Measuring Market Power in Wholesale Italian Electricity Markets: Preliminary results - April 2004

Carlo Andrea Bollino – Paolo Polinori

Department of Economics, Finance and Statistics - University of Perugia (I)
Via Pascoli 20, 06123, Perugia
Tel +39-075-585.5421
Fax +39-075-585.5299 (5057)
E-mail: bollino@unipg.it, polpa@unipg.it

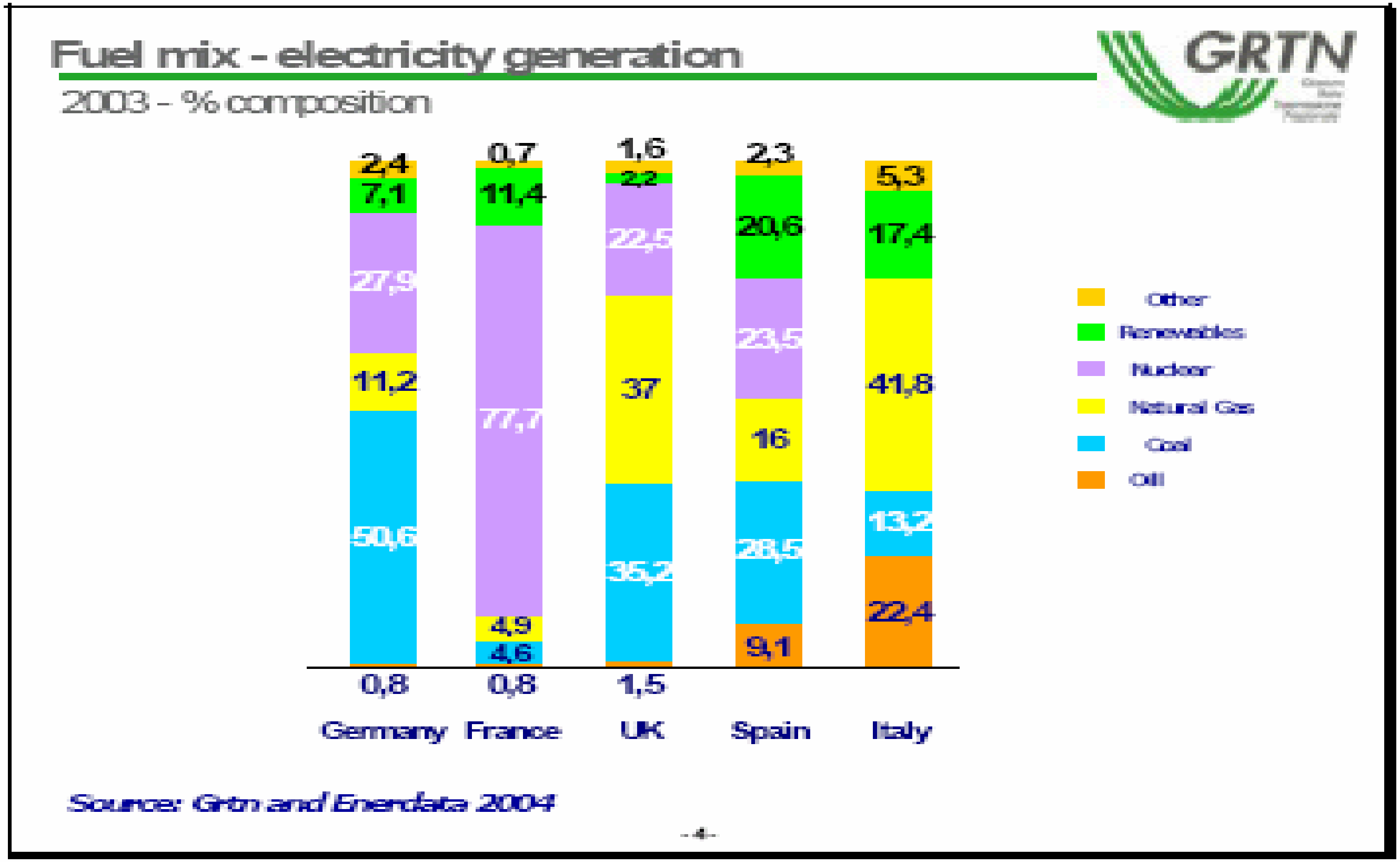
25th Annual North American Conference USAEE / IAEE
Fueling the Future: Prices, Productivity, Policies, and Prohecies
Sept. 18-21, 2005 Denver, Colorado - USA

Theory

- $(p - MC) / p = - 1 / \varepsilon_{DR} = L$

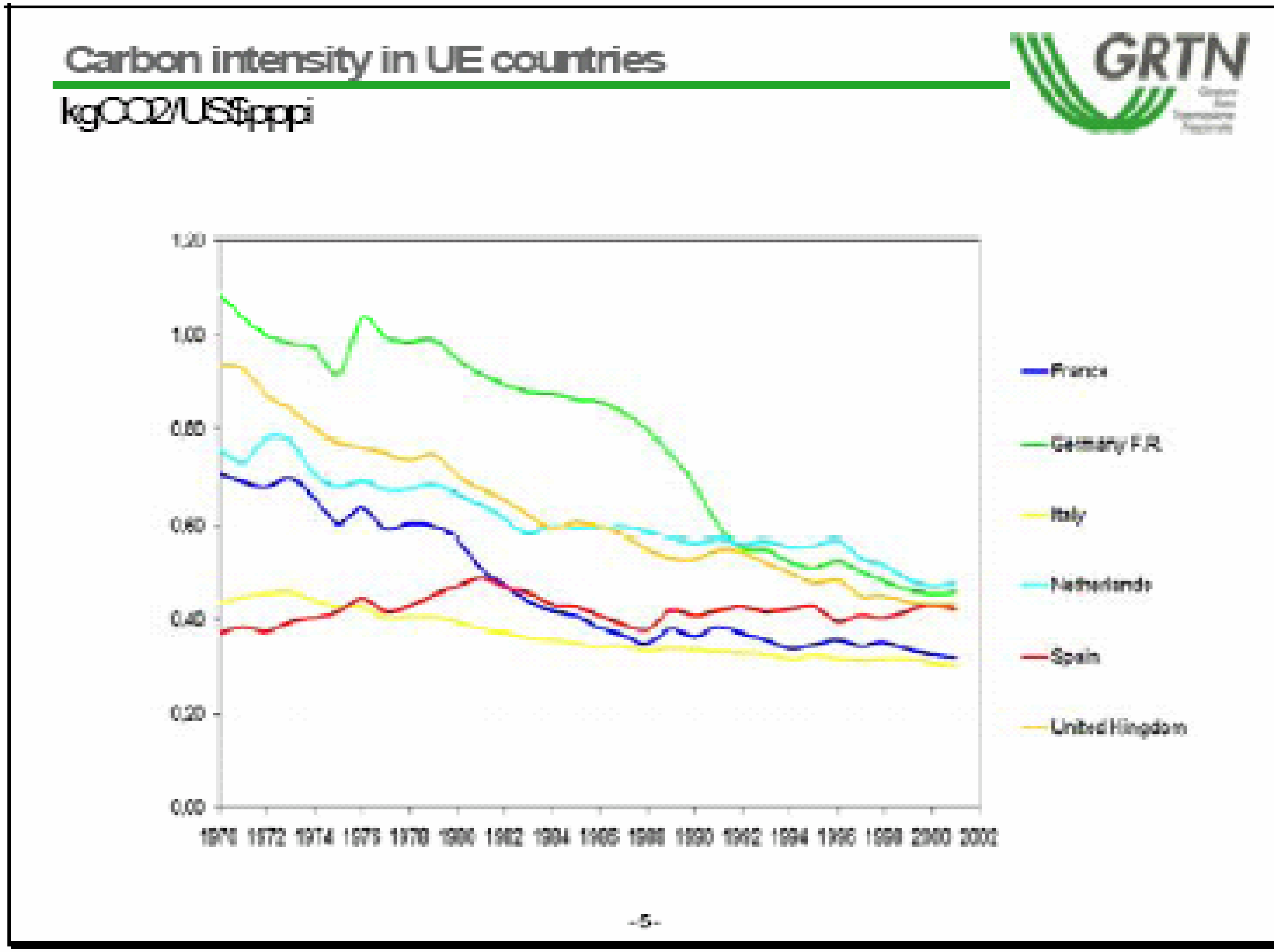
- where:
  - ε_{DR} is the elasticity of residual demand for each firm i.
  - L is Lerner index

Graph. 1

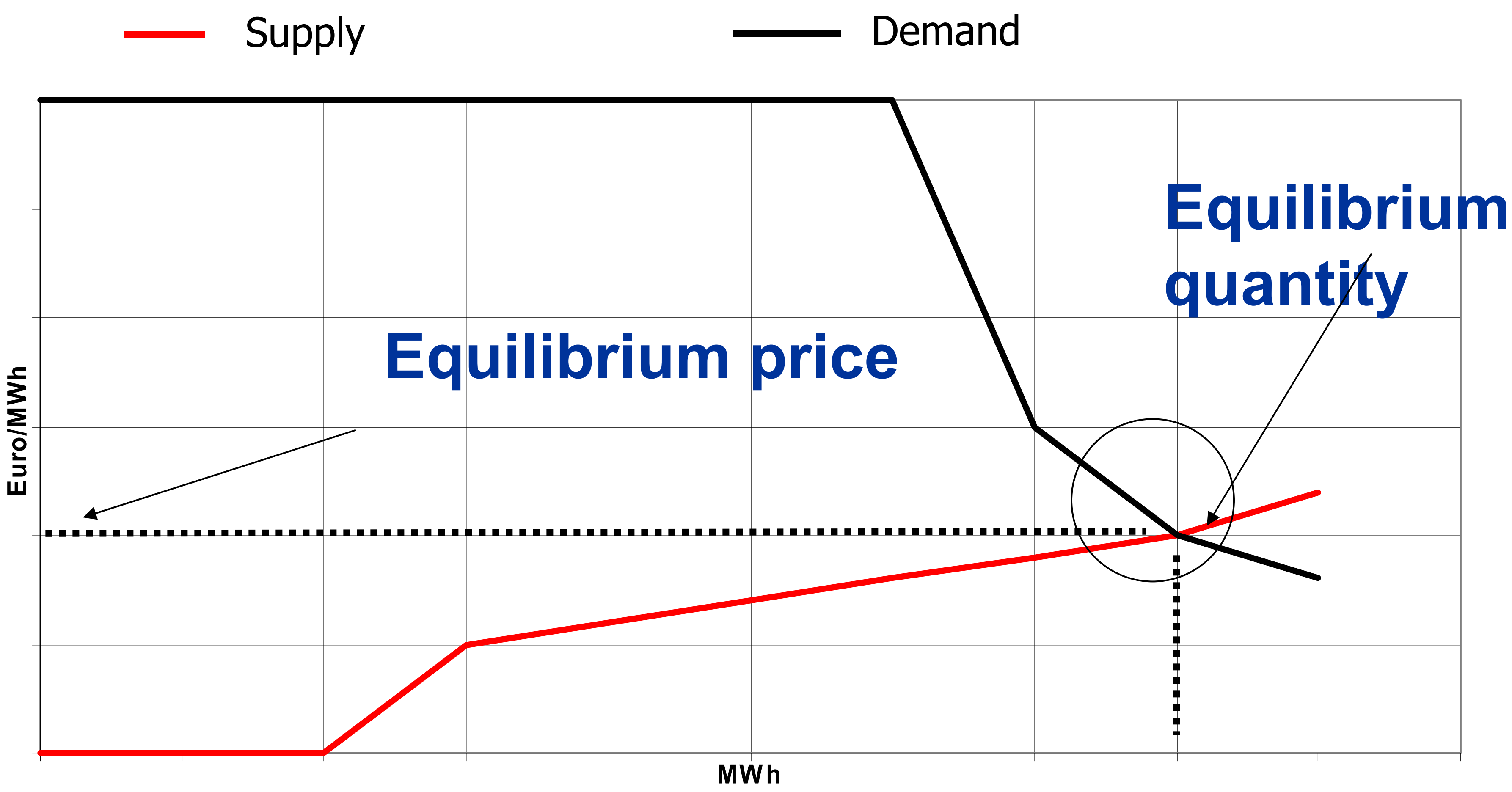


Fuel mix - electricity generation
2003 - % composition
GRTN
2,4
7,1
27,9
11,2
50,6
0,8
0,7
11,4
77,7
4,9
4,6
0,8
1,6
2,2
22,5
37
35,2
1,5
2,3
20,6
23,5
16
28,5
9,1
5,3
17,4
41,8
13,2
22,4
Germany
France
UK
Spain
Italy
Other
Renewables
Nuclear
Natural Gas
Coal
Oil
Source: Grtn and Enerdata 2004

Graph. 2


Carbon intensity in UE countries
kgCO2/US$ppp
GRTN
1,20
1,00
0,80
0,60
0,40
0,20
0,00
1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002
France
Germany F.R.
Italy
Netherlands
Spain
United Kingdom
-5-

DAy Ahead Market – System marginal price



Graph. 3

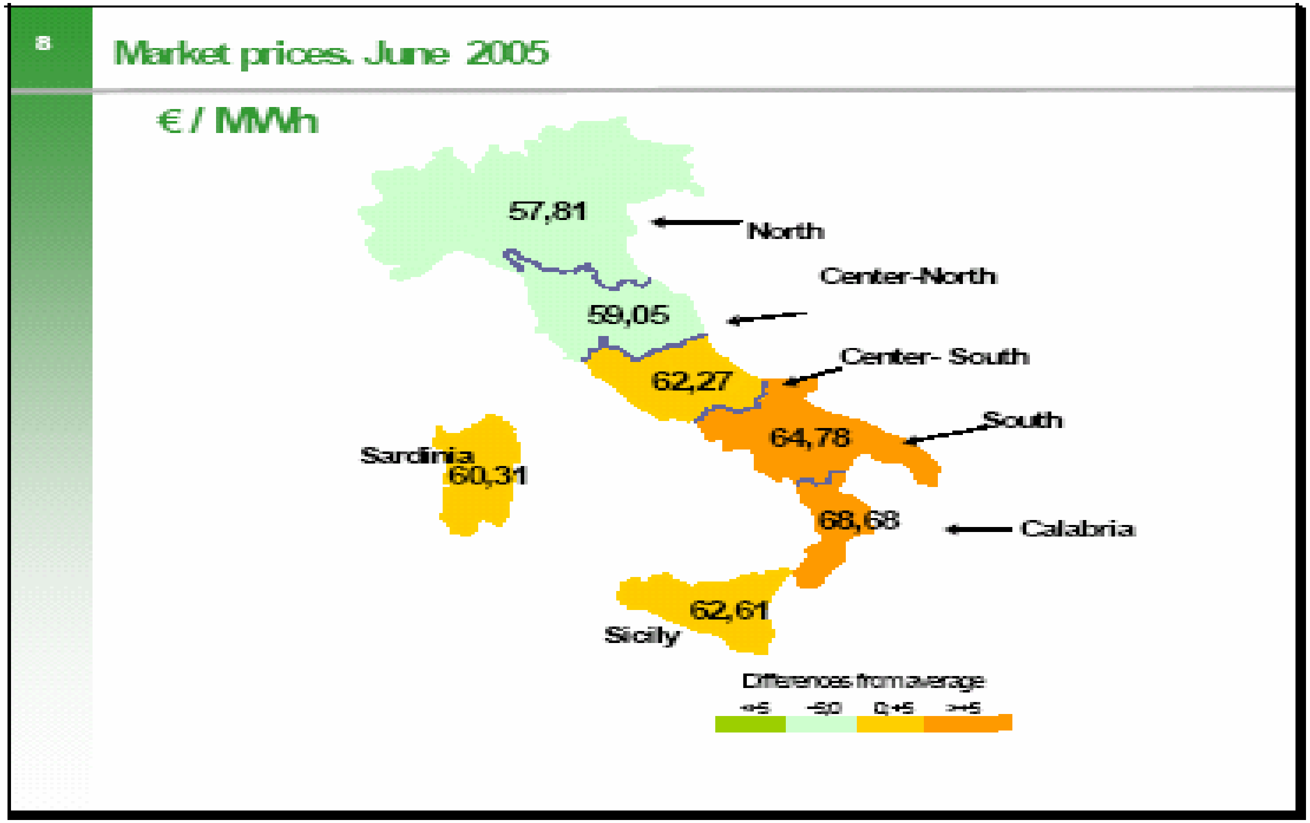

8
Market prices. June 2005
€ / MWh
57,81
North
Center-North
59,05
Center- South
62,27
South
64,78
Sardinia
60,31
68,68
Calabria
62,61
Sicily
Differences from average

Table 1

Net efficient generation capacity

Generator	**2001**	**2002**	**2003**	**2004**
ENEL	53,5%	53,5%	53,2%	49,7%
EDIPOWER	9,4%	9,3%	9,1%	10,1%
ENDESA ITALIA	7,5%	7,1%	7,1%	7,5%
EDISON	3,6%	3,6%	5,1%	5,0%
TIRRENO POWER	3,7%	3,7%	3,6%	3,2%
ENIPOWER	1,4%	1,4%	1,8%	3,5%
OTHERS	21,0%	21,5%	20,1%	21,0%
	100%	**100%**	**100%**	**100%**

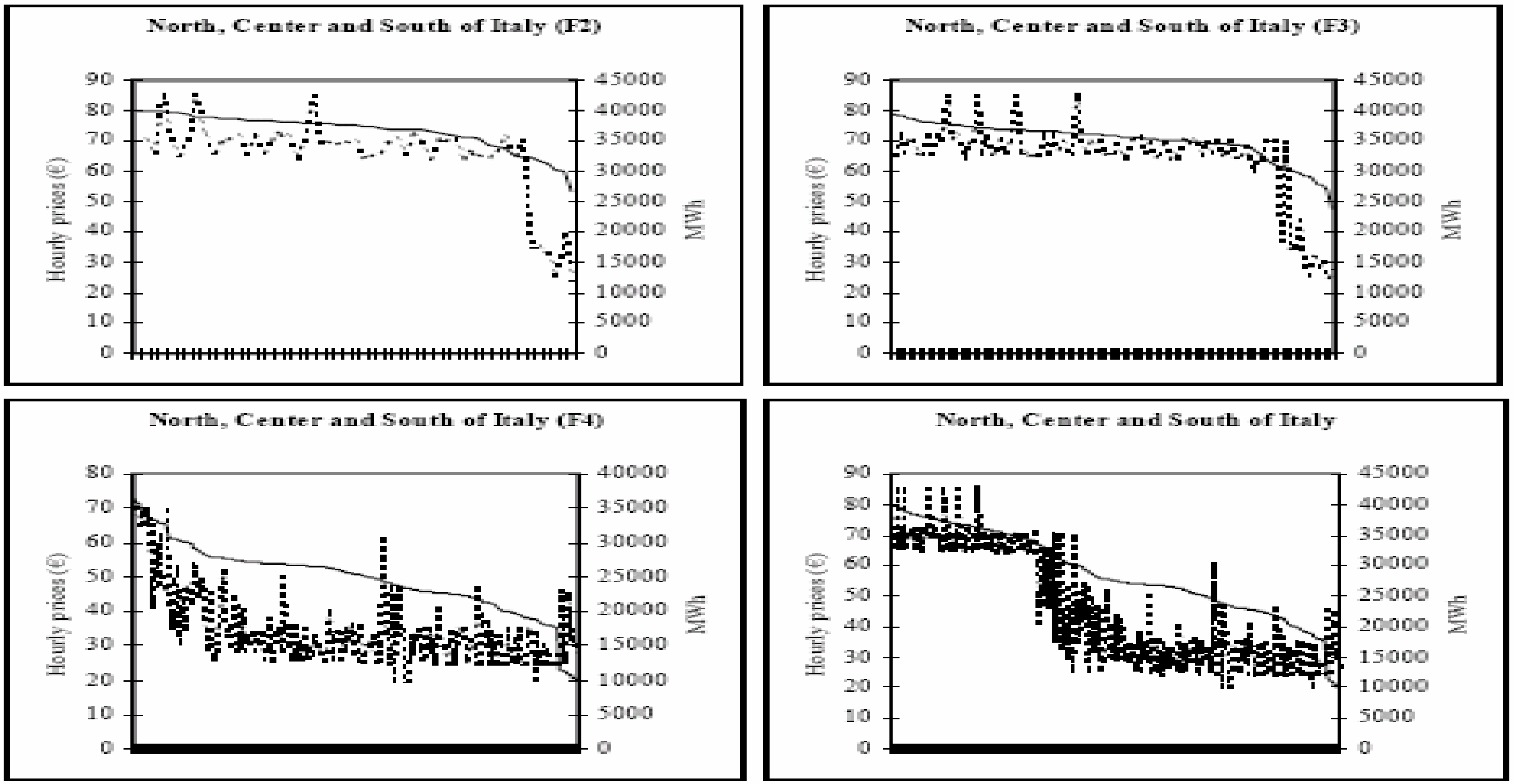
Net production

Generator	**2001**	**2002**	**2003**	**2004**
ENEL	48,6%	48,5%	49,2%	43,4%
EDIPOWER	7,9%	7,3%	7,6%	8,8%
EDISON	5,2%	6,0%	8,2%	8,2%
ENDESA ITALIA	6,1%	6,5%	6,4%	7,2%
ENIPOWER	2,0%	2,0%	2,1%	4,6%
TIRRENO POWER	2,4%	2,1%	2,3%	2,1%
OTHERS	27,8%	27,6%	24,3%	25,8%
	100%	**100%**	**100%**	**100%**

Graph 4 –

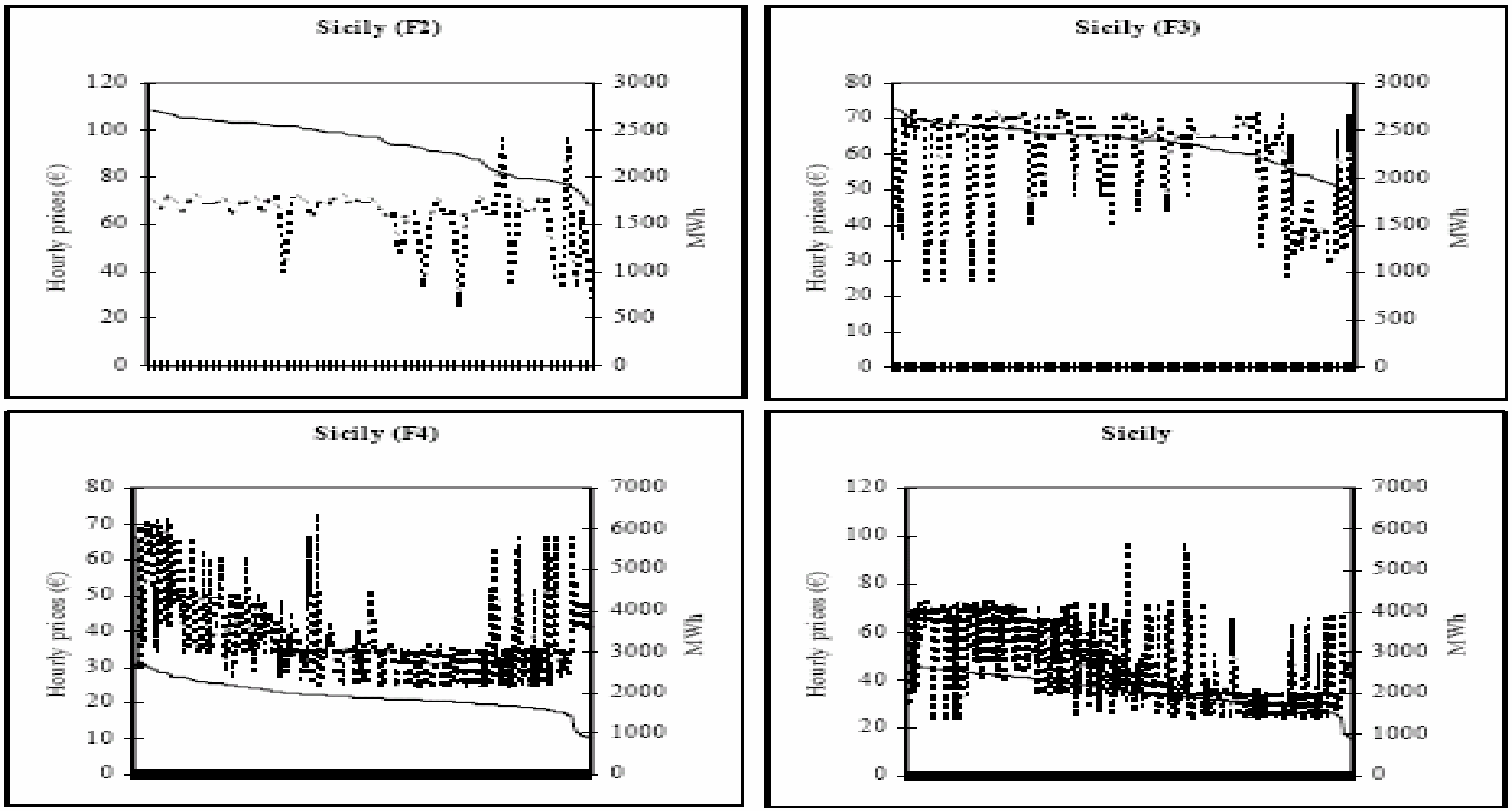
Duration Curves for Italian Power Market by Zone Markets and hourly clusters

Price (dot line) and Quantity (solid line) – States of Nature: (NCS) F2, 52; F3, 95; F4, 257; Total 405



Duration Curves for Italian Power Market by Zone Markets and hourly clusters

Price (dot line) and Quantity (solid line) – States of Nature: (Sic) F2, 61; F3, 116; F4, 312; Total 489.



Graph 5 - Duration Curves for Italian Power Market by Zone Markets and hourly clusters.

Price (dot line) and Quantity (solid lane) States of nature: (Sard.) F2, 98; F3,177; F4, 408; Total 683; - (N) F2, 11; F3,28; F4, 54; Total 93.

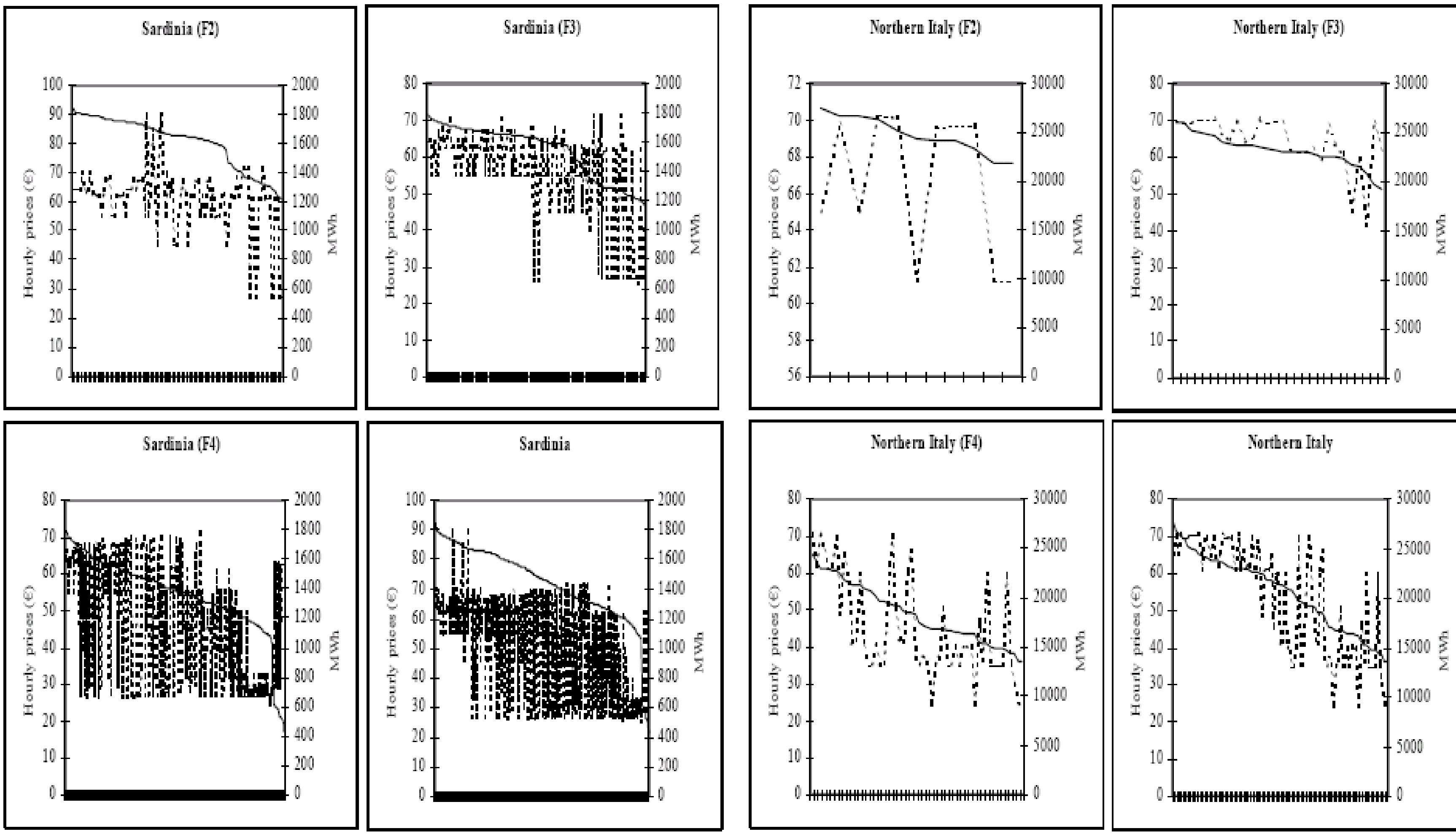


Table 2 - Italian Generators

Generator	Code
ACEAELECTRABEL TRADING S.P.A.	ACEA
AEM TRADING S.R.L.	AEM
AES OTTANA ENERGIA S.R.L	AES
AGSM VERONA S.P.A.	AGSM
ASM BRESCIA S.P.A.	ASM
ATEL ENERGIA S.R.L.	ATEL
AZIENDA ENERGETICA S.P.A. - ETSCHWERKE AG	AE
EDIPOWER S.P.A.	EDIPw
EDISON TRADING S.P.A.	EDIS
EGL-ITALIA S.P.A.	EGL
ENDESA ITALIA S.P.A.	ENDE
ENEL GREEN POWER S.P.A.	ENELG
ENEL PRODUZIONE S.P.A.	ENELP
ENIPOWER TRADING S.P.A.	ENI
IDROENERGIA S.C.R.L.	IDRO
ITALGEN S.P.A.	ITA
S.I.E.T. S.P.A.	S.I.E
TIRRENO POWER S.P.A.	TIRPw
TRENTA S.P.A.	TRE
GRTN Bilateralista	GRTNbi
GRTN SPA	GRTN

Table 3 - Italian zone markets *(No limited zones included)*

Zone	Code
ITALY	ITA
NORTH ITALY	N
CENTRE ITALY	C
SOUTH ITALY	S
CENTRE-NORTH OF ITALY	Cn
CENTRE-SOUTH OF ITALY	Cs
SICILY	Si
SARDINIA	Sa

e.g CsSSi zone includes Centre-south, South and Sicily

Table 5 - Market Statistics *(1997 hourly zones)*

Part A – *Equilibrium price makers*

Generators	#	%	Prices (€)			Quantities (MWh)		
			Min	Mean	Max	Min	Mean	Max
ENELP	1068	53.48%	20.0	51.8	96.5	876.7	16715.2	43449.0
ENDE	644	32.25%	26.3	49.6	85.0	434.0	3496.4	34400.0
EDIS	130	6.51%	27.6	36.3	60.0	1435.0	5098.0	30723.5
ENELG	52	2.60%	24.5	38.3	72.0	1000.8	16200.2	39745.0
AEM	45	2.25%	30.0	33.6	42.0	1960.0	18042.9	32211.0
AES	18	0.90%	40.0	45.9	60.0	1164.0	1344.8	1704.0
S.I.E	17	0.85%	35.0	44.5	48.6	2020.0	5631.1	29760.0
ATEL	14	0.70%	31.8	38.6	45.8	1936.2	9256.4	23106.2
TIRPw	4	0.20%	19.8	36.4	44.7	8925.0	14639.8	21445.0
ACEA	2	0.10%	34.5	-	70.0	6560.0	-	10020.0
AGSM	1	0.05%	-	60.0	-	-	25700.0	-
AE	1	0.05%	-	65.0	-	-	27546.0	-
IDRO	1	0.05%	-	69.1	-	-	34812.8	-

Part B - *Equilibrium price makers by zones*

Generators	#	%	First zone			Second zone		
			Zone	#	Tot Zones	Zone	#	Tot Zones
ENELP	1068	53.48%	Si	343	*489*	NCS	324	*405*
ENDE	644	32.25%	Sa	586	*683*	NCS	26	*405*
EDIS	130	6.51%	Si	103	*489*	NCS	9	*405*
ENELG	52	2.60%	NCS	15	*405*	NCn	9	*22*
AEM	45	2.25%	NCS	23	*405*	Si	11	*489*
AES	18	0.90%	Sa	18	*683*	-	-	-
S.I.E	17	0.85%	Si	14	*489*	N	2	*93*
ATEL	14	0.70%	Si	8	*489*	NCS	4	*405*
TIRPw	4	0.20%	NCS	2	*405*	CS, CSSi	1	*49, 40*
ACEA	2	0.10%	CS	1	*49*	CsS	1	*19*
AGSM	1	0.05%	NCn	1	*22*	-	-	-
AE	1	0.05%	N	1	*93*	-	-	-
IDRO	1	0.05%	N	1	*93*	-	-	-

Table 6 - Lerner Index for Italian Market: April 2004

Inf # = # Larner index >=1; Nr # = # computable Larner index;

N.C. # = # no-computable Lerner index

	ENELP	ENELG	ENDES	EDIS	ENI	ACEA	AEM	TIRPw	S.I.E	GRTN
Inf #	1604	2	1	15	0	0	1	0	0	24
Nr #	1122	2468	2472	2040	2023	1377	2099	1007	1658	2702
Mean	0.274	0.008	0.013	0.008	0.007	0.004	0.005	0.007	0.003	0.051
SE	0.220	0.030	0.043	0.023	0.024	0.010	0.012	0.026	0.007	0.080
N.C. #	0	256	253	671	703	1349	626	1719	1068	0
Total #	2726	2726	2726	2726	2726	2726	2726	2726	2726	2726