

Nachhaltige Abfallwirtschaft als Kernbestandteil zukünftiger Smart Cities

Beispiel Grün Book Singapur

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Ausgewählte Herausforderungen von Megacities

- Platzmangel

- Millionen von Menschen benötigen Platz zum Leben und Arbeiten
- Konkurrenz um Platz zwischen Wohn- und Geschäftsvierteln
- Hohe Grundstückspreise



- Stadtausdehnung

- Vom Stadtkern breiten sich Megacities auf eine große Fläche aus
- Große Distanz für Pendler und Transporte



- Verkehrsüberlastung

- Transport Infrastruktur i.d.R. nicht in der Lage die Mobilitätsansprüche von Personen und Unternehmen zu erfüllen



- Umwelt & Rückgewinnung von Ressourcen

- Hohe Luft & Wasserverschmutzung
- Hoher Ressourcenverbrauch (Energie/Materialien)



Das „Abfallproblem“ asiatischer Mega-Cities

Aufgrund der extrem hohen Bevölkerungsdichte entstehen auf engem Raum große Mengen an Haushaltsabfällen.

In Singapur werden täglich 3.500 Tonnen Abfall von privaten Haushalten gesammelt → ca. 180 LKWs am Tag zur Sammlung

Herausforderungen:



Wie kann möglichst effizient und umweltfreundlich gesammelt werden?



Wohin mit den erzeugten Abfällen? Wie können Recyclingquoten erhöht werden?

Trend → eigene Verwertungs-/ Recyclingkapazitäten

Sungei Kadut Eco-District (SKED)

- Masterplanned by JTC, the 500-hectare Sungei Kadut Eco-District will be an exciting, sustainable and inclusive district to support the transformation of existing businesses in the furniture, timber and construction sectors, and build up Singapore's capabilities in new growth industries like Agritech and Environmental Technology.
- Sustainability and circular economy plays a key part in the district. Complementary businesses will be clustered near to each other to create synergies and encourage circularity in resource usage.



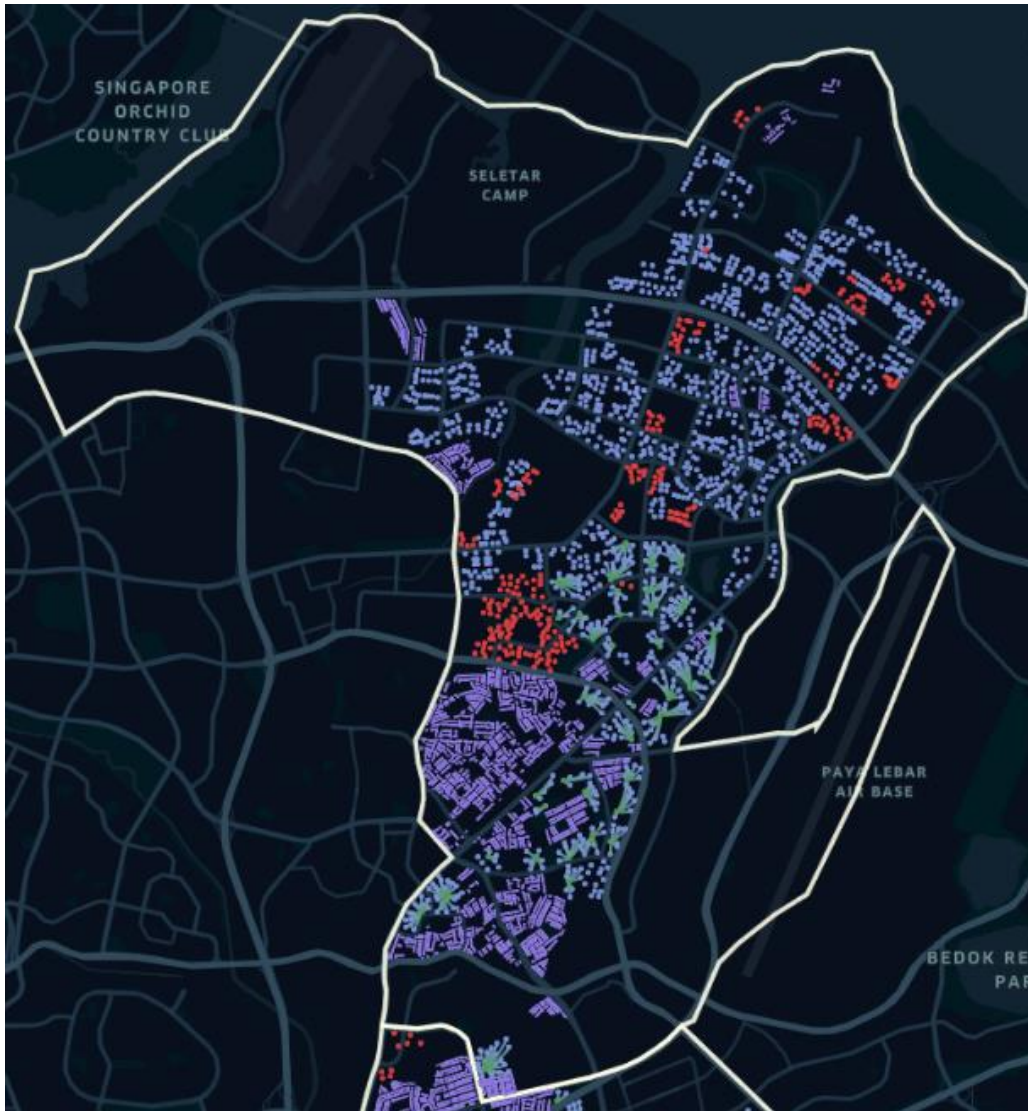
Nachhaltige Stadtplanung – Industrie (2/2)

Sungei Kadut Eco-District will support the transformation of manufacturing and anchor new growth industries



- Existing industries (Timber, Construction, Furniture and Waste Management)
 - JTC's specialised buildings with shared facilities and services to reduce business costs and optimise resources.
- New industries (Agri-Tech and Environmental Technology)
 - Co-locate R&D, prototyping and high-tech farming operations such as indoor farming and aquaculture hatcheries
 - Companies that adopt minimal waste, water and energy consumption
- Future industries
 - 200 ha of land has been set aside to accommodate these industries

Nachhaltige Stadtplanung – privater Wohnraum



Blaue und rote Punkte – HDBs

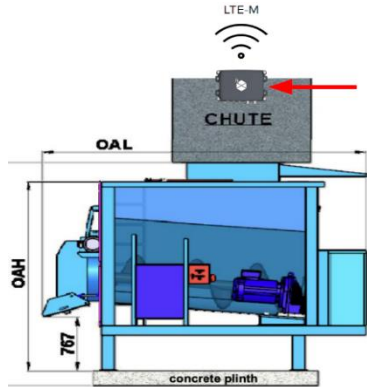


Violette Punkte – Landed Properties



Sustainability - “convenience beats education” in HDBs

Abfallschacht



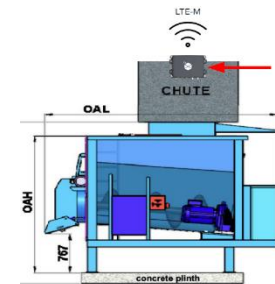
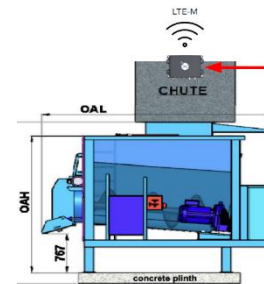
VS.

Recyclingtonne



Recyclingquote 2-4%

Abfallschacht und
Recyclingschacht



Recyclingquote 10-12%

Grün Book

Closing the waste loop through innovative plastic recycling

Grün Book – Plastics Recycling in Singapore



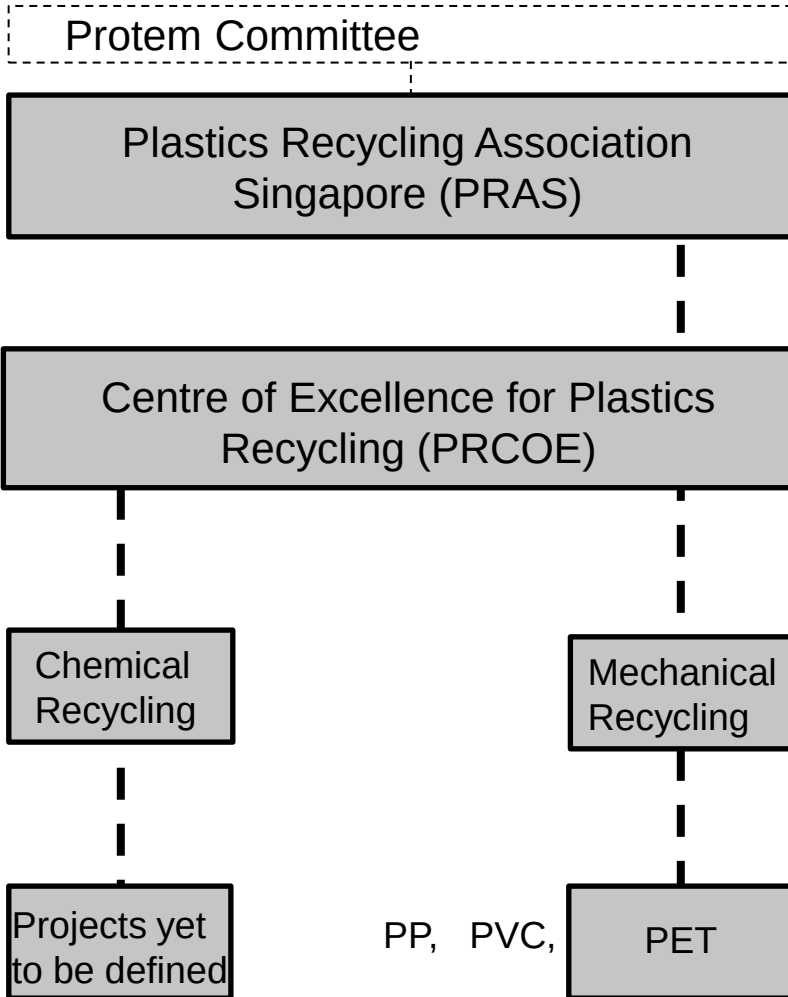
Singaporean-German Chamber
of Industry and Commerce
Deutsch-Singapurische
Industrie- und Handelskammer



 PartnerForSustainability

Establish Association to identify & monitor Plastics Recycling projects

Name



Who (Examples)

Founding Members of PRAS

MSE, NEA, Stat-Boards
SCIC, WMRAS, ...
EDB, ESG, SG-Companies.
SGC, WKO, BVSE
ALBA, German Cos in SIN.
Germany, Austria, Swiss Co

PRA collaborate with IHL
(NTU, NUS, Polys)
German IHLs and
Singapore companies
participating in R&D
project.
German & Singaporean
Standardization bodies.
(TÜV SÜD, SG Standards
Council, ...)
German & Singapore
Industry organisations
(VDMA, Alliance to end
plastic waste, ...)

Private Ltd company, JV,
Consortium, BOT,...
Legally independent from
PRAS or PRCOE,
but with links to both.

What

Define Terms of Reference

Identify suitable projects
Define project guidelines
Form project consortia
Assist to Spin-Off
Monitor progress

Become the Regional Hub
for Plastics recycling know-
how and info exchange.
Absorb Foreign Know-How.
Design SG adaptations.
Create Singaporean IP.
Train specialists.
Localize manufacturing.
Promote PRCOE regionally
using SG as knowledge-
and service base.
Establish Satellite Centres
of Excellence in the region.

Builds and runs PET Plant.
Influence and participation
of the PRCOE to be
discussed

Organise conference to bring Singaporean and German firms together

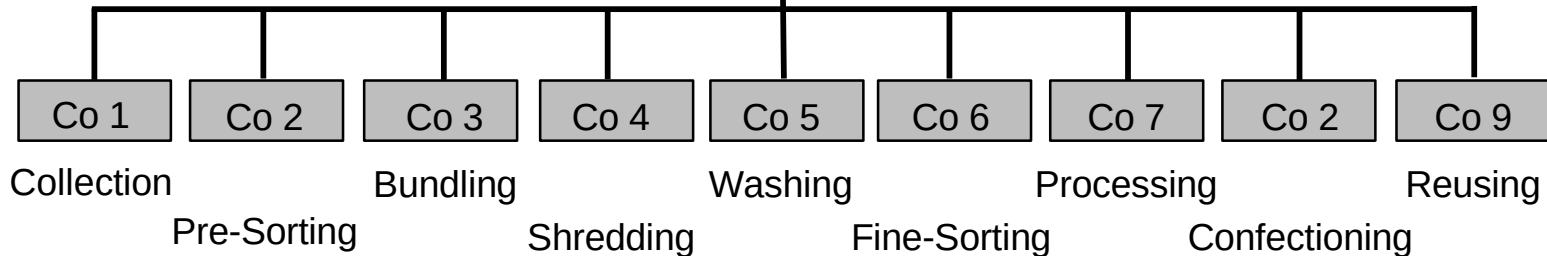
Potential cooperation partners in Europe



Singapore German Chamber in the lead



Each team-member provides technology in his specialty section



Conduct a seminar, find partners, sign MoU

Exemplary Illustration:



Seminar Co-Chairs:

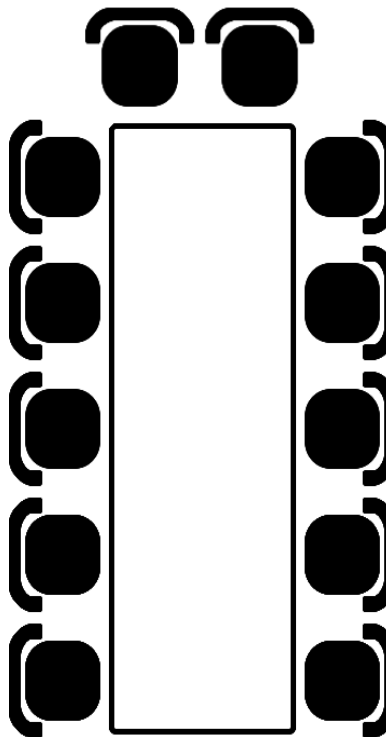
Edwin Khew, Chairman, Sustainable Energy Association
Singapore/Former NMP/Specialist Advisor to SGC.

J Ihrcke, Chairman, Sustainability Committee
Singapore German Chamber of Commerce



German/Austrian/Swiss specialist companies*

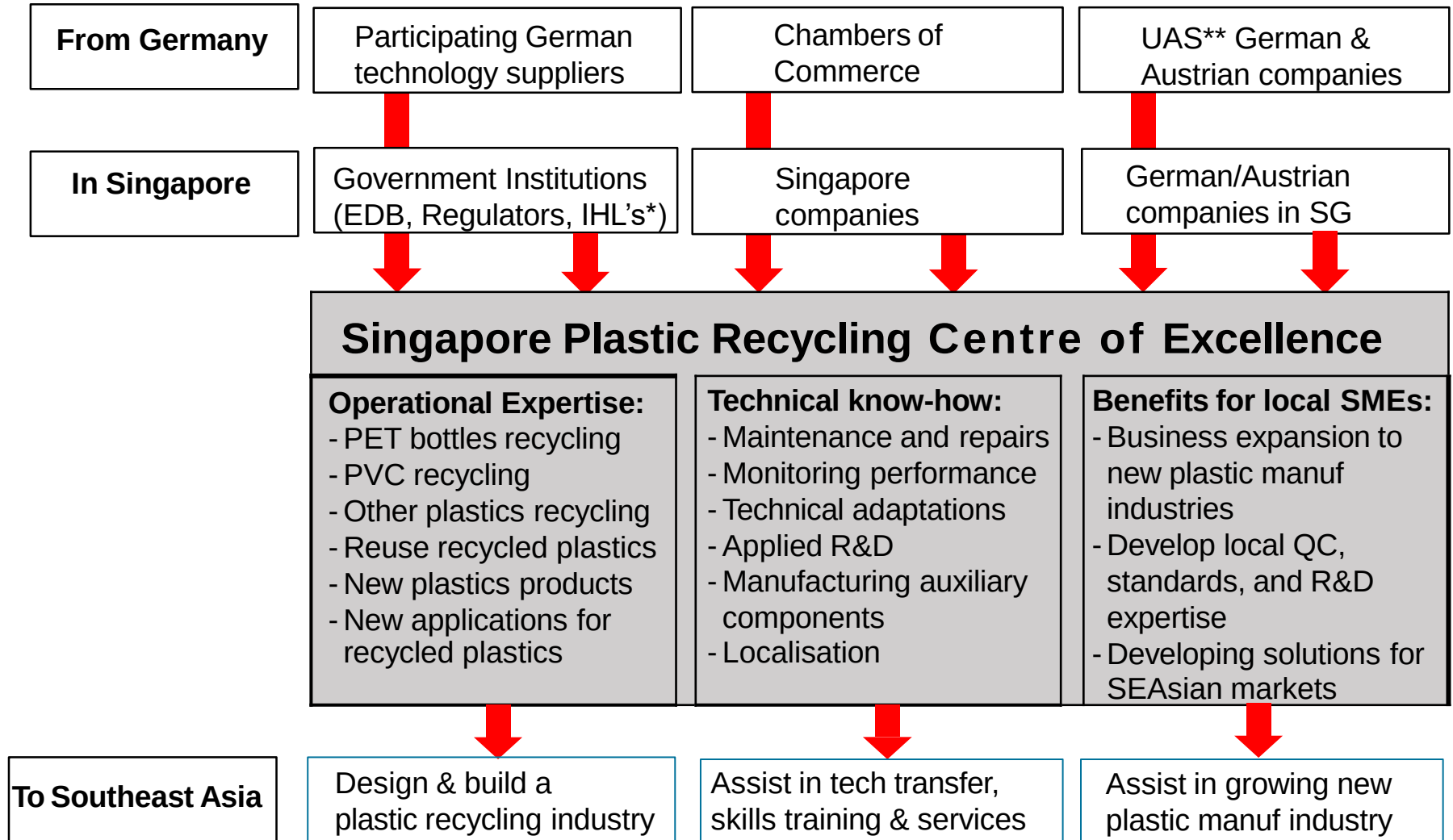
- System integration
- Collection
- Pre-sorting
- Bundling
- Shredding
- Washing
- Fine-sorting
- Processing
- Reuse
- Reformulation of New-Plastics



Singaporean potential cooperation partners*

- Government-linked
- Logistics
- Waste collectors
- Recycling Cos
- Precision Engineering
- Local Manuf SMEs
- Environmental Services
- Start-ups, Spin-offs
- Contract manufacturers
- Consumers of plastics pellets
- M&E Service providers

Establish a Centre of Excellence for plastics recycling



Pilot Project: Recycling of PET material

Used PET material



New manufacturing techniques
Meeting new sustainability standards
New Formulations (1% additives)



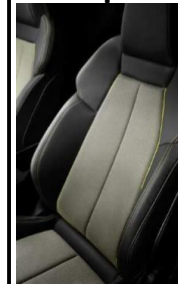
Longer lasting than original:

- Water bottles
- Food containers
- Thermoform films
- Containers
- Feedstock for other processes

Better than before:

- Flame retardant cladding
- Insulation for Hot Water pipes
- Plastic films, sheets, etc
- Granules and compounds
- Feedstock for other processes

New products/formulations:



- Car seats for Audi A3
- Floor mats
- Underbody skin
- Textile fibres
- Pillows
- Carpets

100 PET bottles for 1 set of seats/floor mats

the recycling company **ALBA** Group

