PROJECT 1:
DISTRIBUTED GENERATION

COST
REPLACEMENT
INVESTMENTS

PURPOSE: TO REDUCE STATE EXPENDITURE COSTS MORE SPECIFICALLY ON THEIR ELECTRICITY CONSUMPTION ACCOUNTS (ON SHORT-TERM)

OPPORTUNITY WINDOW: Wider Economic Possibilities Defined in Normative Resolutions REN 482/2012 and REN 687/2015, valid from 1 March 2016.

BASIC STRATEGY: IMPLEMENTATION OF ENERGY GENERATION AND INSERTION SYSTEMS (ENERGY COMPENSATION SYSTEM) WITH IMPLEMENTATION OF PHOTOVOLTAIC SYSTEMS, GENERATING CREDITS IN KWH, COMPENSABLE IN CONSUMER ACCOUNTS.

BASIC INFORMATION (Bahia State / Coelba as an example):

CURRENT PRICES + TAXES

COELBA RATES (group B down consumption)

DESCRIÇÃO	TARIFA	ALÍQUOTAS ICMS	PIS	COFINS	PREÇO FINAL (R$)
B3 - Poder Público Estadual e Municipal					
Consumo Ativo	0,51937000	0%	1,11%	5,10%	0,55375839
Consumo Reativo Excedente	0,22098000	0%	1,11%	5,10%	0,23561147
Consumo Ativo Ponta - Tarifa Branca	1,14615000	0%	1,11%	5,10%	1,22203859
Consumo Ativo Intermediário - Tarifa Branca	0,71722000	0%	1,11%	5,10%	0,76470839
Consumo Ativo Fora Ponta - Tarifa Branca	0,42142000	0%	1,11%	5,10%	0,44932295

COELBA RATES (group A medium voltage consumption) Ex: green hourly (there are others)

DESCRIÇÃO					TARIFA
A4 - Demais Classes (Poder Público Estadual e Municipal)					
Consumo Ativo na Ponta	1,92253000	0%	1,07%	4,96%	2,04589762
Consumo Ativo Fora de Ponta	0,25276000	0%	1,07%	4,96%	0,26897946
Consumo Reativo Excedente na Ponta	0,22098000	0%	1,07%	4,96%	0,23516015
Consumo Reativo Excedente Fora de Ponta	0,22098000	0%	1,07%	4,96%	0,23516015
Demanda Ativa	24,44000000	0%	1,07%	4,96%	26,00830052
Demanda Reativa	24,44000000	0%	1,07%	4,96%	26,00830052
Demanda de Ultrapassagem	48,88000000	0%	1,07%	4,96%	52,01660104

BASIC INFORMATION:

FIXED PRICES (NOT COMPENSABLE) PAID TO CONCESSIONAIRE

COST OF AVAILABILITY (group B - Low Voltage)

I - 30 kWh if single phase standard
II - 50 kWh, if a biphasic standard
III - 100 kWh, if three phase standard.

x R $ 0.57, in the case of Bahia

COST OF DEMAND CONTRACTED (group A - Medium Voltage)

Value with greater complexity of calculations for its definition, but which is proportional to the contracted demand, which in turn reflects the expected use in each Consumer Unit (in the aspects of installed loads, consumption hours, etc.).

These variables (Availability, Contracted Demand, Tariffs) are important in calculating the return time on investments.

ANALYSIS AND EVALUATIONS FOR THE STATES

CONDITIONERS to take advantage of the OPPORTUNITIES OPEN by Normative Resolution No. 482, of April 17, 2012 (amended by REN ANEEL 687, of 24.11.2015 and REN ANEEL 786, of 17.10.2017);

FACTORS FOR STATES IN THIS CONTEXT - Eg: a) WIDE AVAILABILITY OF OWN PUBLIC PROPERTIES WITH FACILITIES FOR DISTRIBUTED micro-generation and mini-generation; b) SIGNIFICANT CONSUMER ACCOUNT VALUES; c) SCALE GAIN, etc.

POSSIBILITIES OF FRAMEWORK OF THE MULTIPLE CONSUMER PROFILES (BODIES OF DISTINCT CNPJs) AND THEIR RESPECTIVE INDIVIDUAL UNITS, WITH REAL OPPORTUNITIES FOR SIGNIFICANT SAVINGS IN CONSUMER ACCOUNTS;

Referrals to be set in each state

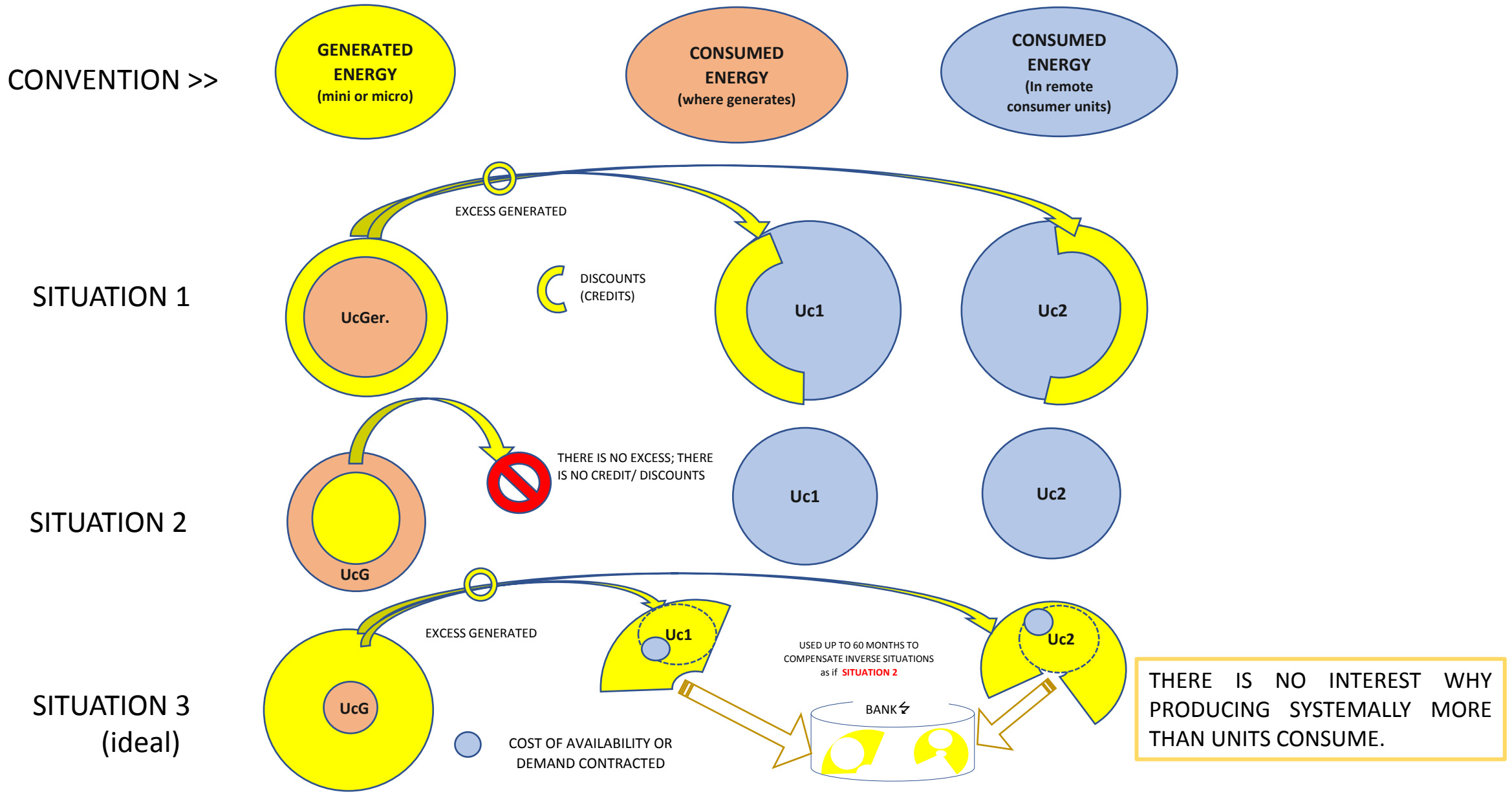
A - COMPARATIVE FEASIBILITY ANALYSIS FOR MULTIPLE ADHERENCE POSSIBILITIES.

B - CHOICE OF THE BEST ALTERNATIVE (S) AND PROPOSAL OF MODELING FOR FORMALIZING ACCESS, CONSIDERING THE ECONOMICITY, FINANCING OF NECESSARY INVESTMENTS AND OPERATIONAL MODEL.

GRAPHIC VIEW OF OPPORTUNITIES OPEN BY REN No. 482

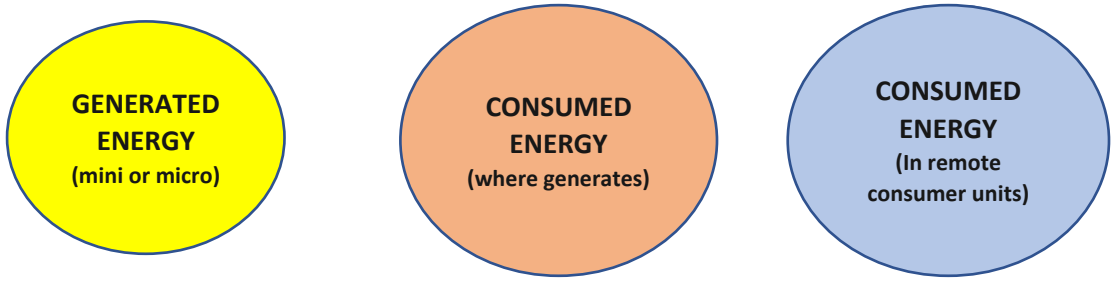
(A SUMMARY OF MOST RELEVANT TOPICS IS IN PRINTED MATERIAL)

Remote Self - Consumption

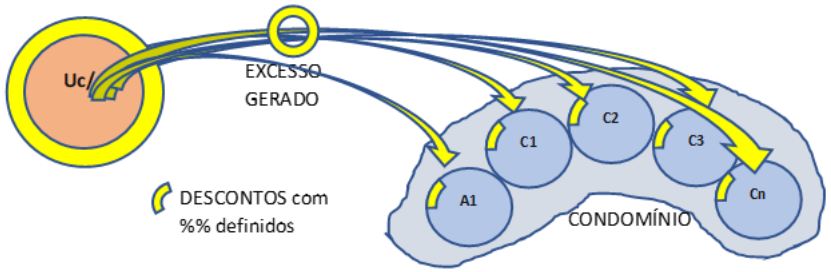


THERE IS NO INTEREST WHY PRODUCING SYSTEMALLY MORE THAN UNITS CONSUME.

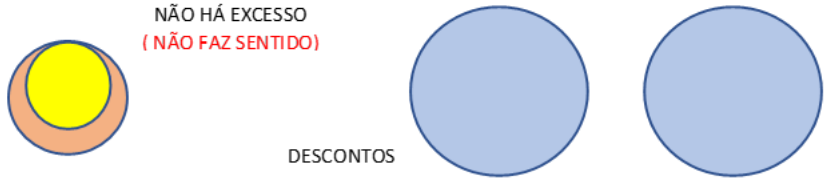
The undertaking of multiple consumer units (Condominiums)



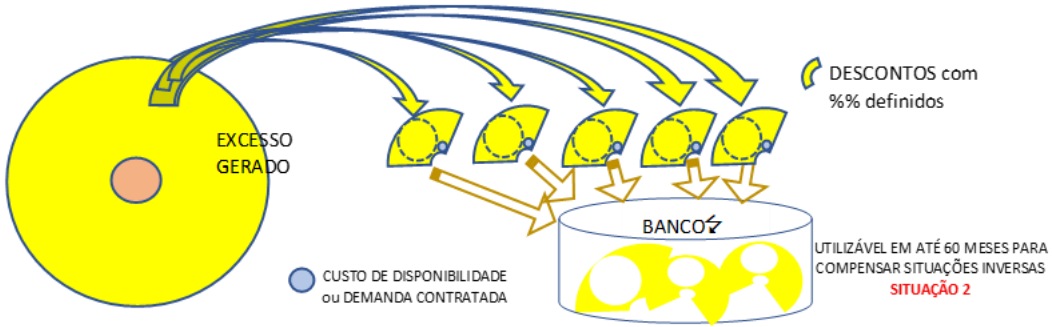
SITUATION 1



SITUATION 2

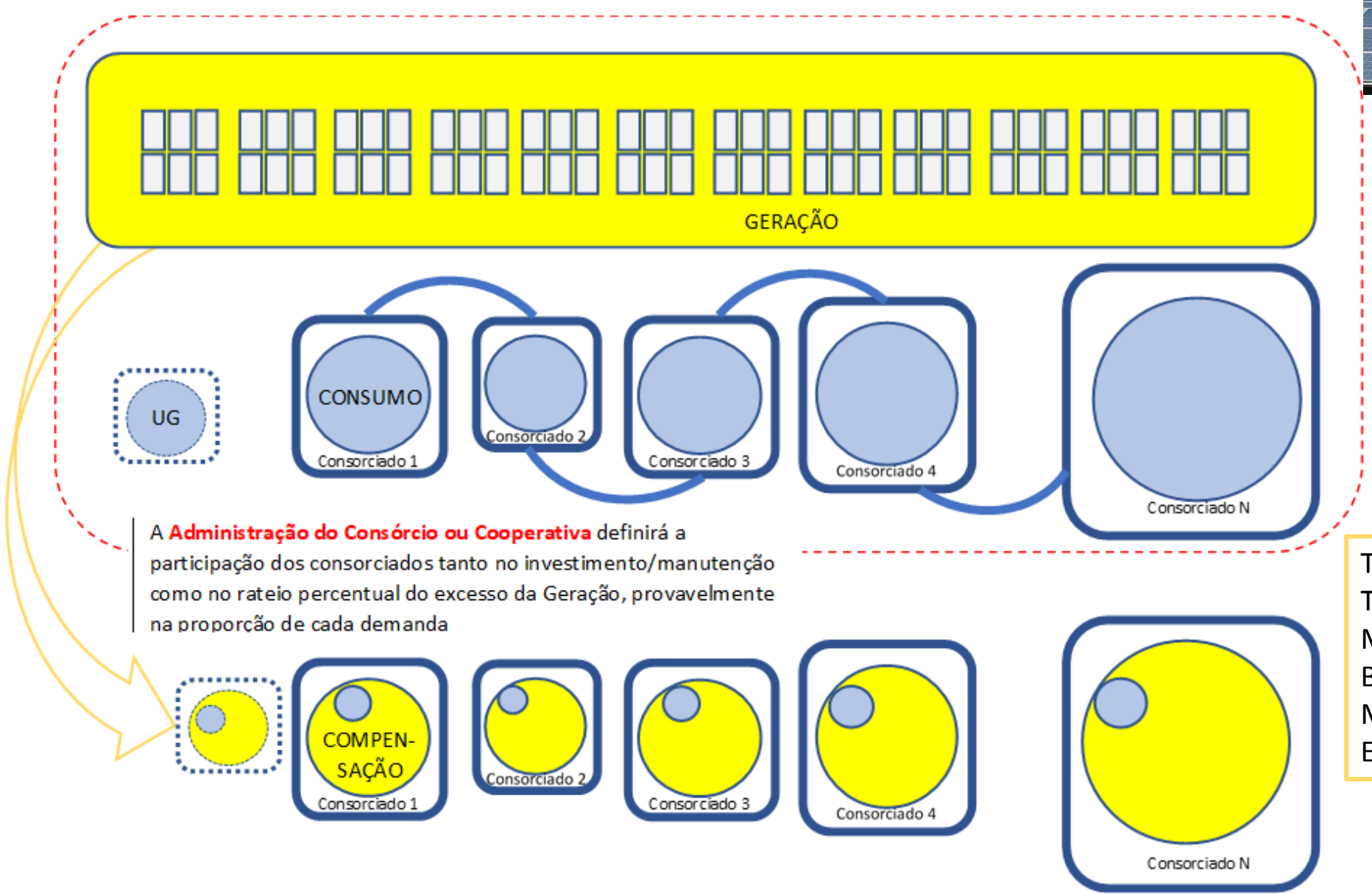


SITUATION 3



THERE IS NO INTEREST ALSO TO PRODUCE SYSTEMATICALLY MORE THAN THE UNIT SET.

Shared generation(Consortium ou Cooperatives)



THERE IS NO INTEREST BECAUSE TO PRODUCE SYSTEMATICALLY MORE THAN UNITS CONSUME BEYOND, BECAUSE THEY ARE MODULABLE, THEY ARE EASY EXPLANABLE

A - RELEVANT DEFINITIONS IN THE FEASIBILITY ANALYSIS FOR ACCESSION ALTERNATIVES BY STATES

1. CONTRACTUALIZATION - (remote self-consumption, the undertaking of multiple consumer units, shared generation, private investor facility lease (?!), Other possibilities)

2. COVERAGE - (Group B, Groups B and A, Group A only after case-by-case review of accounts and contract adjustments)

3. 3. FINANCING OF INVESTMENTS
   - Budgetary own resources of each budget unit
   - Incentive Portfolio Financing (Ex .: CEF, BNB, BB)> payback term
   - Private Financing> type of contract, term

4. GROUPING
   - Single CNPJ before the Concessionaire
   - CNPJ By Secretaries or Organs
   - CNPJ by Territorial or Regional Unit
   - Other

B - REFERENCES FOR CONSUMPTION AND COSTS FOR ANALYSIS

Ex. State of Bahia

Variables (Availability, Contracted Demand, Tariffs) are important in calculating the return time on investments.

GROUP A (Medium Voltage)

Annual consumption

Survey provided by SDE shows the following Summary Table

SECRETARIA/UNIDADE	Consumo Ativo (kWh)	Consumo Ativo (R$)
SESAB	98.938.562,80	39.400.268,50
SEC	31.499.721,71	13.401.872,35
SSP	17.411.859,11	7.149.479,21
SJDH	14.996.508,27	5.674.701,59
SDE	11.150.300,80	3.500.143,70
SAEB	8.722.306,67	3.648.681,58
SECULT	6.132.671,35	2.544.926,07
SEFAZ	5.876.882,35	2.174.435,43
SEAGRI	3.006.156,30	1.337.930,28
SEMA	2.623.148,97	877.979,41
SEDUR	2.576.892,52	1.300.964,50
SEINFRA	1.822.036,38	671.076,01
SECTI	1.640.143,82	658.084,25
SETRE	934.459,24	399.376,32
SDR	894.163,08	338.697,54
SETUR	307.058,74	147.200,77
SEDES	245.639,13	85.912,22
CASA CIVIL	230.780,55	102.185,67
EBAL	156.392,26	81.292,85
CASA MILITAR	127.704,97	58.693,77
totais >>>	**209.293.389,02**	**R$ 83.553.902,02**
p/mês >>>	**16.099.491,46**	**R$ 6.427.223,23**
P/ANO >>>	**193.193.897,56**	**77.126.678,79**

B - REFERENCES FOR CONSUMPTION AND COSTS FOR ANALYSIS

Ex. State of Bahia
13 months

GROUP B (Low Voltage)
Annual consumption
Survey provided by SDE shows the following Summary Table

SECRETARIA/UNIDADE	Consumo Ativo (kWh)	Consumo Ativo (R$)
SEC	33.165.731,26	17.493.939,39
SSP	19.713.650,94	10.427.689,13
SESAB	3.500.597,35	1.839.354,04
SEMA	1.982.810,29	936.656,89
SAEB	1.740.092,68	915.020,67
SJDH	1.410.480,22	741.870,18
SEFAZ	1.399.313,09	737.164,53
SEAGRI	1.142.026,77	647.294,46
SECULT	831.580,12	436.793,86
SDE	783.959,20	413.320,12
EBAL	500.340,87	345.801,95
SDR	418.364,60	222.329,63
SEDUR	418.297,00	240.057,00
SETRE	272.806,35	143.913,58
CERB	140.999,73	63.455,21
SEINFRA	115.940,29	60.934,45
SECTI	114.911,27	61.237,54
SETUR	91.721,00	48.122,23
SEDES	44.075,00	21.072,76
CASA MILITAR	43.433,00	22.922,18
CIS	40.900,80	22.467,38
CASA CIVIL	39.891,40	20.194,64
AGERSA	33.835,00	17.977,35
SEPROMI	10.205,00	5.333,11
SECOPA	228,00	105,80
EBDA	101,00	47,09
totais >>>	67.956.292,23	R$ 35.885.075,17
p/mês >>>	5.227.407,09	R$ 2.760.390,40
P/ANO >>>	62.728.885,14	33.124.684,77

WARRANTIES	PERIOD	RESPONSIBLE
Installations(except inverters and boards)	1º year to 5º year	Installer
Inverters	1º year to 5º year	Manufacturer (before the state)
Boards (Cause-independent auto reset except misuse or vandalism)	1º year to 10° year	Manufacturer (before the state)
Boards (Automatic replacement independent of cause finding, except misuse or vandalism) at no charge for loss of proven test efficiency.	10º year to 25° year	Manufacturer (before the state)

MAINTENANCE

PERIOD	COVERAGE	ESTIMATED VALUE	RESPONSIBLE
1º year	Performance monitoring, cleaning that ensures efficiency of the boards (minimum 1 / semester), Warranties triggering with Manufacturers (boards and Inverters), strategic inventory maintenance and eventually necessary replacements (boards and Inverters).	Without cost	Installer
2º year to 5º year	Performance monitoring, cleaning that ensures efficiency of the boards (minimum 1 / semester), Warranties triggering with Manufacturers (boards and Inverters), strategic inventory maintenance and eventually necessary replacements (boards and Inverters).	R$ 100,00 / per module of 20 boards Note: only reference for costs.	Maintenance company
5º year to 10° year	Performance monitoring, cleaning that ensures efficiency of the boards (minimum 1 / semester), activation of Warranties with the Plate Manufacturer, maintenance of strategic stock and eventual replacement of boards as well as Inverters at their expense.	R$ 160,00 / per module of 20 boards Note: only reference for costs. Hiring must be in SLA mode	Maintenance company
10º year to 25º year	Performance monitoring, cleaning that ensures efficiency of the boards (minimum 1 / semester), activation of Warranties with the Plate Manufacturer, maintenance of strategic stock and eventual replacement of boards and Inverters at their expense.	R$ 200,00 160,00 / per module of 20 boards Note: only reference for costs. Hiring must be in SLA mode	Maintenance company

Over the initial 05 years, in the above SEC simulation we would have;

FOR 15,340 boards / 20 boards = 767 modules

Period	Modules x years	$$/Module	Monthly cost
1º year	767 x 1= 767	R$ 0,00/ módulo	R$ 0,00
2º year to 5º year	767 x 4= 3.068	R$ 160,00 x2 / módulo	R$ 981.760,00
		Total in 05 years	R$ 981.760,00
		Estimated Monthly Cost	R$ 20.453,00/month

B - CHOOSING THE BEST ALTERNATIVE AND MODELING PROPOSAL

1. ACCESSION ALTERNATIVES (self-consumption, etc.)
2. INVESTMENT FINANCING
3. ACCESSION OPTIONS (group A, group B, groups A + B)
4. TIMING OF IMPLANTATION
5. Referrals