SUSTAINABILITY AND CIRCULARITY IN PPE
EXPLORING PRACTICAL SOLUTIONS FOR MANUFACTURERS
Welcome!

Introductions and agenda review -
• Elizabeth King, VP Digital Strategy, Gerber Technology, a Lectra Company

Opening Remarks:
• Ms. Yashodhara Dasgupta - Senior Trade Policy Adviser, British High Commission New Delhi, India
• Dr. Prakash Vasudevan - Director, SITRA
• Sinem Demir - Operations Officer, IFC World Bank Group

Industry Professionals:
• Dr. Rudrajeet Pal (Full Professor at Boras University) - Results Summary of the Indian PPE circularity study that was conducted on behalf of IFC+FCDO.
• David Scheeres (Director, Thermal Compaction Group Ltd.SteriMelt) - Discuss his invention of a thermal compactor to melt down polymer based PPE to make the waste easier to transport and able to be recycled into PPE again or other plastic based products.
• Gloria Adeboi (Sr. Strategic Account Director, Digimarc) - How to identify all garments and textiles for authentication, consumer engagement and circularity.
• Mi Jong Lee (Designer, MI JONG LEE & EMMELLE ) On manufacturing processes, production scrap waste management / reprocessing.
• Sherri Barry (Owner, Arizona Fashion Source & Reusa PPE) On reusable PPE, materials selection

Q&A
Survey

Closing Remarks
Opening Remarks

Ms. Yashodhara Dasgupta
Senior Trade Policy Adviser,
British High Commission
New Delhi, India

Dr. Prakash Vasudevan
Director, SITRA

Sinem Demir
Operations Officer,
IFC World Bank Group
CIRCULAR ECONOMY APPROACHES IN PPE SECTOR

Circular Inputs
- renewable,
- bio-based or
- compostable materials

Ex: Masks, medical textile made of compostable bio-based raw material (compressed hemp, bagasse, PLA, man-made cellulosic fibers)

Resource Recovery
- recycling,
- upcycling/downcycling
- energy recovery

Ex: Construct isolation gowns from polyester made of rPET(upcycling)

Product use extension
- material innovation
- new capabilities for durability,
- modular design

Ex: Construction of isolation gowns, coveralls, masks with durable materials allowing to be used multiple times.

Product-as-Service
- selling services,
- retaining ownership,
- easier to implement take-back mechanism

Ex: Workwear rental, PPE laundry
Industry Experts

Dr. Rudrajeet Pal  
Full Professor, Boras University

David Scheeres  
Director, Thermal Compaction Group Ltd. SteriMelt

Gloria Adeboi  
Sr. Strategic Account Director, Digimarc

Mi Jong Lee  
Designer, MI JONG LEE & EMMELLE

Sherri Barry  
Owner, Arizona Fashion Source & Reusa PPE
Dr. Rudrajeet “Rudy” Pal
Professor at Boras University
Assessment for PPE Circularity & Waste Report: An Indian context

Dr. Rudrajeet Pal
Professor at Swedish School of Textiles, University of Borås, Sweden

Study Commissioned By: IFC and British High Commission, New Delhi
Feb-Apr 2021
Purpose of the study

Investigate circularity enabling solutions for COVID-19 PPE waste management in Indian context to create explicit scalability lessons for wider adoption of good practices.
Circularity perspective

Can be influenced by design

BEST
Reduce waste
Re-use
Recycle / Compost
Incineration with energy recovery
Incineration
Landfill with energy recovery

WORST
Landfill

Refer: EU waste management hierarchy

Circular flows
Circularity perspective

**Beginning of Life (BoL)**
- Design for recycling
- Use recycled fibers
- Create biodegradable products
- Create self-sanitizing products

**Middle of Life (MoL)**
- Design for longevity
- Create washable, 3D-knitted filters
- Create reusable products with zero waste

**End of Life (EoL)**
- Reusability
- Create new decontamination technology
- Novel use-oriented business models for PPE

**CE lifecycle stages**

- **Design for recycling**
- **Design for recycling and reuse**
- **Design for reuse**
- **Design for longevity**
- **Design for longevity and reuse**
- **Reusability**
- **Grading**
- **Mechanical, chemical and thermal Recycling**

**Categories**
- (BoL): Beginning of Life
- (MoL): Middle of Life
- (EoL): End of Life
Nine good practice cases from India
Scalability lessons: Scaling out where the PPE producers can impact

- Participate in collaborative networks/ecosystems in attaining economies of scale along the PPE value chain.
- Consider vertically integrated manufacturing (mostly for large mainstream PPE manufacturers).
- Realize new product portfolios for tapping the “green space” of Indian healthcare market segment. Establish R&D on various high-growth areas suited to address circularity.
- Find industry- and product- agnostic technology applications.
- Stimulate open business model design based on replication.
- Image and brand development (Made-in-India, low-cost pricing models; connection with reputed research institutes).
Thank you!

Dr. Rudrajeet Pal
Professor at Swedish School of Textiles, University of Borås, Sweden
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Full report will be published as a part of IFC’s publication in September 2021
David Scheeres

Director, Thermal Compaction Group Ltd.
SteriMelt
Gloria Adeboi
Sr. Strategic Account Director, Digimarc
25 Years of Innovation at Digimarc

25 Years of Operation
Well-capitalized public company with strong operating history

20+ Years in Security
Digital Counterfeit Deterrence System for the world's largest Central Banks

7+ Years in Packaging
Over 10,000 SKUs enhanced for Walmart, P&G, etc. Recent launch of serialization

2+ Years in Plastics
HolyGrail 2.0 Initiative – 130 companies, driving commercialization of Digital Watermarking in EU

Placing Objects & Packaging at the Center of Digital Transformation
Inflection Points in Adoption of Digital Watermarking

- **UPC Code** (1973)
- **Data Matrix** (1987)
- **GS1-128** (1989)
- **QR Code** (1994)

**Digital Watermarking**
- **Anti-Counterfeiting** (2000)
- **Packaging** (2014)
- **Plastics Recycling** (2018)
- **Textiles** (2019)

**COVERT**

- Digital Pre-Press
- Camera Resolution

**OVERT**
Anything Digitally Processed = Persistent Covert Channel

Any object or medium that is digitally processed, can be digitally processed, or is made from something digitally processed, is now a persistent covert communication channel

- All forms of Digital Media (Nielsen, Digital Cinema Standard, etc.)
- Print
- Plastic
- Textiles
- Machined Parts
- Etc.
DIGIMARC FOR AUTHENTICATION / CIRCULARITY

- Measurement & Transparency
- RECYCLE
- Design Industry 4.0 Piracy Intelligence
- REDUCE
- Reduce Resource Consumption
- RENT
- Financial & Policy Incentives
- RESELL
- Production Workflow Parts Matching
- REPAIR
- New Business Models
- REUSE
- Red Resource Consumption
Mi Jong Lee

Designer

- Pivoted to PPE manufacturing during the COVID-19 pandemic.
- Completed PPE contracts for New York City, Participated in contracts at the state and federal level.
• Q&A

• Closing Remarks

• Survey
Thank you for joining us today for Sustainability and Circularity in PPE - Exploring Practical Solutions for Manufacturers!