QUALIFICATIONS

Dr. Moshe D. Hirsch, Consulting Engineer
Energy & Control Systems

Moshav Zafaria 88, ISRAEL 60932
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Dr. Moshe Dan **Hirsch** Expert in Techno-Economic
EnConSol - Energy & Control Solutions
* Research * Consulting * Design * Optimization * Inspection

Energy & Control Techno-Economic Optimization

Energy Conservation & Management - Alternative & Renewable Energy – Cogeneration

National - Municipalities - Settlements - Institutes - Industries

click any picture to link the relevant page in the internet site

Wind Energy

During 1980-1990 Dr. Moshe Hirsch managed and directed the national wind energy program in the Israeli Ministry of Energy & Infrastructure

Solar Heating & Cooling

Cogeneration

Samples of

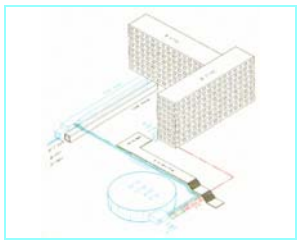
Pioneer Energy Projects in Israel

Directed by
Dr. Moshe Hirsch

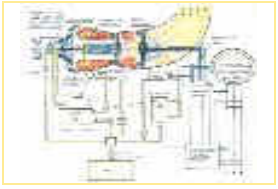
Energy Control

Optimal Energy Management

Smart Buildings



Cool Storage



Gas Turbine Engines

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Dr. MOSHE D. HIRSCH, D.Sc.(Engineering)

Birth Date: November 15, 1943

Education

***D.Sc. (Doctor of Technical Sciences)*: Energy & Power Control**
Technion (Israel Institute of Technology, Haifa, Israel) - 1975

B.Sc. in Mechanical Engineering: Energy & Power
Technion (Israel Institute of Technology, Haifa, Israel) - 1969

Aircraft electrician, Israel Air Force Technical School - 1962

Refrigeration & Air-conditioning Technician,
ORT Junior Technical College, Givataim, Israel - 1961

Courses in digital electronics, control systems and robotics, Israel Institute of Industrial Automation - 1977 - 1987

Professional Societies and Registration

- ***Mechanical Engineer***, Israel
- ***Professional Electrician***, Israel
- ***Member, ISHRAE*** (Israel Society of Heating, Refrigeration and Air Conditioning Engineers)
- ***Member***, Israel Architects & Engineers Society
- ***Member, ISA*** *(Instrumentation Society of America)*

Activities

- Research & Development, Consulting & Design; Planning; Training
- Computer Simulation & Optimization; Testing & Data Acquisition
- Techno-Economic Analysis and Optimization
- Projects Performance & Budgets Control
- Projects Marketing & Organization
- Lecturer in the Energy Fields

Fields of Specialization:

- Cogeneration ; Energy Systems; Power/Heating/cooling Systems Control Systems
- HVAC & R (Heating, Ventilation, Air-Conditioning & Refrigeration) Systems
- Energy Management & Efficient Utilization; Industrial Systems
- Solar Systems for Electricity Production, Heating and Cooling
- Wind Energy Utilization for Power Generation
- Gas Turbines and Turbogenerators

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Experience

1980 - 1990: ***Alternative/Renewable Energy Consultant and projects promotion for the Israeli Ministry of Energy & Infrastructure:***

Senior consultant for the **Israeli Ministry of Energy & Infrastructure** (wind and solar energy, energy control):

- Organizing, leading & supervising the National Wind Energy Program.
- Supervising of projects in solar energy (heating & cooling with unique thermal technologies, electricity production with photovoltaic).
- Design and operation the central data acquisition and performance computerized control of the National Solar Test Center (sponsored by the Ministry of Energy & Infrastructure) for Electricity Production (thermal and photovoltaic technologies) at Sde Boker.
- Computerized energy management & control systems for demonstration in a medical center an in an hotel: projects supervising

1980 - Up : ***Systems Consultant and projects design & promotion in energy management & control, alternative energy, renewable energy, efficient energy utilization, cogeneration***:

- Industries
- Buildings Owners
- Medical Centers
- Institutions
- Settlements
- Ministry of Agriculture (green houses control)
- Lecturer in energy efficient utilization for large consumers through Tel Aviv University/Technical Collage (according to Ministry of Energy & Infrastructure requirements & specifications)

1979-1980: ***Member of the Technical Staff:***

ANCO Engineers, Inc., Santa Monica, California, USA:
Project Engineer and Project Manager in the areas of heat recovery systems, energy management, efficient power generation and utilization, HVAC systems,
control systems, solar energy systems and cogeneration
for:

- Medical centers
- University campuses
- US Army Campuses
- US DOE

1976-1979: ***Project Manager and Control Systems Div. Manager*:**
ASD (Applied Solar Devices) , TADIRAN 1td. ,Israel:
Development, design, construction and testing of central solar systems for heating and air-conditioning (Projects were applied in Israel and in developing countries).

1977-1977: ***Lecturer***, Course in Linear Control Systems for Mechanical Engineers Technion, Israel.

1975-1976: ***Research Associate and Lecturer***, Faculty of Mechanical Engineering, Technion, Israel . : Thermodynamic, Energy Laboratories.

1974-1975: ***Researcher and Instructor***, Faculty of Mechanical Engineering, Technion' Israel: Energy & Power Control Energy Laboratories.

1970-1974: ***Project Manager***-Testing Operating & Control Systems Specialist, Beit Shemesh Engines, Ltd. Israel: Design and development of gas turbine engines and turbo-generators for power generation.

1969-1969: ***Research and Development Engineer***, Armament Development Authority, Ministry of Defense , Israel: Rocket Propulsion.

1968-1969: ***HVAC (Heating, Ventilation & Air Conditioning) Designer***,
Engineering Department, Electra HVAC Co., Israel: Detailed design of medium and large sized central HVAC systems for hotels and a textile factory.

1967-1967: ***HVAC Systems Technician***, Electra Company Ltd. , Israel:
Electrical & Control Systems Specialist (part time job).

1964-1965: ***HVAC Systems Control Technician***, Aviram Co. , Israel:
Installation and operation of electrical & control equipment and systems for central HVAC systems for hotels, hospitals and buildings.

1962-1964: ***Aircraft's Electrical Technician***, Israel Air Force.

1957-1961: ***Electrician assistant***: Installation and operation of
electrical systems for industries, buildings and halls. (part time jobs).

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Activities and Projects as a Consultant for the Israeli Ministry of Energy & Infrastructure
(1980-1990)

Wind Energy

Referent, Supervisor and Coordinator of the Israel Wind Energy Utilization Program. Organization of all activities relating to Wind Energy in Israel:

- Preparation and applications of Master Plans.
- Techno-economical planning.
- Wind turbines and farms projects studies, planning & design.
- Professional committee coordination
- Organization of studies by research institutes
- Organization of entrepreneurs
- Organization of wind survey projects
- Organization of demonstration turbines projects
- Training local entrepreneurs in survey performance and data processing.
- Computerization of wind surveys, using microcomputers and data loggers, processing local entrepreneurs
- Projects initiation and control (performance and budget)
- Initiation and organization the activities of Private Electricity Producers in Israel

Solar Energy for Climate Control

Consultant and supervisor for ASD National Project for Solar Climate Control (Air conditioning, heating and hot water).

Referent for demonstration project for solar air-conditioning with output of 200 tons cooling in the Shiba Medical Center (Governmental) at Tel Hashomer.

Analysis and supervising of Research Projects in Photovoltaic Systems
Analysis and supervising of solar energy research projects (photovoltaic for electricity, photovoltaic combined with wind energy for a settlement, photovoltaic for electricity and heating, photovoltaic for instrumentation station in the wind energy program).

Techno-economical Analysis & Supervising of Energy Management Projects
Energy management projects in hotels.
Energy management projects in hospitals.

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Techno-economic Survey of Heat Pumps

Survey of heat pumps applications in residential buildings for various geographic and climate regions in Israel.

Planning, Analysis, Design and Erection of Computerized Data Acquisition and Control Systems for Solar Test Center

At Sde Boker in the Israeli Desert of the Negev, a Test Center for solar technologies for electricity production was erected by the Israeli Ministry of Energy. Dr. Hirsch's projects included planning, analysis and design of the central computerized data acquisition and control system.

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Activities and Projects as a Consultant in the Institutional & Commercial Market or as a Developer

(from 1980)

Energy Management / Conservation

Activities for large medical centers, university campuses, army campuses and industrial facilities (small size, medium size and large size) in USA during 1979-80 and in Israel (during 1980-90) as a consultant and expert in the energy and control fields. Activities included all aspects (scientific, engineering, technical, economical, coordination, etc.). As a result, many energy saving opportunities were implemented economically.

Attractive results of activities (examples):

1. Few medical centers in Israel got awards from the Israeli Electrical Company (IEC) as efficient electrical energy users. It was in the frame of annual competitions with other big electricity users (1987, 1988, and 1990).

2. Unique projects in energy management were approved by the Israeli Ministry of Energy & Infrastructure and / or by IEC:

    - Cogeneration for a textile industry
    - Optimal control for medical centers
    - Cool storage for a medical center

Technologies Research & Development

1. Rocket propulsion in Israeli Defense Authority.

2. Gas turbine engines and turbo-generators in Beit Shemesh Engines Ltd. Israel.

3. Solar energy technologies for heating & cooling in Tadiran Ltd. Israel.

4. Air condition for buses.

5. Optimal control for energy systems with application to gas turbine engines (Doctorate thesis).

6. Wind turbines.

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Cogeneration/CHP Systems (Combined Heat & Power production)

1. Feasibility studies and planning of various projects at USA (during 1979-80)

2. Feasibility studies and planning of various projects at ISRAEL (from 1981) at various types of energy consumers:

    - Industrial facilities (textile, food processing, paper, Hi-Tech)
    - Medical centers
    - Settlements

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Selected Programs and Projects (partial) In Energy Management

Performed by Dr. Moshe D. Hirsch

Alternative Renewable Energy

1. ***National Wind Energy Program Coordinator***

   Start-up, organization, development and coordination of the National Israeli Wind Energy Program. The related activities were done during the period: end of 1980-1989. Dr. M. Hirsch was hired as a senior energy consultant and expert to be the program manager for the Israeli Ministry of all aspects: Scientific, engineering, technical, economical , managing, administration.

   Results:

   - Development process of wind energy potential in Israel. The potential is estimated to be up to 1,000 Megawatts of electricity. Estimated total investment : up to $1,000,000,000 . Estimated energy and economical potential: electrical energy saving produced by fossil power stations
     - up to 2,500,000 kWh/Year; saving of imported fossil fuel
     - up to 650,000 ton/year; revenue - up to $160,000,000/Year .

   - Wind turbines operation as demonstration projects. The sizes of the turbines are in the range of 45 KW to 225 KW.

   - Siting on many areas in Israel towards erection of wind turbines and wind farms.

   - Arrangement of selling electricity to the Israeli Electrical Company (IEC).

   - Authorization as developing industry in developing area (in order to get 30% grant of the investment for wind farms from the Israeli Government).

2. Developing of unique central large solar energy systems for climate control (heating, cooling, air conditioning) during 1976-1979 and supervision on large demonstration project of central solar air-conditioning plant in Shiba Medical Center in Israel. The supervision activities (scientific, engineering, financial) was during 1981-82 as a consultant for the Israeli Ministry of Energy and Infrastructure.

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Development, Design and Installation of Solar Powered Systems for Heating and Cooling (Air-Conditioning) (Tadiran-ASD)

1. Design and installation of a test plant for solar air conditioning.

2. Design and installation of electromechanical control system for solar air conditioning test plant.

3. Management of project for developing a microprocessor-based control system for large central solar installation

4. Design and installation of central control system for interactive hot water and heating for a 14-story building in Jerusalem

5. Design and installation of central control system for central solar air conditioning and heating system for Sha'arei Tzedek Hospital, Jerusalem.

6. Development of interactive systems and control for solar air-conditioning systems for Iranian Fleet in Banda-Rabas, Iran.

7. Development of interactive systems and control for a solar heating and air-conditioning project in Tel - Hashomer Hospital (200 ton of refrigeration).

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Solar Energy System for Private Customers

1. Energetic and tecno-economical survey for solar energy utilization for steam production by means of central collectors combined with conventional steam boiler for a factory.

2. Concept and detailed design of solar system for steam production by means of central collectors combined with conventional steam boiler for a factory.

3. Design, installation and operation of automatic control system for central solar heating combined with conventional boilers for a 14-story apartment house in Jerusalem.

4. Research and development of control system dynamics for large scale parabolic concentrators solar systems for electricity production (client: LUZ International Ltd. For Southern California Edison Co.)

Operation and Regulation of Electronic Control Systems for Central Air-conditioning Installations (for "Aviram" Ltd.)

Central and local electric and control systems installation and operation for:

- Central Post Office, Tel-Aviv.
- King David Hotel, Jerusalem.
- Hillel Yafeh Hospital, Hadera
- Tel- Hashomer Hospital
- Banks
- Diamond Exchange
- Villas (Rotshild , Asia House, Savion)
- Hebrew University , Jerusalem.
- HaVilot Hotel, Casaria.

Designing Air-conditioning Systems (for "Electra" Ltd.)

Designing of central air-conditioning systems, including cooling and heating load calculations, systems design and choosing components (chillers, fans, air-conditioning units, pumps, heat exchangers, valves, control) for:

- Hotels
- Textile Factory

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Partial List of Engineering Projects in Research, Development and Design of Gas Turbines ("Beit Shemesh Engines," Ltd.)

1. Aerodynamic design of multi-level axis compressor in a gas turbine engine.

2. Aerodynamic design of power turbine.

3. Mechanical design of gear for reducing speed from 18,000 rpm to 3,000 rpm for power turbine (800 KWe) for use in cars .

4. Design of 1ubrication system for gas turbines.

5. Design and building of hydraulic fuel regulating system .

6. Design and building of electronic-hydraulic fuel regulating system.

7. Test run of gas turbines in test cells and customers' installations.

8. Preparation of computer programs for the above subjects.

9. Preparation of program for dynamic simulation and performance prediction of gas turbines in stable and transition states.

10. Optimization of control for gas turbine with variable geometry (thesis for doctorate) using computer simulation.

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Background in Control Systems Applications

1. Care of electric systems for airplanes, building of control panels, testing, etc. as Aircraft's Electrical Technician in the Israeli Air Force.

2. Building control panels for central air conditioning and cooling installations. Electromechanical, electronic and pneumatic control systems. Running and regulating installations as Systems Control Technician for Aviram (1964)

3. Design and development of hydraulic and electronic control for turbogenerators and gas turbines , including operation and testing as Control Systems Manager for Bet Shemesh Engines, 1td.(1970-1974)

4. Design and development of advanced solar systems for central heating and air conditioning , managing development of a central microcomputer system as Control Systems Manager for ASD (Applied Solar Devices), Tadiran
(1976-1979)

5. Techno-economic analysis and application of systems for energy control and conservation (electromechanical, electronic and pneumatic control systems) for American firms such as:
   - Johnson Controls
   - Honeywell
   - Powers

   in the framework of energy management projects for ANCO Engineers, California (1979-1980)

6. Courses in digital electronics and control systems, Israeli Institute of Industrial Automation (1977)

7. Doctorate on Dynamic Optimization of Control of Gas Turbines. The doctorate included computer programs. (1974-1975)

8. Design of control systems for solar systems as an independent engineering consultant. (1980-1987)

9. Techno-economic analysis of control systems for energy conservation and computerized energy management for (partial list):
   - Regional food processing industries (Shaar Hanegev, Miluot)
   - Medical Center (Meir/Sapir, Rabin/Bellinson, Shiba)
   - A demonstration project for an hotel in Eilat (500 rooms)
   - Strauss Dairy Company, Naharia
   - University Campuses (Bar Ilan, Tel Aviv)
   - Electronic (Intel: Haifa, Jerusalem; Motorola Communication, Motorola Semiconductors, Tadiran Communication, Telrad Communication)

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ANCO Engineers Inc., Santa Monica, California (1979-1980)

1. Techno-economical surveys applying advanced analysis methods and design of interactive systems (which include energy , air conditioning, heating and control) for large hospitals such as:

   - Glendale Hospital
   - San Diego Hospital
   - Donald Sharp Memorial Community Hospital.

2. Techno-economical surveys applying advanced analysis methods and design of interactive systems (which include energy, air conditioning, heating and control) for large university campuses such as:

   - California State University at Long Beach

3. Techno-economical surveys applying advanced analysis methods and design of interactive systems (which include energy, air conditioning, heating and control) for government and army campuses such as:

   - The Atomic Energy Institute of DOE, Hanford Conneticut

4. Technical and economical concepts design of energy systems for producing heating, cooling and electricity, such as:

   - Solar systems
   - Heat pumps
   - Biomass
   - Geothermal pools.

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Partial List of Techno-Economic Surveys and Retrofit Optimization in Israel

Detailed techno-economic survey and optimized retrofit analysis and design. The project related to central air conditioning systems and controls' to central heating system, to energy consuming equipment and to the electrical systems.

1. Sha'ar HaNegev Factories (Regional food Industries):
   Each sub-factory included conveyer belts, refrigeration and deep-freeing and consumed electricity and steam. The total electric demand reached 3,700 kWh. The annual electric demand reached 12 million kWh.

   The techno-economic survey included detailed process analysis, measurements and follow-up, and planning of advanced concepts such as storage, interaction of power and heat, computerized control, etc.

   Up to 2 million killowat-hours can be saved by application of the survey results.

2. Medical Centers (Shiba, Meir/Sapir, Yosephtal, Rabin/Beilinson, Carmel, Ichilov)

4. Strauss Dairy Company in Naharia
5. Canning Companies (Yachin, Pricuz, Rimon)
6. Paper Industries (American-Israel at Hadera, Sufra at Lod .
7. Israel Air-Force
8. Chemical Industries (Dead Sea, Machteshim, Brom, Orlite)
9. Hi-Tech (Intel, Motorola, Tadiran, Telrad)

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Samples of Energy-Economical-Technical Surveys & Feasibility Studies Implementation Results

Following samples of energy-economical-technical surveys & feasibility studies implementation results:

1. ***K.A.N. Industry (Textile industrial facility for dyeing & canning/finishing) at the new industrial zone, Rishon Lezion, Israel***

   A survey was performed during 1988-89 in order to study the energy and economical potential of Cogeneration (CHP- Combined Heat & Power). The survey and study indicated high potential. As a result CHP project was design and implemented with the following power and capacity data:

   Electrical rated power : 1200 KWe
   Heat rated power : 1100 KWth
   (hot water at 40 & 80 deg C : up to 450 M^3/day,
   steam at 8 bar : up to 700 Kg/hr)

   The project is in operation since 1992. Energy saving (acccumulated): up to 28 million KWh, above 2,400 ton of heavy fuel. Total national fuel saving (electricity and heat): above 3,200 ton of fuel. Additional benefits: processes time saving:10%, consumed water saving: 10%.

   Economical benefits (accumulated): above 1.1 Million of US $. First Cost: 1.1 Million of US $. Payback period (brute): less than 6 years.

   The project was recognized as a “Demonstration Project” by the Israeli Ministry of Energy & Infrastructure (currently: the Ministry of National Infrastructures) and a Private Electricity Producers (excess electricity is supplied to the national electrical grid). 19% grant of the investment cost was supplied by the Ministry of Energy and Infrastructure (15%) and by the Ministry of Industry and Commerce (4%) due to the recognition as a “Demonstration Project”.

2. ***The National Israeli Wind Energy Program***
   As the leader and coordinator of the Wind Energy Program at Israel (1980-1990) I managed many energy surveys all over the country. As a result. Wind potential mapping (up to 1,000 Mwe) and wind turbine projects were performed (up to 7 Mwe).

3. ***Energy Management & Control System (EMCS) at Motorola, Israel***
   An energy survey was performed at 1990-91 in order to increase the efficiency of the central chilled water and air conditioning system (cooling capacity of 1000 TR) at Motorola Communication Headquarters building, Israel. As a result an EMCS (energy management & control system) was performed. The total investment was 25,000 US$. Annual energy cost saving was 12,000 US$.

4. ***Central Solar System for Domestic Water Heating at Kibbutz Kfar Blum, Israel***
   An energy survey was performed at the hotel campus during 1989. As a result a central unique solar system, integrated with backup hot water boilers, was erected in order to supply the hot water demand to the Kibbutz (up to 60 M^3/day).