Schweizerische Eidgenossenschaft
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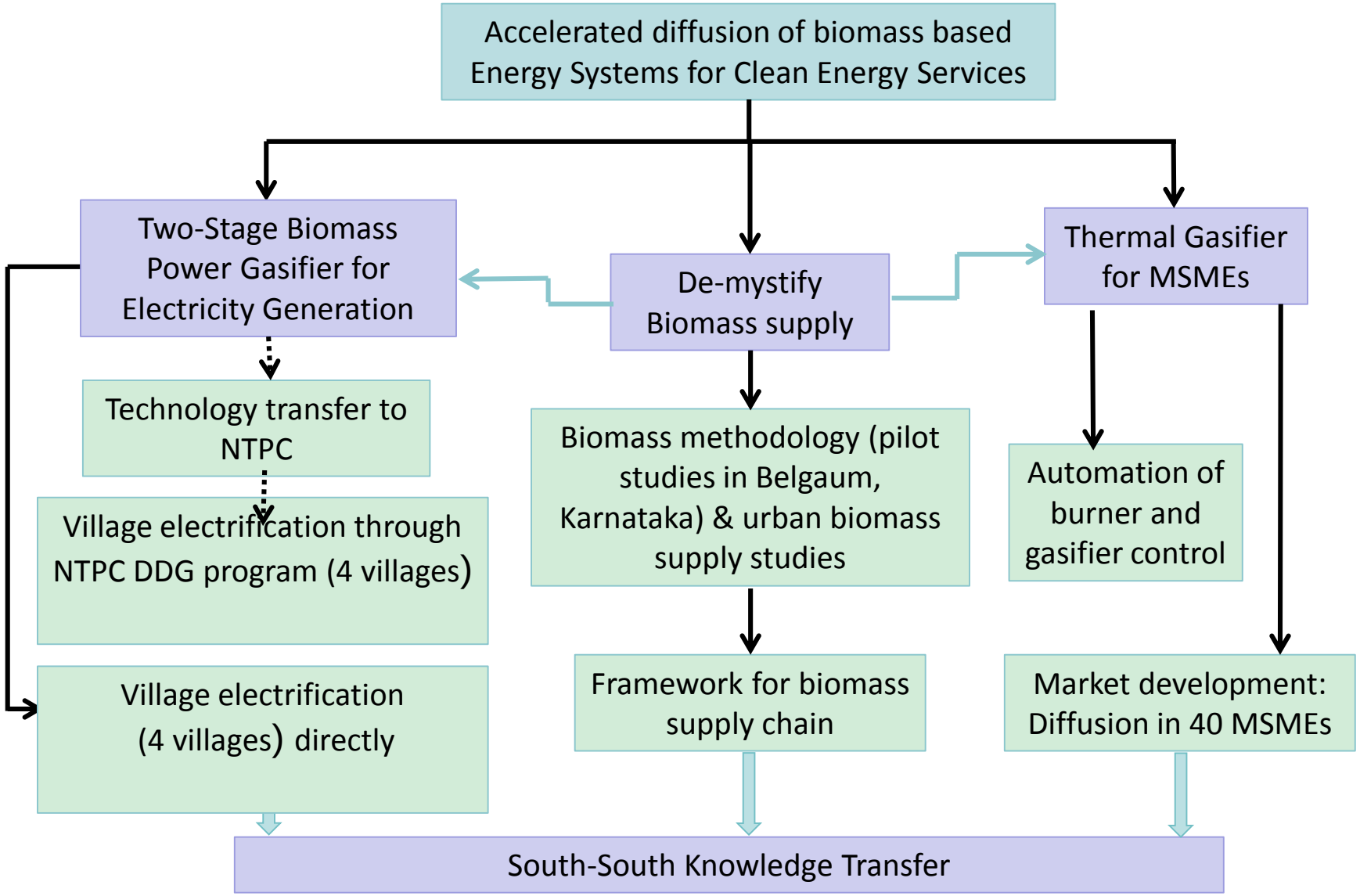
Swiss Agency for Development and Cooperation SDC

Policy Research Workshop
On How to enhance climate actions to meet a long-term goal

International and regional cooperation

TERI SDC Biomass partnership (TSBP) program

TSBP


Accelerated diffusion of biomass based Energy Systems for Clean Energy Services
Two-Stage Biomass Power Gasifier for Electricity Generation
De-mystify Biomass supply
Thermal Gasifier for MSMEs
Technology transfer to NTPC
Village electrification through NTPC DDG program (4 villages)
Village electrification (4 villages) directly
Biomass methodology (pilot studies in Belgaum, Karnataka) & urban biomass supply studies
Framework for biomass supply chain
Automation of burner and gasifier control
Market development: Diffusion in 40 MSMEs
South-South Knowledge Transfer

Context of India's MSME Sector….1

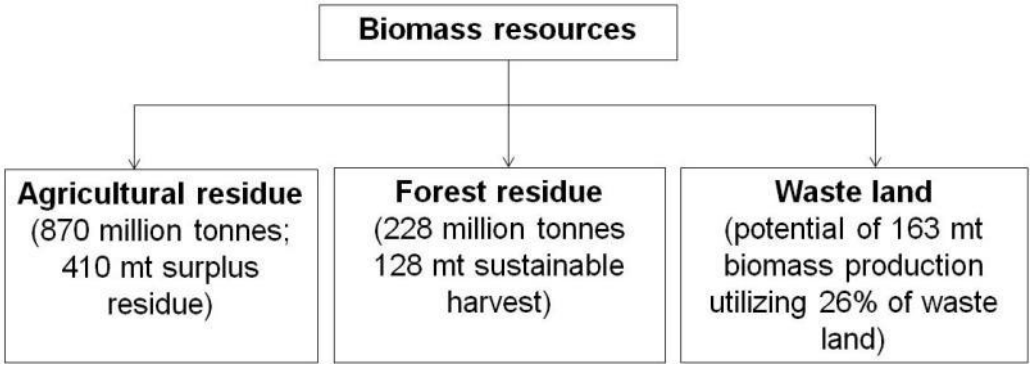
- India's Industrial sector - mix of large energy intensive industries and Micro, Small and Medium Enterprises (MSMEs) units
- MSME sector includes approximately **36.2 million enterprises** spread over 180 clusters
- Economic importance:
  - Around **8%** of **GDP**
  - **45%** of **manufacturing output**; **40%** of **exports**
  - Employs approx **80.5 million people**; second largest after agriculture
- Energy context:
  - Approx **50% of total commercial energy use**
  - **Energy costs** accounts for **30 – 50%** of overall **production cost**
  - Widespread **use of locally available cheaper fuels**
    - Rural MSMEs - fuel wood/biomass energy
    - Urban MSMEs – coal, coke and other fossil fuels

Context of India's MSME Sector….2

- **Inherent challenges**
  - Overall sluggishness in the economy
  - Rising input energy cost
  - High levels of pollution
  - High transaction cost and perceived risk of new technology adoption
  - Lack of capital investment and information failure
- **Opportunity for Clean Technology**
  - Energy efficiency and fuel switching through renewable energy technology can play vital role for
    - Reaching to high untapped potential of wide range of MSMEs
    - Improving productivity and competitiveness
    - Solutions for complying with stringent environmental regulations

Biomass Energy in India

- **Biomass energy** an important **renewable energy resource** for India
- **150 million tonnes** per annum of **surplus biomass** is generated from different sources
- **Gasification technology** a viable alternative for efficient utilisation of surplus biomass
- **Biomass energy** is fast emerging as a potential for meeting **India's energy security** and for its **low-carbon development path**



SDC-TERI Partnership for promoting Biomass Gasifiers

1994 -1996: Biomass energy journey begins

- Silk Reeling in Karnataka

1997- 2000: Technology development & demonstration

- Textile Dyeing, Rubber, Puffed Rice

2001-2004 : Technology Replications

- Lead recovery, Namkeen & Khoya, Bakeries, Mid-day meal cooking, Candle making
- In 2002 foray into **decentralised power generation for rural electrification**

2005-2011 : Mainstreaming in MSMEs

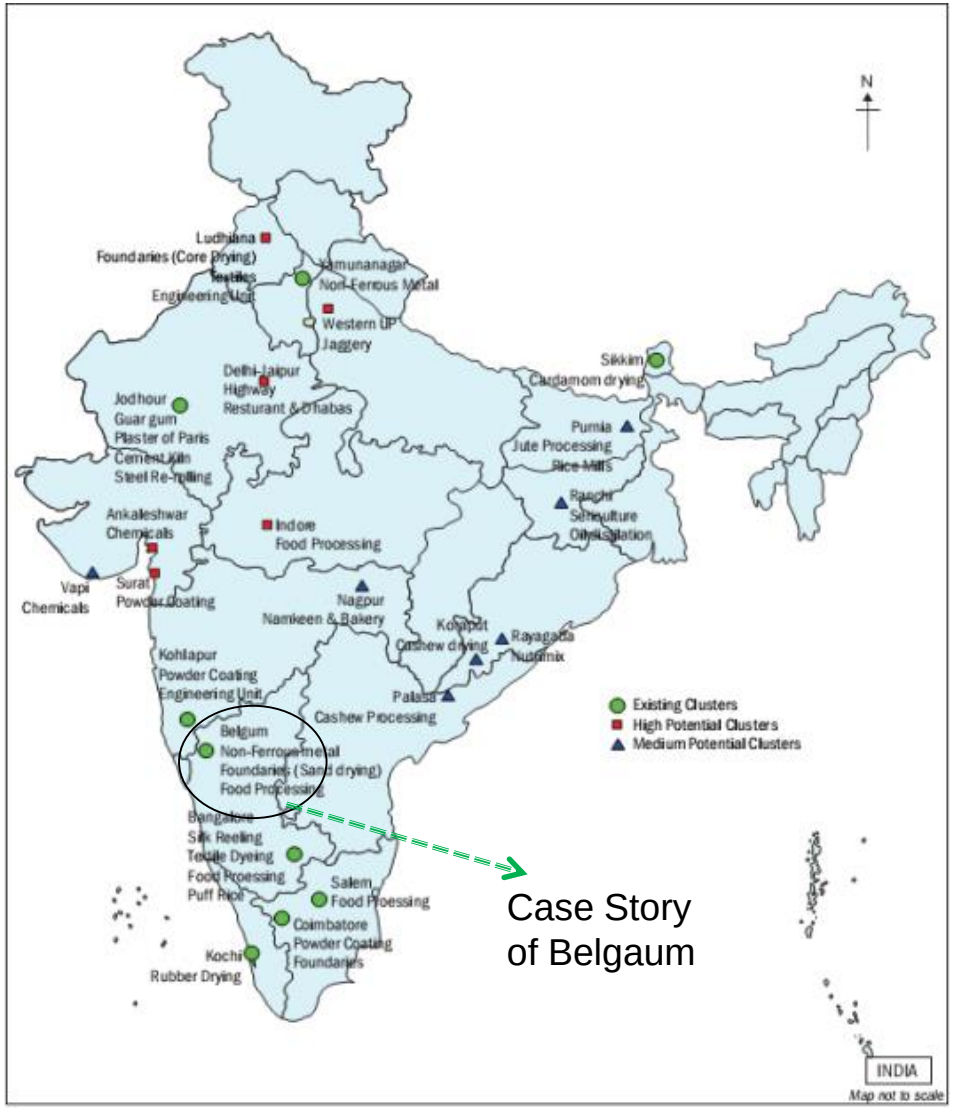
- Replications and awareness through Local Service Providers
- New sectors – Powder Coating, Foundry (Sand drying), Non-ferrous melting furnace (aluminum, lead), Chemical industries
- Testing of small power gasifier in 7 villages
- Development of advanced 2-stage gasifiers

2013-2015 : Accelerated diffusion in MSMES

- Scaling-up diffusion and expanding network of local delivery mechanism in new industrial cluster
- Technology automation of thermal gasifiers
- Implementation of 2-stage gasifier in four villages

Spin-offs and Replications

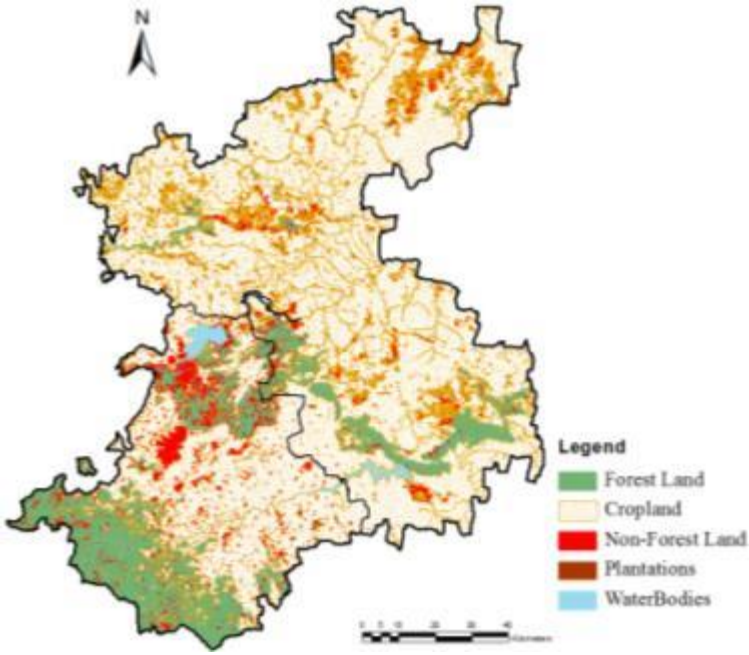
- **650+ thermal gasifiers** installed in different MSME sector across country
  - **Replications** have established biomass gasifiers as a **cost-effective energy delivery system**
  - Generated **positive spin-off effects** within and across clusters
  - **Local manufacturing** and services creating clean energy entrepreneurs and employment



Case Story of Belgaum

- **Reliable biomass supply chain**
  - 750,000 tons of surplus biomass residues
  - 650,000 tons of woody biomass auctioned from Forest depots
  - Biomass flows from private plantations in Maharashtra

- **Diversified and expanding industrial cluster**
  - 150+ foundries; 97% are small and medium scale; allied industries such as sand drying for foundry sector
  - Presence of Sugar, textile, minerals & metals, chemical and food processing/cooking MSME units



Cluster Development Approach for Dissemination

- **Cluster mapping** and identification
- **Creation of Local Delivery System** through an Entrepreneur
  - Identification and training of Local Manufacturer (LM) /Local Service Provider (LSP)
  - Mapping potential MSME units
  - Demonstration/Awareness workshops
- Local Manufacturer in **Belgaum** has installed **20+ biomass gasifier** systems
  - Aluminum smelting, food processing and sand drying (foundries)
  - **Expanding** to glass re-melting units, core baking and sand drying (foundries), food processing (milk/jaggery)

Lessons from Dissemination….1

Huge Untapped Potential

- Biomass gasifier systems can meet thermal energy capacity needs
  - 25 kWth - 3 MWth
  - Temperature requirements of 60^{o}C – 1000^{o}C
- Potential in MSME units such as:
  - Silk reeling, Textile dyeing, Hot water/steam generators
  - Food Processing
  - Non-Ferrous metal (Aluminum and Lead recycling), Powder Coating, Chemicals, Foundries (allied operations), Glass melting
  - Charcoal making, Brick making
  - Ceramics

Lessons from Dissemination….2

Economically Attractive

- Pay back period: 6 months (fossil fuel) to 2 years (biomass)
- Reduction in cost per unit of useful energy through gasification: 60-80% reduction (fossil fuels); 50% reduction (biomass fuels)
- Improved productivity and quality of end products due to better process/heat control

Cleaner Production

- Enforcement of environmental and pollution norms in MSME sector acting as driver for shift towards clean technologies/processes

Lessons from Dissemination….3

Continuing Challenges

- Needs **customised/tailor-made system design** for each end-use application; impedes scaling-up
- **Supportive services** – local manufacturing and supply, maintenance, finance, skilled human resources – remain weak
- Sustainable biomass fuel **supply linkages** and local delivery mechanisms requires strengthening
- **Information failure** and slow pace of **technology up gradation** (system automation) resulting in limited scale-up

Thrust to Address Challenges

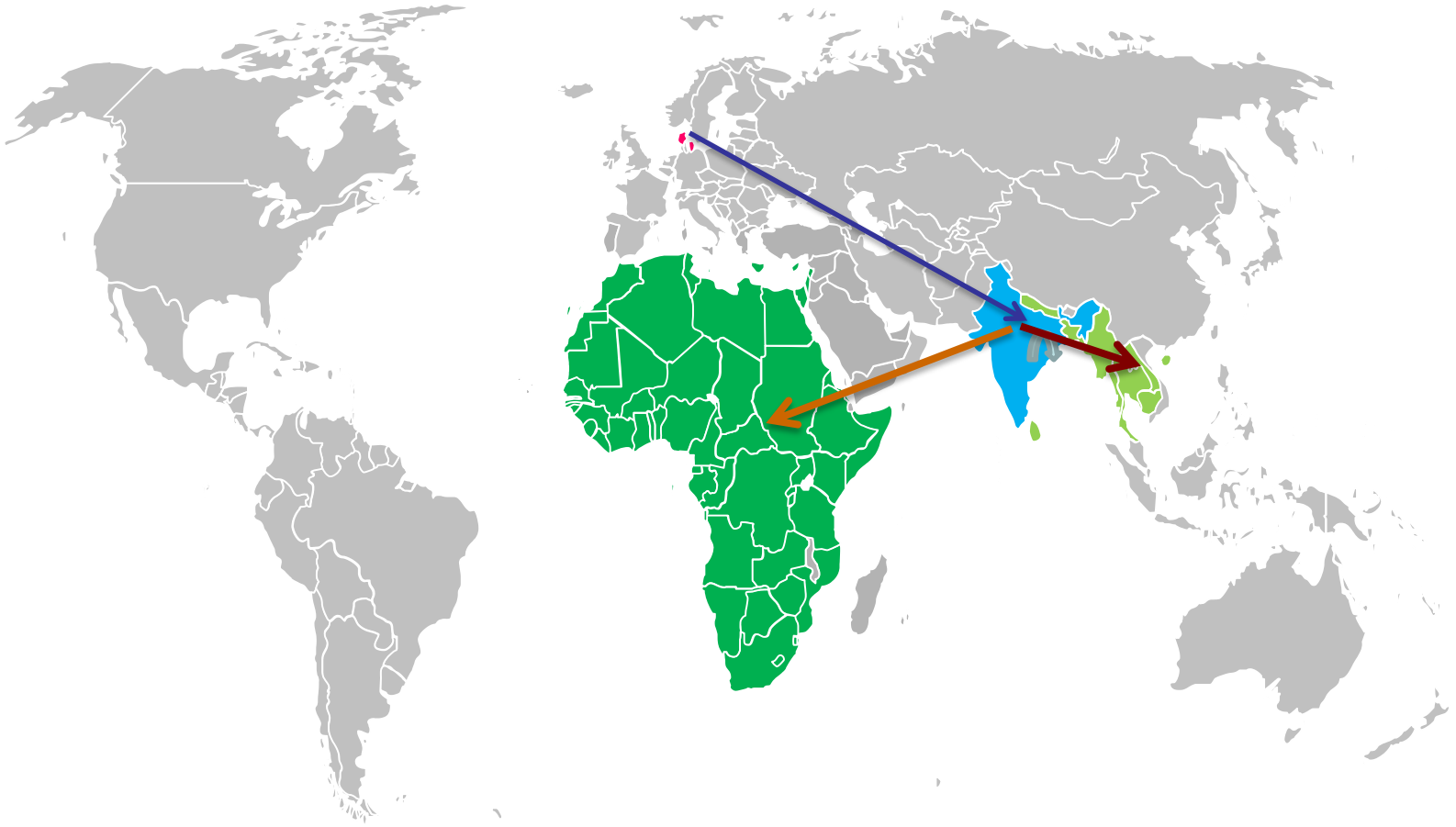
SDC-TERI Biomass Energy Project (2012-15)

- Developing **strategies and formulating enabling framework conditions** to scale-up dissemination, awareness creation, identification of new potential applications and clusters and strengthening local delivery systems
  - **Technology up gradation** through instrumentation and control systems – shift towards user friendly automated systems
  - Comprehensive **biomass supply chain analysis** in existing and new clusters
  - **Market development** by strengthening LM/LSPs and awareness-cum-demonstration workshops

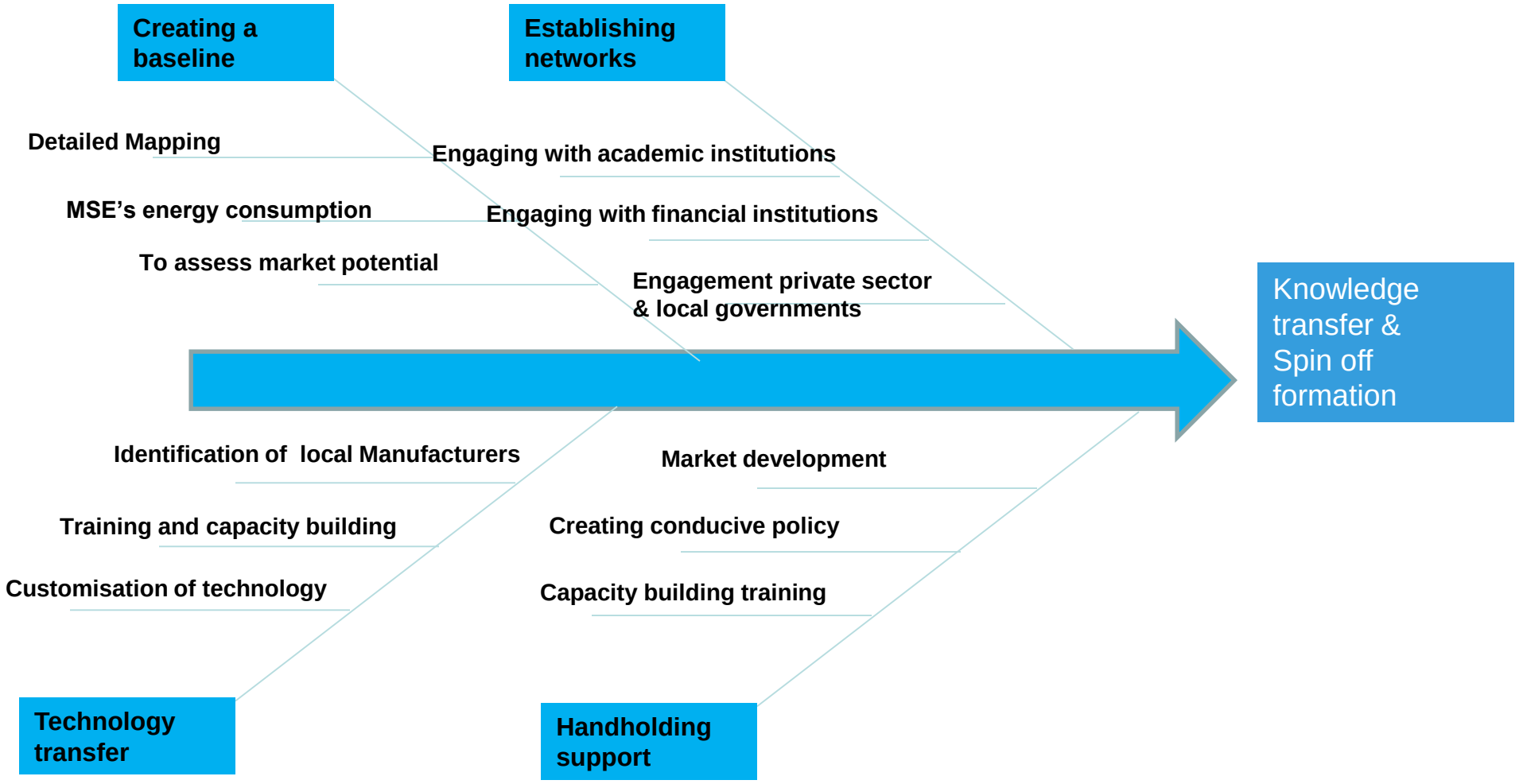
Way Forward for Scaling-up

- A **holistic energy policy** (regulations and economic instruments) specifically for MSME sector
- **Need to mobilise**:
  - **Industry associations** to *shift towards clean technologies*
  - **State governments** for *channeling renewable energy programmes/incentives to focus on MSME sector*
  - **District Industrial Centres** for *awareness/demonstration*
  - **Financial institutions** for *innovative financing products* for MSME clusters (equipment financing, priority lending status to link finance/cover risks)
  - **Technical institutions** for *skills development and training*
- A **Cluster Service approach** as model for accelerated diffusion
  - **Local manufacturer/Local Service Provider** = technology provider + local supplier + biomass fuel supplier + maintenance services/awareness creation

N-S and S-S technology transfer



Knowledge transfer framework



Thank You for Your Kind Attention



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