

**ENERGY ANALYSIS OF 1 TON  
GENERATOR-ABSORBER-EXCHANGE  
ABSORPTION COMPRESSION (GAXAC)  
COOLER**

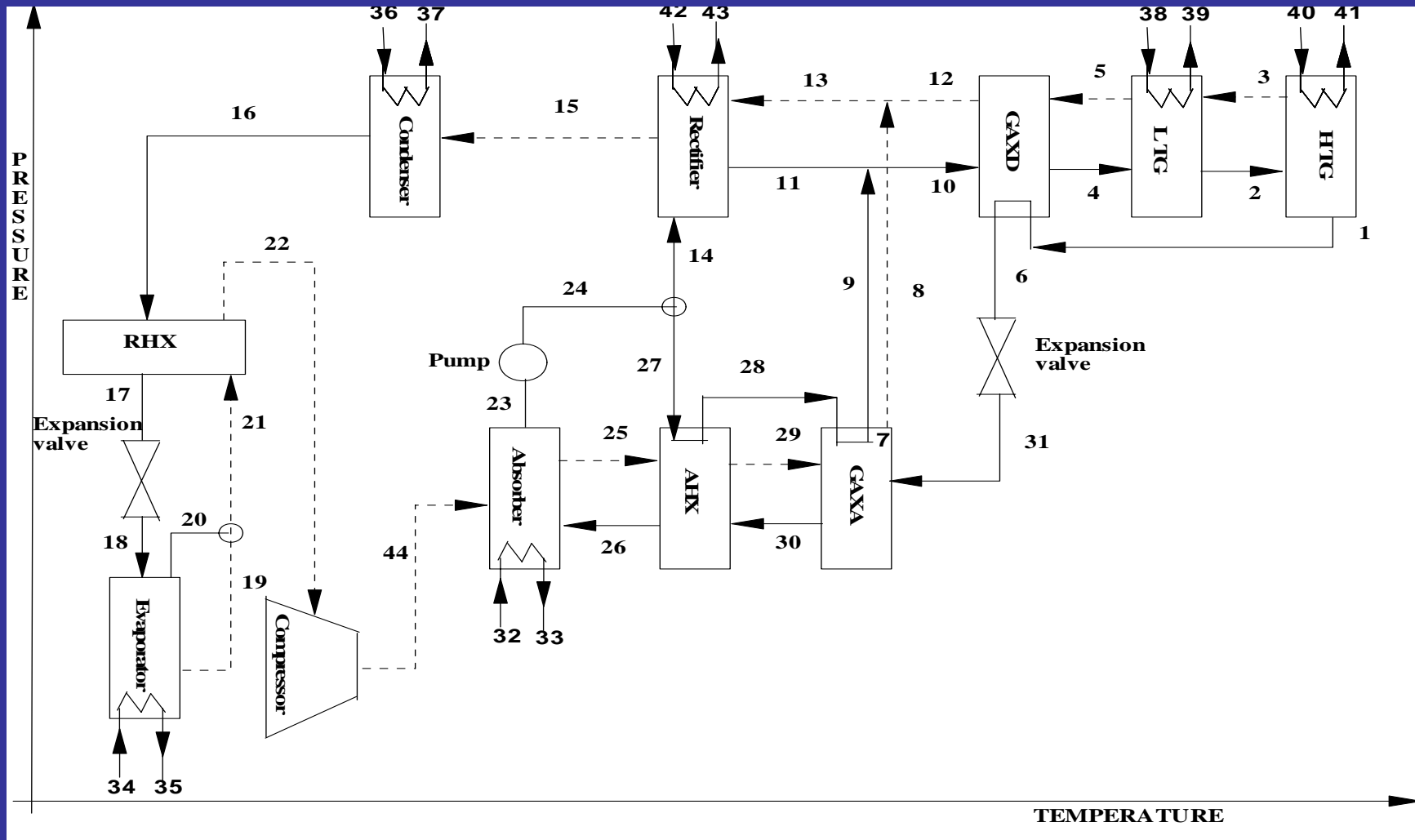
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# INTRODUCTION

- positive impact on environment
- 1TR is the normal cooling requirement
- Energy analysis
- GAX cycle
- Hybrid GAX cycle



# GAX Absorption-Compression Cycle



# Simulation Procedure

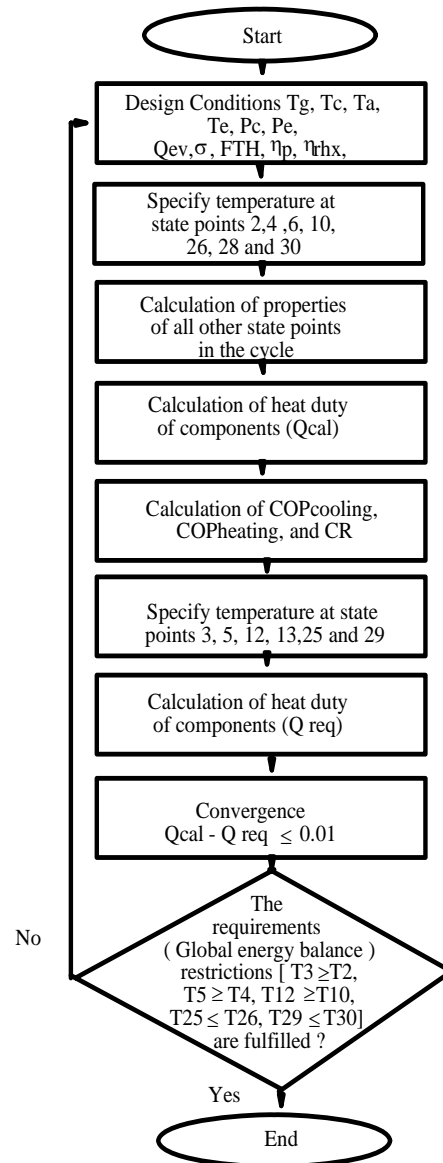


Figure 3. Flowchart for the simulation work

# GAX Cycle – Heat load

	Heat Load based on External circuits (kW)	Heat Load based on Internal circuits (kW)	Difference	% Difference
Generator 1	1.273	1.277	0.004	0.3
Generator 2	1.218	1.220	0.002	0.2
GAX Desorber	0.814	0.824	0.01	1.2
Absorber	1.921	1.923	0.002	0.1
AHX	0.494	0.499	0.005	0.2
GAX Absorber	3.105	3.110	0.005	0.2

# GAXAC cycle - Energy analysis

	Energy Gains (kW)	Energy Losses (kW)	Internal heat exchange (kW)
Generator 1	1.273		
Generator 2	1.218		
GAX Desorber			0.814
Rectifier		0.536	
Absorber		1.921	
AHX			0.494
GAX Absorber			3.105
Solution pump	0.012		
Condenser		3.716	
Pre-cooler			0.406
Evaporator	3.517		
Compressor	0.142		
Total	6.162	6.173	4.819

# GAXAC Cycle – Heat load

Component	Heat Load based on External circuits (kW)	Heat Load based on Internal circuits (kW)	Difference	% Difference
Generator 1	1.878	1.881	0.003	0.2
Generator 2	1.795	1.798	0.003	0.2
GAX Desorber	1.212	1.215	0.003	0.3
Absorber	2.953	2.958	0.003	0.2
AHX	1.086	1.096	0.010	0.9
GAX Absorber	1.954	1.957	0.003	0.2

# GAX cycle - Energy analysis

Component	Energy Gains(kW)	Energy Losses (kW)	Internal heat exchange (kW)
Generator 1	1.878		
Generator 2	1.795		
GAX Desorber			1.212
Rectifier		0.544	
Absorber		2.953	
AHX			1.086
GAX Absorber			1.954
Solution pump	0.018		
Condenser		3.716	
Pre-cooler			0.406
Evaporator	3.517		
Total	7.208	7.213	4.658

# performance comparison

Parameter	GAX conventional	GAXAC	% Difference
COP cooling	0.958	1.412	47.39% high
COP heating	1.958	2.412	23.18% high
CR	2.331	1.904	18.32% less

# Results

- heat based COP value of 1.412
- internal energy exchange of 4.819 kW
- 47 percent higher value of heat based COP
- circulation ratio decreases from 2.33 to 1.90 (18.32%)
- combination of non-conventional (renewable and waste heat) and conventional energy sources.