IEA INTERNATIONAL WORKSHOP

Pinch Technology for Energy Conservation Activities

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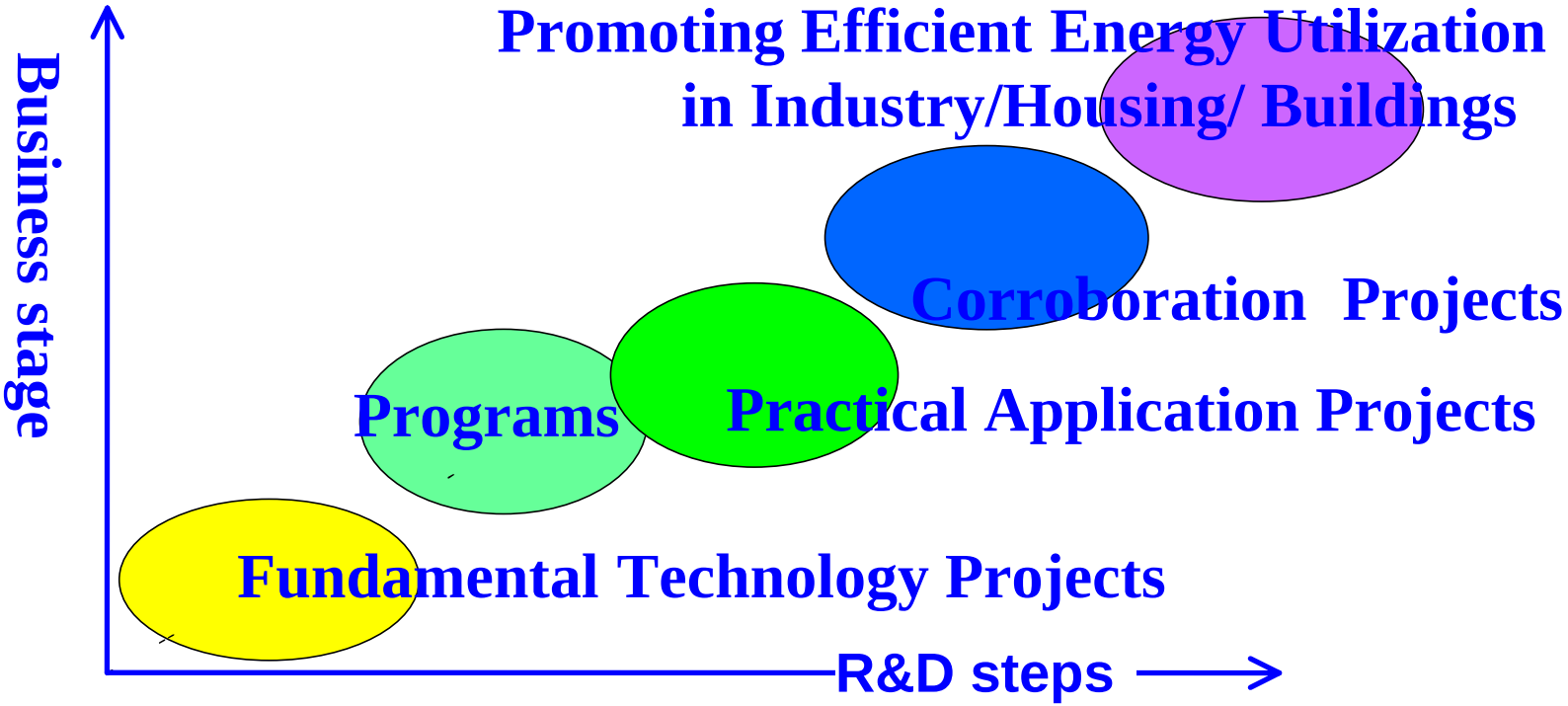
2. Programs、Strategic R&D on Energy Conservation & Business-units subsidy system in NEDO

Programs、Strategic R&D on Energy Conservation & Business -units supporting system



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Technology Map

Commercial /Domestic use	Improvement of Heat Utilization Air Conditioning, Heating,Hot-water supply system
	Energy conservation of Structure
	Energy Conservation of Lightning, other Electrical Equ
	New Energy Management technology development in Domestic Use
	Energy Conservation of off-duty equipment ex. Charger, power adopter
Commercial /Business use	Energy Control of Lightning, Air Conditioning
	Energy Conservation of main body
	Energy conservation of Structure
	Energy conservation for Information Technology
	On Site Dispersed Power Supply ・Storage of Electricit
Transportation use	improvement with Conventional Power System
	improvement with Advanced Power System
	Introduction of Advanced Motor Fuel and Spread
	Improvement of Distribution/ Transportation System
Industrial use	Reduction of Fixed Energy of Industrial Region
	Improvement of Steam Utilization
	Energy conservation of Motor, Power electronics
	Improvement of Heating, drying system
	Energy conservation of Utilization Process of Cold Temperature
	Utilization of Heat

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Potential of Pinch Technology for Energy Conservation

Items	Quantity of Energy Conservation (M liter・crude oil/year)
Pinch Technology Potential	500 ～ 1000

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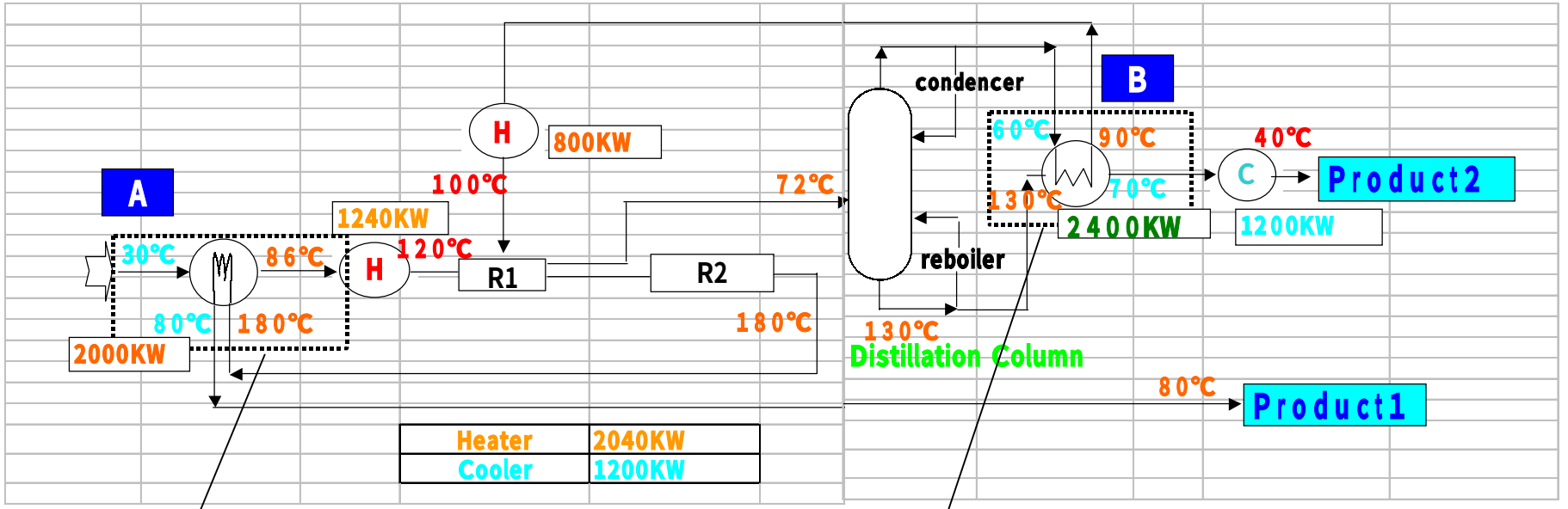
Conventional Process(example)



A

in Temp	out Temp	ΔT	UnitVolume	Heat Unit
30	85.6	55.56	36	2000
180	80	-100	20	-2000

ΔT＝50℃

B

in Temp	out Temp	ΔT	UnitVolume	Heat Unit
60	90	30	80	2400
130	70	-60	40	-2400

ΔT＝10℃

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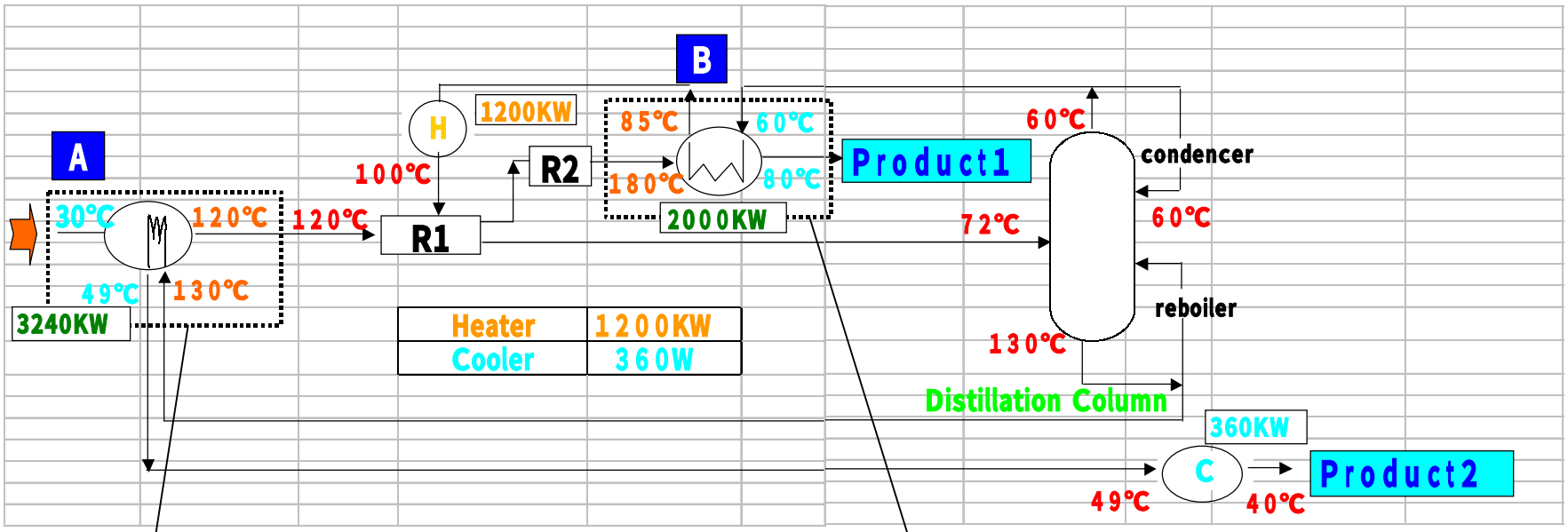
Improved Process(example)



A

in Temp	out Temp	ΔT	Volume	Heat Unit
30	120	90	36	3240
130	49	-81	40	-3240

ΔT＝19℃

B

in Temp	out Temp	ΔT	Volume	Heat Unit
60	85	25	80	2000
180	80	-100	20	-2000

ΔT＝20℃

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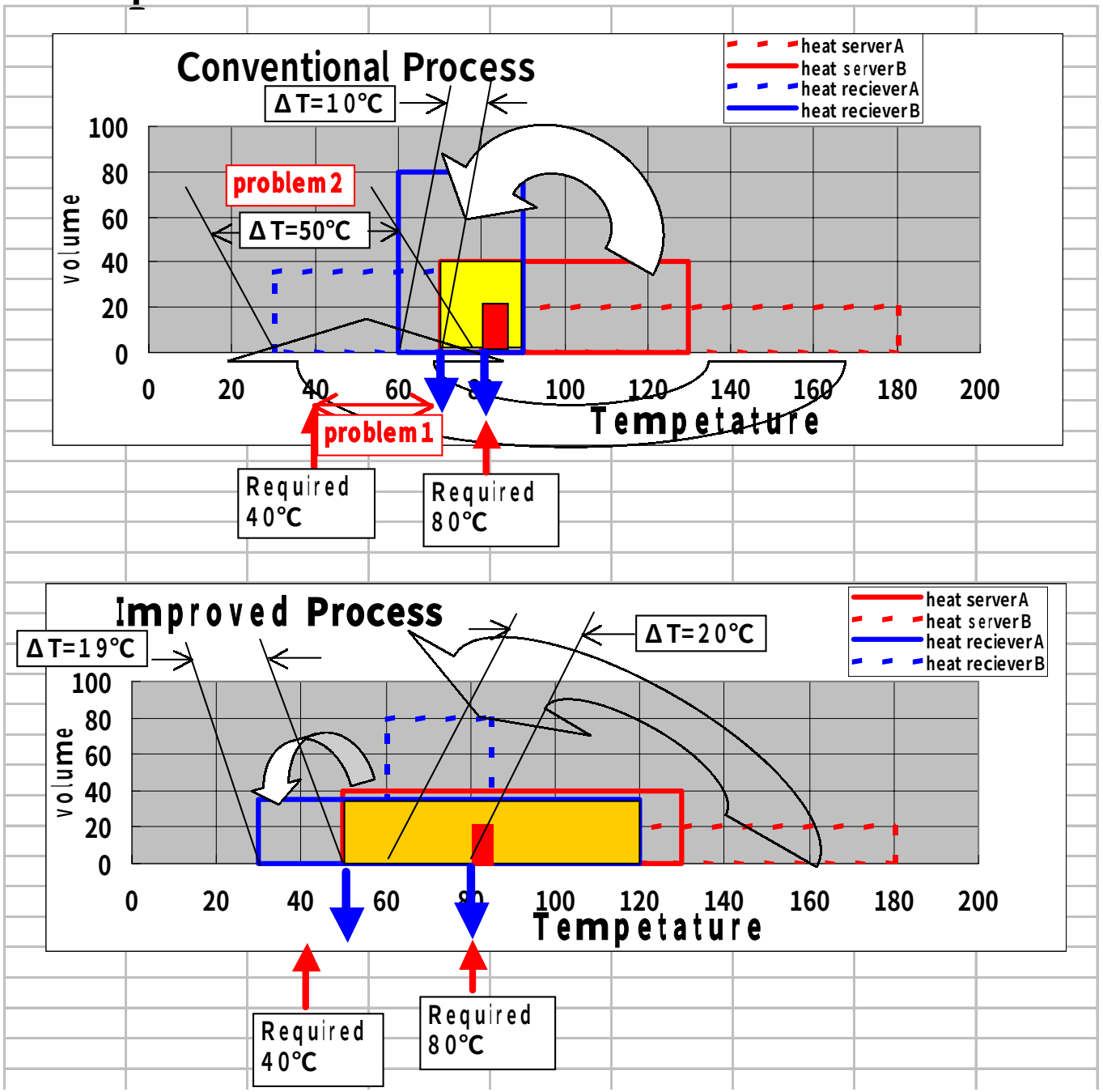
Comparison of Processes



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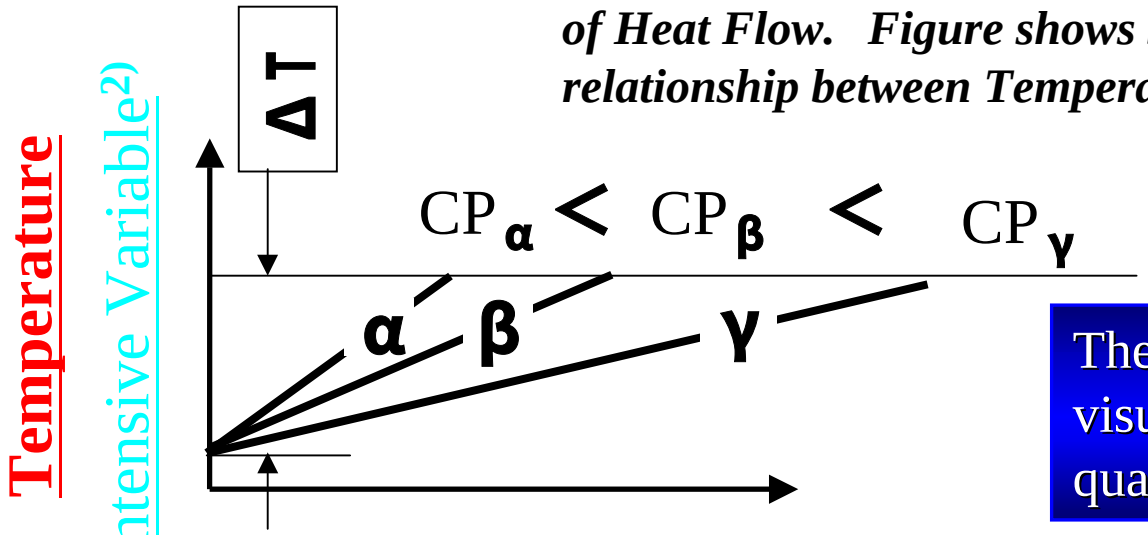
Composite Curve（0）

Attention ;Temperature is not directly the function of Heat Flow. Figure shows solely the relationship between Temperature and Heat Flow



The state of system can be visualized qualitatively and quantitatively at the same time.

Heat Flow＝Temperature＊CP

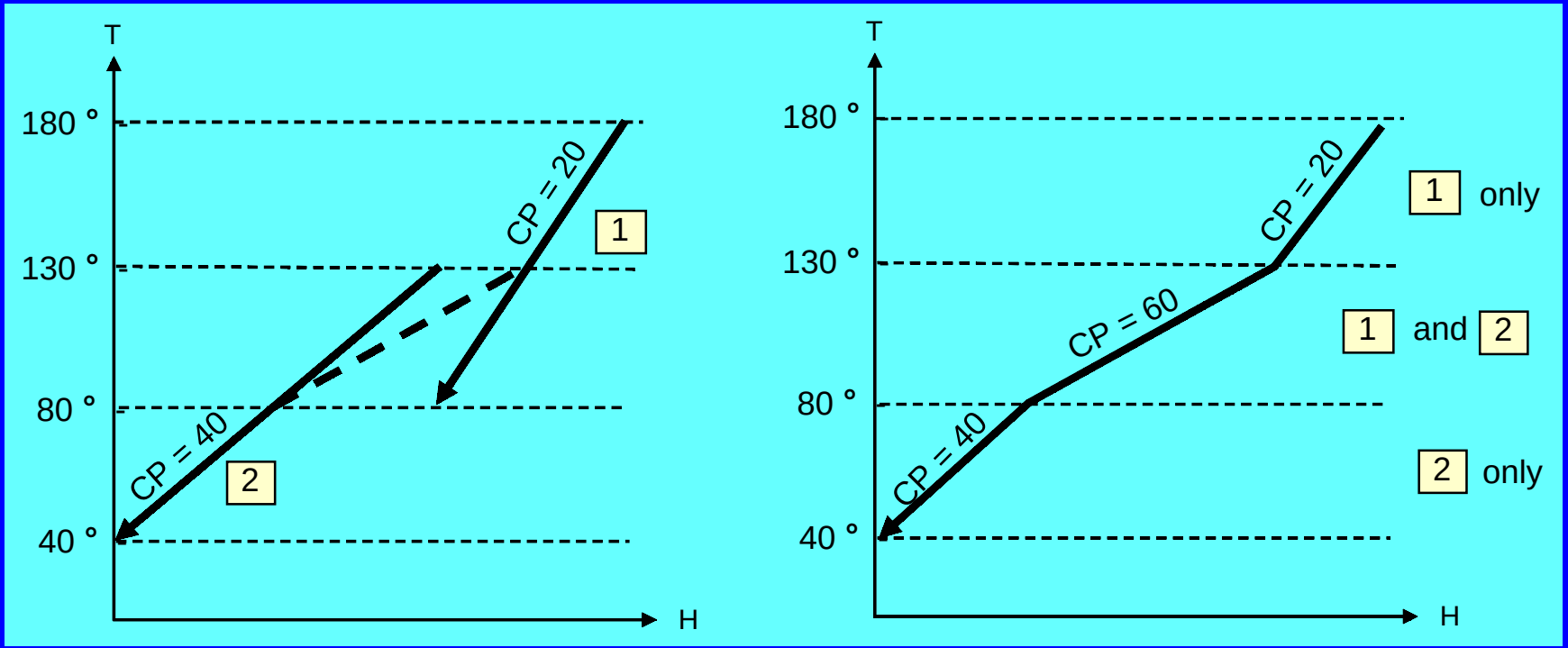
Extensive variable1)

CP＝f（volume，specific heat）

1)Extensive variable:indicates quantitative degree／A+A=2A

2)Intensive Variable：indicates qualitative degree／A+A=A

Composing the Curves



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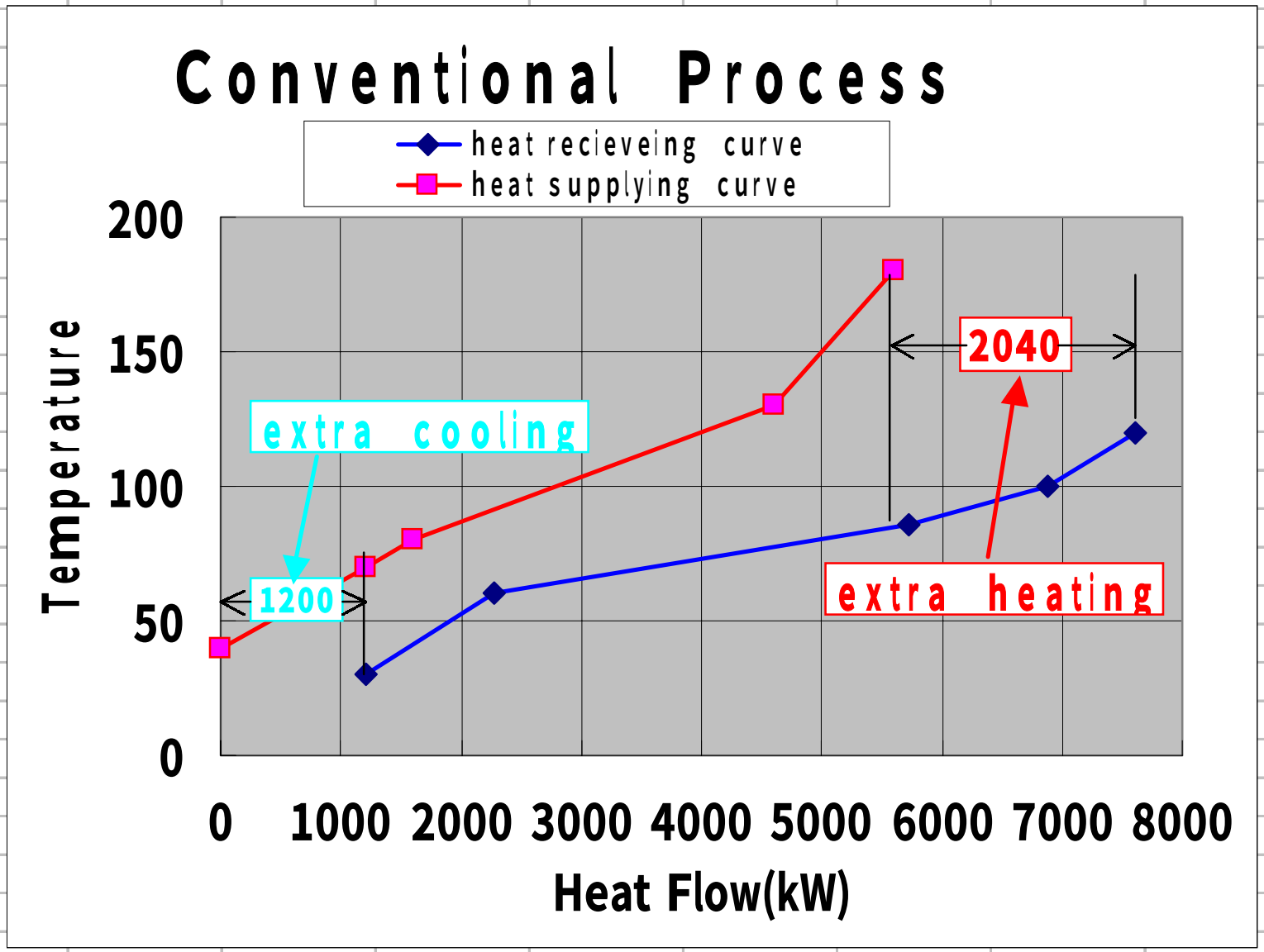
Composite Curve (1)



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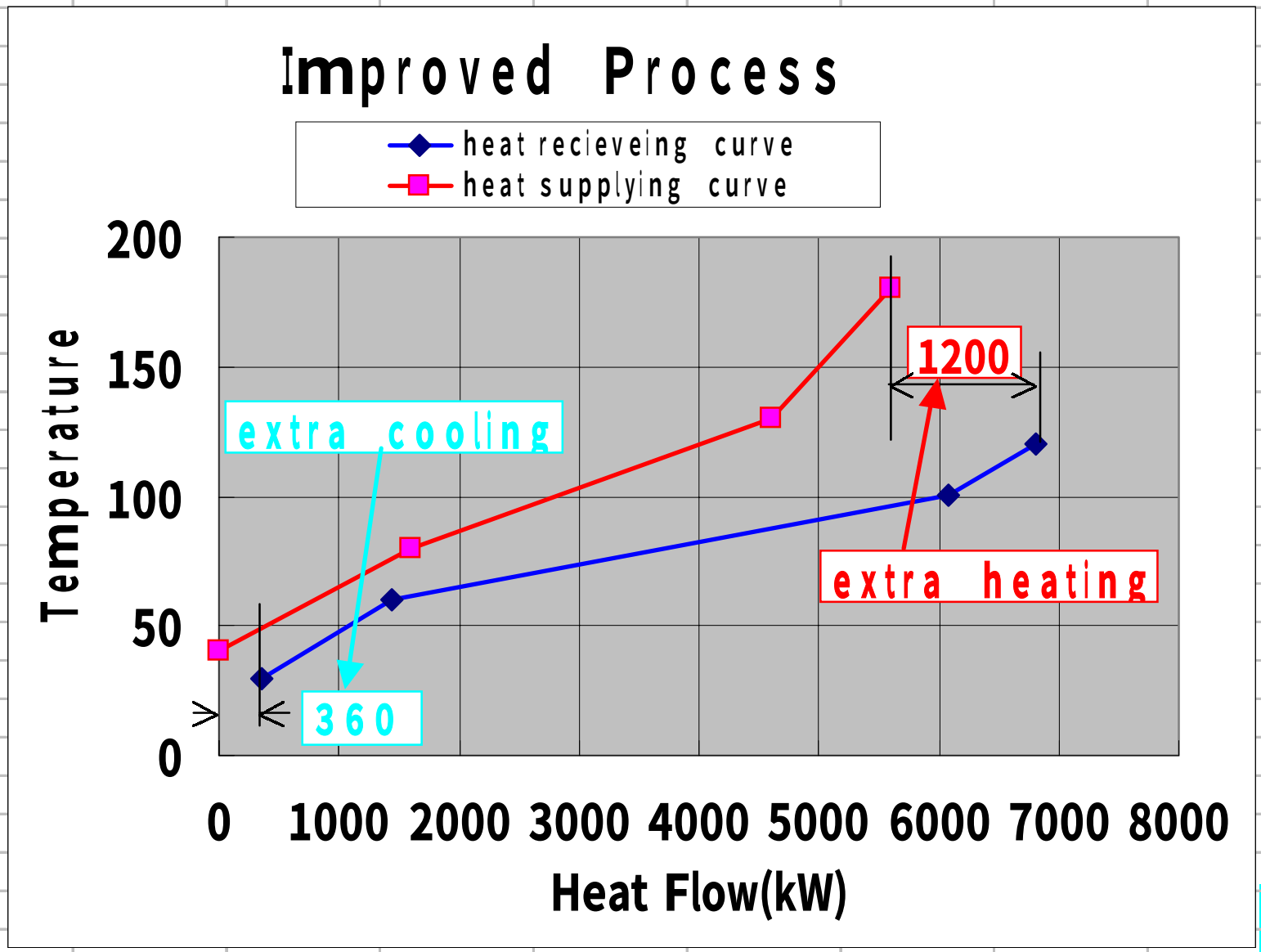
Composite Curve (2)



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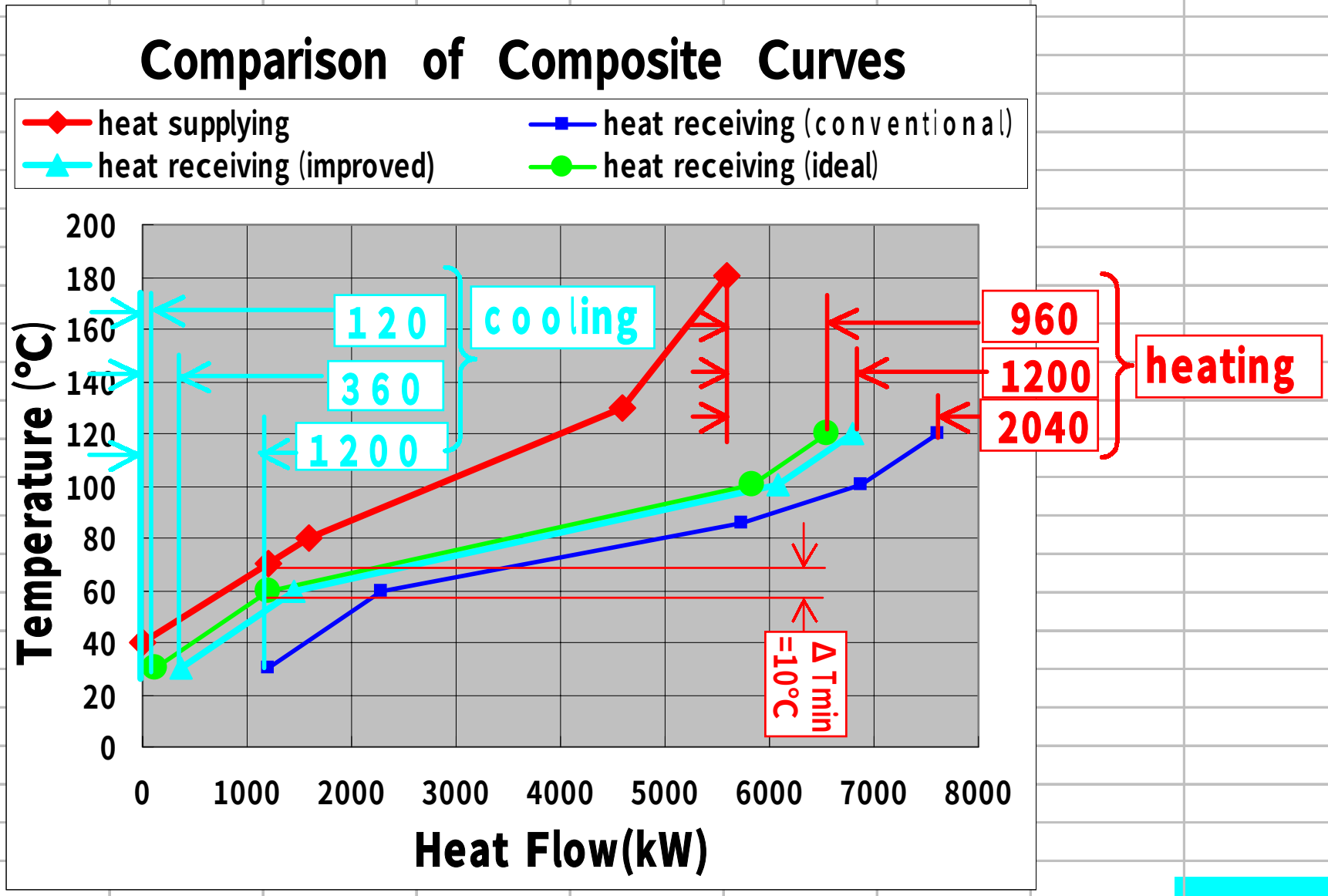
Composite Curve (3)



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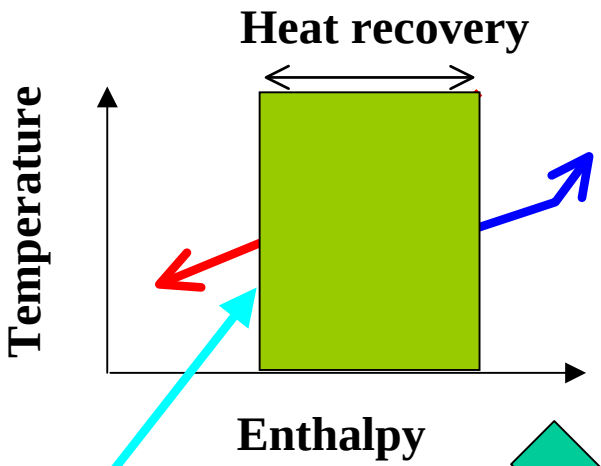
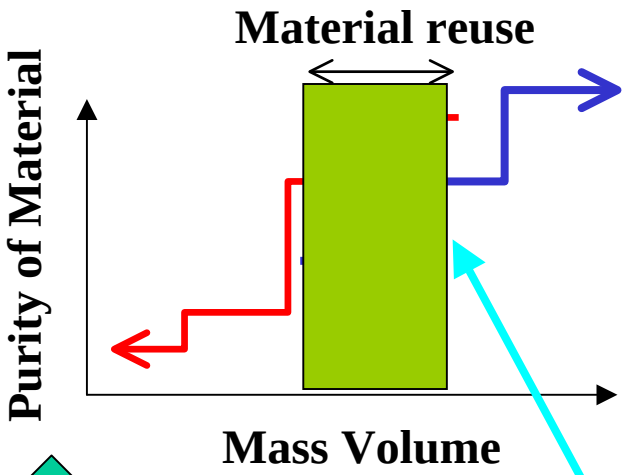
Pinch technology for Co-production system

Pinch technology for Thermal analysis



Pinch technology for Material analysis



Maximization of thermal cascade utilization

Maximization of material cascade utilization

Pinch technology for Co-production system

Optimizing Analysis Method for

Heat and Material cascade utilization

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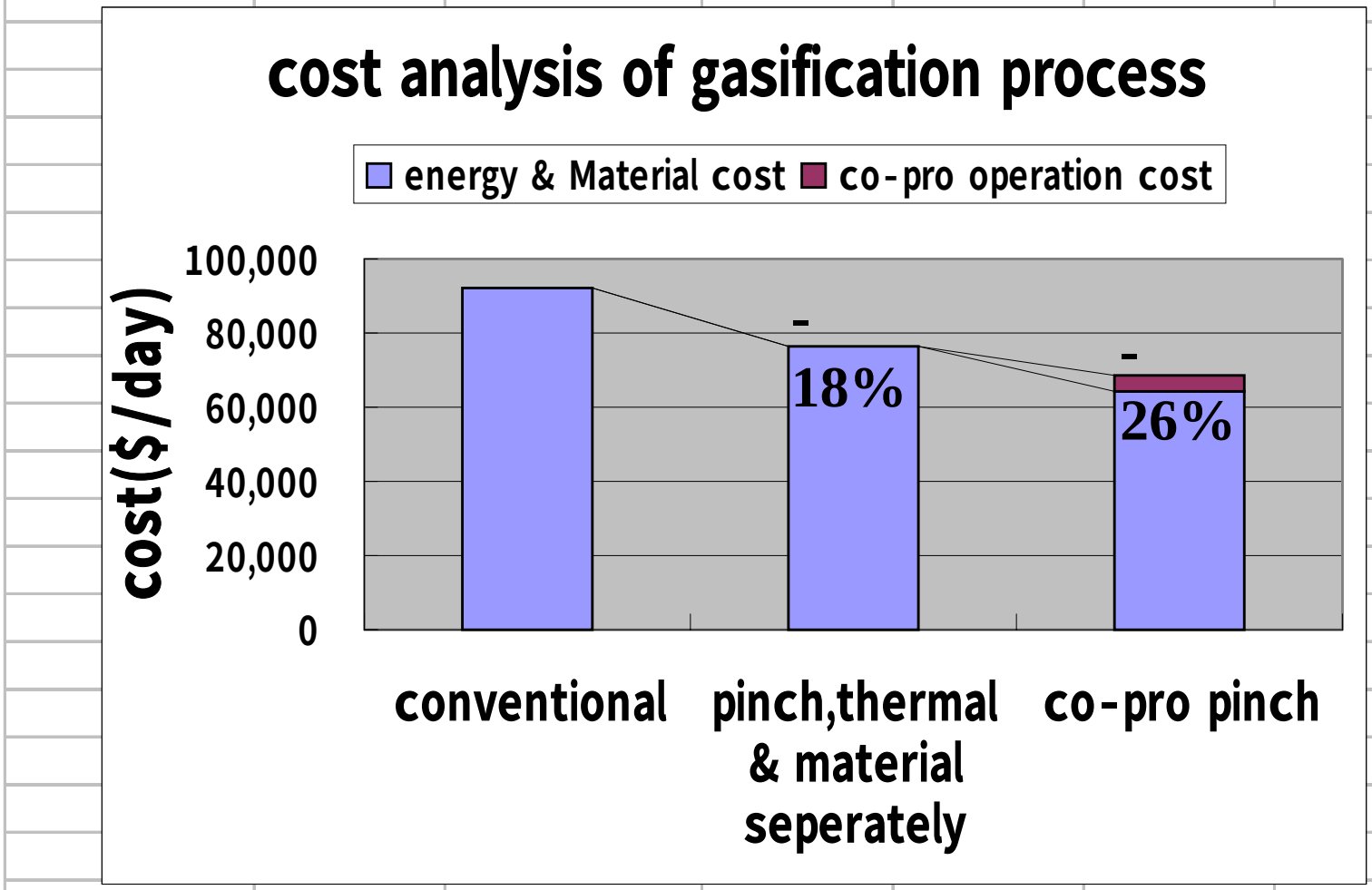
Analysis Example of Co-production System



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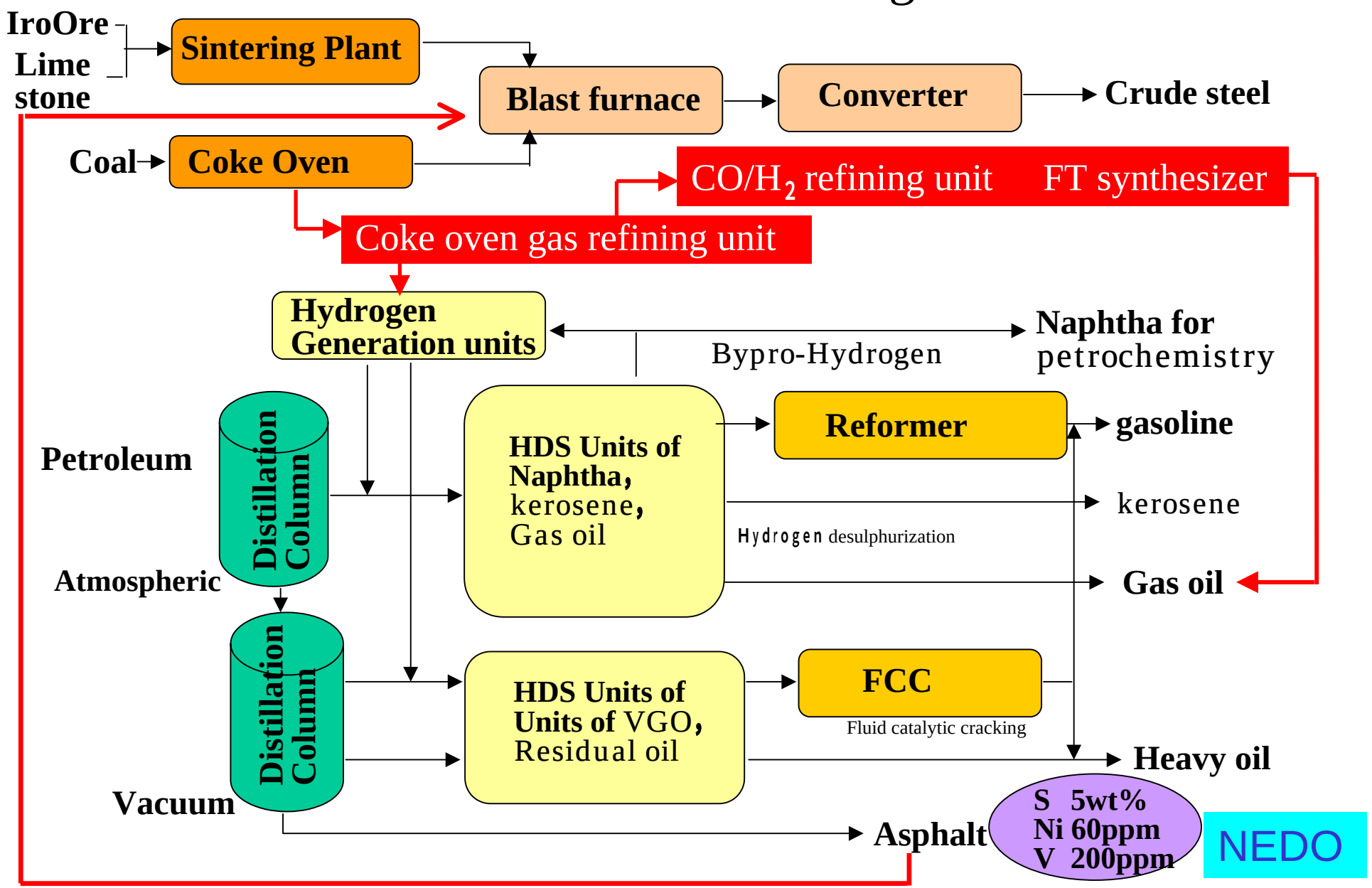
Example of Correlation Between Steel Plant and Oil Refining Plant



Conclusion

1.Pinch Technology visualizes waste heat panoramically，qualitatively and quantitatively．

2. Potential of Pinch technology for Energy Conservation is not less than 500～１０００M･Liter･crude oil/year．

3. Moreover Pinch technology for Co-production system may enlarge the Energy Conservation effect．

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