

Indo-German Energy Program Opportunities for Cooperation

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IGEN – Indo German Energy Programme

Tirupur, August 08, 2009

3L Seminar
Textile Industry Tirupur

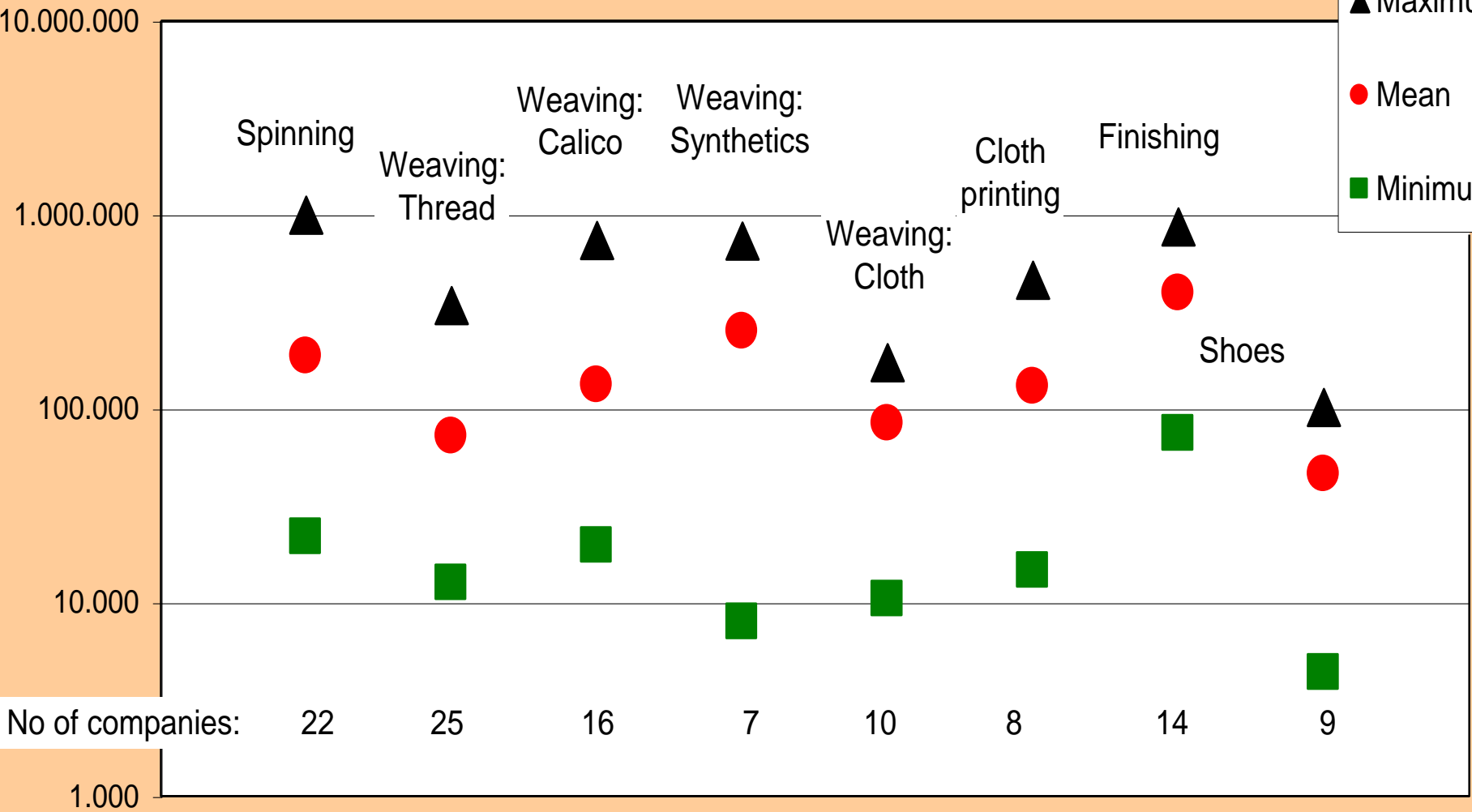
- **Indo-German Energy Programme 2003 - 2012**
- **TRIGEN Project Dec 2008 – Nov 2011**
- **Com Solar Oct 2009? – Sep. 2012**



Variations of Energy Consumption

Energy Consumption (GJ/year)

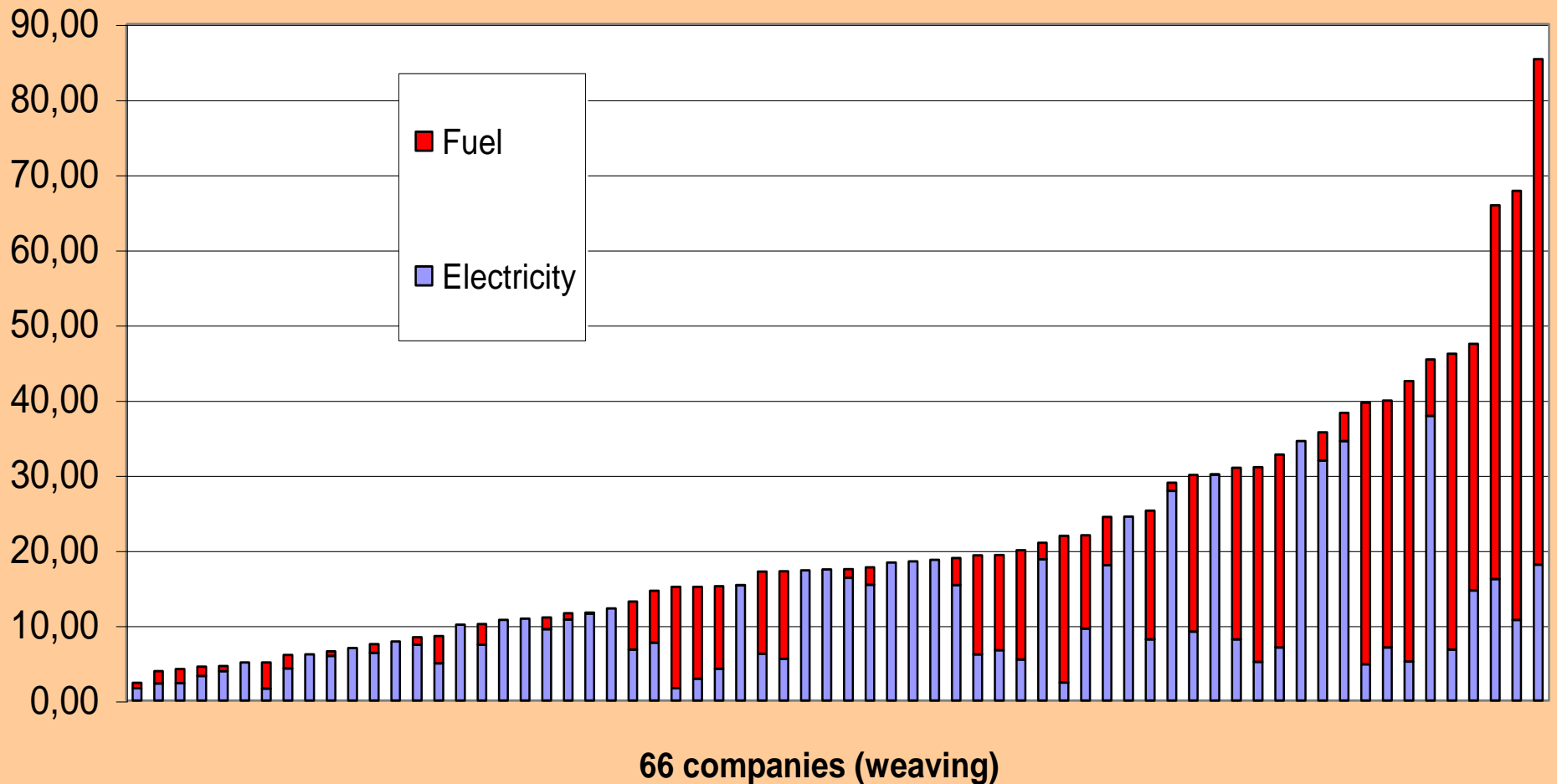
▲ Maximum
● Mean
■ Minimum





SEC Weaving Industry

Specific energy consumption (GJ/ton)

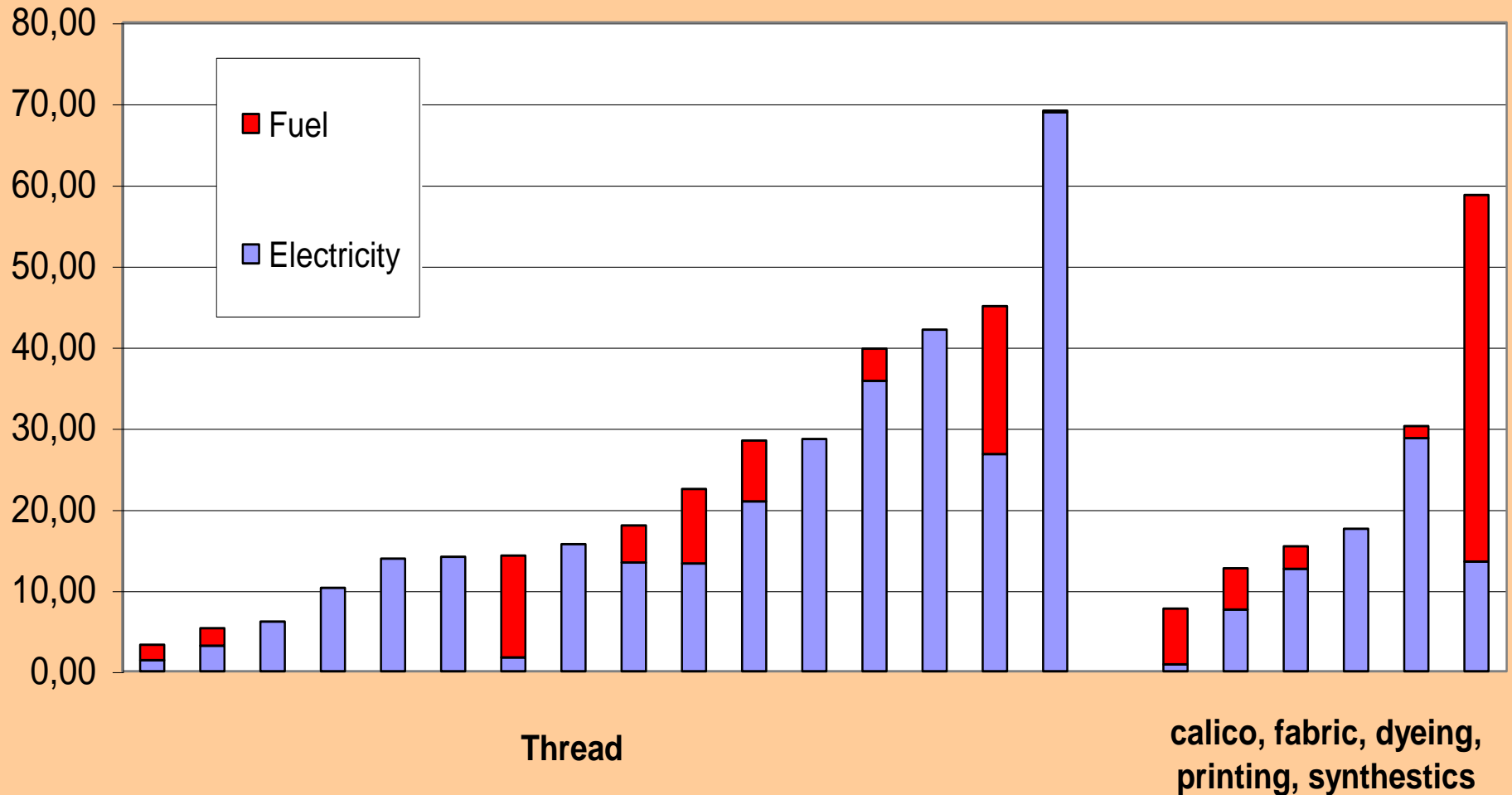




SEC Spinning and Weaving Industry

Specific energy consumption (GJ/ton)

22 companies (spinning)

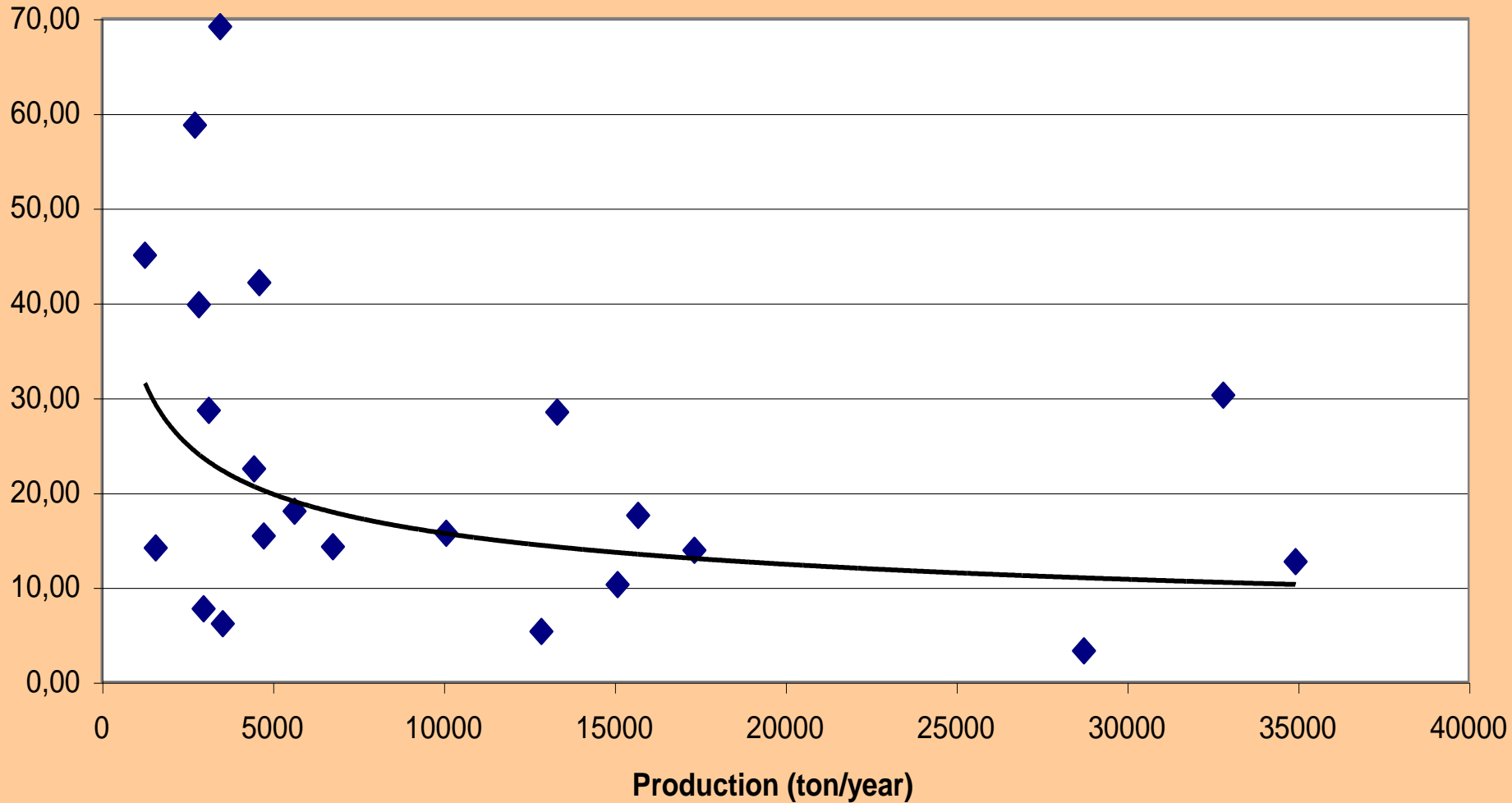




SEC Spinning Industry

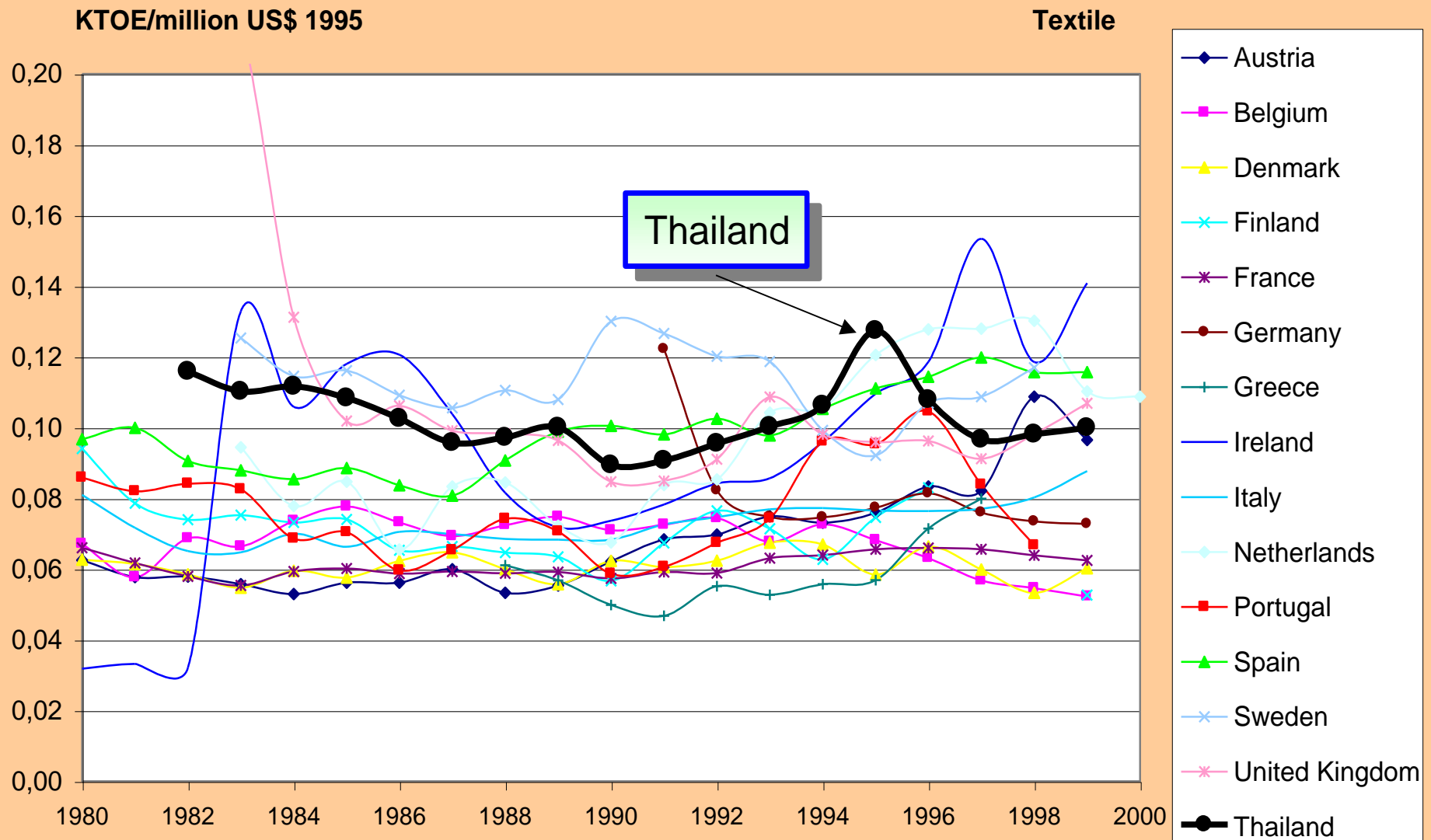
Specific energy consumption (GJ/ton)

22 companies (spinning)





Energy Intensity of Textile Industry



- What is Trigen
- Main Application Areas
- Main Components
- Cost Efficiency/ Economics
- Case Study 1
- Case Study 2
- Business Opportunities for ESCOs

What is Trigeneration?

Trigeneration is the simultaneous generation of:

- **Electricity**
- **Heat**
- **Cold**

**The overall energy efficiency of a Trigen System is > 80%
compared to electricity from the grid < 25%**

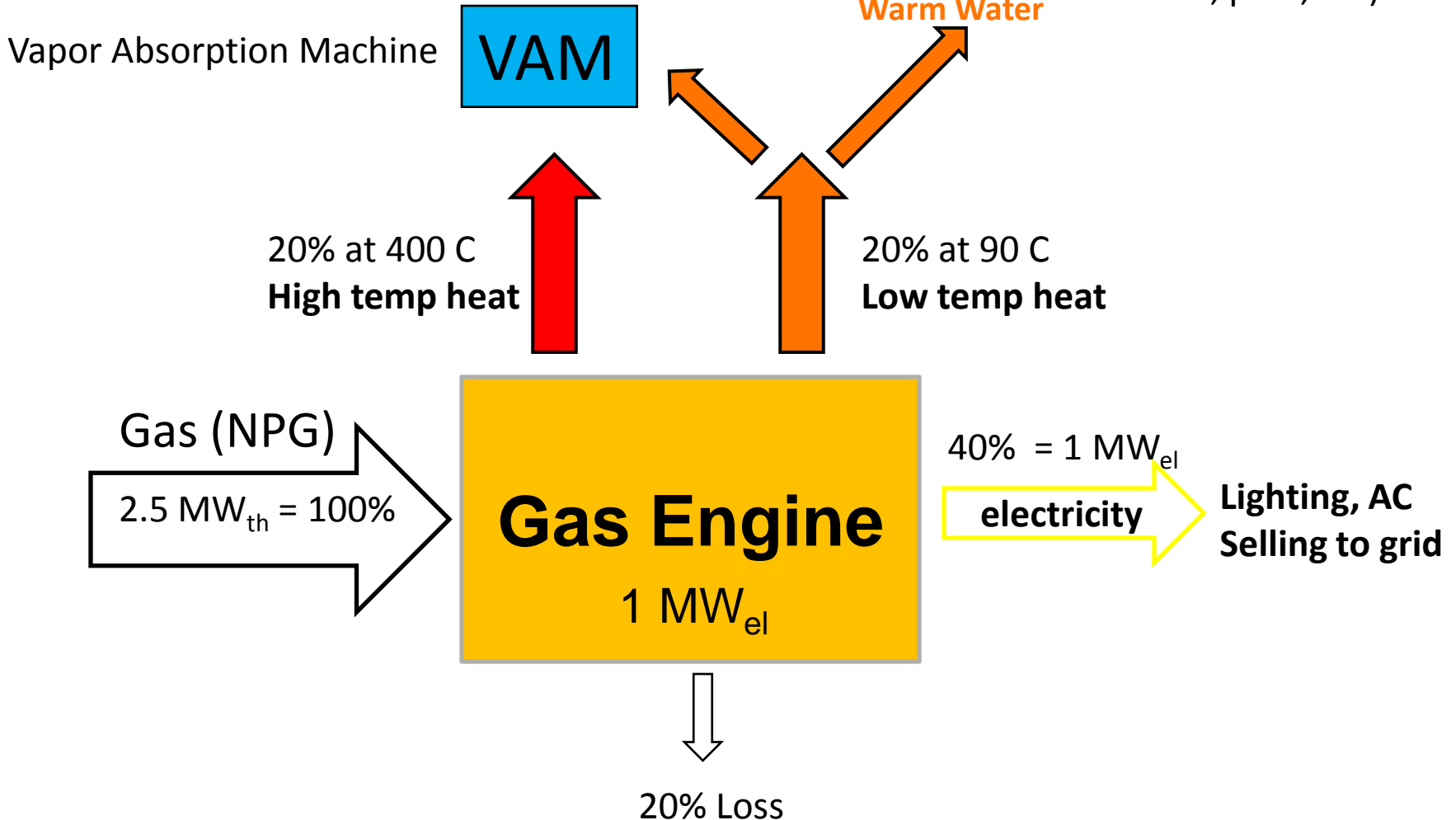
Main Application Areas of TRIGEN

- All buildings and industry which require simultan. electricity, heat and cold
- like hotels, hospitals, food processing industry, etc
- special advantage if frequent power cuts are a problem and diesel generators can be replaced
- Most environmental friendly with gas engines
- Typical range: 250 KW_{el} up to several MW_{el}
- 40% electricity &
- 40% waste heat used for heating and cooling

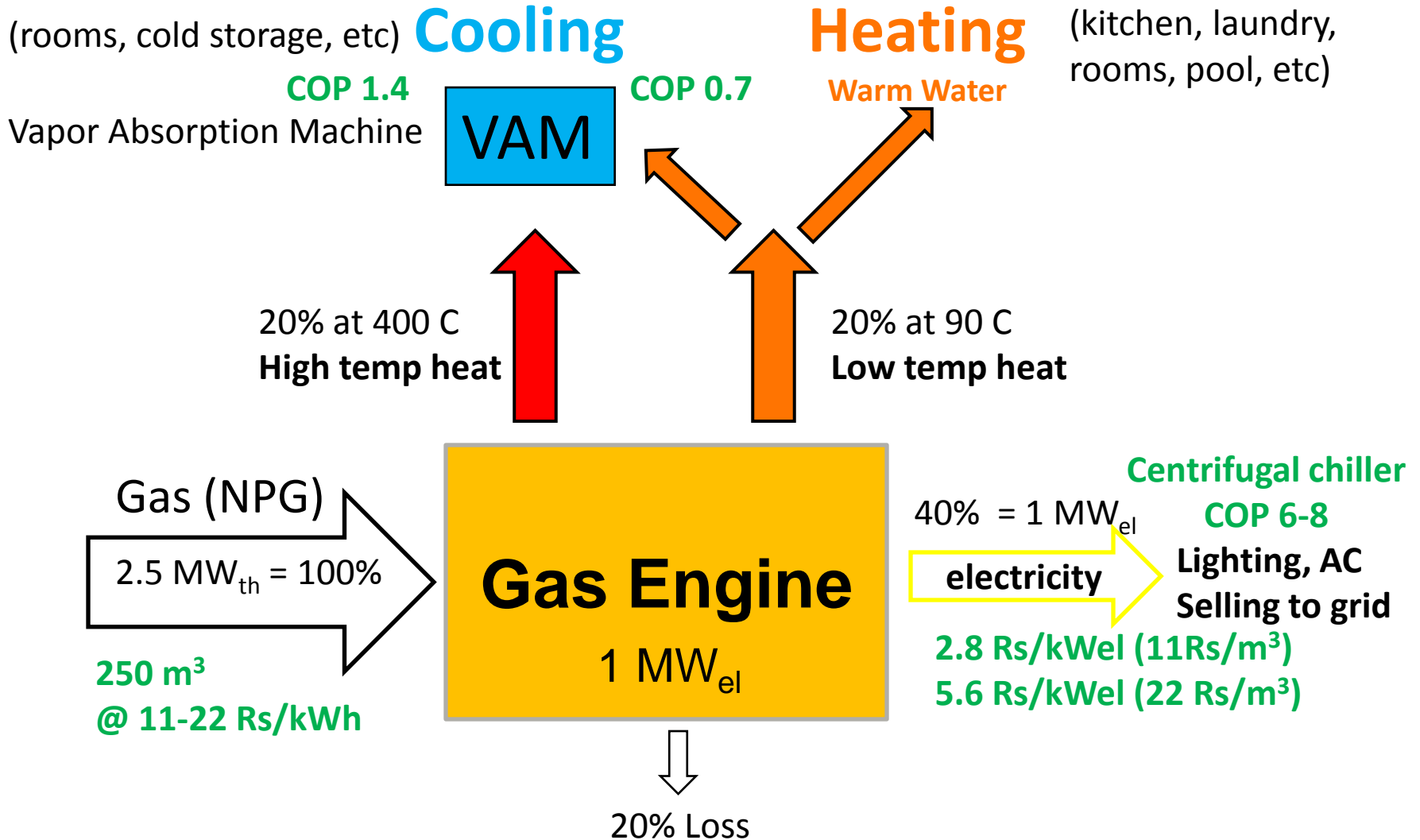
Main Components of Trigen:

(rooms, cold storage, etc) **Cooling**

Heating (kitchen, laundry, rooms, pool, etc)
Warm Water



Cost Efficiency/ Economics:



Demo Project: Tamil Nadu Delhi House

New TN House:

- 6 storey building (2 VIP suites, 26 suites, 46 guest rooms, restaurant, etc)
- contracted electrical demand 622 KVA
- & PNG from local utility for direct fired VAM
- **Investment in Trigen System and DMS: 30 Crore Rs**
- Implementation as ESCO concept
- **Payback 5 years** mainly from reduced electricity purchase
- then transfer to owner
- Main components: 350 kWel gas engine, heat exchangers & VAM, cooling tower, high efficient centrifugal chiller
- Option: wheeling of electricity to Old Tamil Nadu House
- Reduction of CO₂ emissions: 1400 t/a

Tamil Nadu Delhi House: Technical Details

- Main components: 350 kWel gas engine, heat exchangers & VAM, cooling tower, high efficient centrifugal chiller
- Option: wheeling of electricity to Old Tamil Nadu House
- Reduction of CO₂ emissions: 1400 t/a

Example: AES School New Delhi

- **1 MW_{el} gas engine & VAM**
(replacing purchased electricity from grid)
- **Investment: > 1 Mio USD**
- **Payback 3 years** (electricity cost reduced by 25%)
- **So far Cogen: electricity and cooling only**
- **Future: heating of swimming pool (trigen)**
- Other advantages:
 - less power outage and interruption of school activities
 - less damage of electrical equipment
 - reduction of CO₂ emission: 4000 t/a

Business Opportunities for ESCOs:

- **Trigen is a complex system**
- **Requires special know how in planning and operation**
- **High investment cost**



- **Third Party Financing (TPF)**
- **Implementation by ESCO**
- **Performance contracting**



no/low risk for customer

Commercialization of Solar Energy In Urban and Industrial Areas

- 6 pilot projects
- develop business models
- 3 main areas:
 - buildings (eg roof top PV, etc)
 - industry (solar heat and electricity)
 - solar thermal power plants

We are looking for project proposals

Are you interested to join?

**Detailed energy audit/prefeasibility study
for most promising proposals**

thank you

