

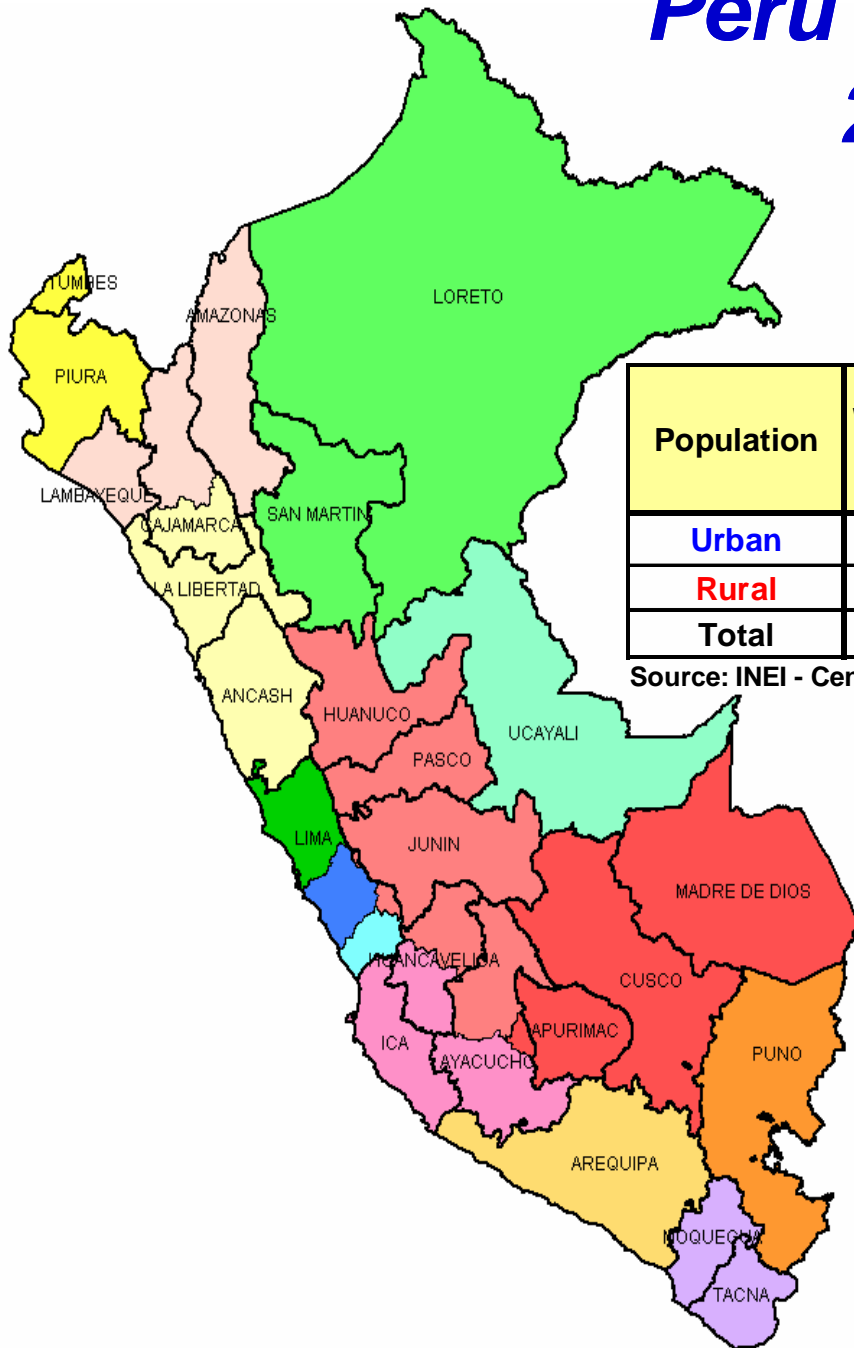
Mechanism of Subsidies Applied in Peru

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South America



Peru statistics 2008



Population	With electrical service	No Electrical Service	Total	No Service (%)
Urban	18 634 183	1 882 738	20 516 921	9.2%
Rural	1 958 130	4 582 148	6 540 278	70.1%
Total	20 592 313	6 464 886	27 057 199	23.9%

Source: INEI - Censos Nacionales 2007: XI de Población y VI de Vivienda

Realities

- “ Rural costs of supply are more expensive than urban areas .
- “ Existing rural tariffs generally do not cover the expansion of the electrical rural system.
- “ The level of investment required per consumer in rural areas is between two to five times greater than that required in urban areas

Constraints

- “ Rural customers can not pay full cost recovering tariffs (economic).
- “ All low-income Peruvians must be treated equally (political).
- “ A tariff design must be aligned with the consumer's willingness to pay (socio-economic)
- “ What are possible solutions?

Possible solutions

- “ To promote universal access to the rural areas investment subsidies are necessary (Economic).
- “ To promote the efficient award of investment subsidies, the State must provide subsidies to the utilities who request the lowest subsidy per connected customer (Economic).
- “ Tariffs charged to new rural consumers should be capped at the maximum regulated urban tariff (Political).

Three Types of Subsidies

- “ #1--Initial cost of capital subsidy (US \$100 million per year)
 - . Isolated mini-grids under 500 KW power capacity installed.
 - . Distribution (rural grids outside of utility concession)
 - . Sources of subsidy: Fiscal fund, international loans (**US\$ 50 millions**), Rural Electrification Fund (REF) (**US\$ 17** millions) and donors.
- “ #2--Internal tariff subsidy (US \$36 million per year)
 - Subcomponent A:**
 - . To reduce the price of isolated generation. Source: REF (**US\$ 23** million per year)
 - Subcomponent B:**
 - . To reduce de cost of the distribution added value (DAV) (the %distribution cost reduction+before to be applied to rural consumers) (**US\$ 13** million per year). Source of subsidy: The urban consumers.
- “ #3--Consumption subsidy (US\$ 31 million per year)
 - . To obtain similar tariffs between interconnected mini-grids and urban areas
 - . To obtain similar tariffs between isolated mini-grids and urban areas
 - . Source of subsidy: The consumers whose consumption is higher than 100 kW.h per month.

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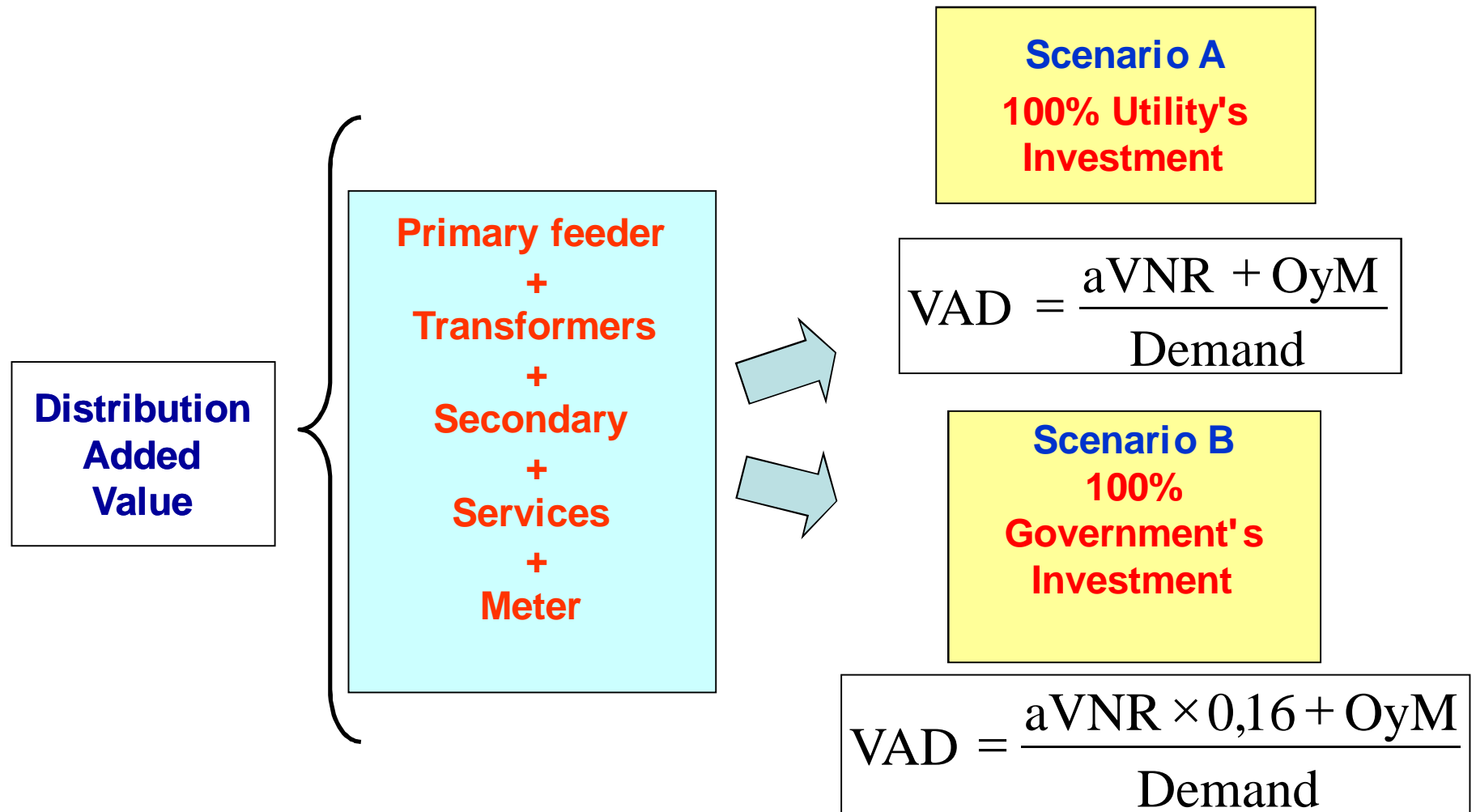
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#1 --Initial capital cost subsidy

“ Implementation Criteria (isolated mini-grids)

- . Subsidies are provided for isolated mini-grids projects **outside of a** utility's concession with a power capacity under 500 KW .
- . The subsidy for isolated mini-grids expansion (mini hydro/thermal power plants) must be no higher than US\$ 1000 per consumer.
- . The isolated mini-grids are transferred to the municipality.
- . The municipalities operate without concession
- . The law concedes the municipalities the rights to set their own tariff and to determine the conditions of the service (number of hours of operations)
- . The service is provided between 6 to 13 hours per day and the consumers pay a fixed charge that varies between US\$ 3 to US\$ 10 per month.
- . Generally the municipality covers with its own budget the cost of fuel and maintenance.
- . There are 368 municipalities in Peru

Components of the Distribution Added Value



Rural Tariff for a Distribution Company (DISCO)

Sector 5	RES 100% DISCO	RES 100% Government	RES 20% DISCO 80% Government
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New Replacement Value - NRV (thousand US\$)				
NRV medium voltage	2,210.5	795.8	795.8	795.8
NRV low voltage	3,504.2	1,261.5	1,261.5	1,261.5
Service medium voltage	---	78.0	78.0	78.0
Service low voltage	---	577.5	577.5	577.5
Total	5,714.7	2,712.8	2,712.8	2,712.8

Annual Investment Cost (thousand US\$)				
Primary distribution	274.4	98.8	---	19.8
Secondary distribution	435.0	156.6	---	31.3
Service medium voltage	---	9.7	---	1.9
Service low voltage	---	71.7	---	14.3

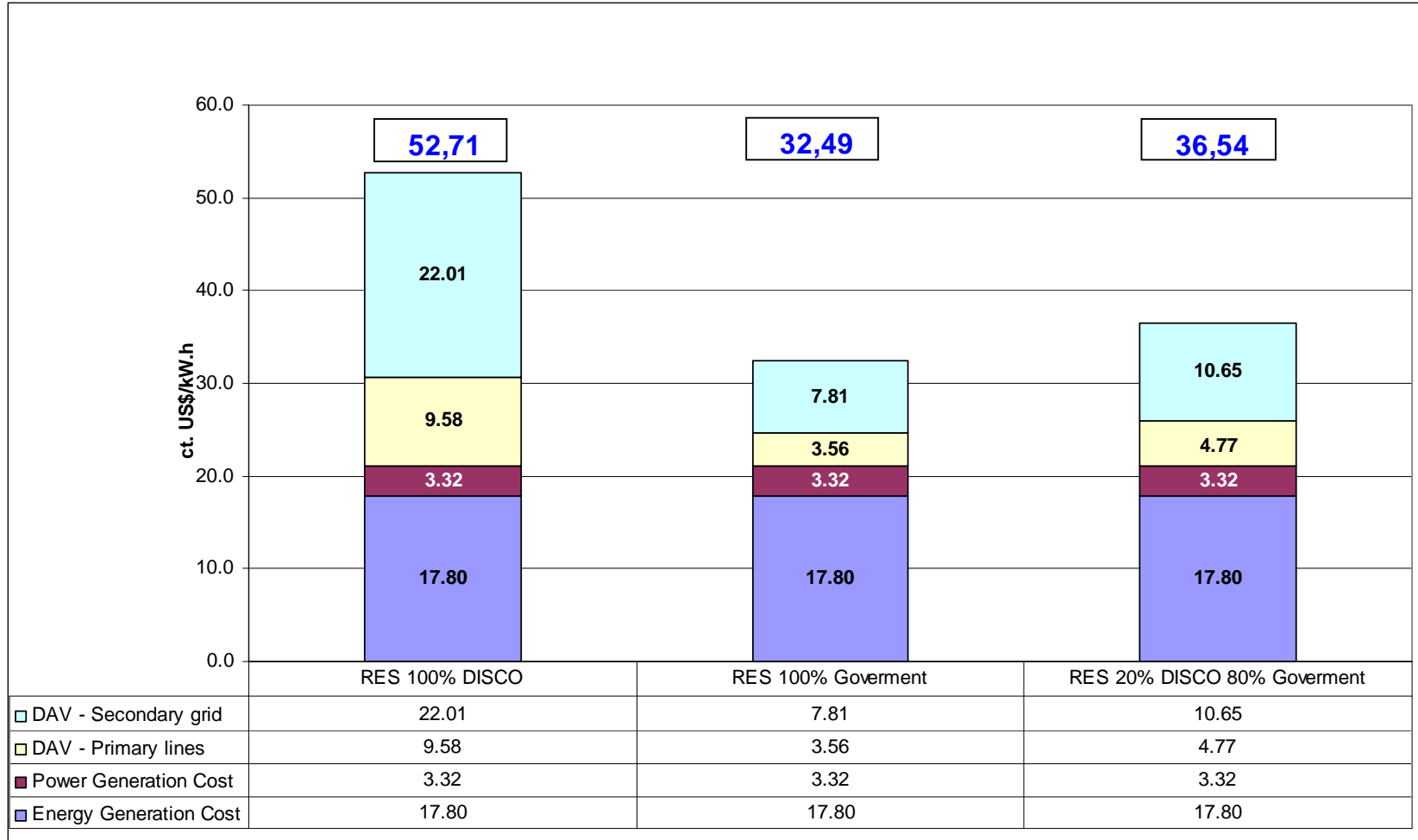
Replacement Cost (thousand US\$)				
Primary distribution	---	---	15.8	12.6
Secondary distribution	---	---	25.1	20.0
Service medium voltage	---	---	1.5	1.2
Service low voltage	---	---	11.5	9.2

Annual O&M (thousand US\$)				
Primary distribution	96.0	34.6	34.6	34.6
Secondary distribution	156.6	56.4	56.4	56.4
Service medium voltage	---	0.3	0.3	0.3
Service low voltage	---	8.9	8.9	8.9

Peak Load (kW)				
Primary distribution	3,057.0	395.0	395.0	395.0
Secondary distribution	2,458.0	395.0	395.0	395.0

Distribution Added Value - DAV				
DAV medium voltage US\$/kW-month	9.7	29.1	10.8	14.5
DAV low voltage US\$/kW-month	19.3	59.5	21.1	28.8

Final Isolated Rural Retail Tariffs (Subsidy #1)



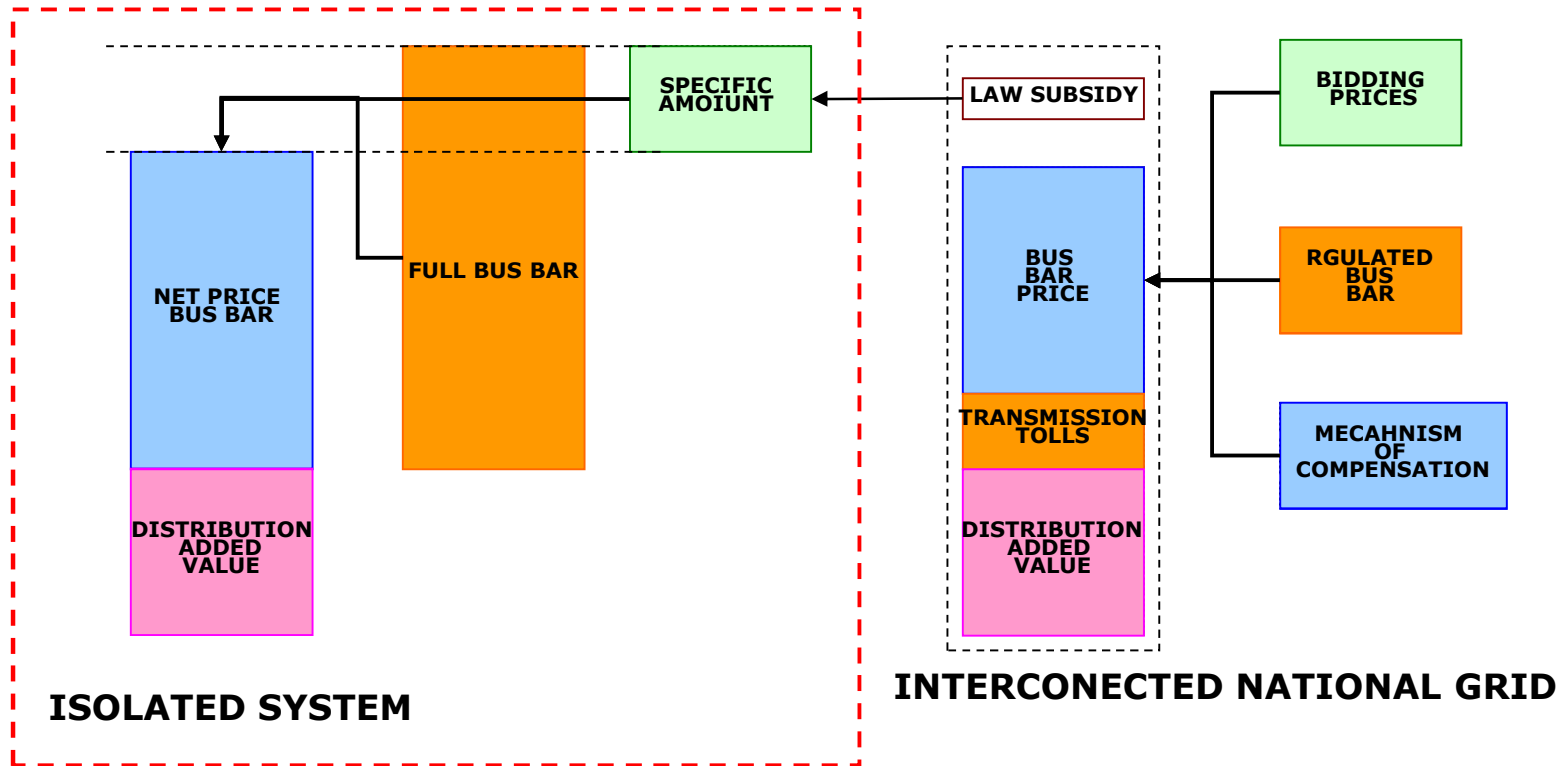
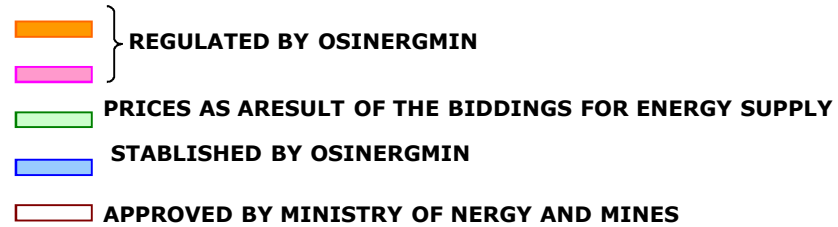
#2--Internal tariff subsidy

Isolated Generation Price Internal Subsidy

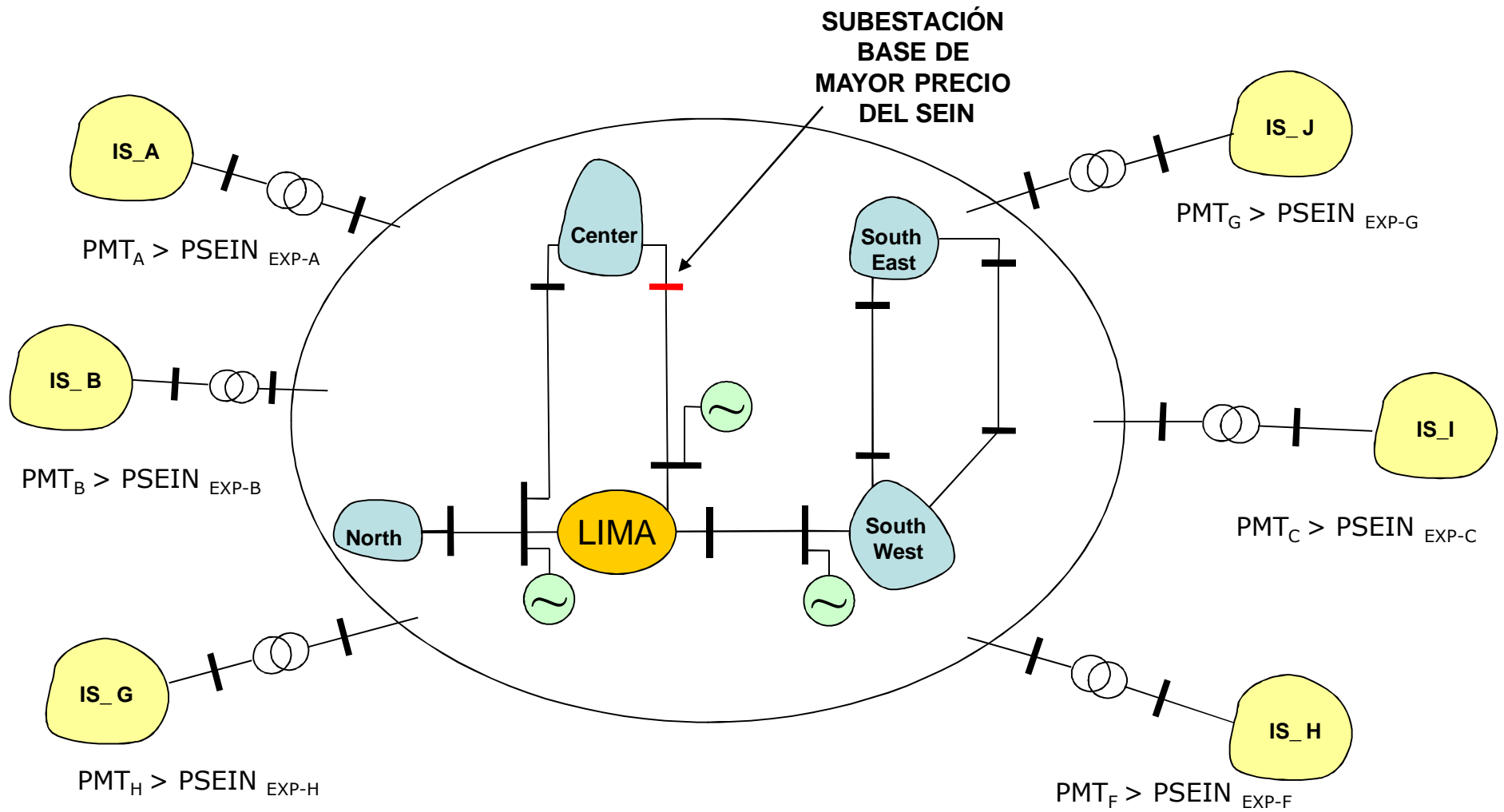
Subsidy to Isolated Generation Attended by Energy Power Utilities

- “ Law N° 288832 (Law for the Efficient Development of the power generation): created compensation mechanisms for isolated systems.
- “ Objective: compensate the differential between the isolated generation prices with the bus bar price of the national interconnected system.
- “ Resources: No more than 50% of the Rural Electric Fund created by Law N° 28749 (General Law of Rural Electrification)

Framework: Maximum Tariffs to Regulated Consumers



NATIONAL INTERCONNECTED GRID VS ISOLATED SYSTEMS



Bar Prices Expanded to Primary Voltage

Utility	Tensión kV	PPM US\$/kW-mes	PEMP ctv. US\$/kW.h	PEMF ctv. US\$/kW.h	Average Price ctv. US\$/kW.h
Adinelsa	MT	7.10	7.24	7.24	9.04
Chavimochic	MT	7.10	7.24	7.24	9.04
Edelnor	MT	7.10	7.24	7.24	9.04
Edelsa	MT	7.10	7.24	7.24	9.04
Egepsa	MT	7.10	7.24	7.24	9.04
Electro Oriente	MT	7.10	10.48	10.48	12.27
Electro Pangoa	MT	7.10	7.24	7.24	9.04
Electro Puno	MT	7.10	15.70	15.70	17.50
Electro Sur Este	MT	7.10	16.72	16.72	18.51
Electro Sur Medio	MT	7.10	15.70	15.70	17.50
Electro Ucayali	MT	7.10	7.24	7.24	9.04
Electrocentro	MT	7.10	7.24	7.24	9.04
Electronorte	MT	7.10	6.77	6.77	8.56
Emseusa	MT	7.10	6.43	6.43	8.23
Hidrandina	MT	7.10	7.28	7.28	9.07
Seal	MT	7.10	12.17	12.17	13.96
Sersa	MT	7.10	10.85	10.85	12.65

PPM: Peak load marginal power price

PEMP: Peak load marginal energy price

PEMF: Peak out load marginal energy price

Annual Compensation

Utility	Annual Compensation Thousand of US\$ Dollars	Participation (%)
Adinelsa	33	0.14%
Chavimochic	2	0.01%
Edelnor	29	0.12%
Edelsa	4	0.02%
Egepsa	6	0.03%
Electro Oriente	22,438	94.40%
Electro Pangoa	12	0.05%
Electro Sur Este	214	0.90%
Electro Sur Medio	1	0.00%
Electro Ucayali	18	0.07%
Electrocentro	179	0.75%
Electronorte	176	0.74%
Emseusa	0	0.00%
Hidrandina	110	0.46%
Seal	253	1.06%
Sersa	295	1.24%
Total	23,768	100.00%

Net Bus Bar Price

Utility	Tensión kV	PPM US\$/kW-mes	PEMP ctv. US\$/kW.h	PEMF ctv. US\$/kW.h	Average Price ctv. US\$/kW.h
Adinelsa	MT	7.10	4.91	4.91	6.70
Chavimochic	MT	7.10	4.91	4.91	6.70
Edelnor	MT	7.10	4.91	4.91	6.70
Edelsa	MT	7.10	4.91	4.91	6.70
Egepsa	MT	7.10	4.91	4.91	6.70
Electro Oriente	MT	7.10	5.28	5.28	7.07
Electro Pangoa	MT	7.10	4.91	4.91	6.70
Electro Puno	MT	7.10	5.08	5.08	6.87
Electro Sur Este	MT	7.10	5.69	5.69	7.48
Electro Sur Medio	MT	7.10	5.08	5.08	6.87
Electro Ucayali	MT	7.10	4.91	4.91	6.70
Electrocentro	MT	7.10	4.91	4.91	6.70
Electronorte	MT	7.10	5.05	5.05	6.84
Emseusa	MT	7.10	5.15	5.15	6.94
Hidrandina	MT	7.10	4.91	4.91	6.70
Seal	MT	7.10	5.01	5.01	6.80
Sersa	MT	7.10	5.32	5.32	7.11

PPM: Peak load marginal power price

PEMP: Peak load marginal energy price

PEMF: Peak out load marginal energy price

Final Impact on Isolated Bar Price

Utility	Tensión kV	PPM US\$/kW-mes	PEMP ctv. US\$/kW.h	PEMF ctv. US\$/kW.h	Average Price ctv. US\$/kW.h
Adinelsa	MT	0%	-32%	-32%	-26%
Chavimochic	MT	0%	-32%	-32%	-26%
Edelnor	MT	0%	-32%	-32%	-26%
Edelsa	MT	0%	-32%	-32%	-26%
Egepsa	MT	0%	-32%	-32%	-26%
Electro Oriente	MT	0%	-50%	-50%	-42%
Electro Pangoa	MT	0%	-32%	-32%	-26%
Electro Puno	MT	0%	-68%	-68%	-61%
Electro Sur Este	MT	0%	-66%	-66%	-60%
Electro Sur Medio	MT	0%	-68%	-68%	-61%
Electro Ucayali	MT	0%	-32%	-32%	-26%
Electrocentro	MT	0%	-32%	-32%	-26%
Electronorte	MT	0%	-25%	-25%	-20%
Emseusa	MT	0%	-20%	-20%	-16%
Hidrandina	MT	0%	-33%	-33%	-26%
Seal	MT	0%	-59%	-59%	-51%
Sersa	MT	0%	-51%	-51%	-44%

PPM: Peak load marginal power price

PEMP: Peak load marginal energy price

PEMF: Peak out load marginal energy price

Distribution Added Value Internal Subsidy

Internal Subsidy DAV

- “ Rules of Law N° 25844 (Art. 147): The distribution added value will be set for each concession through the application of weighed factors.
- “ Ministry Decree: Establish the methodology for the calculation of weighed factors.
- “ Objective: compensate the differential price between rural and urban areas.
- “ Application: OSINERGMIN set the DAV weighed factors every year.

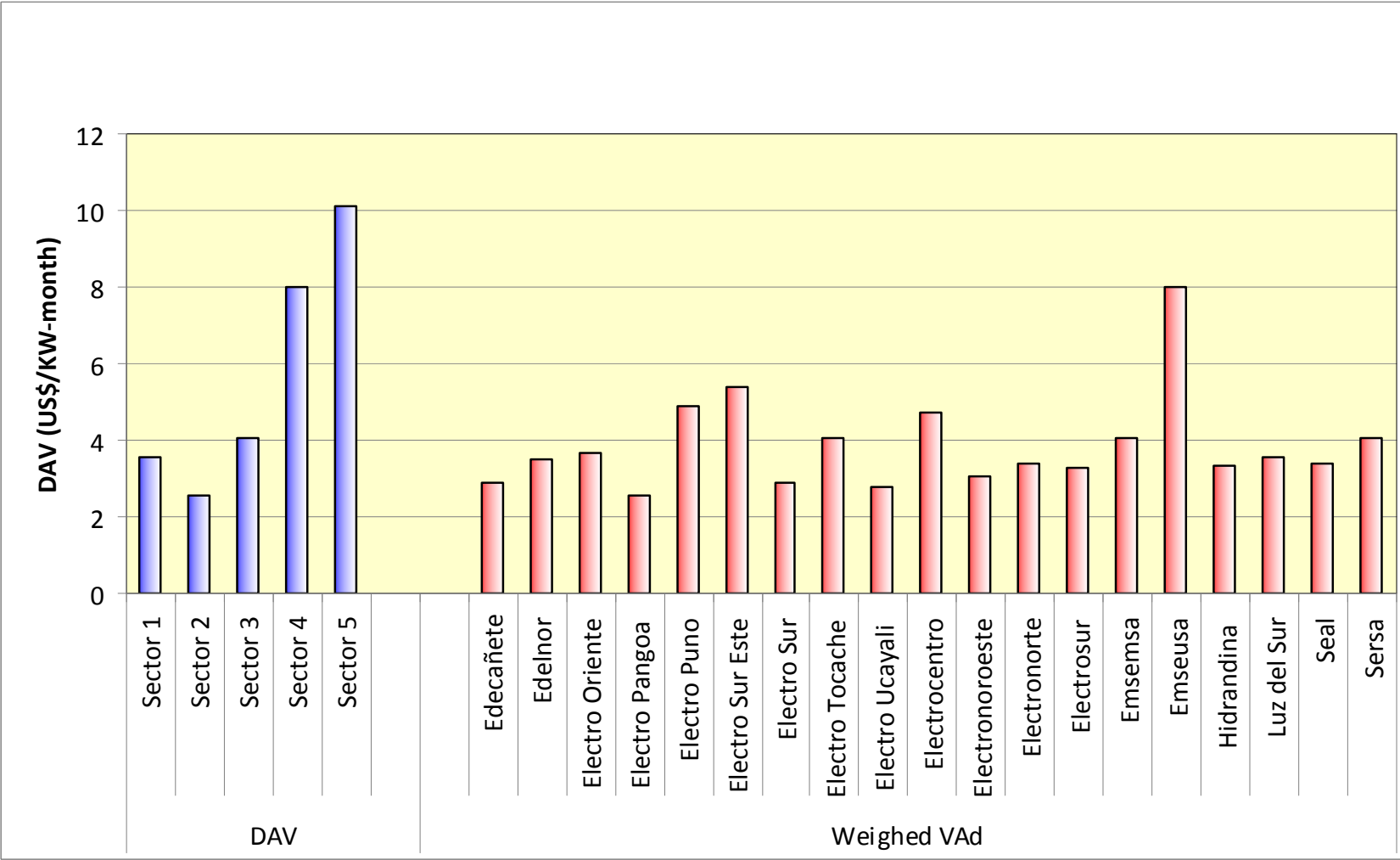
Weighed factor of the DAV

- “ The weighed factor is calculated for each utility.
- “ The factor is calculated using the sales of energy separated for each level of voltage (medium and low voltage).

Weighed Factor of the DAV of Medium Voltage

Company	Sector						
	1	2	3	4	5	Especial	SER
Coelvisac	0.00%	0.00%	5.66%	0.00%	0.00%	94.34%	0.00%
Edecañete	0.00%	93.66%	0.00%	6.34%	0.00%	0.00%	0.00%
Edelnor	94.51%	5.24%	0.23%	0.00%	0.02%	0.00%	0.00%
Electro Oriente	0.00%	75.98%	10.47%	2.94%	10.57%	0.00%	0.04%
Electro Pangoa	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Electro Puno	0.00%	49.59%	22.57%	2.29%	24.90%	0.00%	0.65%
Electro Sur Este	0.00%	47.81%	17.48%	0.00%	34.33%	0.00%	0.38%
Electro Sur Medio	0.00%	95.71%	0.32%	0.02%	3.62%	0.00%	0.33%
Electro Tocache	0.00%	0.00%	99.60%	0.00%	0.00%	0.00%	0.40%
Electro Ucayali	0.00%	92.04%	5.05%	2.91%	0.00%	0.00%	0.00%
Electrocentro	0.00%	53.38%	19.05%	8.13%	18.90%	0.00%	0.54%
Electronoroeste	0.00%	87.87%	4.66%	5.94%	1.51%	0.00%	0.02%
Electronorte	0.00%	71.14%	21.32%	2.99%	4.29%	0.00%	0.26%
Electrosur	0.00%	90.41%	0.00%	0.00%	9.59%	0.00%	0.00%
Emsemsa	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Emseusa	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
Hidrandina	0.00%	82.79%	7.70%	2.90%	6.25%	0.00%	0.36%
Luz del Sur	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Seal	0.00%	82.13%	8.15%	0.87%	8.81%	0.00%	0.04%
Sersa	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%

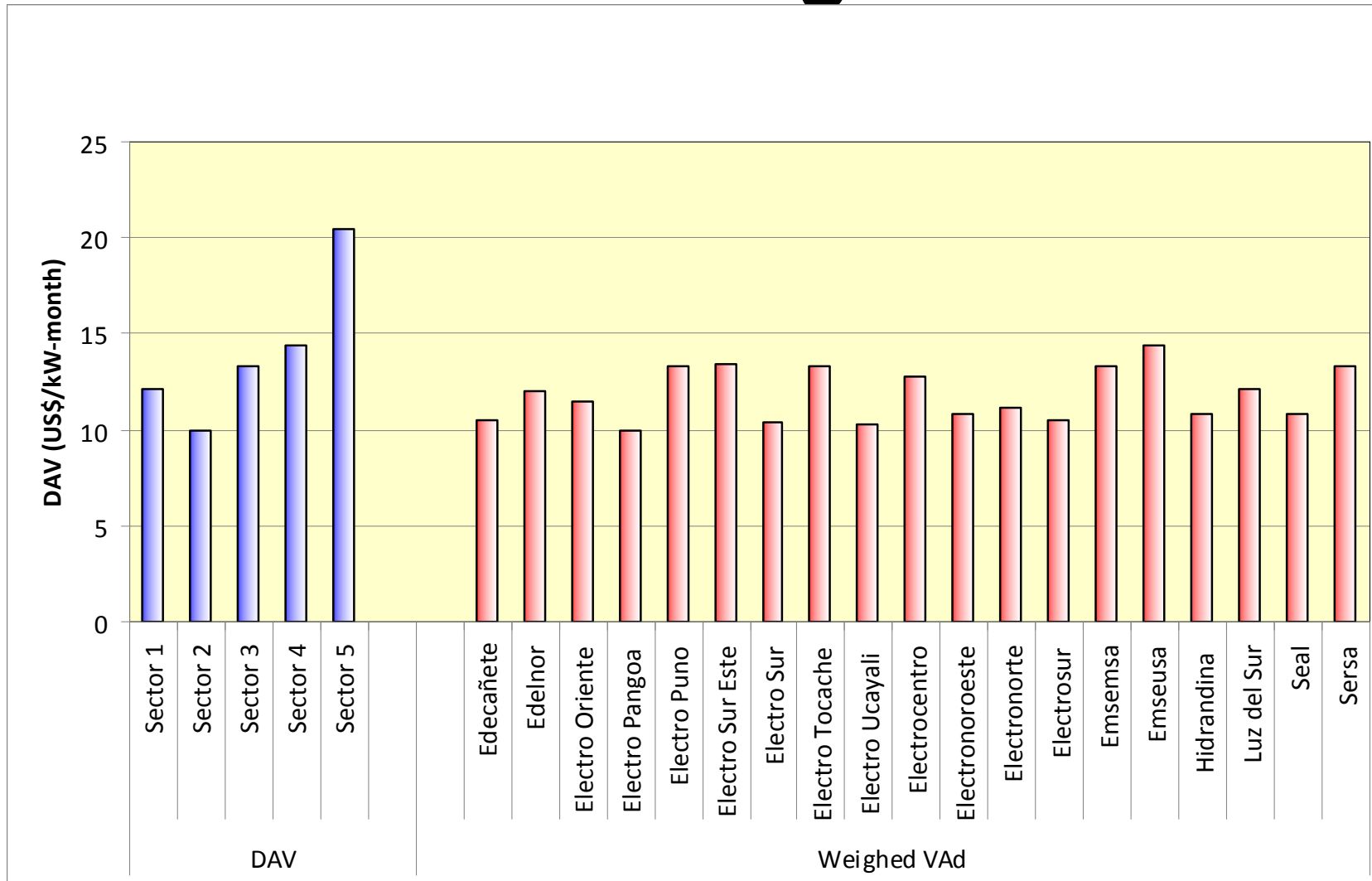
Weighed Factor of the DAV of Medium Voltage



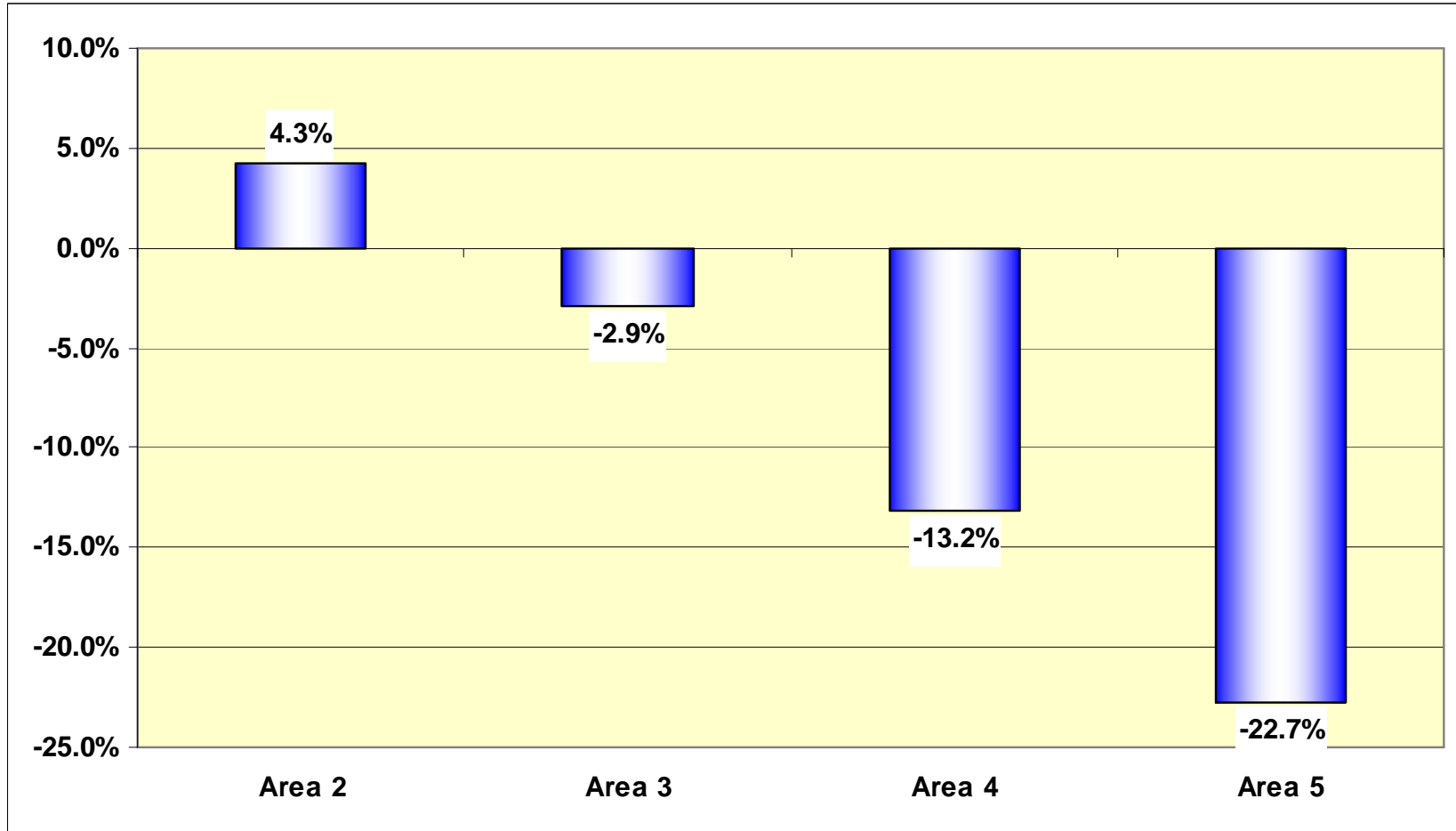
Weighed Factor of the DAV of Low Voltage

Company	Sector						
	1	2	3	4	5	Especial	SER
Coelvisac	0.00%	0.00%	47.38%	0.00%	0.00%	52.62%	0.00%
Edecañete	0.00%	87.87%	0.00%	12.13%	0.00%	0.00%	0.00%
Edelnor	94.95%	4.68%	0.34%	0.00%	0.03%	0.00%	0.00%
Electro Oriente	0.00%	80.48%	6.14%	2.28%	11.03%	0.00%	0.07%
Electro Pangoa	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Electro Puno	0.00%	53.72%	18.84%	1.72%	24.74%	0.00%	0.98%
Electro Sur Este	0.00%	53.53%	19.58%	0.00%	26.37%	0.00%	0.52%
Electro Sur Medio	0.00%	96.13%	0.82%	0.06%	2.14%	0.00%	0.85%
Electro Tocache	0.00%	0.00%	99.56%	0.00%	0.00%	0.00%	0.44%
Electro Ucayali	0.00%	91.71%	6.94%	1.35%	0.00%	0.00%	0.00%
Electrocentro	0.00%	55.60%	16.85%	8.88%	18.01%	0.00%	0.66%
Electronoroeste	0.00%	83.31%	5.61%	8.67%	2.36%	0.00%	0.05%
Electronorte	0.00%	75.33%	15.45%	3.93%	4.89%	0.00%	0.40%
Electrosur	0.00%	94.93%	0.00%	0.00%	5.07%	0.00%	0.00%
Emsemsa	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Emseusa	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
Hidrandina	0.00%	83.59%	9.78%	2.51%	3.62%	0.00%	0.50%
Luz del Sur	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Seal	0.00%	85.19%	8.30%	1.17%	5.27%	0.00%	0.07%
Sersa	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%

Weighed Factor of the DAV of Low Voltage



Variation of de Distribution Added Value



#3--Consumption subsidy

Electricity Social Compensation Fund (FOSE)

Law 28307

Consumers	Typical sector	Monthly tariffs reduction - Consumption \leq 30 KW.h	Monthly tariffs reduction - Consumption \geq 30 KW.h and \leq 100 Kw.h
Inerconected System	Urban	25%	7,5 kW.h
	Rural	50%	15 kW.h
Isolated System	Urban	50%	15 kW.h
	Rural	62.50%	18,75 kW.h

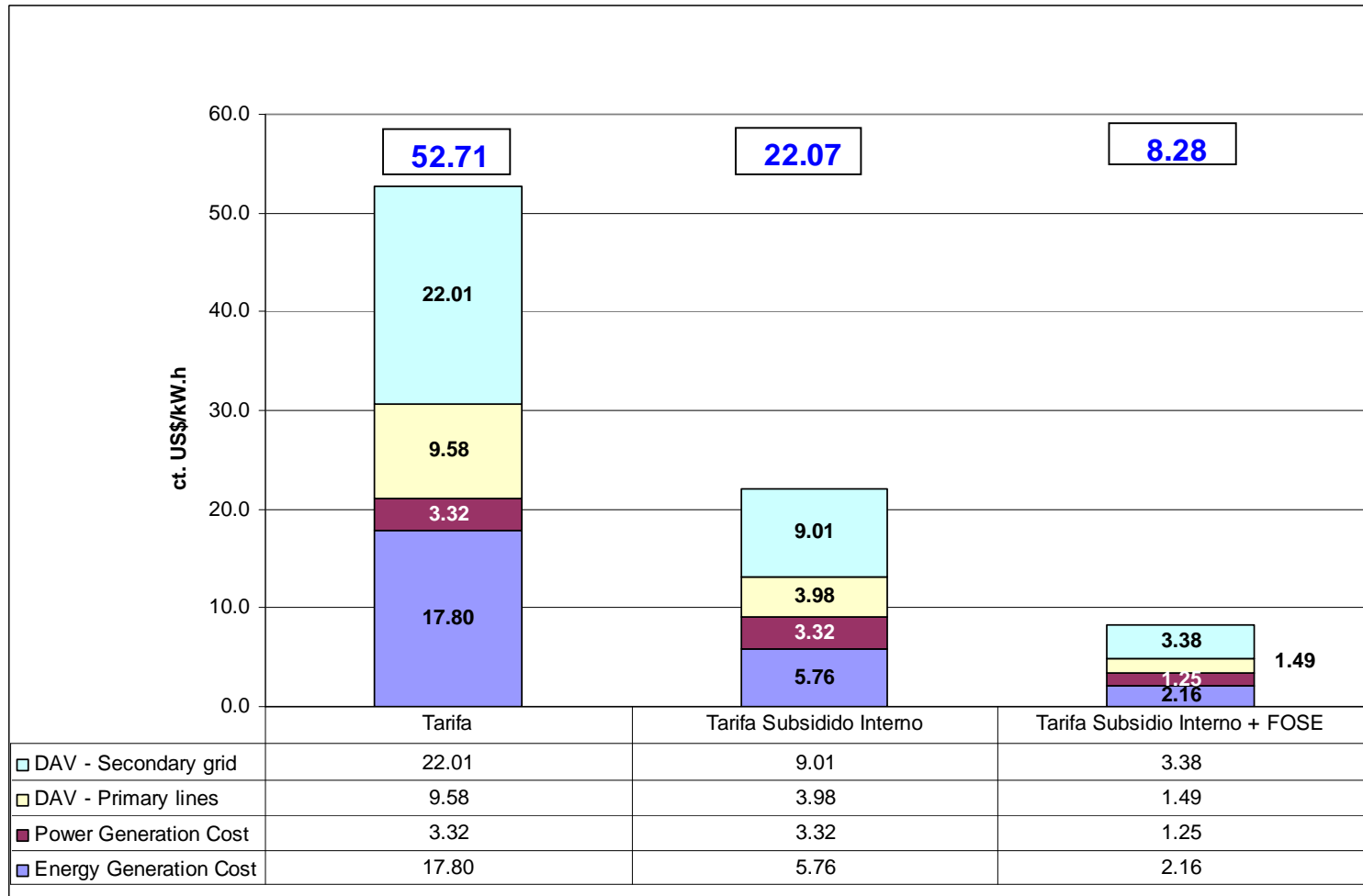
Electricity Social Compensation Fund (FOSE)

Range	Interconected	Isolated	Total	Percentage
0-30 kW.h	1 150 155	141 527	1 291 682	
31-100 kW.h	1 188 228	97 166	1 285 394	55%
> 100 kW.h (1)	2 031 648	72 705	2 104 353	45%
Total	4 370 031	311 398	4 681 429	100%

(1) Consumers with consumption > 100 kW.h are charged with 3% over their energy bill consumption.

FOSE collection : Million US\$ 30.7 per year

Final Isolated mini-grid Retail Tariff Subsidies (#1, #2 y #3)



Conclusions

- “ It is possible to implement different types of subsidies depending on the necessity of its use in order to cover social, economical and political issues.
- “ The model of subsidy applied in Peru is based on recognizing the economic cost of service.
- “ The reductions in the retail tariffs is financed through monthly transfers to the utilities.
- “ The subsidies applied in Peru are financed mainly by urban consumers served by the National Interconnected Grid with a consumption higher than 100 KWh.
- “ Equalize the rural and urban tariffs stabilize the social environment.

Thank you !



Final Impact on Residential Consumers

Distribution Utility	Area 2	Area 3	Area 4	Area 5
Edecañete	1.3%		-16.1%	
Electro Oriente	4.3%	-4.5%	-13.5%	-24.8%
Electro Puno	12.9%	1.6%	-10.1%	-21.3%
Electro Sur Este	14.5%	3.0%		-20.3%
Electro Sur Medio	0.8%	-7.4%	-11.6%	-23.8%
Electro Ucayali	0.6%	-9.5%	-18.2%	
Electrocentro	11.9%	0.2%	-10.7%	-21.8%
Electronoroeste	2.2%	-7.4%	-16.1%	-25.0%
Electronorte	3.8%	-5.5%	-15.5%	-25.3%
Electrosur	2.4%			-26.5%
Hidrandina	3.2%	-6.6%	-17.3%	-24.7%
Seal	3.4%	-6.4%	-17.1%	-26.2%