

Combined Heating, Power and Cooling



***Multi Energy
Absorption Chillers***

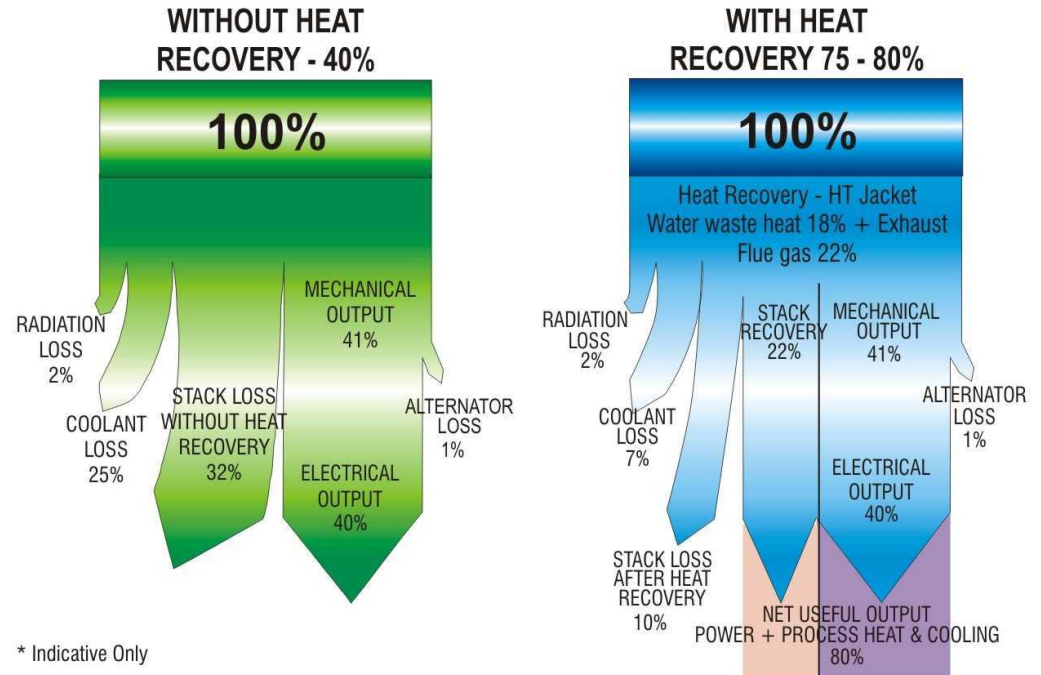
Heat Recovery...

Cogeneration

Trigeneration

Double the overall system efficiency!

Sankey Diagram* for IC engine



* Indicative Only

Components of Co/Tri-generation

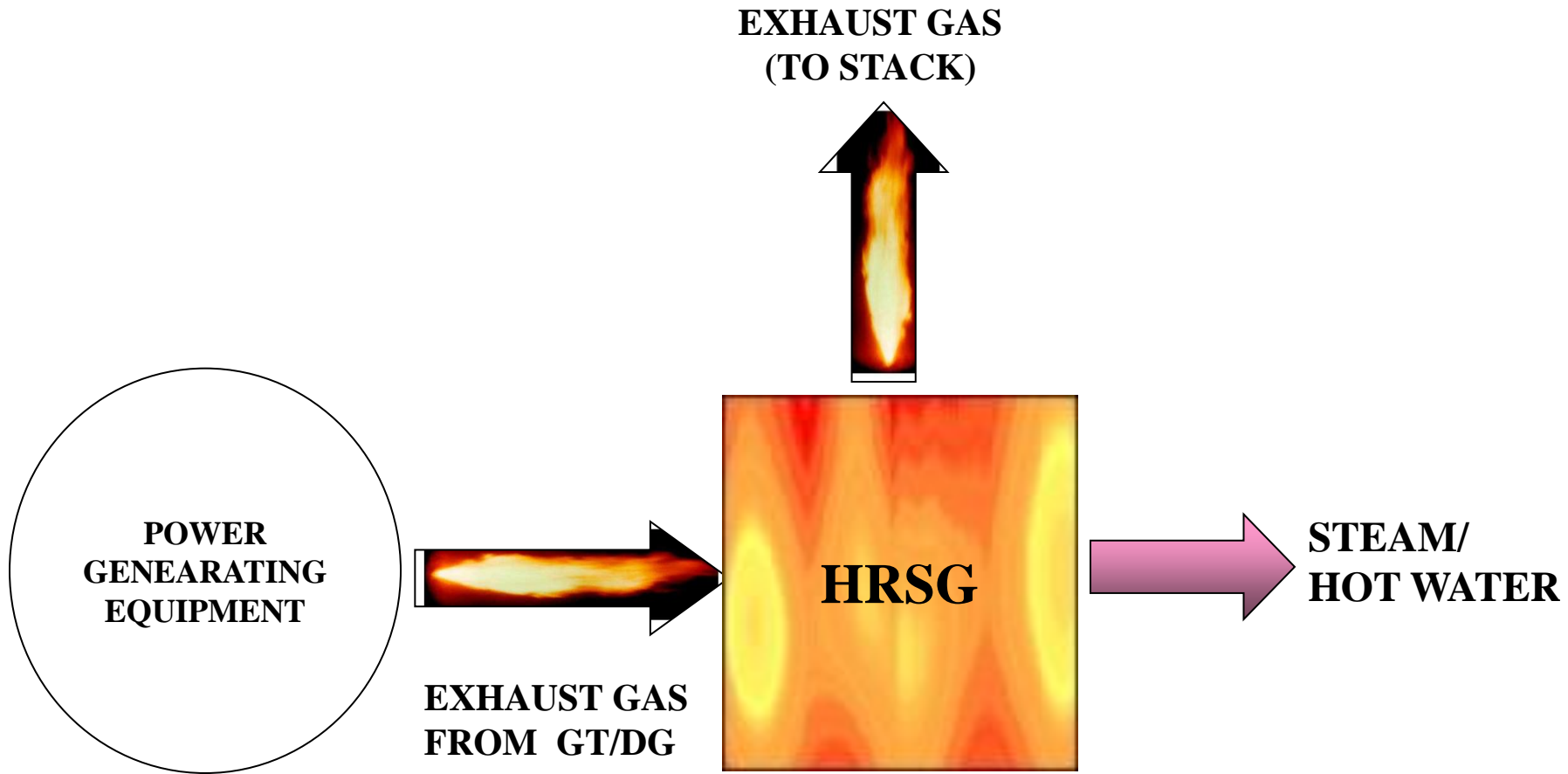
POWER SIDE

- Gas Turbine / MTs
- IC Engines
- Steam Turbine

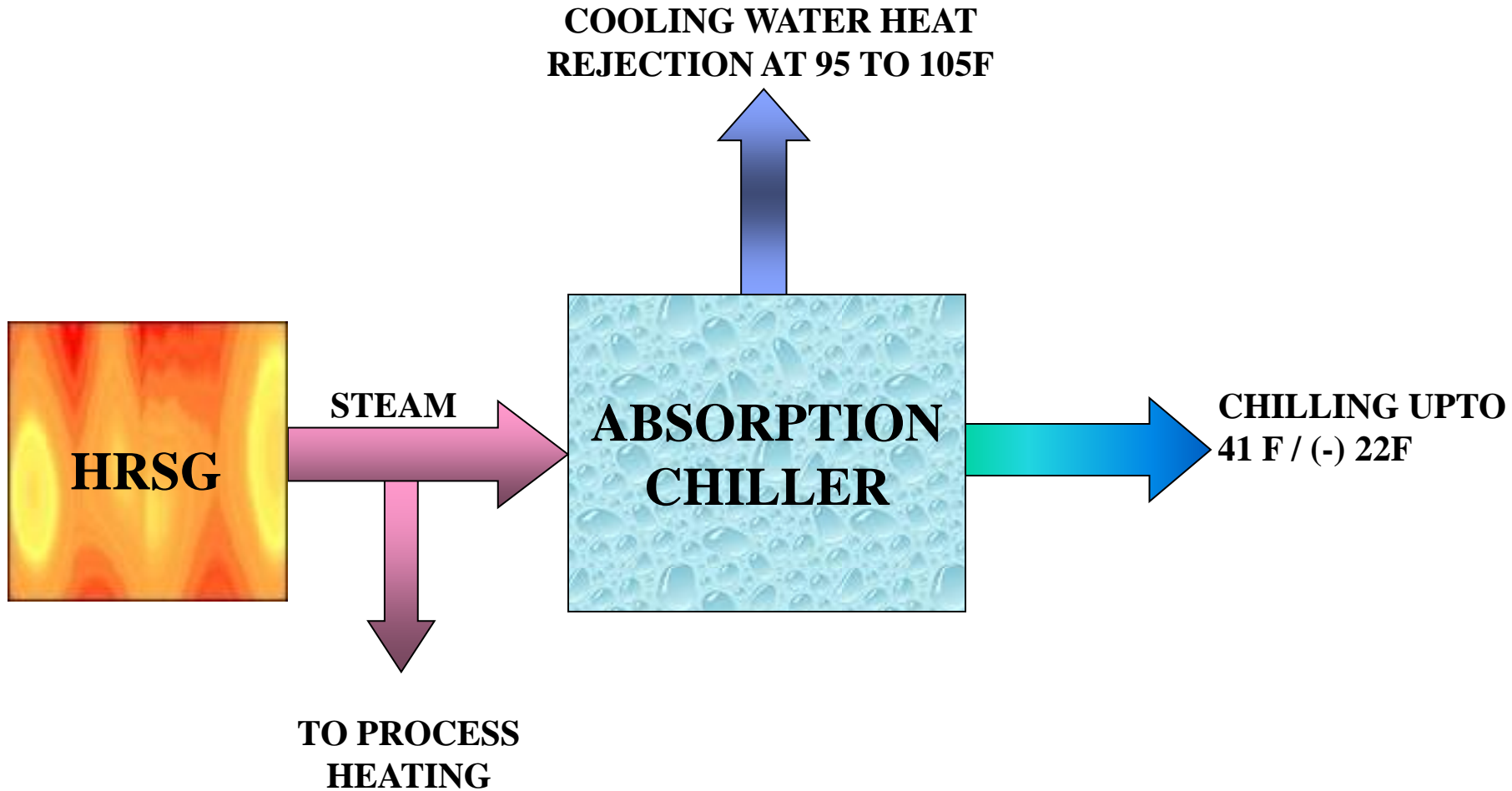
RECOVERY SIDE

- HRSG/ EGB
- Absorption Chiller

COGENERATION



TRIGENERATION



Thermax Product Offerings / Capabilities

TYPE	RANGE in TR (Tons)	COP	HEAT INPUT
Single Stage Steam	50-3500	0.7	16.8 lb steam/hr/TR (Steam: 14 – 50 psig)
Two Stage Steam	50-3500	1.35	8.6 lb steam/hr/TR (Steam: 55-140 psig)
Low Temp Hot water	20-1380	0.75	3.2 gpm hot water/TR (195/185 degF)
Direct Fired	50-1400	1.20	10,000 BTU/hr/TR
Multi- Energy	50-3500 50-1400 with firing	-	Combination of two or more heat sources

Medium & High Temp Hot water driven chillers up to 3500 TR also available.
1 TR = 1 ton of refrigeration = 3.51 kW = 12000 BTU/hr = 3024 kcal/hr

3500 TR absorption chiller



3500 NTR VAM

Recognition & Testing Capability

Awards and Recognition

2010

Thermax Exhaust Driven chiller with 12% higher COP was awarded Runners up prize in “Innovative Product design” Category in Bry-Air National awards for excellence in HVAC & R.

2007

Thermax Zero Deg C machine awarded First prize in ‘Most Innovative Product Design Category in HVAC’ in Bry-Air Awards.

2006

Thermax exhaust and multi-energy driven Machine (Trigenie) awarded first prize in ‘Most Innovative Product Design Category in HVAC’ in Bry-Air Awards.

2000

Thermax low temperature hot water driven machine (Cogenie) awarded as the ‘Environment Product of the Year’, UK.



Thermax has a state-of-the-art test bay capable of testing various types of vapor absorption machines – steam driven, fuel fired, exhaust driven, hot water driven or a combination of these up to a capacity of 3500 TR.

Advantages of Multi-Energy chillers

- Lesser equipments for CHPC plant, better for cost, space, maintenance
- Single absorption chiller can work on any combination following:
 - Exhaust Gases
 - Hot water
 - Fuel: Gas/Oil
 - Steam
- Totally customized to meet customer's requirements with optimum heat recovery
- Back up firing option for cooling when prime mover is not operational
- Supplementary fuel firing option to meet higher cooling load than possible by heat recovery

Experience

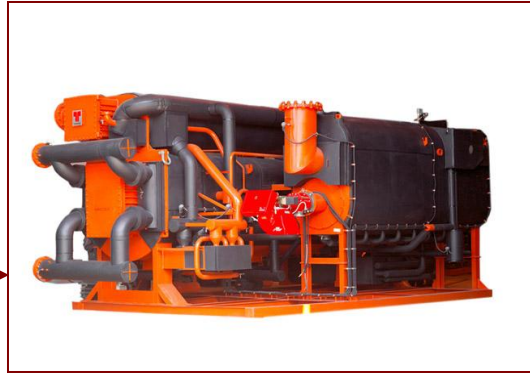


References of CHPC Installations

California State University, Fullerton, USA – 4.5 MW Power, 2600 TR of Cooling



1 x 4.5 MW CAT Solar
Gas Turbine

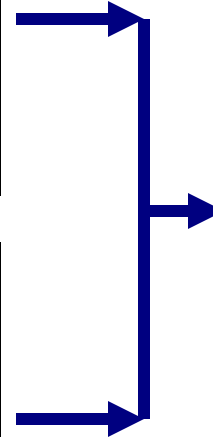
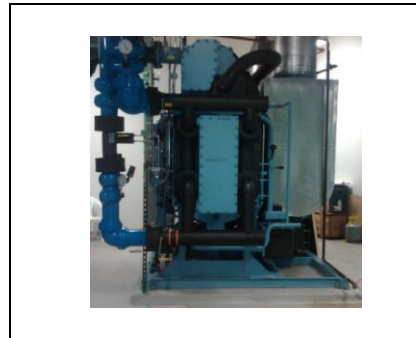
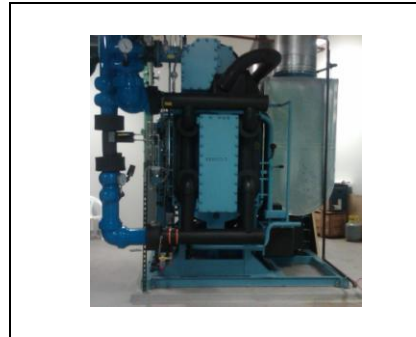


2 x 1300 ton Exhaust gas Fired
Chillers with back up firing

→ Exhaust gas



IBM Data Center Syracuse University, NY, – 780kW Power, 300 TR of Cooling



12 x C65 Capstone

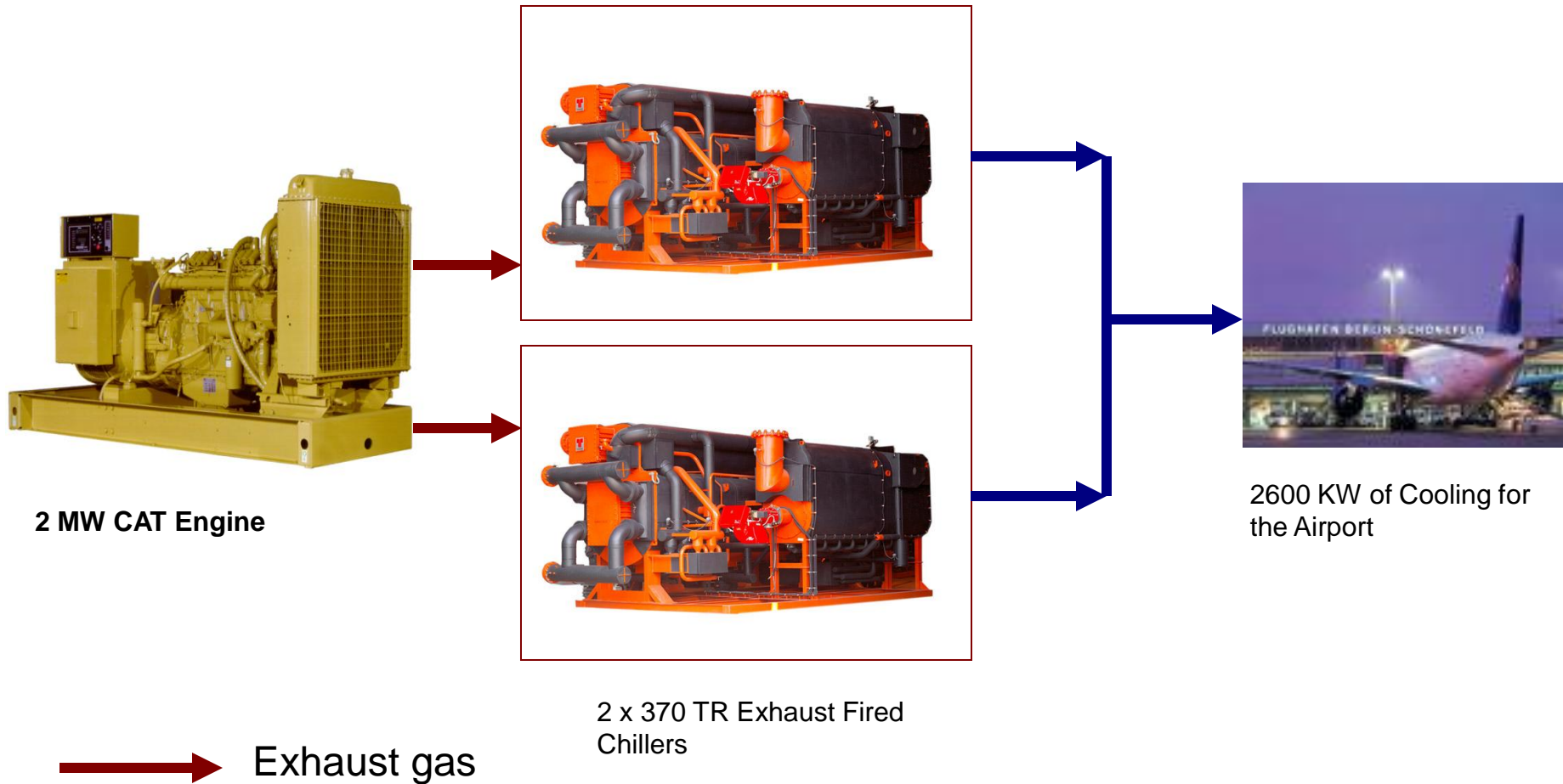
Micro - Turbine

2 x 150 TR Exhaust gas

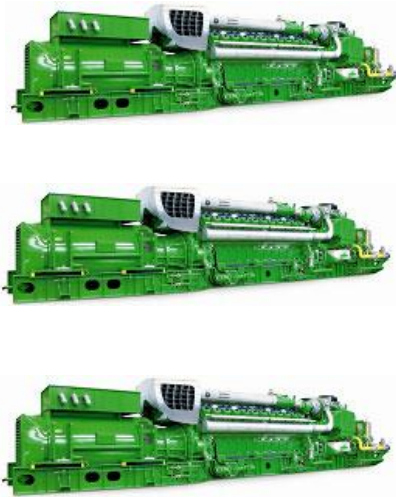
Fired Chillers

 Exhaust gas

Berlin Airport, Germany; 740 TR Cooling



Lonjas Tecnologia, Barcelona – 1400 TR of Cooling



GE Jenbacher J 620 GS
F-196; Power output 3353
KW



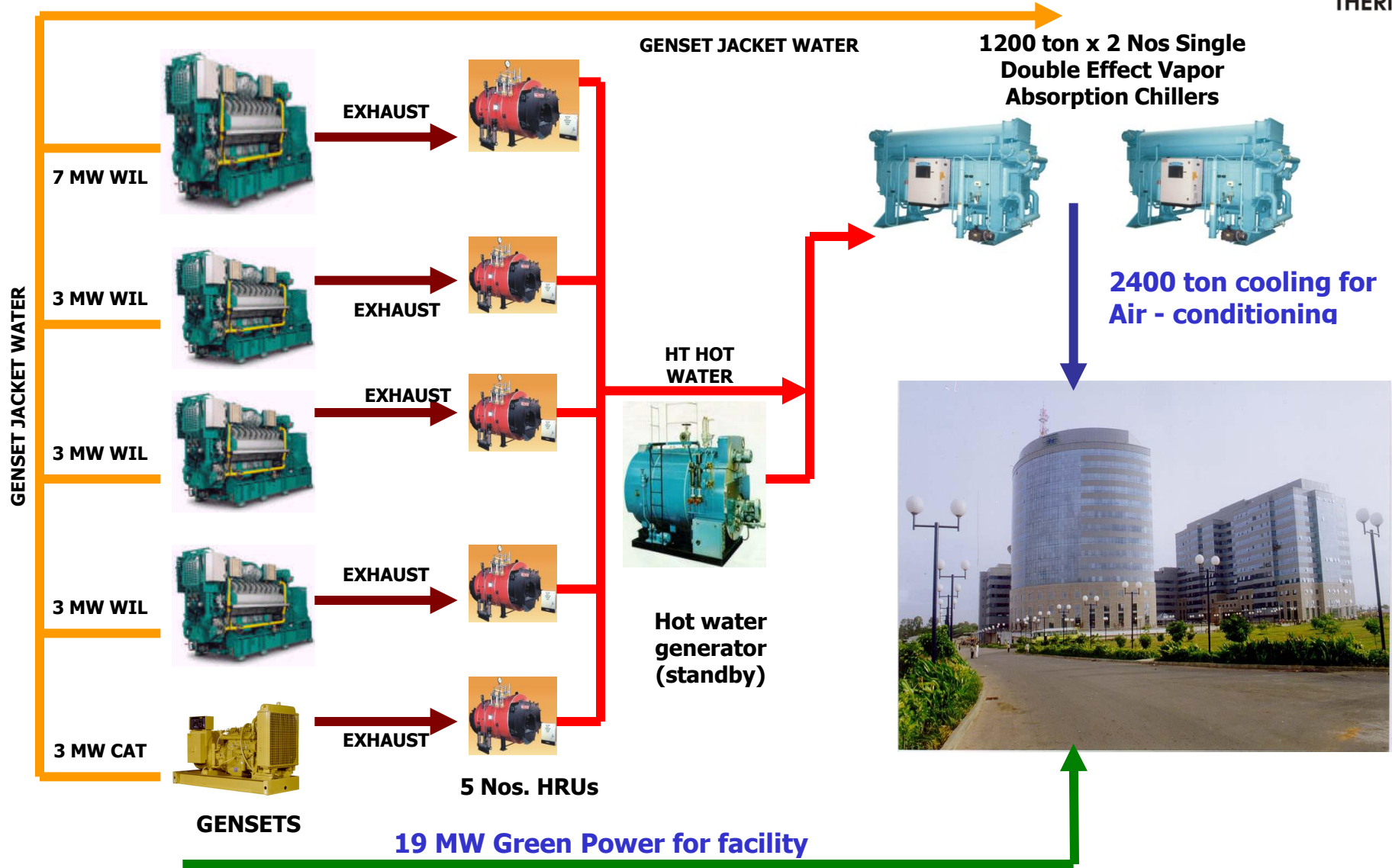
Exhaust gas based chiller

District Cooling

→ Exhaust gas

ITPL, Bangalore CHPC Project

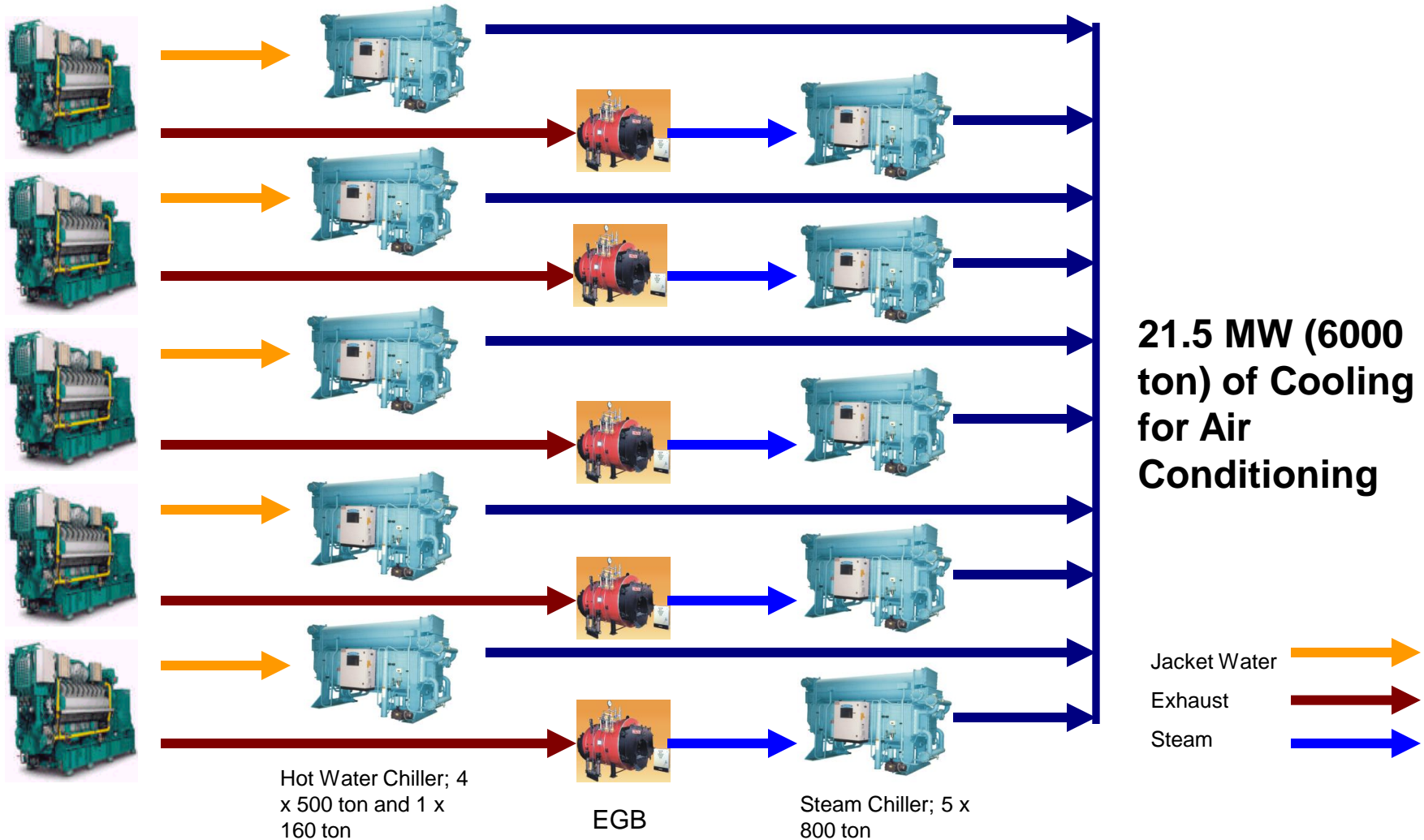
19 MW power; 2400 ton Cooling



Moser Baer, India - 34 MW Power; 6000 TR Cooling



5 x 6 MW Wartsila Engines



Few More

- UCF, USA* : 1000 TR
- Ciputra Mall, Indonesia : 1000 TR
- Huainan Coalmines, China : 1400 TR
- Atlantic City, USA : 2000 TR
- Halmsted, Sweden : 1300 TR
- Egger, Austria : 1600 TR
- Videocon, India : 1800 TR
- Sun Pharma Limited, India : 750 TR
- Praful Overseas, India : 800 TR

*: Not installed yet

Thank You!

Contacts:

Piyush Patel

Thermax Inc.

21800, Haggerty Road, Suite 112,
Northville, MI 48167

Off: 248 468 0541 Ext 700

Cell: 248 756 5398