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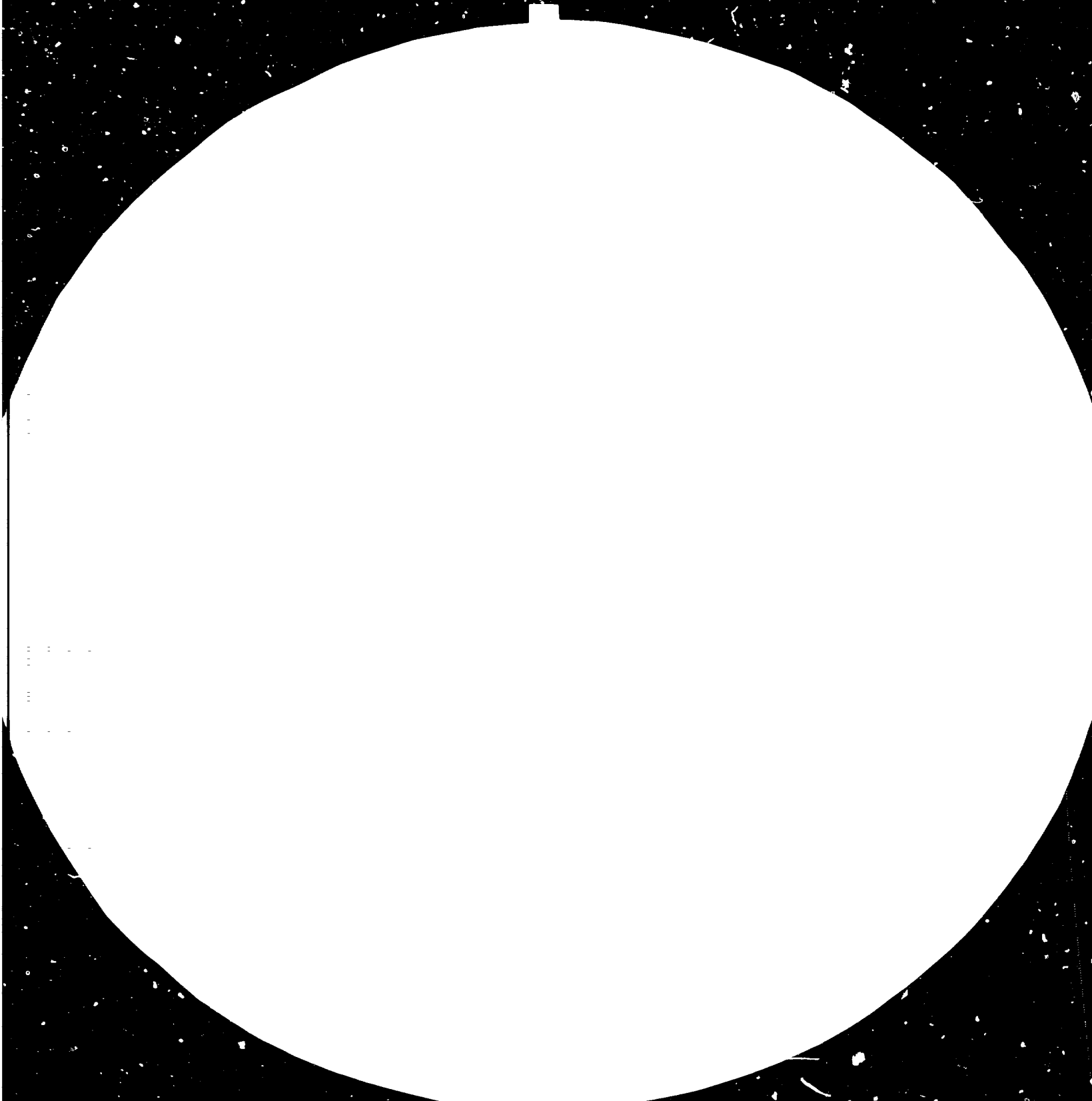
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SMALL HYDRO POWER (SHP)
in the Republic of Turkey*

by

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In recent years, Turkey has recorded a remarkable growth of economy which has created a big demand for electric power. To cope with the growth of electric power demand, the GOVERNMENT of TURKEY has made in these years, great efforts for the development of hydroelectric potential in the Country. In TURKEY, the total economic hydroelectric generating capacity is estimated by State Hydraulic Works (DSI) to be 30980 MW. The present developed hydroelectric generating capacity is only about 10.32 percent of the total potential hydroelectric power.

Since the yearly increase of power demand of TURKEY is in the order of 15 percent, more emphasize is given on large hydroelectric projects in order to be able to compensate this large demand. With this in view, presently 17 projects are under construction ranging from unit capacity 5 MW to 300 MW with a total installed capacity of 6427.6 MW. With the completion of these projects, the total installed capacity will be increased to 31.06 percent of the total economic hydraulic potential capacity of TURKEY. It is very well known, that SHP projects will produce a quite important power which can not be neglected.

In fact the first studies made in this field, have indicated that it is possible to produce 32.9×10^9 kwh annually. As a matter of fact these are considered in the general electricity planning of Turkey, and as it can be seen in the annex documents, it is planned to complete the construction of all 429 powerplants including small and large power plants, before the year of 2010. In any case the most favourable period will be chosen to give priority for the construction of SHP, which will certainly play a significant role in hydroelectric power development in near future. The most favourable period will be restudied by considering the economic factors, in the world, the developments in the construction technics in civil works, standardization of units which will have a great effect on the cost and time.

Consideration for cost reduction may also be given with the existing projects. This can be accomplished by studying possibilities of adding more units, by modernization and uprating of existing units and adding power producing units to existing single irrigation purpose projects. The economic factor for the above schemes is mostly because the high cost item of civil works already exist and the additional cost will consist only for the power units. In our studies it is proved that about two thirds of a hydroelectric projects covers the civil works and only one third covers power production equipment. Therefore increasing the power production of our existing plant by one of the

above methods will prove to be economic.

Turkey, is a country with a large territory and the population is spread all over the country. The Country is divided into 67 main provinces, more than 500 counties and about 36000 villages. With this situation the transmission and distribution of electric power should be very carefully planned. Presently, there is a transmission network system reaching almost all main consuming centers and most large and small plants are connected to this system. Due to long distances, there are also many consuming centers which are fed by regional installations. For instance, out of 36000 villages only about 50 percent have electricity. The rest being remotely located are not provided with electricity. Long distances between power centers and consumers are not making economic for network distribution. Therefore in our country both systems that is network transmission and regional distribution should be considered. In planning the power production and distribution on long term basis another important factor to be considered is the great increase of population and the relocation of population specially to large cities.

As it was pointed above presently only 10.32 percent of the economic hydro-electric potential of the country is being used, and it is planned to complete the balance by 2010, great efforts should be made in the coming years to realize this important program. Therefore, since up to now

most of the necessary equipment has been imported from abroad, now serious steps are being taken to produce such equipment in the country. This will reduce foreign exchange requirement and will give more flexibility to work. Since this industry will require a large investment it is planned to form a state owned company. As a result Turkish Electro-Mechanical Industry (TEMSAN) has already built important workshops in the eastern part of the country and has obtained an order of 3 units 5 MW each, TEMSAN has a licence agreement with Neyrpic for 20 MW capacity turbines and with Jeumont Schneider for same capacities generators. This is the beginning stage of local manufacturing and this capacity will be soon increased to higher levels. In the meantime some other private and state organizations are preparing themselves for the production of hydro electric equipment parts.

As a conclusion it can be stated that Turkey is a country making great efforts to develop its hydroelectric power potential in a short time. It is very well known that this power is essential for the fast development of the Country. Therefore, governments are giving top priority to do planning, design, construction and manufacturing of equipment of hydro-electric projects.

I personally strongly believe that, with the present policy of the government, this goal will be easily achieved.

**Annex. 1 Classification of Existing Hydroelectric Power Plants
According to Their Installed Capacities in 1982**

Total Installed Capacity Kw	Number of Power Plants	Installed Capacity (MW)	Annual Output (10⁶ kWh)
Micro 0 - 100	67	4	10
Mini 101-1000	86	27	50
Small 1001-10000	21	83	347
SHP Sub-Total	174	114	407
BHP 10001-over	22	3083	12028
SHP+BHP Total	196	3197	12435
Small Hydro as percent of Total Hydro	88.7	3.56	3.27

SHP: Small Hydro-Power

BHP: Big Hydro-Power

Annex. 2 Installed Generating Plant Capacity
(1978-1982)

Years	Total installed capacity MW	Hydro-Power Installed Capacity MW	Hydro as percent of Total
1978	4868.7	1880.8	38.6
1979	5118.7	2130.8	41.6
1980	5118.7	2130.8	41.6
1981	5188.5	2171.3	41.8
1982	6514.5	3197	49.0

Gross Electric Power Generation
(1978-1982)

Years	Total Annual Output 10 ⁶ Kwh	Hydro-Power Annual Output 10 ⁶ Kwh	Hydro as percent of Total
1978	21726	9365	43.1
1979	25522	10304	45.8
1980	24617	11348	46.0
1981	26289	12616	48.0
1982	28325	14167	50.0

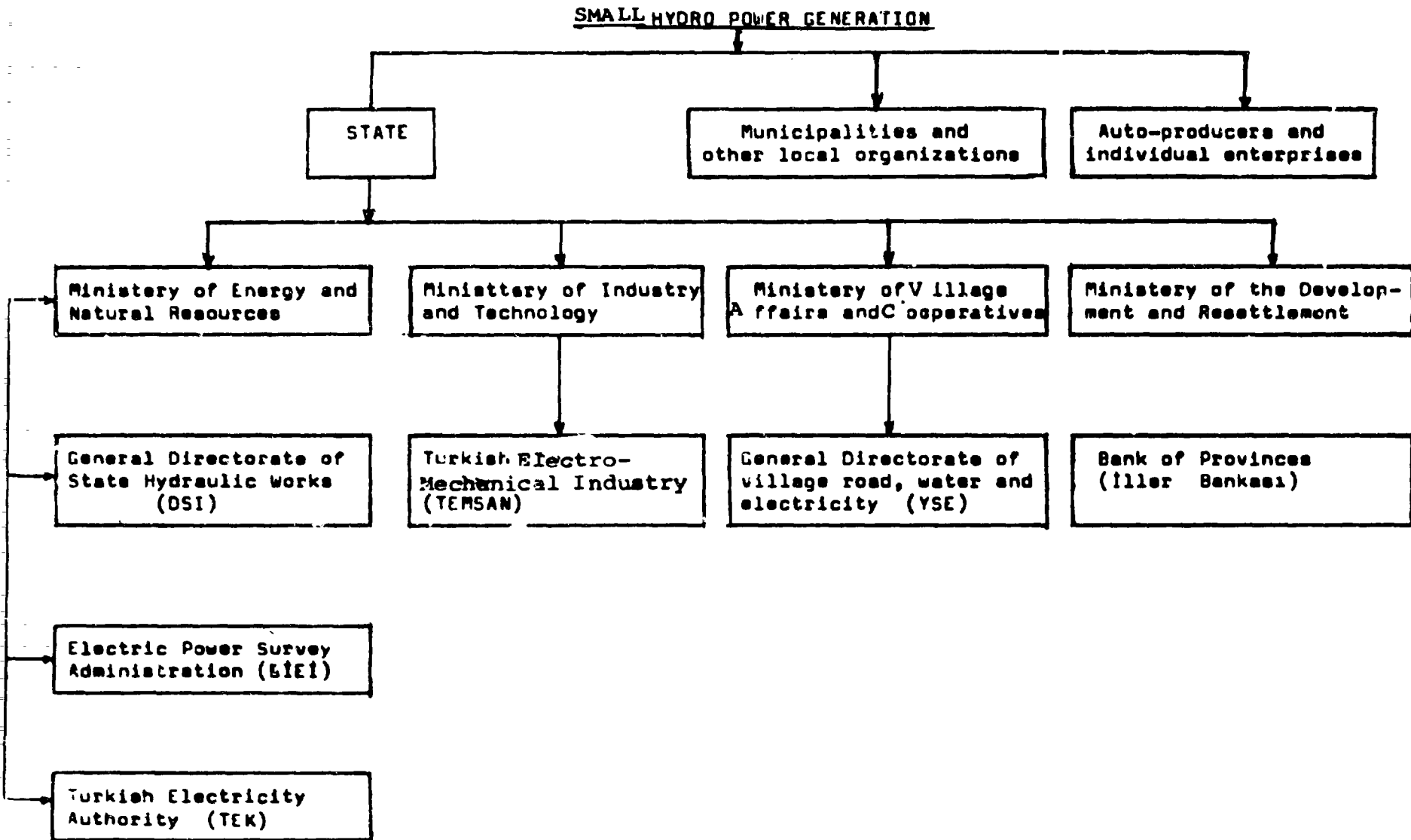
Annex.3 Classification of Generating Units in Plants according to their Installed Capacities as Economic Potential

Installed Capacity Kw	Municipal Plants Auto-producer plants			Regional Plants			Total			Capital Investment Including Transmission lines excluding city networks) \$ / Kw
	Number of Units	Installed Capacity MW	Annual Output GWH	Number of Units	Installed Capacity MW	Annual Output GWH	Number of Units	Installed Capacity MW	Annual Output GWH	
0-100	40000	3000	10000				40000	3000	10000	1500-2500
101-1000	2000	1500	5000	6000	4500	15000	8000	6000	20000	1500-2000
1001-5000	100	350	1000	1900	6650	19000	2000	7000	20000	1400-1800
5001-10000	-	-	-	1000	8000	20000	1000	8000	20000	1200-1600
SHP Sub-total	42100	4850	16000	8900	19150	54000	51000	24000	70000	1350-1900
10001-50000	-			280	10000	25000	280	10000	25000	1000-1400
50001-over	-			150	15000	45000	150	15000	45000	800-1200
BHP Sub-Total	-			430	25000	70000	430	25000	70000	880-1280
GRAND TOTAL	42100	4850	16000	9330	44150	124000	51430	49000	140000	1110-1580

SHP - Small Hydro Power

BHP - Big Hydro Power

Annex.4 ORGANIZATIONAL SET UP OF THE SMALL- HYDRO POWER GENERATION



Annex .5 Division of Responsibilities of Government Organizations Engaged with small Hydropower Generators

Responsibilities Institutions	Planning		Design		Construction		Management and Operation	Manufacture	City and village networks construction
	Plants	Transmis- sion Lines	Plants	Transmis- sion Lines	Plants	Transmis- sion Lines			
General Directorate of State Hydraulic Works(DSI)	+	+	+		+				
General Directorate Electric Power survey Administration(EiEi)	+	+	+						
Turkish Electricity Authority (TEK)		+		+		+	+		
Turkish Electro-Mech- anical Industry (TESSAN)								+	
General Directorate of village roads, water and Elec.(YSE)	+	+					+		
Bank of Provinces (iller Bankası)	+	+	+	+	+	+			+
Municipalities and Local Organizations							+		
Auto-producer and private sector	+	+	+	+	+	+	+	+	

+ The responsibilities of the institutions

