

FROM WORLD POWER CONFERENCE TO WORLD ENERGY COUNCIL

90 YEARS OF ENERGY COOPERATION, 1923-2013

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WORLD ENERGY COUNCIL

CONSEIL MONDIAL DE L'ÉNERGIE

For sustainable energy.

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FOREWORD

When playing with the idea to refresh WEC's history, four thoughts really kept the wheel spinning.

First, energy has been a defining driver of the industrial history of humanity. The World Energy Council as it is now known, has existed since the early ages of electrification, is older than the UN, and has been the social network of energy thought leaders during its entire existence seeded in 1923.

Then, we define ourselves often through our actions and our network but it is by studying our history that we learn who we truly are. Or, as Cicero wrote: "Our background and circumstances may have influenced who we are, but we are responsible for who we become." [Cicero, Rome (106-43 B.C.)] I do believe that WEC or any institution can only be strong and fulfil its mission if we know and understand our identity.

Third, since the assumption of my role of Secretary General over four years ago, I have been privileged to meet many wonderful WEC personalities who are part of the recent history of their own countries, through their work as energy thought leaders, business executives or government ministers. Missing out on the opportunity to give these leaders a voice in WEC's history would simply be a loss. Similarly, it will be immensely interesting and useful to know more about the role of our national member committees and other members in the story of the WEC, and I applaud colleagues who are starting to reconstruct the histories of their national bodies. This booklet serves as a point of entry into our rich history, and WEC and I are grateful to the three historians – Rebecca Wright, Dr Hiroki Shin and Prof Frank Trentmann – for writing and researching the pages that follow, building on existing work carried out by Prof Ian Fells.

It is for these reasons that it is our noble duty to keep WEC's history alive and up-to-date in a context where we are looked at as an impartial lighthouse for thought-leadership by many energy leaders.

Dr Christoph Frei
Secretary General, World Energy Council

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BIRTH

In the summer of 1924 H. G. Wells visited the British Empire Exhibition at Wembley, London. For Wells, renowned for his journalism, science-fiction writing and socialism, a lot of the charade was 'quite absurd', but he was pleasantly surprised to discover 'a strong breath of human common sense' at the Exhibition. That common sense, Wells explained, was the First World Power Conference, which had been called together by the British Electrical and Allied Manufacturers Association (B.E.A.M.A.) to consider the future of energy resources. Instead of the 'stuffy, foggy conceit' of the British Empire, Wells continued, the Conference was truly global in spirit. Even the Prince of Wales, who gave the opening speech, met Wells' approval. The speech commended the Conference as a significant step towards removing 'one of the greatest obstacles to progress' arising from the disparity in the utilisation of knowledge: while searching for knowledge – in finance, science and research – was a universal activity, its results were unevenly distributed and utilised. Wells felt that the Prince of Wales left behind his usual 'imperialist egotism of the narrower sort of English' for a genuinely internationalist vision. Wells quoted the Prince's words at length:

You have before you in the reports submitted to the World Power Conference, the raw material for a survey of the power resources of the world; you can now explore many countries which have hitherto been veiled in mystery, and assess at their true value the possibilities of an immense industrial development in many of them; you may, from this material, erect the structure which will go beyond the confines of one country, or group of countries, and include all those parts of the world where man can hope to prosper. International cooperation may emerge from the realm of the ideal into the realm of practical utilisation as the result of your deliberations, and I sincerely trust that full success will attend them.¹

The Wembley meeting was the birth of the World Power Conference (WPC). Following the conference a permanent committee was established in 1925. This

committee would go under the name of the World Power Conference, until it was renamed the World Energy Conference in 1968 to reflect the broadening of the energy perspective beyond primary fuels. In 1989 it was retitled the World Energy Council (WEC) and the WEC Foundation was established. In 2001 under the leadership of the then Secretary General Gerald Doucet, WEC was incorporated as a charitable trust.

This booklet looks back on the eventful history of the WEC to commemorate the history of one of the oldest international bodies in the world but also to reflect on its role at the crossroads of domestic and international politics and cultural and social change in the transition from an age of empire to the present age of climate change.

FOUNDING IDEALS

The World Power Conference of 1924 was one manifestation of the search for a new international order after the upheaval of the First World War. The war shook faith in the basic tenets of liberalism that had defined the Victorian order and upheld national sovereignty as a pillar of liberty. The submarine war, dependence on foreign wheat and raw materials, and the creation of inter-allied shipping and controls all pointed to the precarious nature of national states in an interdependent world. Peace in 1918 was followed by calls for a new international order in which global organizations would steer and regulate potentially sensitive areas of international life and trade. 'New internationalists' offered the following diagnosis: economic globalization in the nineteenth century had outpaced national politics. Political institutions now needed to catch up and develop the capacity for international exchange and regulation with a set of new bodies that could see and act above those of nation states.

Energy was among the most explosive subjects in international relations, and the World Power Conference was a major experiment in the emerging new internationalist laboratory. One critical question concerned the precise balance between national and international powers in the new organization. Realists were ready to accept the persistent strength of national political institutions and hoped that an international energy body would act as a clearing house for information that would over time develop a shared international mindset. Radicals wanted to go further and looked towards an international organization with its own supra-national institutions and powers to act. Some new internationalists saw the British Empire as a stepping stone to such a new world authority. It was such a vision that made the 1924 World Power Conference so entrancing to H. G. Wells. He felt it was 'hoisting the flag of the world-State over all the Imperial flags' fluttering at Wembley.² History would prove this prognosis to be far too optimistic. Indeed, the following ninety years showed the efforts required by the first world energy body to steer between the forces of nationalism and globalization.

The World Power Conference was born amidst many sightings of an incipient world unity. It came on the heels of an 'International Shipping Conference'.³

Just a few days after the power conference opened, the Italian Senator Marconi read a paper at the Royal Society of Arts and discussed how a new technology (the development of short-wave radio) would bring about 'the unity of world thought and opinion'.⁴ Lord Reith, managing director of the recently formed British Broadcasting Corporation expressed a similar argument at one of the WPC panels: by 'cast[ing] a girdle around the earth' the wireless 'ignores the natural barriers which estrange mankind.'⁵ The international gathering of scientists at WPC was after the same goal as the radio: both organizations were seeking to create a 'unity of world thought' through a meeting of minds on all matters relating to energy and its application.⁶ It would be, as many hoped, a technological 'League of Nations'.⁷ In 1930, at the opening of the WPC conference in Berlin, the German President, Paul von Hindenburg reminded the audience that 'on its foundation the World Power Conference was called the "Technical League of Nations" and nothing is indeed better calculated to league together the nations of the earth than a mutual endeavor of this kind to further the common weal.'⁸

The main inspiration behind the World Power Conference was Daniel Nicol Dunlop. The establishment of an international organisation that could stand above politics had been one of Dunlop's principal objectives for organizing the event. Born in 1868 in Kilmarnock, Scotland, Dunlop was a visionary leader in the field of occult science and central in the formation of the British electrical industry. He was an early member of the Alchemical Society, the Theosophical society (editing the journal *The Path*) and later became Chairman of the British Anthroposophy society. Having spent a period in Ireland in his youth, where he befriended the Irish poet W. B. Yeats, he crept into the pages of James Joyce's *Ulysses* as 'Dunlop, Judge, the noblest Roman of them all'.⁹ He would later recount that his first contact with electricity had been through writing a series of sixteen articles on the subject in response to the World Exhibition in Paris in 1889.¹⁰ These well-received articles brought him into contact with the Westinghouse American Electrical Company. In 1896, Dunlop joined the publicity department of the same company. He worked there until 1911, when he helped found B.E.A.M.A. and subsequently became the first Organizing Secretary and later its Director.¹¹

Although Dunlop's role in the electrical industry may appear ancillary to his leadership in the then fashionable world of the occult sciences, both positions were complementary. He was deeply influenced by the German philosopher

and social reformer Rudolf Steiner. Steiner's concept of the Threefold Commonwealth held that practical solutions could not be disengaged from the spiritual plane. The three fields of the social order – culture, politics and economy – needed to function as autonomous bodies, Steiner believed. Dunlop followed this train of thought and first laid the seeds of the World Power Conference in 1916 in his book *British Destiny: The Principle of Progress*.¹² His book was aimed at businessmen and economists as well as the occult disciples looking for observations about the spiritual essence of the human being. Dunlop put forward a spiritual proof for the requirement of co-operation between nations in the management of energy within the world. Energy, which spilled over national boundaries, he argued, could not be governed through national political directives. The correct balance between individuality and co-operation, Dunlop maintained, was essential within the biological organism, and so too would it be in the enhancement of world unity. He looked to the British Empire to take the reins to enhance vital co-operation and greater unity.



D. N. Dunlop

Source: World Energy Council

Dunlop would pursue this ideological goal as Chairman of the Executive Council of the WPC. Following the disasters of the First World War, Dunlop believed, the idea of national power had to be relinquished. Power, in party political and national terms had to give way to considerations concerning the power of nature, which did not belong to any single individual, but transcended personal, as well as national points of views. Despite the early success of the WPC, Dunlop always perceived the organisation as the seed of a larger, more-

expansive life-long project, which he termed the World Economy. In fact, Dunlop had originally wanted to found a World Economic Conference, as opposed to a World Power Conference. However, he reasoned against it and confessed to an intimate friend:

I could see clearly that it was impossible to bring together politicians, and as all the important economic decisions are in the hands of politicians, it was hopeless to found an international economic body as a first step. But it was possible to bring together human beings in the field of technical questions, and so I started there. But I always had in mind the idea of enlarging this body of engineers to a body of experts of all branches of industry and agriculture. I wanted not only to include the producers and distributors but also the consumers and consider their point of view.¹³

In 1932 Dunlop actively revisited his earlier dream, recruiting the Austrian philosopher W. J. Stein to come and work at the central office of the World Power Conference, then based at 36 Kingsway, London, to begin preparation for the establishment of the World Economic Organisation. In 1935 the pair began a journal published under the auspices of the WPC, entitled the *World Survey*. The *World Survey* was to act as a mouthpiece for this new project. It would collect and display information on economic matters purporting a truly global and interdisciplinary perspective. The viability of such an ambitious journal had been discussed at the 1934 International Executive Council Meeting, with the suggestion that it should be affiliated closer to the WPC; the title 'The Journal of the World Power Conference' was put forward as a workable alternative. Dunlop, however, stressed that the journal should maintain its autonomy as he did not want it to be the official mouthpiece of the organisation.¹⁴ When the first issue appeared it contained an article by Dunlop entitled 'Power-Mankind-Economics'. Alongside there were articles on other topical subjects such as 'The Increasing Production of Labour' and the question of world wage distribution.¹⁵ The opening article in 1935, 'World Unity and World Problems', promised that:

The dominant characteristic of the present situation is the fact that the world has now become so inextricably linked as to be virtually one unit, and if economic problems are now of greater importance than ever before, it is to this fact that we must look for

a reason and for the explanation of the inadequacy of purely national remedial measures.¹⁶

Although Dunlop had hoped to reveal his plans for this project at the 1936 Third World Power Conference in Washington, by-way-of a keynote address delivered by Stein, this was never realised due to Dunlop's death at the age of 66 in 1935.¹⁷ This also spelled the end of the *World Survey*, which was shortly to be discontinued due to financial problems.¹⁸ In 1937 Stein sketched 'an outline of the second step planned by [his] friend D. N. Dunlop' in a special issue of his own follow-on journal *The Present Age*, entitled *The Earth as the basis of World Economy*.¹⁹ Although the entirety of this project would be compressed into this hundred-page pamphlet, the ideals of the World Economy lived on through WPC.



Official dinner at the First World Power Conference, London, 1924
Source: German Member Committee

The first World Power Conference offered an unprecedented global view of energy. During the first two weeks of July 1924, 1,700 delegates from 40 countries met in the Conference Halls at the Palace of Engineering, a huge sprawling concrete building on the site of the Empire Exhibition for the First World Power Conference.²⁰ The venue covered many acres packed with machinery. One journalist described how 'Stephenson's old locomotive stands by the side of the newest oil-burning monster, and where other marvels of

modern engineering contrast sharply with the primitive models drawn for exhibition from dusty corners of museums.’²¹ Following the devastation caused by the First World War, the future direction of the evolving electrical supply industry was uncertain, and it was up to the assembled group to discuss its future. The journal *Science* reported how more than four hundred papers were presented at the conference under headings such as: ‘Power Resources, Power Production, Power Transmission and Distribution, Power Utilization and General’.²² Papers were wide ranging and covered topics which traced everything from particular scenarios such as the ‘Economic Importance of Norwegian Water Power’ to the general ‘Effect on British Empire of Power Development’. The utilities giant Samuel Insull provided a ‘Regional Power review of the Central States of the United States’. A paper on the ‘Development and Use of Power in Southern Rhodesia for Industrial and Domestic Purposes, with particular references to Electric Power’ offered another perspective. Other talks discussed ‘Power applied to Road Transport’, ‘Electric Power Plants in the Textile Industry’ and ‘Electro-farming Economics’. “General” panels considered financial, legal aspects, as well as questions for research, standardization, education, health and publicity. Julius Barnes, President of the Chamber of Commerce of the United States gave a paper on ‘Power Development in Relation to Human Progress’. J. Beauchamp, director of the British Electrical Development Association analysed ‘The Place of Publicity in the Public Service of Electricity Supply’, while Herbert Hoover, Secretary of the Chamber of Commerce in the United States outlined ‘Government Policies in Relation to Power Development and Distribution’.²³

To bring together such truly global expertise, national political differences had to be put aside. The diplomatic feat of assembling both German and Russian delegates at an international conference for the first time since the war was a step in the right direction. In the preface to the conference transactions, Dunlop outlined the objective of the conference:

The nations of the world after the great war revealed the need for a conference of practical men, scientists, engineers, manufacturers, financiers and politicians, to consider the utilization of the forces of nature, in the light of a new internationalism, and to attempt to discover a means by which the nations of the world might be preserved from

the constant actions and reactions of past history, and might all advance together.²⁴

Despite Dunlop's intention of raising the conference above politics, the inclusion in the conference program of stanzas from Rudyard Kipling's poem 'The Sons of Martha' would have reminded delegates that geopolitics had not completely been suspended.²⁵ The poem was a traditional ode to the prowess of the engineer, yet these celebratory lines also came from the 'prophet of British Imperialism', in the words of George Orwell. There was a grey zone between British imperial power and internationalism.

Responses to the conference ranged from gratitude for Britain's initiative to suspicions of British imperial interests. F. V. Hansen, the Chairman of the National Committee of Sweden, reminisced how 'all of us learn in our earliest lessons in geography, that Great Britain with her Dominions is a world power'.²⁶ The American magazine *The Living Age*, by contrast, expressed trepidation over the British motives for organizing the conference in the first place. It was impossible to forget, it wrote, that Great Britain was one of the old coal producing countries, now rapidly churning through her stock.

Clinging as she does to traditional methods of power-generation, she is obtaining, according to expert figures, less than four percent of the energy theoretically available from the coal, water and oil she consumes, while Switzerland, without coal and forced to resort to up-to-date economies, is utilizing profitably more than thirty six percent of her power.²⁷

Due to the imminent swing of power away from the old 'coal-producing nations towards countries who had more effective means of producing power', the magazine concluded, Britain had high stakes in the subjects discussed at the conference. It is no surprise then that one of the early sessions of the conference concerned the 'British Empire and USA resources', highlighting the importance of the colonies for Britain's future prosperity. The Australian delegate, Russell Sinclair pointed to his own 'country's vast reserves of power', suggesting that Australia, still in its infancy as an energy exporting country had a lot to offer the world, and would find this conference very important in determining how to direct its destiny.²⁸ However, despite the obvious benefits of pooling information about colonial reserves, the Colonial Office remained concerned as to whether the conference might be overly technical to directly

benefit it. Instead, recognizing that the Crown Agents had a lot to do with power plants in the colonies, the Colonial Office sent out invitations to organize representatives from the colonies.²⁹

Notwithstanding such scepticism, the First World Power Conference was a huge success. The prestigious journal *Science* called the event 'the most notable gathering of its kind ever convened'.³⁰ Following the conference a permanent organization was formed. In 1925 the International Executive Committee met in London to draft a constitution. The industry journal *Electrical World* reported on how the organizers firmly set out the guidelines for the WPC. It was decided that 'the central office [was] to be nothing more than a clearing house for the interchange of information on all matters relating to the development of power resources.'³¹ The importance that the central organization be the creature of national committees was also stressed. To enforce this an International Executive Council was formed. This council, which met annually, was the authoritative power within WPC. It was up to each National Committee to elect representatives who could best represent the energy interests of their country. The Chairman was chosen by the Council the year preceeding the plenary session and would remain in position for the following three years. He could only be reelected twice. Three Vice-Chairs would be appointed in the same way. However, it was stipulated that no more than two of the four officers (including the Chairman) could be subjects or citizens of the same continent.³² To maintain neutrality it was decided that the National Committee of the next plenary meeting should be responsible for appointing the President from the leaders of the power sector.

Despite the objective of distributing power by way of the International Executive Council, the organisation did not always adhere to the ideals set out in the constitution. Each national committee contributed what they could reasonably afford to the annual budget to run the Central Office. However, with the Central Office based in London and with Great Britain being the largest donor to the annual finances (along with the United States, USSR and France), influence was swayed towards the larger industrial powers. In 1939, India only contributed £20 compared to the £150 each donated by Great Britain, Russia and the USA.³³ Geopolitical power was reflected in WPC through financial influence. This was despite a general consensus amongst the delegates that no stigma should be attached towards countries that paid less, as long as they covered the required amount.³⁴ Within these limits, the constitution of the WPC

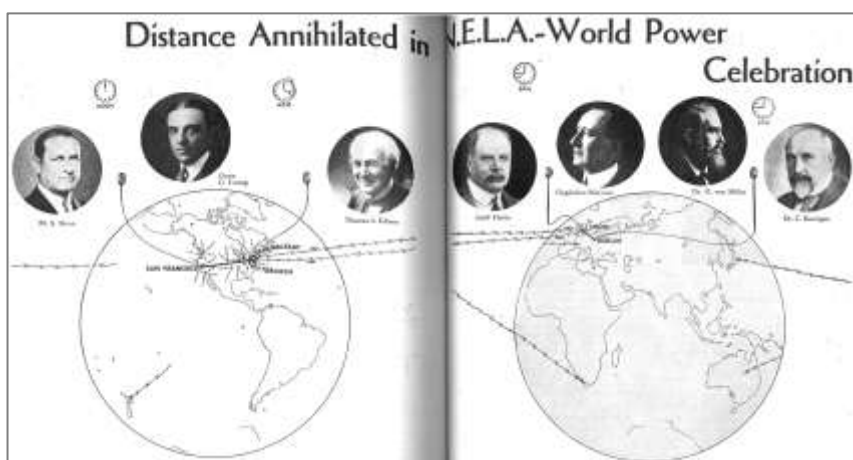
nonetheless provided a structure that enabled nation states and their national committees to preserve their autonomy vis-à-vis the body's central organisation. This structure, it was hoped, would prevent the Conference from growing into an overbearing superorganization.³⁵

Resistance against a federal structure or world state also manifested itself in the WPC's opposition to rival international engineering bodies in the inter-war years. In the early 1920s, several countries had addressed the United States with the hope of forming an engineering alliance.³⁶ One of the most effective projects in this respect was proposed in 1921 by a Czech civil engineer, Stanislav Špaček, and Bedřich Štěpánek, the envoy to the United States. In conversation with American engineers they called for the establishment of a transatlantic body, the World Engineering Federation (WEF).³⁷ WEF would champion a 'technocratic internationalism' to compensate for the supposed rejection of scientific and technical advice during the recent peacekeeping treaty at Versailles. This called for engineers, not politicians, to assert technological rather than political cooperation between nation states.³⁸ While the WEF might seem to be in line with WPC's original mandate, the WPC did not support its establishment, nor its first nascent project, the European Engineering Federation (EEF).³⁹ Quite the contrary, the WPC became one of its most vocal critics in the 1930s. Representing its industrial members, WPC rejected the 'technocratic internationalism' proposed by WEF and committed itself instead to 'engineering internationalism'.⁴⁰ This would involve the formation of an international network for the exchange of engineering knowledge.⁴¹ In Berlin in 1930, the WPC publicly criticised WEF for leading 'to the duplication of activities and over-organization of international work.'⁴² In 1932, the WPC circulated a note forbidding national committees to be involved in WEF. The issue was mooted the following year, at the Stockholm meeting.⁴³ WPC resistance ensured that the EEF and WEF would remain unrealised projects before the Second World War.⁴⁴

The WPC's hostility to WEF reveals its own self-understanding at the time. Instead of an international body with powers of control, it championed co-operation and knowledge exchange. This included support for new transnational networks and modes of communication. During the Second World Power Conference in Berlin in 1930 one item on the entertainment list offered a practical demonstration of how a new international engineering body might function. After a lavish banquet on Wednesday night, where delegates

consumed a formidable 10cwt of turtles (for the soup), 2,000 chickens and 6,000 bottles of wine (2,000 Moselle, 2,000 Bordeaux, and 2,000 Champagne),⁴⁵ the audience was treated to the first international conference call. The journal *Electrical World* reported the event, noting how on this night 'The Ends of the World were brought together at noon Pacific Coast Time (9 p.m Berlin Time), June 18, when speakers in London, Berlin, West Orange, N.J., and San Francisco simultaneously addressed the NELA [National Electric Light Association] convention in San Francisco and the World Power Conference in Berlin by combined wire, cable and radio telephone messages'.⁴⁶ Into the Berlin meeting room Senator Marconi's voice was transported from London and Thomas Edison's echoed from New Jersey. Concurrently, in Berlin, Lord Derby, first president of the World Power Conference could be heard as far away as Japan, Australia, and New Zealand as the conference was projected around the world.⁴⁷ The conference call fulfilled the earlier promise of the Welcome Address that:

When the voices of friends and colleagues from beyond the seas are at this moment made audible to us on the swift wings of the ether, we cannot but marvel at such a wonderful engineering feat of inventive genius. The voices tell us that they are one with us in aims and sentiments, and reveal to us, better than anything else could do, that the whole human race has been transformed into one great family through the medium of the ether for a better and lasting understanding.⁴⁸



'Distance Annihilated in N.E.L.A.-World Power Celebration'

Source: *Electrical World*, 21 June 1930, p. 1257

Courtesy of the Institution of Engineering and Technology Library

Another project of this type had been proposed in a keynote address presented at the conference by Dr Oskar Oliven, the Director-General of the *Gesellschaft für Elektrische Unternehmungen* (GESFÜREL) in Berlin, who discussed the establishment of a new network to connect the electricity grids of Europe. This was not the first time this subject had come up at a WPC event. A whole panel had been devoted to cross-border collaborations in the electrical industry at the 1926 Conference in Basel, Switzerland.⁴⁹ The European electricity system Oliven envisioned would cross-over national borders and consist of five lines. Three lines would structure the north-south grid. Two lines would run east-west.⁵⁰ This grid, he explained, would not only provide a valuable infrastructure, but would help consolidate peace by forming a community of interests.⁵¹ The matter was referred to the Communications and Transit Organisation of the League of Nations. When a subcommittee (the Committee on Electric Questions) was set up at the League to deal with electricity problems, a representative from the WPC was invited to discuss the facilitation of this European network.⁵²

WPC's vision of international exchange and interdependence were thus clearly recognised by other international organisations like the League of Nations. Rather than seeking technocratic authority to match political power (as WEF tried), the WPC took its mission as nurturing and mediating international communication, exchange and discussion. The mission assumed growing importance in a world where energy resources increasingly contributed to international tension and conflict.

VISIONS OF PLENTY AT A TIME OF POLITICAL CONFLICT

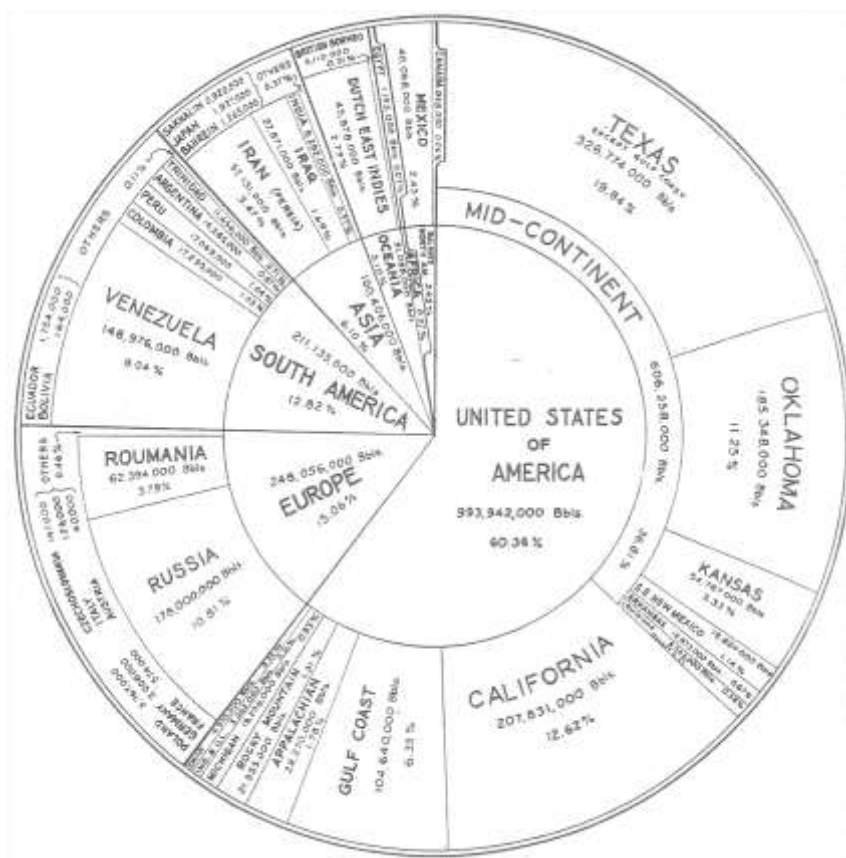
At the Second World Power Conference delegates were offered a stellar programme of entertainment. On the opening night, Sunday, 15 June 1930, Albert Einstein, the noble-prize winning physicist and father of relativity theory, gave a paper on 'The Physical Space and Ether Problem'. Its complexity, *The New York Times* joked, left '4000 bewildered'.⁵³ Towards the end of the conference on Monday 23 June, the British Astronomer Arthur Eddington offered a similarly beguiling vision for an energy future. 'I am going to tantalise you', Eddington told the audience, 'with a vision of vast supplies of energy, far surpassing the wildest desires of the engineer.'

We need not travel far to find this land of Eldorado, this paradise of power. The energy of which I speak exists abundantly in everything we see and handle. Only it is so securely locked away that, for all the good it can do us, it might as well be the remotest star – unless we can find the key to that lock. We know very well that the cupboard is locked, but we are drawn irresistibly to peep through the keyhole like boys who know where the jam is kept.⁵⁴

Eddington's speech spelled out new discoveries in sub-atomic physics. He evoked myths of the perpetual motion machine and the land of milk and honey.

While Eddington looked towards a golden future on the brink of discovery, the assembled delegates, however, were firmly lodged in the real world, amidst limits and dwindling resources. After all, Dunlop's principal objective in founding the WPC had been to establish a permanent body to collect data on the world's power resources, which was premised on the finite nature of energy reserves. At the First World Power Conference, in a talk on 'Coal Resources of the World', Richard Redmayne, the chairman of the Imperial Mineral Resources Bureau, radically downgraded pre-war estimates. Instead of those provided by the 1913 Twelfth International Geological Congress held in Toronto, which had estimated that the world's supply of fossil fuel (at the present rate of consumption) will suffice for 6,000 years, Redmayne suggested, that they would in all likelihood last no more than 1,500 to 2,000 years.⁵⁵ He estimated that the

United States had more excess coal than that contained within the entire British Empire – enough to run at the rate then for 2,000 years. British coal was much less plentiful and would be exhausted in 600 years. For others, the prognosis was worse. France would soon be forced to rely on imported coal, and Switzerland would have dug up all of its domestic coal in a few years. Redmayne was also convinced that the world's mineral oil resources would be completely exhausted within 100 years, if not earlier – one of many wrong diagnoses of the peak oil problem to come.⁵⁶



The world's crude-oil production in 1936, from J. E. Pogue, 'The economic structure of the petroleum industry of the United States',

Source: *Transactions: Third World Power Conference* (1938), vol. IV, p. 224

In 1929 the WPC published the book *Power Resources of the World*. It was compiled by Hugh Quigley, who had worked under Dunlop at B.E.A.M.A between 1924 and 1930. In the preface, Dunlop marvelled at how 'only a few years ago any investigation which aimed at the assessment of the power resources of the world, would have been regarded as one of those pleasant

exercises in prophesy and vague description which only a statistician in his leisure moments would attempt'. Now he was proud to present a comprehensive account of power resources. Despite this optimism, the book stressed the difficulty of the project. Throughout the text Quigley discussed the problems of estimating the total power resources of the world, accusing previous attempts, by eminent figures such as Professor Svante Arrhenius, for having been purely academic.⁵⁷ He criticised the extreme discrepancy between the projections of the Toronto Geological Congress, World Power Conference papers, and those of Dr Van Heys. As the estimates of coal reserves ranged from 5,835,000 million tons to 10,800,000 million tons, the scope was far 'too wide to allow any of these calculations to be of value.'⁵⁸ Quigley singled out a particularly inaccurate paper submitted to the 1928 WPC sectional gathering, known as The Fuel Conference by the American delegate Dr Gustav Egloff who had optimistically pointed out that geologists predicted oil discovery to be a possibility in 1,100,000,000 acres of the United States, 56% of the total land area of the US alone. This fantastical appraisal, Quigley suggested was typical of the calibre provided by American estimates that 'have been shown repeatedly to be completely inadequate.'⁵⁹



'Power Resources of the Nations of the World'

Source: *Electrical World* 84.11 (1924), p. 512

Courtesy of the Institution of Engineering and Technology Library

Not only were coal and oil estimates way off, but Quigley pointed out, no attempt had been made to carry out a survey of coal resources since the First World War. 'As Austria and Hungary, as defined by the Geological Congress

Reports, [had] ceased to exist', a survey based on the new geographical borders was urgently needed.⁶⁰ The problem was not only practical but political. When it came to a survey of the world's oil, it was obvious that due to the few 'international combines that dominate the market, it would be dangerous for a number of countries to disclose their oil resources if they had any real knowledge of them, while experts attached to these great combines are surveying the entire world for oil possibilities.' With this in mind, he concluded, 'any statistics' would probably be 'totally inaccurate and have their real basis in propaganda'.⁶¹

Despite these pitfalls, Quigley pressed for monthly statistics of the electrical outputs from the main countries and for annual statistics for the principal countries notwithstanding their likely inaccuracy. Between 1936 and 1957 (with a break during the Second World War), the *Statistical Yearbook of the World Power Conference* continued to publish this information.⁶²

IN THE PUBLIC EYE

Such information gathering made visible the state of national and global energy supplies in a whole new manner. These were no mere statistical exercises though. They triggered more general discussions about future ways of life, feeding new visions of comfort and emancipation. At the same time, they also sparked conflict about who should own and control the fields of energy that were waiting to be opened up. Inevitably, it meant the World Power Conference attracted the interest of a wide range of social factions, including women's groups and social reformers. It also ensured it would be the target of political critics.



Opening meeting of the Third World Power Conference, Detroit, 1936
Source: *Transactions: Third World Power Conference* (1938), vol. I, p. 136

A press dispatch from the Third World Power Conference in 1936, held in Washington, reported how the conference intended to 'make life as simple as pressing a button.' Two recent advances on show at the conference had proved this: a steam engine run by sunlight and an electric dictating machine. 'Both machines', the journalist added 'are in working order, ready to put an end to winter coal bills and supply a stenographer who doesn't chew gum and can't misspell.'⁶³ The former instrument, the 'sun-machine' invented by Dr Charles Greeley Abbot, Secretary of the Smithsonian Institute in Washington, was a

small solar motor driving a steam engine. The latter invention, the so-called 'robot secretaries', referred to new 'electrical stenographers' and involved a microphone and wax speakers. At the conference these managed to record 'close to 700,000 words in English, German, and Spanish'. The accompanying exhibition staged at the Smithsonian Museum, the 'Panorama of Power' contained many miniature models that pointed to the new 'push button life'. One exhibit, which illustrated the living habits of a typical 'Detroit citizen', marked on three-dimensional electric current loads: the time the city went to bed, when it had breakfast, and when the factory wheels started to turn.⁶⁴ The message delivered in the exhibition was plain: it was the public that would be the chief beneficiary of the 'push-button-life'. Energy-related technology permeated into private homes and its influence was increasingly reaching beyond the world of experts and politicians. In the expanding sphere of energy utilisation, the WPC continued to be an important site for public discussion and experiments with new technology.



'Sun refuses to be harnessed', a special demonstration of Charles G. Abbot's sun ray machine to delegates from the Third World Power Conference, Detroit, 8 September 1936

Source: Library of Congress Prints and Photographs, LC-H2- B-11134 [P&P]

The Third World Power Conference opened amidst a storm of controversy. The year before, there had been a five hour Republican filibuster in the Senate to thwart the gathering in Washington. The conference fell right in the middle of

the re-election campaign of the Democratic incumbent President Franklin D. Roosevelt. As Roosevelt's campaign centred on energy matters, espoused in New Deal projects such as the Tennessee Valley Authority, the WPC was seen as an advertising mill for the president's progressive vision of America. Republican Congressman, Bertrand Snell expressed his strong antagonism in the press, 'the only reason I can see for calling this conference is to bring together a bunch of long-haired socialists who advocate government ownership by power companies.' He added, 'that may be a campaign issue next year and if it is, we don't need any help from a lot of foreigners to settle it.'⁶⁵

At the previous plenary session in Berlin the WPC had already become a political battleground between rival advocates of private and public control of the world's energy systems. This scuffle had caused an embarrassing publicity episode, when the Chicago utilities magnate Samuel Insull had requested the American Ambassador Frederic M. Sackett to withdraw his speech from the conference in which he attacked private utility companies.⁶⁶ Although Sackett initially complied, Democratic Senator George W. Norris of Nebraska eventually read out Sackett's speech in the Senate in protest of Insull's censorship. In no other industry, the speech said, was the 'sale price of the product to the great mass of consumers ... fifteen times the actual cost of production of the article sold.'⁶⁷ The attempt to censor critics like Sackett, Norris argued, proved the monopoly of the power companies, not only within the WPC, but in the life of the nation as a whole. He added:

That Samuel Insull, who at one time thought he had bought a seat in the United States Senate with money taken from the consumers of high-price power, this same Insull representing the power trust which has crept into the back door of schoolhouses, into lodges, women's clubs and farmers' organizations; this same outfit which has been crawling and creeping everywhere and boasting of its deceptions; this same man, now in Berlin, his activities becoming world-wide, approaches the American ambassador and tells him what he cannot say.⁶⁸

On the back of this, the 1936 conference was bound to be a political hot potato. As late as 1934, the WPC annual report registered trepidation over whether the invitation given in 1930 by the American National Committee still stood, or whether invitations from other nations should be considered.⁶⁹

In the end, the conference went ahead. During the inauguration ceremony, on 11 September, President Roosevelt pressed a button, which opened the last two valves of the Boulder Dam; a symbolic gesture aimed to convey the importance of the new federal power projects and what they could achieve. Since Roosevelt did not press quite hard enough on the device, it took a minute or two before the audience could finally hear the sounds of the Colorado River over the radio. Despite the technical glitch, the act reiterated Roosevelt's earlier speech. Energy development was too important to be kept in the hands of bankers, government officials or demagogues.⁷⁰ While there was growing anxiety about the devastating ends to which energy could be wielded – not least in alarmist speeches from Cordell Hull, Roosevelt's liberal Secretary of State – the conference agenda was dominated by the on-going debate whether private or state-run utilities should dominate the future of the electrical industry.

The conference itself had been organised by the progressive reformer, Morris Cooke, from the Rural Electrification Administration, who championed public ownership. Bankrupted by the Great Depression, Samuel Insull was absent from the conference, weakening the voice of the utility firms. With Insull out of the way, New Deal propaganda swept the conference. Newspaper headlines noted 'New Dealers Steal Centre of Power Stage',⁷¹ 'Utilities attacked at Power Meeting',⁷² and 'Uncle Sam in the Power Business'.⁷³ Some professional journals took a different line. *Electrical World*, which had a stake in the private utilities industry, concluded that, despite Roosevelt's call for public-owned utilities, the rest of the world trusted private initiatives to deliver the benefits of electrical technology.⁷⁴ The preconception that Europe was dominated by government ownership and had repressive attitude to private interests, it added, was wrong and had to be rethought: 'one after another the speakers emphasized the fact that publicly owned utilities are accorded no preferential treatment by government, and on the contrary, are required to behave like private enterprises as to taxes, accounting and performance.'⁷⁵

During the conference each country outlined their own philosophy. Germany called for a national power economy with common ownership of electricity and gas utilities. France, Hungary and Poland described their largely state owned systems. For all the tussle between the two schools of thought, Secretary of State Harold L. Ickes explained, what ultimately mattered was that 'cheap

power means a wider use of power, and a wider use in its turn means a higher standard of living and advancing civilisation.’⁷⁶



Gertrude Ruth Ziani de Ferranti (right) and Caroline Haslett (left) at the 3rd World Power Conference, 8 September 1936

Source: Library of Congress Prints and Photographs, LC-H2- B-11136 [P&P]

The conflict between state and utility companies was not just about economic competition, but about energy and social reform. From the inception of the WPC a variety of social groups had had a stake in the conference. The subject was of particular importance to the Woman's Electrical Association. Caroline Haslett, its director, was the one woman in the British delegation sailing to Washington in 1936.⁷⁷ Haslett had already spoken at the First World Power Conference, where she met the feminist labour reformer Dr Lillian Gilbreth.⁷⁸ Following the conference, the formation of a committee under the banner of the Women's Engineering Society (W.E.S.) was proposed to represent women's interests in the subject of electrification.⁷⁹ This would lead to the birth of the Electrical Association for Women. '[I]n spite of the propaganda and the work of the clever salesman,' she noted, 'there still exists a wide gap between the supplier of "juice" and the maker of electrical apparatus and the woman who is the potential customer.'⁸⁰ The women's committee would not only help reduce this gap. As electricity was helping to lighten the load of housewives around the world, it was also liberating women from the drudgery of household tasks. Electricity was

acquainting women more profoundly with the topics of the day leading to greater emancipation.⁸¹ Gertrude Ruth Ziani de Ferranti widow of the electrical engineer Sebastian de Ferranti, and mother to later WPC director Vincent de Ferranti, supported Haslett's claim. She advocated rural electrification so that the new 'labouring classes will rise to new heights, be better educated, better trained, better conditioned.'⁸² A model electric farm built by the WPC in nearby Virginia, in association with the Rural Electrification Administration, illustrated this. While not yet able to electrify farm hands, there were plenty of other achievements at the electrified farm, from fly shields to mask the cows to air conditioning, water warmers, and ultraviolet lamps to improve egg laying, all the way to percolators, irons, stoves, churns, clocks, waffle-irons, dishwashers, ventilating fans, dough-mixers and refrigerators in the home.⁸³ These inventions demonstrated the progress of the 'push button life'. They were also greeted for transforming the demographic make-up of the American Republic. T. Stewart Lyon, chairman of the Ontario Hydro-Electric Commission, told delegates that, thanks to television, boys would no longer drift from farms in order to seek entertainment in urban centre. As young men now found everything they needed in the home, television, he suggested, would raise 'a formidable barrier to the drift of rural population to the cities.'⁸⁴

WAR AGAIN

The Second World War interrupted both the implementation of international electricity plans and halted the activities of the WPC. During the war no annual reports were published, and between 1939 and 1945 the WPC remained largely inactive. Communication between National Committees became increasingly difficult. In 1940 Germany invaded Holland leading the German national committee to attempt to seize control of the WPC. The Germans intercepted a letter which had been sent by the Swiss delegate Dr Büchi to Mr Bakker, the Acting President during the war and previous Dutch Vice-President of the Executive Committee. In the letter Büchi offered his services to Bakker in the limits posed by Swiss neutrality. With the letter in their hands, the Germans pressed for Bakker to hand over the Vice Presidency to the then president of the German Committee, Fritz Todt, the Nazi engineer in charge of motorways in the Third Reich.⁸⁵ They also demanded that the Chairmanship and Central Office be relocated to Berlin. Bakker refused, leading Harold Hartley to resume his position as active president. When the International Executive Council met following the armistice in London in 1945 his act of courage won Bakker a round of applause. Thanks to Bakker, the WPC preserved its independence.⁸⁶

During the war Hartley had approached the Foreign Office about arranging a meeting in London, where many Allied governments had their headquarters.⁸⁷ Although the British Commonwealth Science Committee had submitted a report to the Foreign Office which detailed the importance of the WPC in providing statistical and technical information – invaluable following the hostilities for the control of fuel and power – the first meeting would have to wait until the war was over. On 20 November 1945, representatives from National Committees met in the Stephenson Room at the Euston Hotel in London. The group was an assortment of allied countries; half the faces were part of the “old guard” – the other new.⁸⁸ Although the problem was raised as to how the WPC was going to handle enemy countries, it was decided for the time being that limited cooperation with countries not administered by Allied Control Commissions was best. Delegates returned to the question the following year at the International Executive Council Meeting in Paris. It was agreed that inclusion should only be extended to the present members of the United Nations.⁸⁹

The key item at the 1945 gathering was to re-establish member committees, to organise the central office and to fix a post-war budget. After the war the Central London Office moved from its pre-war address on 36 Kingsway, London WC2 to 201-2 Grand Buildings, Trafalgar Square, London WC2. In the face of post-war inflation it was agreed to increase the budget to run the central office by roughly £200. Whilst in 1939 the actual expenditure on the Central Office Maintenance Fund had totalled £1,641, it was now estimated that the same costs in the post-war world would total around £1,850.⁹⁰ Great Britain, America, and Sweden all volunteered additional support to ease this financial burden.⁹¹ The meeting also considered whether the WPC might play an additional role in post-war reconstruction. While some delegates were in favour, it was eventually decided that the most valuable contribution for WPC would be the production of a new edition of the booklet *National Committees and Representations*. This would put the National Committees back in touch with each other and serve as a compact directory of the leading organisations and experts on fuel and power in each country.⁹²

After the war, the WPC successfully joined the new international order. In 1947 the United Nations granted the WPC consultancy status. Along with a plethora of organisations, including the Inter-Parliamentary Union, the International Committee of the Red Cross, and the International Council of Women, WPC representatives were granted admittance to the UN Council of Commission meetings. The consolidation of WPC's consultancy status was solidified in 1947 when the Economic and Social Council of the UN asked the WPC to put together a report on 'Fuels' and 'Power' for the Provisional Programme of the UN Scientific Conference on the Conservation and Utilization of Resources, to be held in the United States in 1949.⁹³

In the post-war years, the language of 'internationalism', which had dominated WPC's early years, increasingly jarred with that of nationalism. Tensions arose as WPC negotiated which nations should be recognised by the organization as members and permitted to form national committees. To soften the situation Harold Hartley, Chairman of the International Executive Committee, set about in 1946 to amend the constitution so as to open up membership to countries which had not yet been admitted to the United Nations. Pointing out that certain countries that had recently been at war, had been given full admittance to 'the non-political subsidiaries of the United Nations (known as the 'Specialized

Agencies'), Hartley suggested that, as the WPC was 'not strictly political', membership should be granted to them on this basis. In lieu of this, he argued, the following amendment should be made to paragraph C:

C. Other countries upon their admission to the United Nations or to the Specialised Agencies brought into relationship with the United Nations, pursuant to Chapter X, Article 63 of the Charter of the United Nations, to become eligible for membership of the World Power Conference.⁹⁴

Thanks to this amendment, National Committees began to re-form in the following years. Austria, Italy, Finland, Hungary, Turkey and Egypt were admitted in 1948,⁹⁵ followed by Iceland and Israel in 1950,⁹⁶ and Germany and Japan in 1951, at which point the number of national committees totalled forty.⁹⁷

Inevitably, the WPC also had to accommodate itself to the transfer of global hegemony from the British Empire to the new superpower, the United States. Accusations of imperial self-interest were now directed at the American National Committee. The war in China and the establishment of the People's Republic of China (PRC) in 1949 brought new divisions. The PRC withdrew its membership from WPC in protest of Taiwan's representation on the International Executive Council. In a 1959 letter to WPC Secretary C. H. Gray, Liu Lan-Po (the President of the Committee of the People's Republic of China) blamed the International Executive Council for being compliant with the U.S. imperialist plot of creating 'two Chinas'.⁹⁸

THE SPECTRE OF ENERGY INSECURITY

WPC's life during the cold war was shaped by two major challenges: how to escape energy shortages and what to do about nuclear power. Often the two proved inseparable. The prospect of atomic energy had already been discussed at the very first World Power Conference in 1924, but only in passing, and was brushed aside as merely lying 'in the womb of the future'. Solar power, interestingly, had been given more detailed consideration, including the idea of storing solar energy by cultivating plants in the tropics.⁹⁹ After Hiroshima and Nagasaki, the topic of nuclear energy was inescapable.

At the first International Executive Council meeting after the war, a committee was established to discuss the utilisation of atomic energy for industrial and domestic purposes, leading to the formation of the Atomic Energy Committee.¹⁰⁰ However, although during the following years candidates were gradually put forward and correspondence ensued, the first formal gathering of the committee would have to wait until the Fourth World Power Conference held in London in 1950.¹⁰¹ Despite this somewhat protracted development, in 1954 the then Chairman of WPC, Vincent de Ferranti, foregrounded the importance of nuclear energy for the development of the organisation. He did this in a letter to the Chairman of the American National Committee following an announcement in the British press, noting President Eisenhower's intention of holding an international conference on the peaceful use of atomic power.¹⁰² Ferranti had the idea of proposing the World Power Conference as a platform for discussing the subject. Despite the 'bad memory' of the fractious 1936 Washington meeting, Ferranti felt strongly that the WPC 'really ought to be at the centre of these developments, which will have such importance for the future.'¹⁰³

As Ferranti pointed out, a panel had already been dedicated to the application of nuclear power during two post-war conferences. Papers had been given in 1947 at the Sectional meeting in The Hague, and a panel had been established at the Fourth plenary session, which met in 1950 in London.¹⁰⁴ The 1950 conference registered the growing anxiety caused by depleting reserves of coal and oil. Natural gas and atomic energy were the new sources put forward as a

solution to future shortages. During the panel on atomic energy, Harold Hartley acknowledged the difficulty of discussing matters of top security at a time when political tensions were at boiling point.¹⁰⁵ To complicate things further, the panel was to be attended by three Russian delegates. This was a controversial step at the beginning of the cold war. Although it was agreed to bracket discussion of the atomic bomb, Professor V. A. Golubstov, leader of the Soviet delegation, openly challenged Ward F. Davidson, a research engineer of the consolidated Edison Company. Davidson had argued that the use of atomic energy for peaceful purposes could only be feasible in the case of waste material caused from the production of atomic bombs. Golubstov attacked Davidson. Unlike the United States, he said, the Soviet Union would only develop atomic energy for peaceful purposes and not for the destruction of mankind.¹⁰⁶ Golubstov's outburst met with silent applause from a few of his colleagues, and the room erupted as other delegates sprang to Davidson's defence.¹⁰⁷ This exchange was of such interest and importance, an almost verbatim report of the discussion was published by the WPC as a separate pamphlet.¹⁰⁸



Opening ceremony of the 7th Plenary Meeting of the World Energy Conference, Moscow, 1968.

Source: *Annual Report*, 1968

Rapid industrial growth during the Trente Glorieuses (1950s-70s) added to the pressure on energy resources and created new vulnerabilities for Western industrial powers. It also widened the remit and ambition of the WPC. In 1956 the "Objects" in the Constitution were revised. Adjusting its former commitment to the 'consideration of the potential resources of each country, in hydro-electricity power, coal and oil', the "Object" was now focused towards 'the potential resources and all the means of production of energy in all their aspects'.¹⁰⁹ Twelve years later, in 1968, the organisation was formally rechristened the World Energy Conference.



Exhibition, 16th WEC Congress, Tokyo, 1995

Source: Japanese Member Committee, *Commemorative Photograph Album*, p. 29



Opening ceremony for the 16th WEC Congress, Tokyo

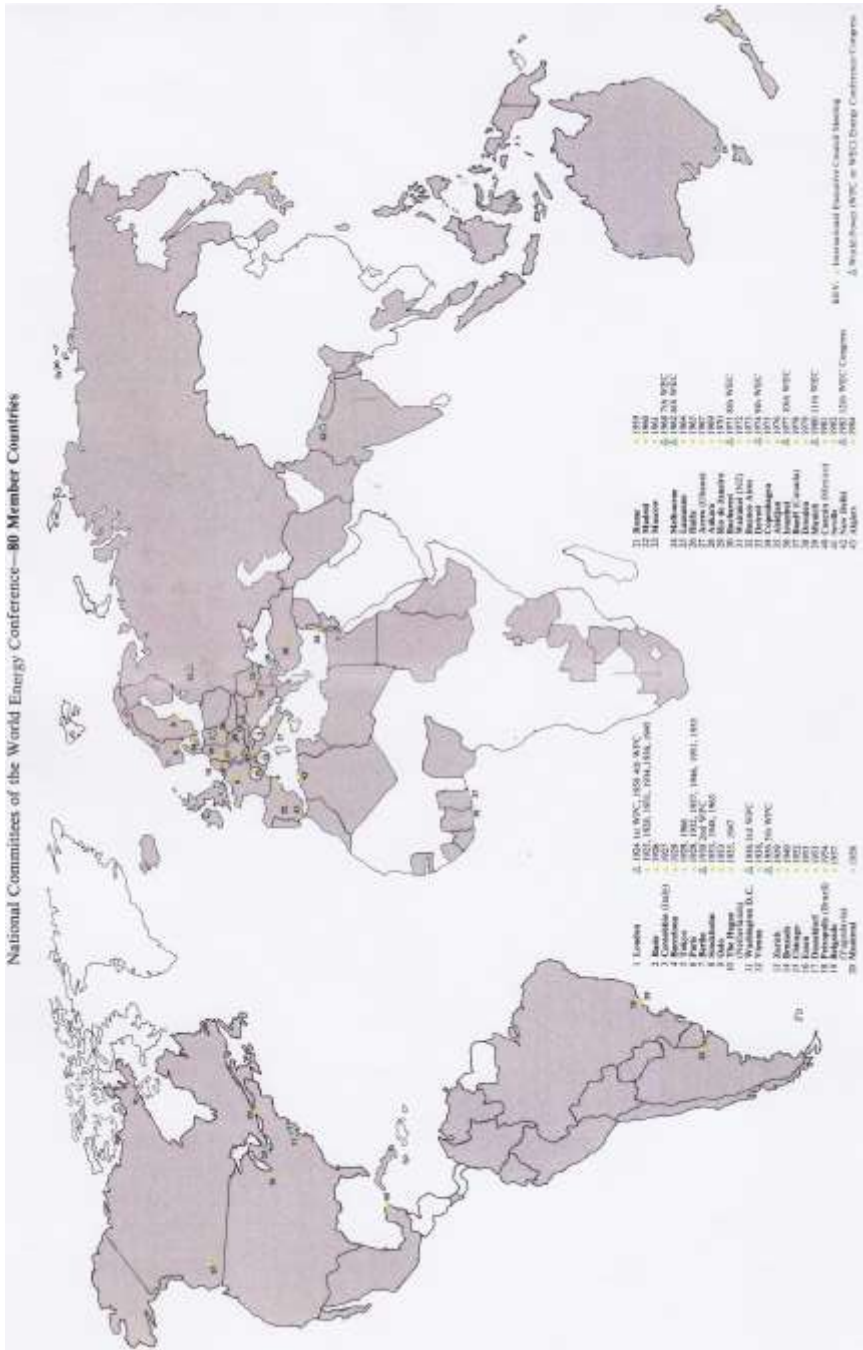
Source: Japanese Member Committee



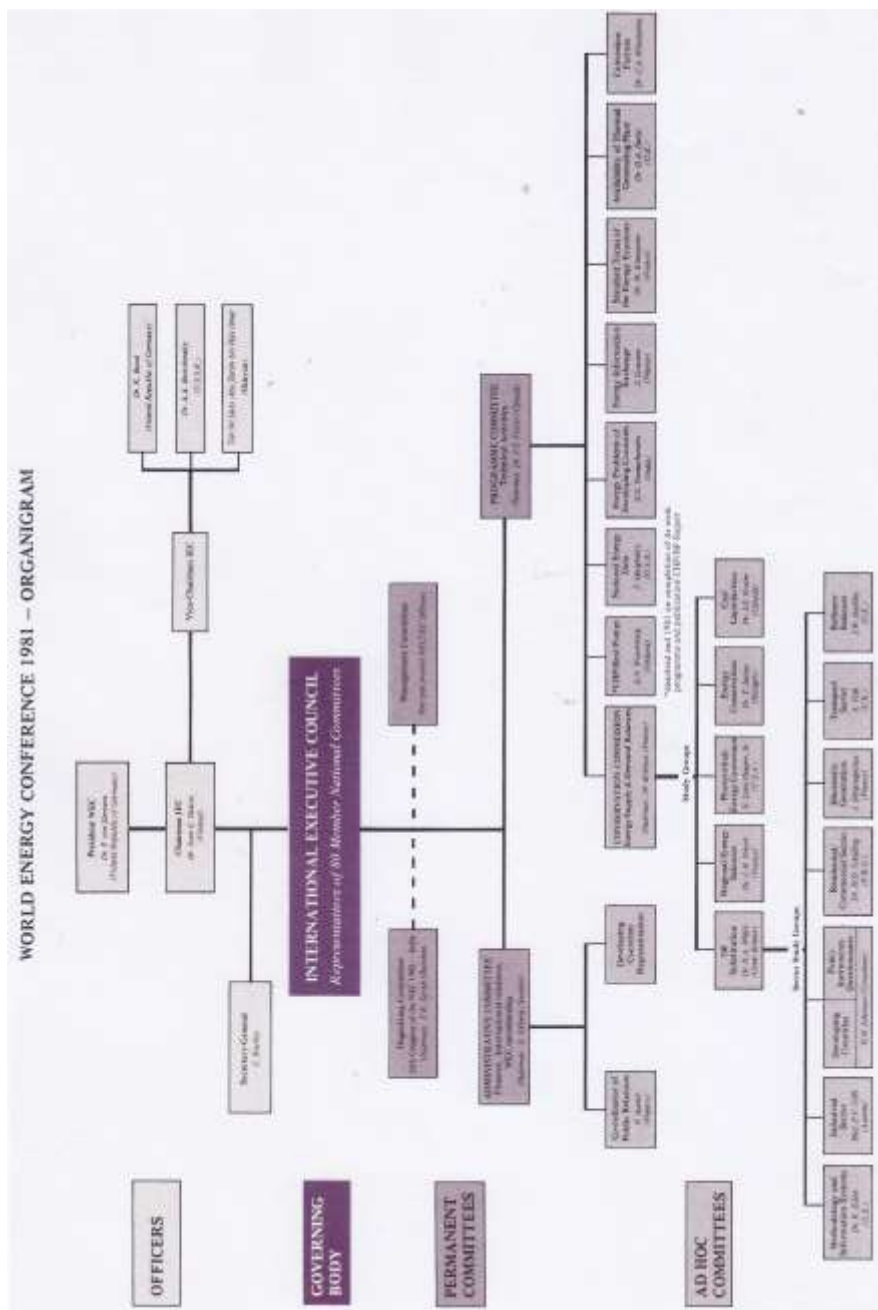
'Energy and Life', theme of the 15th WEC Congress, Madrid, 1992
Source: *Annual Report*, 1989



WEC Chairman Pierre Gadonneix, at the 21st WEC Congress, Montreal, 2010
Source: World Energy Council



Map showing National Committees, 1981, Source: *Annual Report, 1981*

World Energy Conference organigram, Source: *Annual Report, 1981*

The transition to an era of energy insecurity was full of uncertainties. Alarmism wrestled with optimism. In 1971, at the Eighth World Energy Conference in Bucharest, for example, many delegates expressed great confidence in untapped reserves. 'Optimism Voiced On Energy Needs, Talk of Gap Doesn't Alarm Conferees in Rumania' ran the headline in the *New York Times*. The age of nuclear energy appeared imminent. In addition to nuclear power, Harold Hartley also suggested that the recent discovery of natural gas and oil in the Arctic would release current pressure on demand. This sentiment was reiterated by Pytor Neporozhny, the Soviet Minister for Electrical Power and Chairman of the Conference. Neporozhny, a self-proclaimed optimist, was convinced that more oil and natural gas would be discovered. '[E]ven when you have drunk all the bottles of vodka to the dregs,' he said, 'you can always find another half-bottle somewhere.'¹¹⁰ Neporozhny's optimism met with little patience from delegates from developing nations, and his suggestion that they should employ nuclear from the start was laughed off. Abdul Hoseini of Indonesia, 'smiled the suggestion away', and asserted that Nuclear Power 'could not be contemplated by Indonesia for the foreseeable future because the country had neither the money nor the skills required.' What is important', he asserted was 'rural electrification based upon traditional fuels, if possible with highly efficient Western techniques.'¹¹¹



Consultative Panel for the 1974 edition of the *Survey of Energy Resources* in Detroit
Source: *Annual Report*, 1974

The optimism of Bucharest proved short-lived. In 1972 the Club of Rome published *The Limits to Growth*, a bestseller that spread public concern about finite resources. A year later, in October 1973, the first oil crisis erupted, when the Arab members of OPEC proclaimed an oil embargo in response to the United States supplying Israel with arms in the Yom Kippur War. Having once been the largest oil producer, from the early 1940s, following extreme pressure on resources during the war, America sought foreign oil to supply its rising demand. This had taken a rapid upsurge in 1972, whilst there was a time lag in the development of nuclear power plants. That year, the US was consuming 32% of global energy.¹¹²



'Ford Speaks at World Energy: Power Czars'

Source: *Ann Arbor Sun*, 27 September 1974

The oil crises of the 1970s handed the World Energy Conference a new challenge of managing highly contested ground in the face of an increasingly critical and vocal public. The Ninth World Energy Conference held in Detroit in 1974 was even portrayed by *Time* magazine as part of 'the energy war'.¹¹³ This 'energy war' attracted 1,000 demonstrators and 800 police officers as well as 4,000 delegates from 69 countries.¹¹⁴ A report in the *Ann Arbor Sun* captured the heightened atmosphere at the conference both among delegates but also between delegates and protesters:

Delegates poured out of Cobo Hall following Ford's [inauguration] speech, the demonstrators rushed to the police barricades to stare and be stared at. They held their signs high and chanted

loudly, 'Stop the Energy Rip-off'... 'The People Don't Pardon Nixon', and 'Stop Aid to Turkey!'... During the next half hour delegates stared at demonstrators, and demonstrators stared at delegates.¹¹⁵

The first round in the energy war was fired by President Gerald Ford who on the 23 September 1974 in his opening speech deplored 'the pulverizing impact of energy price increases on every aspect of the world economy.' Sovereign nations, he added, 'cannot allow their policies to be dictated or their fate decided by artificial rigging and distortion of world commodity markets.'¹¹⁶ That same day in New York the sentiment was echoed by his Secretary of State, Henry Kissinger, at the UN, who stressed that the oil hike was a political, not only an economic issue. The response from OPEC was one of 'instantaneous outrage'.¹¹⁷ *Time* magazine told how the Shah of Iran, (in Australia on a state visit), declared how 'no one can dictate to us. No one can wave a finger at us because we will wave a finger back.'¹¹⁸ At the conference the Saudi Arabian Oil Minister, Sheikh Ahmen Zaki Yamani (chief spokesman for the OPEC nations) sent out a warning that the US. better not start practicing 'economic imperialism'. The OPEC nations, he said, had no intention of bankrupting the West. In his view, most of the World's economic problems were not caused by OPEC's oil prices, but by the profligate use of energy when it was cheap.¹¹⁹ Apparently, some Western delegates in private agreed with Yamani, and pointed to the convention city, Detroit, as a symbol of energy waste in the car industry.¹²⁰ How ironic, a press despatch said, that the same delegates who had made a plea for energy conservation were now being chauffeured all around the city by oil-guzzling vehicles.¹²¹



Sheik Ahmed Zaki Yamani (far right) and Prof Lord Zuckerman (second right)
Source: *Annual Report*, 1974

This irony was also noted by Ford, who in his opening address welcomed the Delegates 'to the city which some blame for the energy crisis.'¹²² However, in an attempt to establish some consensus among the oil consuming nations, Ford laid out a new directive, which he termed 'Project Interdependence'. He explained how 'the magnitude of the energy task before us' was both comparable and exceeded the cost and technological prowess of the recent Moon landing.¹²³ The domestic energy program 'Project Independence' (initiated in 1973 by President Richard Nixon), had sought ways to reduce American consumption and increase the production of energy through investment in technological development. However, Ford added, 'just as Americans are challenged by Project Independence, the world faces a related challenge that requires a "Project Interdependence".'¹²⁴ No single country can solve the energy problem by itself. Instead Ford pointed out that his Administration was committed to 'international cooperation in an interdependent world.'¹²⁵ He added:

Stressing interdependence, you may ask why is our domestic energy program called Project Independence? As I see it, especially with regard to energy, national sufficiency and international interdependence fit together and actually work together. No nation can be part of the modern world and live unto itself. No nation has or can have within its borders everything necessary for a full and rich life for all its people. Independence cannot mean isolation. The aim of Project Independence is not to set the United States apart from the rest of the world; it is to enable the United States to do its part more effectively in the world's effort to provide more energy. Project Independence will seek new ways to reduce energy usage and to increase its production. To the extent that we succeed, the world will benefit. There will be much more energy available for others.¹²⁶

Ford's challenge for greater global co-operation through Project Interdependence, failed to heal the break within WEC between OPEC and the oil consuming countries. When the 10th World Energy Conference opened in 1977 in Istanbul, Saudi Arabia and half the OPEC nations were conspicuously absent. The conference turned to a long list of alternative energy sources to oil, coal and natural gas. It also concentrated on renewable sources, solar power,

dammed rivers and wind.¹²⁷ And it showed renewed interest in the question of nuclear energy.



US President Ford opening the 9th World Energy Conference, Detroit, 1974
Source: *Annual Report*, 1974

The tension between developing nuclear for peacetime programs and global security came to the fore at the 12th Congress of the World Energy Conference, held in New Delhi in 1983. The conference was inaugurated by Prime Minister Indira Gandhi who highlighted India's success in developing nuclear energy and defended its commitment to continuing these policies. Gandhi stressed that India did not have a nuclear bomb, despite having tested one in 1974. India's nuclear program, she said, was prompted by 'necessity' not military objectives. For too long, she argued, the idea had persisted that only advanced countries could develop nuclear technology to replace oil, leaving developing nations with 'simple' fuels such as hydrocarbons.¹²⁸ Whilst French representatives boasted about their own 'self-reliance' achieved through nuclear-based energy programs, the importance of nuclear to the development sector was foregrounded.¹²⁹ Although officials from the International Atomic Energy Agency (IAEA) suggested that many developing nations had too small and fragmented grids to hold 600MW capacity loads, they stressed that (if economically viable) the potential market for smaller power stations in the (200-600MW range) might be the best solution for the future.¹³⁰



Indian Prime Minister Indira Gandhi at the opening ceremony for the 12th WEC Congress, New Delhi, 1983

Source: *Annual Report*, 1983

Despite negative public opinion following the Three Mile Island accident in Pennsylvania in March 1979, WEC remained committed to the development of nuclear energy. Whilst the Carter administration put a halt to the development of its nuclear programme following the accident, at the 1980 Congress in Munich, French and British delegates criticised America for its trepidation. It would lag behind the rest of the world they said. The conference host, Franz Josef Strauss, the conservative minister-president of Bavaria and a former federal minister of atomic affairs and defence, warned that 'whoever refuses to take nuclear energy, condemns himself to social backwardness.' He added 'the future belongs to those countries that push ahead with nuclear energy.'¹³¹

While anti-nuclear protests grew in strength following the Chernobyl disaster in 1986, support for nuclear in WEC remained strong. During the 1989 Munich Triennial conference Walter Marshall (Baron Marshall of Goring), a staunch nuclear advocate and first Chairman of the World Association of Nuclear Operators, reiterated that 'the problems facing nuclear power are primarily institutional problems; in this case primarily the problems of public understanding and acceptance.'¹³² Where the Three Mile Island accident was an 'economic disaster for the American utility industry', he stressed, 'Chernobyl was an immense disaster', brought about by institutional failure.¹³³ He added 'in this case the reactor had a fundamental design fault which the Russian

authorities knew about but thought to eliminate by managerial instructions.' The West, he argued, would never allow such failings to happen. He held up nuclear programmes in Canada and France as examples of how successful institutional arrangements had allowed nuclear energy to make steady progress 'decade after decade independently of public opinion.'¹³⁴

THE ENVIRONMENT

In the wake of the first oil crisis, the World Energy Council set up a Conservation Commission, which in turn established study groups on Resources, Conservation and Demand. It was the Conservation Commission that published the report *World Energy: Looking Ahead to 2020* in 1979.¹³⁵ It made a powerful defence of the link between economic growth and the rising demand for energy. Since growth was imperative but oil and gas could no longer be relied on, the report advocated a shift to coal and nuclear power. The report was crucial in setting out new policy directions, but it also attracted criticism. In *Chemistry and Industry*, the energy campaigner Walt Patterson, for example, took aim at the WEC report.¹³⁶ It was hardly surprising, he argued, that WEC 'a body with a brief drawn, essentially, from the power and fuel supply industries' would produce a report in favour of increasing energy supplies rather than prioritising reducing demand and increasing efficiency, as the International Institute for Environment and Development had done in a report on low energy strategy.¹³⁷



Meeting of the Conservation Commission in Vienna, 1975

Source: *Annual Report*, 1975



The Committee on Pollution meeting at Hakone, Japan, 1970

Source: *Annual Report*, 1970

While WEC delegates in the late 1970s and early 1980s focused on the development of the best mix of energy resources and technologies for the future, counter-cultural and increasingly vocal environmental groups marched in protest against nuclear risk and pollution from conventional fuels. In contrast to its early years, when world power conferences attracted the support of social reformers and women's groups, WEC now faced open suspicion from new social movements. In Munich in 1980, environmentalists set up their own 'anticonference' in a convention centre a few blocks from the official meeting.¹³⁸ The charge against WEC was that it represented the interests of big industry committed to selling technology to third world countries to keep them dependent. In 1924 political involvement was seen as a threat. Now as market economics escalated in the 70s and 80s the lack of politics appeared equally ominous. The *New York Times* suggested that the conference 'was hampered by the fact that the conference delegates had little or no democratic political representation.'¹³⁹ This was marked by the small number of Government representatives amongst the 450 delegates sent from the US, all representing the energy industry, financial institutions, consulting organisations and lobbies. The critique of WEC was symptomatic of a growing suspicion towards "big science" – and the scientists and politicians supporting them – as faith in the model of modernization waned in the 1970s and 80s.

At the 1974 Detroit Conference the anti-nuclear and environmental activist Mary Sinclair accused WEC of excluding the 'citizen-consumer voice that has most at risk in the questions being considered'.¹⁴⁰ While 'WEC invited other major environmental groups' – she was representing the conservationist Sierra Club – 'the \$200 registration fee plus transportation, hotel and meal bills were so high they were just priced out of these sessions.'¹⁴¹ She also took issue with Lord Zuckerman, who chaired the conference. In his opening address, Zuckerman, who began his career as a zoologist, had concluded that 'with the prospects of severe short-falls in energy supply systems before us, the aims of the environmentalists interested in amenity and the conservation of nature, need urgent reassessment.' For Sinclair, Zuckerman was 'the perfect spokesman for the industry', giving the 'impression that it is a rather emotional, irrational, and unknowledgeable kind of public reaction that we are dealing with on the nuclear issue.'¹⁴² Although the terms 'environment' and 'ecology' were frequently used in papers and discussions, Sinclair said, 'some of the energy specialists reporting seem to regard the environment as an antagonist instead of a major energy resource and ally in supporting the biosphere.'¹⁴³ Sinclair singled out the chairman of the organizing committee Stephen D. Bechtel Jr, head of the huge Bechtel construction company. When asked why he had developed the pipe-line through Alaska, Bechtel had said it was 'good for business'. Sinclair felt like a lonely voice among the nearly 3,500 delegates. 'I didn't expect to be made welcome. You can tell it's a little irritating – someone reminding them of a few other things in life.'¹⁴⁴



Round table discussion 'Energy and Environment' at the 8th World Energy Conference, Bucharest, 1971

Source: *Transactions: The 8th World Energy Conference* (1972), vol. X

Mary Sinclair's criticisms may have been a bit unfair on WEC. After all, it had invited environmentalist groups to a dialogue at a time when they were often ignored altogether. Moreover, WEC had been supporting panels on the challenges surrounding man-made climate change since the 1950s. In 1955 the WPC was accorded consultancy status to the World Meteorological Organization (WMO). At the Fifth World Power Conference, in Vienna in 1958, a panel explored the 'Utilization of Primary Sources of Energy (thermal, electric, atomic and others)' and raised questions about the effect of nuclear power generation on the atmosphere.¹⁴⁵ At the conference, representatives from WMO reported to WPC about its research on renewable energy sources.

By the end of the 1980s, environmental concerns had moved to the centre of WEC's agenda. 'Environment Dominates 91-Nation Energy Talks', the *New York Times* summed up the 14th Congress held in Montreal in 1989.¹⁴⁶ It noted how the 'worry at this triennial event has shifted from oil embargoes and declining reserves of fossil fuels to urban smog, acid rain and, above all, global warming.'¹⁴⁷ At the conference, the Prime Minister of Canada, Brian Mulroney, put forward the controversial thesis that the polluter should pay environmental costs. This, he added, meant also "us", the consumer.¹⁴⁸ Mulroney concluded 'environmental sensitivity and economic growth, fuelled by energy, go hand in hand... we no longer have the luxury of trying to have one without the other.'¹⁴⁹ Recognising that greenhouse gasses were predominantly a product of energy use, the conference urged more research in that area. It also called for effective international policies and their implementation.¹⁵⁰ The 1989 meeting marked a paradigm shift. As Elihu Bergman, executive director of the Americans for Energy Independence, a conservation group, noted 'you would never have heard this three years ago. This conference is symbolically legitimizing what we have known in the States: environmental policy is driving energy policy.'¹⁵¹

The catalyst for this shift came in the late 1980s, with the publication of the Brundtland Commission's report *Our Common Future* (1987) and the establishment of the Intergovernmental Panel on Climate Change (1988), followed in 1992 by the Rio Summit of the United Nations Conference on Environment and Development (UNCED) and the Kyoto Protocol in 1997. In these years, sustainability came to be foregrounded at WEC.

PAST, PRESENT AND FUTURE

In the first fifty years, from its birth in 1924 to the first oil crisis in 1973, WEC had to confront a number of challenges that tested its vitality as an international organization. There were conflicts between champions of private and public control of energy; tensions between big and small states, energy rich and energy poor countries; and competing visions about the best energy mix for the future. These past episodes are interesting in their own right, but it would be wrong to treat them as closed chapters on which the dust has settled. They all helped shape the WEC to be what it was and is, defining its mission, its self-understanding and the scope of its activities. And it was with this historical baggage that WEC came face to face with a new cycle of challenges towards the end of the twentieth century.

The late 1980s rang in a new round in the old conflict between public ownership and private utility as Ronald Reagan and Margaret Thatcher initiated the deregulation and privatization of public utilities. For WEC it was a major turning point. Once vertically integrated state monopolies found themselves competing for customers, the fraternal relationships that had informed WEC in the previous decade came to a halt. It ushered in a new era of competition. Kieran O'Brien who has had a long involvement with WEC serving as Chair to the Programme Committee, Chair of the Irish Member Committee, and at the time of writing an Honorary WEC Officer, recalls how consensus became increasingly difficult to maintain as member committees found it harder to stay united due to heightened competition within the industry. This intensified further when competition became international, making national committees less willing to share information with colleagues in other countries.¹⁵² To adjust to these changes WEC's structure was modernised, under the leadership of Gerald Doucet, who was instrumental during his time as Secretary General in reforming the governance systems in the organisation in the late 1990s.

This period stimulated changes within individual member committees as they sought greater autonomy from corporate and governmental interests. This could be seen in the reformation of the South African National Committee. Until 1997 the South African member committee was known as the South African National

Committee of the World Energy Council (SANCWEC). However, the Committee was housed and managed by utility provider ESKOM. This meant that the Chief Executive of ESKOM was also the Chairman of SANCWEC. In order to incorporate the broader purview of the entire energy sector in South Africa, the organisation discontinued its administrative ties with ESKOM and was reformed as an independent organisation in its own right. It adopted the name the South African National Energy Association (SANEA), and today acts to stimulate 'original thought and catalyses transformations in the Energy Sector.'¹⁵³ A similar process of dissociation occurred within the Polish Member Committee. Due to changes in the energy sector in the 90s ministerial involvement began to impair the Committee's effectiveness. Just as SANEA distanced itself from ESKOM, in 1997 the Polish Member Committee dissociated itself from the Energy Ministry, to which it had formally been closely tied.¹⁵⁴ This would eventually lead to the Committee being officially recognised as an Association in 1997, after which it would take the title the Polish Member Committee of the World Energy Council.¹⁵⁵



50th anniversary commemoration in Detroit

Source: *Transactions: The 9th World Energy Conference* (1974), vol. X, p. 328

As early as 1936, the world power conference stressed the importance of energy for development and social equity. The prospect of electrifying farms and rural households attracted experts to WEC from the beginning. Since the 1980s these concerns have become a crucial part of WEC's role and identity in the context of international development. Together with environmental impact

mitigation, social equity and energy security make up the energy trilemma for WEC. At the 1983 New Delhi 12th Congress the theme 'Energy, Development, Quality of Life' discussed how to deal with a growing population and increased energy demand. More recently the Energy Trilemma project has developed 'The Energy Sustainability Country Index'. This index provides a score on the 'energy performance axis' – in relation to sustainability – and the 'country context' axis, which considers the development and implementation of suitable policies. It ranks countries by their capacity to 'provide a stable, affordable and environmentally sensitive energy system.'¹⁵⁶ Drawing on examples from around the world, the report includes a discussion of how rural electrification programmes across non-OECD countries can illustrate the future role of renewable energy in communities where distance from the grid means they are marginalised by conventional electrification programmes. It advocated more effective frameworks to facilitate investment by third parties in decentralised rural electrification systems.

The World Trilemma Report (2012) gave new support for a truly global understanding of energy. Energy security, social equality and environmental impact mitigation were treated as global problems requiring global solutions. Such a vision was assisted by WEC's own global expansion, with many new members joining the organisation in the decade after 2000. The Report proved to be timely. Pierre Gadonneix, WEC Chairman 2007 – 2013, points out how in recent years China and other governments around the world have pledged themselves to secure an 'ecological civilisation', and are trying to make their economies more sustainable. As Gadonneix emphasises, with the failure of the Kyoto and Doha trade negotiations, the need for a strong global governance of energy is more important than ever.¹⁵⁷

WEC continues to be home to different visions of the prospect and nature of energy security and sustainability. In the view of Brian Statham, former General Manager of ESKOM and Chairman of the WEC Studies Committee, the issue of sustainability has become too narrowly defined as a question of climate change and the influence of anthropogenic carbon emissions. Instead he believes that 'sustainability means the ability of mankind, animals and plants to continue indefinitely to co-exist on planet earth.' This requires a complex analysis of integrated systems and the assessment of trade-offs.'

It is not sufficient to compare two energy systems on the basis of relative carbon emissions and express an opinion on their desirability from a sustainability point of view. We have to also consider financial cost, economic cost, land use, water use, mineral use, impact on animal and plant life, safety, convenience, risks and a host of other measures before we can express a rational view on their relative merits from a sustainability perspective.¹⁵⁸

Confidence in future energy supplies and new technologies continues to be offset by concerns about energy poverty. Many WEC members today remain confident that the prospects in the world are good. Dr Gerhard Ott notes that energy resources are abundant and technological development and innovation has yet to come to an end. One strength of WEC is that it has always looked at a variety of fuels. In the words of Dr. Ott, its credo has always been 'there are no *alternative* forms of energy, but they are all *additive*, and therefore we need them all.'¹⁵⁹

For others, the reality of energy poverty exposes talk of energy security as an illusion. Brian Statham, notes:

I am disappointed that even with all the scientific, technological, economic and social development of the past one hundred and fifty years we, the global community, have failed to provide formal energy services to all people. Until we achieve that objective we cannot talk about global energy security. I am not optimistic that this will be achieved any time soon. Self-interest is a powerful force that impacts decision-making at individual, community, national and regional levels. The reality is that those with the knowledge, technology and financial resources are failing to deliver substantial progress in terms of global energy security because they lack the vital driver of "desperation". This inhibits the ability to be innovative and creative in finding ways to overcome the many difficulties that stand between today and a future with global energy security. Self-interest priorities take precedence over the plight of others.¹⁶⁰

Where Statham points to failure of the global community in mitigating these problems, Professor Abubakar Sani Sambo, Chief Executive Officer of the Energy Commission for Nigeria, and Vice-Chair for Africa of the World Energy Council, adds the importance of the uneven distribution of primary energy sources across the globe for the difficult pursuit of energy security. 'Since energy goes hand in hand with development,' he explains, the question of inequalities within and across countries is a central concern.'¹⁶¹ 'More than ever before, we must work to find a sustainable path that reconciles economic growth, protection of the environment and greater energy equity among the various parts of the globe.' To do so, the mitigation of energy poverty is a crucial step. The 'future of energy security', Sambo notes, 'especially in Africa, depends among other things, on the ability of the region to utilize its energy resources to power its socio-economic development contrary to the situation now in which energy resources serve as means of foreign exchange earnings from exports and manipulated imports which at the end only enriches some privileged individuals at the expense of the mass majority.'¹⁶²

Environmental demands and the need for energy security remain in tension. Whether the rise in cost for the user will be acceptable is yet to be seen. Kieran O'Brien suggests that WEC 'has to be supportive of renewables... but at the same time has to be somewhat critical of a policy that seems to be driven by political needs rather than any commercial or engineering possibility of success.'¹⁶³ At a time when energy transitions to renewables, the phasing out of nuclear power stations, and the discoveries of shale gas are all hot political topics to which parties and social movements look for immediate solutions, WEC's distinct role is more than ever to provide a long-term view of informed expertise. WEC, for Sir John Baker, a former Chairman of the organisation, could play an enlightening role in the public controversy today over fracking, by providing an honest analysis of its pros and cons, without having to be in a position of advocating either for or against it. By offering high quality impartial evidence based research WEC can provide information not inflected by polemical issues and point to anomalies in policy.'¹⁶⁴ The need to stimulate and inform the global energy transition through non-polemical research, Pierre Gadonneix suggests, was the reason why WEC 're-launched its scenarios study three years ago.' He explains:

Our scenarios are exploratory; both show the diversity of the possible tracks, the multiplicity of possible choices as regards energy sources, technologies, policy instruments and

measures, behavioral changes promotion, geopolitical shifts etc. They provide energy leaders with the long term vision and information that makes us apt at exerting our leadership and accountability. These two scenarios are an instrument of our global responsibility. They put all of us in a position of responsibility towards our global future. Each of our choices, be it on a type of energy source, or on a type of public policy, will shape our global trajectory.¹⁶⁵

WEC's future role as a mediator extends to international relations. It is here where WEC will take on new influence, the former WEC Chairman Dr Gerhard Ott suggests:

I should envision the role of WEC also in the future as an objective and reliable mediator between North and South, between East and West – employing its expertise in energy issues as a common link reaching beyond political borders. In order to fulfil this role, it is vital for WEC to maintain its character as non-governmental and non-commercial organisations. Important as contacts and co-operations with governments and industry are, they must never unduly influence or even dominate the work of WEC, which has to be objective, long-term and globally oriented, rather than concerned with single-interests or day-to-day events.¹⁶⁶

WEC did not chart the rise of the world-state, as the writer H. G. Wells had hoped when he was present at the birth of the World Power Conference in 1924. Its strength has derived from its political and financial neutrality. It is this neutrality that allows it to bridge industrial, political and environmental interests. In the words of the WEC Secretary General and CEO since 2008, Dr Christoph Frei, WEC tries to impart a UN style governance structure.¹⁶⁷ Following the establishment of other international organizations like the International Energy Agency (IEA), WEC has had to define its role in an era of greater competition. Despite the rise of large think tanks, Frei points out, WEC's remit remains unique. Unlike the IEA, whose 28 members include only OECD recognized bodies; WEC is an international organization with a global reach and no fewer than 93 national member committees and 3,000 member organizations, from both the private and public sector. Unlike the International Energy Forum (IEF), which focuses predominantly on oil and gas, WEC considers a broad range of

energy technologies that allows it to look at diverse sectors and energy types.¹⁶⁸ As Marie-José Nadeau, WEC Chair-elect says, 'in a world where most non-governmental organisations have clear partisan agendas, the World Energy Council stands out as a unique umbrella grouping that represents a wide range of beliefs and views. They are however united in the belief that energy provides unprecedented benefits to mankind.'¹⁶⁹

Just as the tensions between national sovereignty and international corporations have marked WEC in the past, in the future, Gadonneix points out, its role will be both to promote strategies which are smart at the local level and beneficial at a global one. As the number of issues which require global governance increase, there is now more than ever a need to share feedback on CO₂ pollution, nuclear safety and similar issues. Greater international cooperation should be fostered to develop new technologies, such as CCS and nuclear fission, which demand international research and international funding.¹⁷⁰ It is easy, Gadonneix notes, to think locally but what is needed is a global perspective, and it is here where WEC's strength lies.¹⁷¹ As in 1924, so today: WEC deals with issues that are worldwide and extend beyond national sovereignty. Gadonneix recalls Dunlop's original vision of international cooperation and mutual understanding of expertise, expectations and demands.¹⁷² WEC continues to be, in H. G. Wells' 1924 phrase, 'a breath of common sense' in a global age.

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- ¹⁵⁹ Dr Gerhard Ott, Interview, 15 August 2013.
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- ¹⁶¹ Prof Abubaker Sani Sambo, Interview, 31 August 2013.
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- ¹⁶⁵ Pierre Gadonneix, Interview, 31 July 2013.
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APPENDIX

APPENDIX 1. World Power Conference founder members, 1924
Source: Ian Fells, *World Energy 1923-1998 and Beyond* (1998), p. 160

Australia
Austria
Belgium
British Guyana
Canada
Chile
China
Colombia
Czechoslovakia
Denmark
Dutch East Indies
Finland
France
Germany
Gold Coast
Great Britain
Greece
Hungary
India
Ireland
Italy
Japan
Kenya
Latvia
Luxemburg
Mexico
Netherlands
New Zealand
Norway
Nyasaland
Peru
Poland
Romania
South Africa
Southern Rhodesia
Soviet Union
Spain
Sweden
Switzerland
United States of America
Yugoslavia

APPENDIX 2. 'Analysis of attendance by countries', the Fourth World Power Conference

Source: *Transactions of the Fourth World Power Conference* (1952), vol. I, pp. xvii-xviii

ANALYSIS OF ATTENDANCE BY COUNTRIES						
Country				Full Members	Accompanying Persons	Total
1. Algeria	.	.	.	20	8	28
2. Argentina	.	.	.	1	1	2
3. Australia	.	.	.	10	1	11
4. Austria	.	.	.	23	—	23
5. Belgium	.	.	.	39	10	49
6. Brazil	.	.	.	7	—	7
7. Canada	.	.	.	25	13	38
8. Chile	.	.	.	3	2	5
9. Cuba	.	.	.	1	—	1
10. Czechoslovakia	.	.	.	1	—	1
11. Denmark	.	.	.	18	4	22
12. Dominican Republic	.	.	.	1	2	3
13. Egypt	.	.	.	6	1	7
14. Finland	.	.	.	9	6	15
15. France	.	.	.	116	28	144
16. Germany	.	.	.	16	2	18
17. Greece	.	.	.	3	1	4
18. Holy See	.	.	.	1	1	2
19. Hungary	.	.	.	4	—	4
20. Iceland	.	.	.	2	1	3
21. India	.	.	.	7	1	8
22. Indonesia	.	.	.	4	—	4
23. Iran	.	.	.	2	—	2
24. Ireland	.	.	.	14	3	17
25. Israel	.	.	.	4	2	6
26. Italy	.	.	.	36	9	45
27. Japan	.	.	.	4	—	4
28. Jordan	.	.	.	1	—	1
29. Korea	.	.	.	1	—	1
30. Luxembourg	.	.	.	5	3	8
31. Nepal	.	.	.	1	—	1
32. Netherlands	.	.	.	30	11	41
33. New Zealand	.	.	.	4	2	6
34. Nicaragua	.	.	.	1	—	1
35. Norway	.	.	.	29	14	43
36. Pakistan	.	.	.	4	—	4
37. Panama	.	.	.	1	—	1
38. Peru	.	.	.	1	—	1
39. Philippines	.	.	.	2	—	2
40. Poland	.	.	.	6	—	6
41. Portugal	.	.	.	7	3	10
42. Roumania	.	.	.	1	—	1
43. Saar	.	.	.	1	—	1
44. South Africa	.	.	.	6	3	9
45. Southern Rhodesia	.	.	.	1	—	1
46. Spain	.	.	.	3	1	4
47. Stateless	.	.	.	4	—	4
48. Sweden	.	.	.	40	16	56
49. Switzerland	.	.	.	31	12	43
50. Turkey	.	.	.	4	1	5
51. Union of Soviet Socialist Republics	.	.	.	3	—	3
52. United Kingdom	.	.	.	699	101	800
53. United States of America	.	.	.	65	27	92
54. Yugoslavia	.	.	.	11	—	11
				1,339	290	1,629

APPENDIX 3. Member Committees of the World Energy Council,
October 2013

Albania	Macedonia (Republic)
Algeria	Mexico
Argentina	Monaco
Austria	Morocco
Bahrain	Namibia
Belgium	Nepal
Bolivia	Netherlands
Botswana	New Zealand
Brazil	Niger
Bulgaria	Nigeria
Cameroon	Pakistan
Canada	Paraguay
Chad	Peru
China	Philippines
Colombia	Poland
Congo (Democratic Republic)	Portugal
Côte d'Ivoire	Qatar
Croatia	Romania
Cyprus	Russian Federation
Czech Republic	Saudi Arabia
Denmark	Senegal
Egypt (Arab Republic)	Serbia
Estonia	Slovakia
Ethiopia	Slovenia
Finland	South Africa
France	Spain
Gabon	Sri Lanka
Germany	Swaziland
Ghana	Sweden
Greece	Switzerland
Hong Kong, China	Syria (Arab Republic)
Hungary	Taiwan, China
Iceland	Tanzania
India	Thailand
Indonesia	Trinidad & Tobago
Iran (Islamic Republic)	Tunisia
Ireland	Turkey
Israel	Ukraine
Italy	United Arab Emirates
Japan	United Kingdom
Jordan	United States
Kazakhstan	Uruguay
Kenya	Zimbabwe
Korea (Republic)	
Kuwait	
Latvia	
Lebanon	
Libya	
Lithuania	
Luxembourg	

APPENDIX 4. Conferences and Congresses of WPC and WEC

Source: Ian Fells, *World Energy 1923-1998 and Beyond* (1998), p. 161; Jan Soliński, *85 years of the World Energy Council* (2009), p. 101; World Energy Council

The First World Power Conference, London 1924: 'The Resources of the World in Power and Fuel and their use of the Greatest Possible Advantage'

The Second World Power Conference, Berlin 1930: 'The Power Problem from Every Point of View'

The Third World Power Conference, Washington D.C. 1938: 'The National Power Economy'

The Fourth World Power Conference, London 1950: 'World Energy Resources and the Production of Power'

The Fifth World Power Conference, Viena 1956: 'World Energy Resources in the Light of Recent Technical and Economic Developments'

The Sixth World Power Conference, Melbourne 1962: 'The Changing Pattern of Power'

The Seventh World Energy Conference, Moscow 1968: 'The World's Resources of Energy and their Utilisation to the Profit of Mankind'

The Eighth World Energy Conference, Bucarest 1971: 'Improving the Utilisation of Energy, with Special Reference to Complex Uses'

The Ninth World Energy Conference, Detroit 1974: 'The Economic and Environmental Challenges of Future Energy Requirements'

The Tenth World Energy Conference, Istanbul 1977: 'Energy Resources, Availability and Rational Use'

The Eleventh World Energy Conference, Munich 1980: 'Energy for our World: Energy, Society, Environment'

The Twelfth Congress of the World Energy Conference, New Delhi 1983: 'Energy Development, Quality of Life'

The Thirteenth Congress of the World Energy Conference, Cannes 1986: 'Energy Needs and Expectation'

The Fourteenth Congress of the World Energy Conference, Montreal 1989: 'Energy for Tomorrow'

The Fifteenth Congress of the World Energy Conference, Madrid 1992: 'Energy and Life'

The Sixteenth Congress of the World Energy Council, Tokyo 1995: 'Energy for our Common World – What will the Future Ask for US?'

The Seventeenth Congress of the World Energy Council, Houston 1998: 'Energy and Technology: Sustaining World Development into the Next Milenium'

The Eighteenth Congress of the World Energy Council, Buenos Aires 2001: 'Energy Markets; The Challenges of the New Millenium'

The Nineteenth Congress of the World Energy Council, Sydney 2004: 'Delivering Sustainability: Challenges and Opportunities for the Energy Industry'

The Twentieth Congress of the World Energy Council, Rome 2007: 'The Energy Future in an Interdependent World'

The Twenty-First Congress of the World Energy Council, Montreal 2010: 'Responding now to Global Challenges – Energy in Transition for a Living Planet'

The Twenty-Second Congress of the World Energy Council, Daegu 2013: 'Securing Tomorrow's Energy Today'

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