrocautery hand pieces 44g/pc and pads 38g/pc)

Recovered

6-month procurement vs recovery of cables (Wt of electrocautery hand pieces and pads in kg)

79.836

84.84

RECYCLING

94,732

Ī	Month	Jul	Aug	Sep	Oct	Nov	Dec	Total
	Hand Piece (in pieces)	935	1165	1030	975	578	104	935
	Pad (in pieces)	1004	1144	1040	972	1167	674	1004

Total weight of cables from electrocautery hand pieces and pads: 438.666kg Wt. of electrocautery cables recovered from recycling 182.94 ÷ Wt. of electrocautery cables procured 438.67 x 100% = **41.70%** 

Recovered cables will be processed to extract the copper for recycling. Copper • can be melted into new copper for various applications such as wires, printed circuit boards (PCB) and copperwares.

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80.0

70.0

60.0

50.0

40.0

30.0

20.0

10.0

0.0

79.292

Jul

47.9

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Disinfected disposable instruments and sold to vendor for recycling since 2019.

RECYCLING

Melted metal to make pots and pans.

Done it 4 times Total weight of 1,200kg Proceeds go to SKH Patient Needy Fund

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SGH now collects, on the average, about 600 kg of single-use steel instruments per month, following repeated publicity to create awareness among the staff from different departments that use disposable steel instruments for their work.



















ALPS

Green Procurement Policy



### Health Care Supply Chain 🗦

- **Green Procurement** is the practice of procuring goods and services that cause minimal adverse impact environmental impact (Scope 3).
- Principal Considerations for Green Products / Services:
  - 1. Resource (e.g. energy / water) efficient
  - 2. Made from raw materials obtained in an environmentally sound, sustainable manner
  - 3. Manufactured in environmentally-friendly production
  - 4. Respects the environment with appropriate 3R plan and implementation
  - 5. Distributed with minimal packaging (consistent with care of the product), preferably made of recycled and/or recyclable materials
  - 6. Certified by recognised international and/ local organisations like Energy Star, Forest Stewardship Council (FSC), Green Seal, Ecologo, Singapore Environmental Council (SEC) etc.



ALPS will lead the effort to championing environmental stewardship in our sourcing efforts by including green requirements & evaluation criteria in all RFPs, where applicable, including providing choices/ options in RFP:

i. Business As Usual - Normal Options

**Moving Forward** 

- ii. Green Options (with Accreditations or without Accreditations, but supported with proof of evidence)
- Incorporate the Price-Quality-Environmental (PQE) ratio in evaluating proposal
- ALPS will be working with vendors to identify and increase opportunities to reduce, reuse and recycle – e.gs:
  - Reduce use of plastic packaging e.g. during issuance of uniform, etc
  - Collect back carton boxes for reuse
  - Move potential food supplies to local source





### Building a Culture of Sustainability

- Cluster level e.g. by Committee on Sustainability and Shared Services, Group Allied Health, etc
- Institutional level e.g. Green Committees, and departmental level



Sustainability as SingHealth's way of life

### Annual Clean & Green Event

Celebrate impact and raise awareness

### Awareness and Education

E.gs. Hackathons, talks and workshops, EDMs, quizzes, etc

### **Green Activities**

E.gs. tree-planting, Earth Day, recycling collections, clean-up events, talks/ symposiums, and workshops, etc

### **Green Audits**

E.gs. Employee-engagement audits to assess staff's involvement and awareness about sustainability, green event checklist audits, recycling audit, green-building audit

### Green Champions!

Identify, recognise and celebrate staff who advocate for the cause

### **Green Spaces**

Create green spaces within the hospitals e.gs. Green Corridor at SGH, locations of recycling bins, gardens, etc



### **Building a Culture of Sustainability**

Environmental Sustainability Retreat – 9 May 2024

- Around 60 participants from different domains including Medical, Nursing, Finance, Communications, Operations, and strategic partners from SIT, UEMS and ISS



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Wai Hoe NG • 1st Group Chief Executive Officer & Neurosurgeon 2h • S

Joined the **SingHealth** Environmental Sustainability Retreat yesterday where clinicians, administrators, and partners came together to chart a greener path for healthcare.

Beyond cultural shifts and programmes, fostering public-private collaborations is key to sustainable progress. Together, let's continue innovating and working together to create tangible benefits for our patients and the community.





### Building a Culture of Sustainability



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### **Building a Culture of Sustainability**

















KKH Colleagues supporting the event



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### **Building a Culture of Sustainability**























## Cover: Why so serious?

Singapore Health May to Jun 2022 Sanah steps and the step of th

When you become away what you use and three area

erry day, yea also become and of what you actually consume Then you start to minimize what you use. The start be constructed on the start be constructed on





### **Building a Culture of Sustainability**









### Building a Culture of Sustainability





Think Green, Define Sustainability



Defining Tomorrow's Medicine