

# SOLAR COOLING AND DEHUMIDIFYING

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Edited by **A R MARTINEZ**  
*Caracas, Venezuela*

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# **SOLAR COOLING AND DEHUMIDIFYING**

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# SOLAR COOLING AND DEHUMIDIFYING

Proceedings of the First International Conference,  
SOLAR/80, Caracas, Venezuela, 3-6 August 1980

Edited by

**A R MARTINEZ**

*Caracas, Venezuela*



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*The Editor.*

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## FOREWORD

This volume contains the reports of the First International Solar Cooling and Dehumidifying Conference (SOLAR/80), held in Caracas, Venezuela, August 1980. We hope it to have been the first in a series of meetings on the subject.

English was the 'official' language, but it was inevitable that Spanish be used with as much frequency. There was instantaneous translation from one to the other at the Conference. For the few papers presented in Spanish a translation of the main points is provided, to be supplemented by simple perusal of equations and data, in the universal language of signs and formulae.

Only the abstract is included for those papers promised, but not sent in by the authors. We wish to thank the Embassies of Brazil and Colombia for allowing the projections of films on the gasohol and 'Las Gaviotas' programs, respectively. Even a 'Solar/80 Stakes' was run at the 'La Rinconada' racetrack.

The preparation of this volume is due in great part to the efforts of Miss Miriam Martinez Nunez, who was also the General Coordinator of the Conference.

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# CONTENTS

Organizing Committee	x
Programme	xi
Moda de los tiempos A. R. Martínez	1
Algo nuevo bajo el sol L. E. Alcalá	7
Ministro de energía y minas H. C. Berti	9
Minister of energy and mines H. C. Berti	15
Feasibility of solar-powered refrigeration I. Borde, I. Yaron and M. Jelinek	19
Solar cooling by use of desiccants H. I. Robinson and S. H. Houston	25
An opportunity for producing ethanol from municipal cellulosic wastes A. J. Parker, Jr. and T. J. Timbario	27
Instalacion de aire acondicionado operado con energia solar para un edificio del litoral central E. Mayer	39
A three and a half ton solar absorption air conditioner's performance in Riyadh, Saudi Arabia A. A. M. Sayigh and B. H. Khoshaim	49
An improved solar cooling system G. D. Mehta	51
Ground solar collector system P. I. Chen	53



Application of solar cooling for a school building in subtropics A. J. Parker, Jr., D. E. Cassel and R. E. Hedden	55
Disminucion de la temperatura de un refrigerante con el calor radiante J. Silveira	77
Use of concentrators in solar power plants G. Guastini	79
Design limitations of solar refrigeration systems of ammonia-water absorption type for very low temperature applications B. J. Huang	81
Net energy analysis of solar energy systems and heat pumps D. Orth and H.-J. Wagner	83
The construction cost of thermal storage for solar systems T. King, J. Carlock and J. Shingleton	95
Basic heat and masstransfer research in solar energy W. Aung	109
Options for cooling using solar energy from flat plate collectors T. E. Alt	111
Earth coupled heat pump J. A. Edwards	113
Solar powered Rankine cycle, dual stage chiller/regenerator improves combined cycle efficiency M. Meckler	115
An overview of energy resources A. L. Dellon	149
Desarrollo de fuentes alternas de energia solar en Puerto Rico J. A. Bonnet, Jr.	151
On a prototype solid desiccant air-conditioner and its performance data K. Matsuki, M. Tatsuoka and T. Tonomura	159
Solar absorbent for solar regenerative air drying cooling systems J. A. Theisen	181
Optimization of double hollow slab for maximum thermal load levelling A. S. Sodha, A. Kumar, A. Srivstava and G. N. Aiwari	183
Thermodynamic humidity control through architecture A. Bowen	185
Passive energy systems in Persian and Islamic architecture D. B. Elmer	187
Principles for the non-mechanical cooling of buildings A. Bowen	189

Passive systems for rural areas in developing countries D. B. Elmer	191
Solar driers V. P. T. Chacko	193
Modelling of solar drying R. Kumar and K. V. Mallan	195
Estudio de factibilidad de un secador-almacenador de cereales en Venezuela J. D. Sauzade and F. Allard	197
A finite-difference technique for the analysis of a solar drier G. Kamaraj	215
An analysis of the performance of a silica gel rotary air dryer F. E. Pla Barby	217
Perspectivas de las aplicaciones de la energia solar en la industria de los alimentos E. Arias, E. Castro and J. Sevilla	239
Desarrollo de un prototipo para desalacion de aguas Salobres por medio de energia solar R. F. Soto	247
Solar energy for cooling — application in India K. S. Murty	249
Round table discussion P. Obregón, U. Ramírez, F. Pla, K. Matsuki, A. Parker, Jr., R. Martínez and R. Villegas	257
Author Index	267

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# PROGRAMME

## SUNDAY AUGUST 3

10:00 a.m. - 3:00 p.m.  
3:00 p.m. - 6:00 p.m.  
8:00 p.m. - 10:00 p.m.

Registration  
"SOLAR/80" STAKES  
La Rinconada racetrack  
Reception - Cocktail

## MONDAY AUGUST 4

9:30 a.m. - 10:30 a.m.

Opening Ceremony  
The President of the Organizing Committee,  
Dr. Aníbal R. Martínez  
The Executive Director, CONICIT  
Dr. Luis Enrique Alcalá  
The Minister for Energy and Mines,  
Dr. Humberto Calderón Berti

10:30 a.m. - 11:00 a.m.  
11:00 a.m.

Coffee  
Plenary Session:  
Dr. George Löf  
"History of Solar Energy"

### Session I August 4:

2:00 p.m. - 2:30 p.m.

Chairman: Dr. Abelardo López Villegas  
Borde, I.  
"Feasibility of Solar-powered Refrigeration"  
Robinson, H.I.; Houston, S.H.  
"Solar Cooling by Use of Desiccants"

2:30 p.m. - 3:00 p.m.

3:00 p.m. - 3:15 p.m.

3:15 p.m. - 4:15 p.m.

Coffee  
Plenary Session:  
Dr. Andrew J. Parker, Jr.  
"Ethanol from Municipal Cellulosic Wastes"

4:50 p.m. - 5:05 p.m.

Mayer, Eric  
"Air Conditioned Installation for a Central  
Coast Building"  
Sayigh, A.A.M.

5:10 p.m. - 5:25 p.m.

"A Three and a Half Ton Solar Absorption  
Air Conditioner's Performance in Riyadh"  
Mehta, Gurmukh D.

5:30 p.m. - 5:45 p.m.

"An Improved Solar Cooling System"

8:30 p.m.

Folklore Show  
Presented by the National Council for Culture

## TUESDAY AUGUST 5

### Session II

8:00 a.m. - 8:15 a.m.

Chairman: Dr. Ulises Ramírez O.

8:20 a.m. - 8:35 a.m.

Chen, Pah I.  
"Ground Solar Collector System"  
Parker, Andrew J.; Cassel, D.E.; Hedden, R.E.  
"Applications of Solar Cooling for a School  
Building in Subtropics"

8:40 a.m.	-	8:55 a.m.	<u>Silveira, Josemar</u> "Climatización de Ambientes con el Mínimo Gasto Energético"
9:00 a.m.	-	9:15 a.m.	<u>Guastini, Giorgio</u> "Use of Concentrators in Solar Power Plants-AMN Realization in the Air Conditioning Field"
9:20 a.m.	-	9:35 a.m.	<u>Huang, B.J.</u> "Design Limitations of Solar Refrigeration Systems of Ammonia-Water Absorption Type for Very Low Temperature Applications"
9:40 a.m.	-	9:55 a.m.	Coffee
10:00 a.m.			Plenary Session: <u>Dr. Lucio Pita</u> Films: 1. Marine Platform at Almeria 2. Solar Cooling (and heating) for hospitals, prisons and schools.

### Session III

Chairman: Dr. Mario P. Vecchi

2:00 p.m.	-	2:15 p.m.	<u>Wagner, H.J.</u> ; Orth, D. "Net Energy Analysis of Solar Energy Systems and Heat Pumps"
2:20 p.m.	-	2:35 p.m.	<u>Parker, Andrew J.</u> ; King, T.A. "The Construction Cost of Thermal Storage for Solar HVAC Systems"
2:40 p.m.	-	2:55 p.m.	<u>Aung, Winn</u> "Basic Heat and Mass Transfer Research in Solar Energy"
3:00 p.m.	-	3:10 p.m.	Coffee
3:10 p.m.	-	4:10 p.m.	Plenary Session: <u>Dr. Juan A. Bonnet</u> "OTEC for Latin America"
4:20 p.m.	-	4:35 p.m.	<u>Shibl, A.M.</u> ; Sheelan, M.R. "Comparison of Two Alternatives of Utilizing Solar Energy for Thermo-electric Refrigeration"
4:40 p.m.	-	4:55 p.m.	<u>Alt, Theodore E.</u> "Options for Cooling Using Solar Energy from Flat Plate Collectors"
5:00 p.m.	-	5:15 p.m.	<u>Edwards, J.A.</u> "Earth Coupled Heat Pump"
5:20 p.m.	-	5:35 p.m.	<u>Meckler, Milton</u> "Pool Solar Powered Rankine Cycle Chiller Condenser Regenerator Improves Combined Cycle Efficiency"
		8:00 p.m.	Cocktail
		8:30 p.m.	Banquet: <u>Speaker</u> The Minister for Youth, Dr. Charles Brewer Carías

### WEDNESDAY AUGUST 6

### Session IV

Chairman: Dr. Marcel Antonorsi B.

8:00 a.m.	-	8:15 a.m.	<u>Dellon, Alfred L.</u> "An Overview of Energy Sources"
8:20 a.m.	-	8:35 a.m.	<u>Bonnet, Juan A.</u> "Development of Alternative Sources of Energy in Puerto Rico"

8:40 a.m.	-	8:55 a.m.	"Fincas Energéticas Boricuas"
			<u>Matsuki, Kenji</u>
9:00 a.m.	-	9:15 a.m.	"On a Prototype Solid Desiccant Air Conditioner and its Performance Data"
			<u>Theisen, J.A.</u>
9:20 a.m.	-	9:35 a.m.	"Solar Absorbent for Solar Regenerative Air Drying and Cooling Systems"
			Sodha, M.S.; Kumar, A.; Srivstava, A.; Tiwari, G.N.
9:40 a.m.	-	9:55 a.m.	"Optimization of a Double Hollow Slab for Maximum Thermal Load Levelling"
			<u>Bowen, Arthur</u>
10:00 a.m.	-	10:10 a.m.	"Thermodynamic Humidity Control Through Architecture"
10:10 a.m.	-	10:25 a.m.	Coffee
			<u>Elmer, Donald B.</u>
10:30 a.m.	-	10:45 a.m.	"Passive Systems for Rural Areas in Developing Countries"
			<u>Bowen, Arthur</u>
10:50 a.m.	-	11:05 a.m.	"Principles for the Non-mechanical Cooling of Buildings"
			<u>Elmer, Donald B.</u>
11:10 a.m.	-	11:25 a.m.	"Passive Energy Systems in Persian and Islamic Architecture"
			<u>Chacko, V.P.T.</u>
11:30 a.m.	-	11:45 a.m.	"Solar Driers"
			Kumar, R., Mallan, K.V.
11:50 a.m.	-	12:05 p.m.	"Modelling of Solar Drying"
			<u>Rahui, A.</u>
12:10 p.m.			Film: "Problemática del secado de granos en Perú"
			<u>Brazil Embassy</u>
			Film: "Plantaciones Energéticas de Alcohol"

#### Session V

Chairman: Dr. George Löf

2:00 p.m.	-	2:15 p.m.	<u>Sauzade, J.D.</u> ; Allard, F.
2:20 p.m.	-	2:35 p.m.	"Secador Solar de Granos en Venezuela"
			<u>Kamaraj, G.</u>
2:40 p.m.	-	2:55 p.m.	"A Finite-difference Technique for the Analysis of a Solar Drier"
			<u>Pla Barby, Fernando</u>
3:00 p.m.	-	4:00 p.m.	"Análisis del funcionamiento de una rueda de secar aire con gel de sílice"
			<u>Colombia Embassy</u>
4:00 p.m.	-	4:15 p.m.	Film: "Las Gaviotas"
4:15 p.m.	-	6:45 p.m.	Aldea Energética Autónoma
			Coffee
			Round Table Discussion - International Cooperation.

Moderator: Dr. Javier Sandoval

Participants:

Mr. Raimundo Villegas  
 Mr. Aníbal R. Martínez  
 Mr. Kenji Matsuki  
 Mr. Pedro Obregón  
 Mr. Andrew J. Parker  
 Mr. William Ramírez  
 Mr. Lucio Pita

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