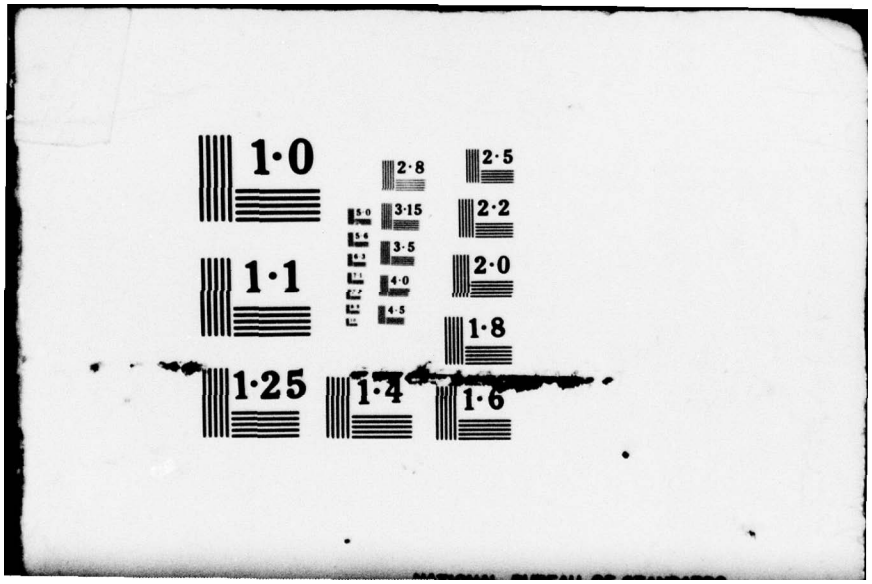
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This thesis is an examination of Japan's response to the oil crisis of 1973. Intermediate measures to cope with rising prices and restrictions on supplies of oil and petroleum products were marginally effective, but inadequate as bases for long term policies.

It will be shown that Japan has available to it five major areas of alternative petroleum sources. The conclusion emerges that no other area except the Middle East has sufficient available supplies

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CONT

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Japanese Oil Dependence

by

Charles Alfred Meyer, Jr.
Captain, United States Air Force
B.S., U.S.A.F. Academy, 1973

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF ARTS IN NATIONAL SECURITY AFFAIRS

from the

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This thesis is an examination of Japan's response to the oil crisis of 1973. Intermediate measures to cope with rising prices and restrictions on supplies of oil and petroleum products were marginally effective, but inadequate as bases for long term policies.

It will be shown that Japan has available to it five major areas of alternate petroleum sources. The conclusion emerges that no other area except the Middle East has sufficient available supplies to meet Japan's needs.

The next section undertakes an estimate of alternate sources of energy which might become available to Japan as oil substitutes. Again, the conclusion is inescapable that Japan will remain dependent on Mideast supplies for the foreseeable future and will, therefore, be constrained to make such modifications and improvements in economic and diplomatic procedures as to obtain maximum benefit at least cost to meet her economic and security needs.

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I. INTRODUCTION AND METHODOLOGY

The study of Japan's oil situation requires a twofold methodology--statistical and conceptual. Either technique, if taken by itself, would not yield a clear enough interpretation of the events which surrounded Japan's oil crisis.

A statistical evaluation of recent years' production levels, growth, drilling activities, proven reserves, market trends, and crude shipments will provide the background against which can be measured the relative validity of statements and/or predictions made by analysts and policy-makers. Tables are provided for the reader to examine and use to arrive at his own conclusions.

A wide-ranging amalgam of sources has been collected and synthesized. Conclusions are reached on the basis of a general con ensus, weighted in favor of higher authorities. The weighting mechanism is admittedly a subjective judgment. Statements must be considered in an historical context as well as the current one; a chronological format has been incorporated into the background description of the problem.

The conceptual framework for the study of Japan in her reaction to the oil crisis demands a search for linkages, causal relationships, and important variables. If these linkages are found to be applicable to other situations, they may contribute to an enhanced understanding of the variables themselves. Such knowledge, through understanding, may help

policymakers to defuse the potential dangers inherent in certain kinds of international relations.

Japanese foreign policies can be categorized in terms of interests, goals, objectives, and methods. These terms are familiar enough, but they are used in this thesis in the following manner:

> ...The national interest represents the general and continuing purposes that governments see themselves as serving on behalf of the nation. Essentially this refers to the enhancement of the nation's security, well-being, prestige, ideology, and power....
>
> Goals may be defined as the general, long-term, and best conceivable outcomes that policy-makers seek to establish during a time span that can be reasonably anticipated...vis-a-vis some other nation or group of nations....
>
> Objectives...are the more precisely defined shortrange preferred outcomes that are attainable at any particular time, given the existing configuration of the domestic and international environments. As such they represent specific steps that are designed to achieve a particular goal.[1]

The methods which a nation such as Japan may choose to achieve her particular objectives and goals are varied. As the oil crisis came to the forefront in late 1973, Japan's ability to cope was a function of basic constraints which operate on any nation's ability to act. Which resources, political, economic or military, were at Japan's disposal? What were some of the constraints? Have these changed over time?

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[1] Joseph S. Szyliowicz and Bard E. O'Neill, The Energy Crisis and U.S. Foreign Policy, Praeger Publishers, New York, 1975, p. 7.

Being unable to project her military power, Japan had virtually no military options at her disposal. The credibility of her economic power may have been in question as well; Japan's willingness to expend economic resources, specifically capital, played a significant role in her handling of the oil crisis. Japan took advantage of the fact that the world's economic system is largely a system of interdependencies. Even the oil producers could not afford to lay the developed countries' economies to waste.

If political interests, goals, and objectives are independent variables, the methods, or dependent variables in Japan's situation must include her lack of military power, the magnitude of her industrial and technological resources, her large capital reserves, her willingness to extend credit, and her dependence upon both the U.S. market and OPEC energy sources.

Beyond those constraints, the structure of the international system imposes systemic limitations upon actions being contemplated by Japan or other nations. Global and domestic public opinions, treaty commitments, and the precedents of international law also serve to modify, or even direct the course of national policies.

An examination of the Japanese reaction to their oil crisis is therefore expected to provide a better understanding of Japanese national interests. This understanding should be useful to American policymakers and policy-implementers when called upon to deal with the intricacies of Japanese trade negotiations, and U.S. foreign policy with respect to Asia.

II. THE OIL CRISIS OF 1973-74

"Necessity never made a good bargain"

- Benjamin Franklin

There was much consternation around the world as the full impact of the Arabian oil embargo became known. The Organization of Arab Petroleum Exporting Countries (OAPEC), in the winter of 1973-74, had not only cut their oil production to a level well below the going demand, but had raised the price of that oil by unprecedented increments. The economies of the industrialized world lived and breathed by means of petroleum and petro-products. To a greater or lesser degree, every oil-importing country in the world felt the strong hand of that Arabian embargo on its neck; it was an uncomfortably firm hand.

Japan believed itself to be choking. More than any other nation in the world, Japan depended upon imported oil for the maintenance of its highly industrialized economy and its energy requirements. The Japanese were in shock, in a panic, groping around in all directions for a solution to their predicament.

In this study of the Japanese reaction to the oil crisis, it is clear that the Japanese did not, until 1973 fully appreciate the fact that their phenomenal economic growth over the years depended so heavily upon a cheap source of energy.

Also Japan was ill-prepared, both politically and economically, to cope with even the slightest interruption in that energy flow; and the conditions have become such that Japan is unlikely to extricate itself from the hazards of outside oil dependence in the near term.

By way of a chronological presentation, this chapter will attempt to point out the origins and the extent of Japan's oil vulnerability, the state of the Japanese economy immediately prior to and during the Arab oil embargo, and Japanese reactions to their oil problem throughout the period of the crisis. As a result, a better understanding of the unique Japanese energy situation may be reached, and Japanese action during and after this watershed in the world oil market can be understood on a broader perspective.

A. THE SHIFT TO OIL

Japan has essentially no domestic oil supply. For all its economic power, Japan is incredibly dependent (99.7%) on imported oil. The result is a terrible vulnerability to possible breakdowns or other threats to its oil shipping routes.

> In fiscal year 1972, more than 90 percent of Japan's oil came from sources not controlled by the country's petroleum firms, almost four-fifths of that from the Persian Gulf, in an amazing night and day rotation of more than 250 tankers, tailing each other less than 50 miles apart.[2]

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[2]Leon Howell and Michael Morrow, "Asia, Oil Politics and Energy Crisis," (IDOC/International Documentation/North America, Nos. 60-61: New York, NY, c1974) p. 47.

It was not, however, until quite recently that Japan came to rely on oil for its source of industrial power and economic growth.

> Japan Industrialized, as nations traditionally did, on its own coal and hydroelectricity until after World War II...With the encouragement of her U.S. occupiers, Japan decided to shift to oil...Yet the need for capital and foreign exchange presented a barrier; further, much of the equipment and expertise was available only from the U.S.[3]

The choice was a bitter pill for the Japanese to swallow. They wearied of the U.S. occupation and its impositions. Rapid industrialization, however, was the motivating factor.

> In 1950, therefore, the government took a decision which it has since lived to regret but which was probably unavoidable at the time. In conflict with the traditional Japanese attitude toward foreign participation in the country's basic activities, the government agreed to allow the major international oil companies to join forces with the local refining companies. Each party put up half the capital required...and in return for this procedure...the foreign companies putting up the money secured the permanent right to supply all the crude oil ever needed by the refineries.[4]

Due to the abundance of cheap oil available from the Middle East, and the efficiency through which the American companies sought to maximize their profits, the Japanese oil industry prospered, grew, and contributed in significant measure to the phenomenal growth of their island economy.

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[3]Ibid., p. 48.

[4]Peter R. Odell, Oil and World Power, (London: Penguin Books, Ltd. 1975), pp. 124, 126.

Much has been written to describe Japan's economic development during the 1950's and 60's. Edwin O. Reischauer, a former U.S. ambassador to Japan, wrote that "Unlike most countries, the problem usually was to prevent more rapid growth than society could adjust to. Commonly, the government set its goals at 7 or 8 percent growth in real terms, only to find the economy had exceeded this by another 2 or 3 percent."[5]

A victim of what perhaps may be called "too much of a good thing," Japan had opted for the immediate advantages of rapid economic growth and industrial power, but had had to accept a proportionate measure of the long-range disadvantages of environmental pollution and social restiveness in the bargain.

Even before the oil crisis became a reality, the Japanese public had become increasingly critical of some of the byproducts of economic growth, pollution, lack of social welfare expenditure, and urban sprawl. These problems, together with the destabilizing effects on the international monetary system after the U.S. dollar was devaluated in 1971, were quite disconcerting to most Japanese economists. Japanese scholar Tsunehiko Watanabe wrote that after the revaluation of the yen in 1971, which spurred fears of an impending economic recession, Prime Minister Tanaka introduced new, expansionary fiscal and monetary policies which were designed to restore the economy to the 10 percent growth rate experienced all through the 1960's. The official discount rate was reduced from 4.75 to 4.25 percent,

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[5]Edwin O. Reischauer, Japan - The Story of a Nation (New York: Alfred A. Knopt, Publisher, 1964), p. 289.

supplemental government spending was authorized, and on the exchange market, the outflow of capital was less restricted.[6] These expansionary measures worked too well. Economic indicators showed that in the first quarter of 1973, Japan's GNP (gross national product) increased at a rate equivalent to 17 percent per annum!

Concomitant to such growth in the GNP, Japan's inflation rates began to increase dramatically as well. The progressive increases in the annual rates of inflation are shown below in a month-by-month assessment of Tokyo's "Consumer Price Index."

TABLE I

Percentage Increases Over Previous Year
Consumer Price Index - 1973[7]

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
6.2	6.7	8.4	9.4	10.9	11.1	11.9	12.0	14.6

By June of 1973, the problem was obvious, and inescapable. Increasing imports to Japan, high rates of borrowing and spending, combined with high rates of inflation, forced the Bank of Japan to attempt to "put the brakes" on the economy by raising their prime discount interest rate to six percent.[8]

In that same month, in response to increases in the price of crude oil decided upon by the Oil Producing and Exporting

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[6] E. R. Fried and C. L. Schultze, eds., Higher Oil Prices and the World Economy (Washington, DC: Brookings Institution, 1975), p. 143, 144.

[7] Ibid., p. 144.

[8] Japan Quarterly, "Chronology," Vol. XX, No. 4, Oct-Dec 73, p. 468.

Countries (OPEC), the British Petroleum Company announced that it would have to add another ten cents per barrel to the price of its oil shipments to Japan. Low sulfur Saudi light crude, the standard by which other grades of oil are measured, then stood at $2.30 per barrel.[9]

B. THE IMPENDING CRISIS

In Japan the prices on food and housing continued to escalate. Land, already at a premium, was being bought up by speculators, who were beginning to realize huge profits on its resale. The "overheating" economy was showing no signs of slowing down, so on the 28th of August, 1973, the Bank of Japan again raised its discount rate to seven percent.[10]

In Japan, rice is a primary staple food; the government subsidizes the consumer by buying from the producers and selling at a loss to the general public. This is a highly inflationary, but highly popular, government policy which in 1973 added 180 billion yen to the red; August saw a 16.1 percent increase in the price paid to rice producers.[11] The decision appears to have been more political than economic in its rationale.

At this point, in August the government seemed to recognize part of the problem, and admitted that it had failed to cope adequately with Japan's spiraling inflation. The leadership was advised that added emphasis should be placed on three

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[9] Ibid., p. 467.

[10] Ibid., p. 468.

[11] Ibid., p. 467.

remedies: (1) find ways to reduce consumer demand; (2) promote free market competition; and (3) calm the panic and fear among the public concerning the prospect of runaway inflation.[12]

The summer of 1973 had been long and hot, and the demand for electricity to power the air conditioners and refrigerators and, at the same time, power the growing needs of industry, was simply unprecedented. The energy crunch had become so acute in fact, that the Ministry of International Trade and Industry (MITI) published its first white paper on the subject. The paper, released in early September, recommended that certain policies be adopted in order to economize on the consumption of oil, and that ways should also be found to protect Japan's environment from the dangers of further industrial pollution.[13]

The political situation continued to worsen for Prime Minister Tanaka and his ruling, conservative, Liberal Democratic Party. Land, which has always been considered to be a good hedge against inflation for the private investor, was in such demand that land prices had risen more than 40 per cent over the previous year, and speculation continued unabated.[14] In the face of criticism for this and other forms of inflation, Tanaka resorted to a traditional political tactic.

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[12]Ibid., p. 468.

[13]Japan Quarterly, "Chronology," Vol. XXI, No. 1, Jan-Mar 74, p. 113.

[14]Koji Nakamura, "Inflation Ever Up In Japan," Far Eastern Economic Review, Vol. 82, No. 40, 8 Oct 73, p. 47.

With the elections drawing ever nearer, and his party's popularity dropping with the standard of living, he asked the LDP to support his request to the Finance Ministry for an income tax reduction amounting to 2 trillion yen in fiscal year 1974.[15]

In oil-related matters, Japan and Britain agreed to go ahead with a joint development project in the North Sea oil fields. Three days later, on 5 October, Japan and West Germany also agreed to cooperate closely in mutual acquisition of energy resources and raw materials.[16] However, on 25 October Japan was greeted with news which could only be described as "bad."

> Oil majors notified local oil refineries that shipment of crude oil to Japan will be cut by 10 percent, retroactive to October 18 at the ports of loading, in the wake of a (16 Oct) production cut by the Arab oil producing states.[17] (parenthesis added)

This was just too incredible. The Japanese felt that, at the very most, this cut in production was just a war-related device which was being brandished for only a temporary effect. The war would be short, they theorized, and soon production would be back where it belonged. Besides, Japan had 55 days' supply of oil in reserve, and the pipelines were by no means dry. Still, MITI thought it prudent to incorporate some attempts at conservation, and the "consume less" campaigns were quickly promulgated throughout the islands.

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[15] Japan Quarterly, "Chronology," Vol. XXI, No. 1, Jan-Mar 74, p. 113.

[16] Ibid., p. 111.

[17] Ibid., p. 114.

On 16 November the "Principles of Countermeasures" passed the Cabinet. It described, in a general way, a national energy-saving movement, and called for reductions in government consumption of electricity and oil. On 19 November the Cabinet expanded on the idea to include the private sector. The iron and steel industries, auto manufacturers, heavy machinery, electric appliances, petroleum, chemicals, tires, synthetic fibers, aluminum, nonferrous metals, cement, sheet glass, and paper and pulp industries were all strongly urged to conserve oil.[18] Other specifics included reductions in television broadcasting hours, reduced numbers of authorized flying hours for aircraft, a 60 kph speed limit on the highways, restrictions over the use of private automobiles, heating (not air conditioning) thermostats being set at 20°C, and neon sign and shop window display illumination curtailment.[19]

In November, the Director of the Economic Planning Agency offered his "deep apologies" for failing to keep the nation's spiraling inflation under control. He also confessed his inability to do anything further about it.[20]

Nevertheless, the government continued its campaign for conservation of energy. The government called for a ten percent reduction in the amounts of energy consumed by the large, industrial users. The gas stations were ordered closed on

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[18]Yuan-li Wu, Japan's Search for Oil, Hoover Press, Stanford, CA, 1977, p. 6.

[19]Koji Nakamura, "Japan: The Gear Shift Jams," Far Eastern Economic Review, Vol. 82, No. 46, 19 Nov 73, p. 36.

[20]Ibid.

Sundays and holidays. Thermostats were to be lowered. According to the Japan Quarterly, on 16 November "the government estimated the effective cut in oil imports to be about 15.4 percent less than planned. Japan consumes about 260 million kiloliters of oil each year.[21]

> The 10% supply cut to eleven industries, according to the Economic Planning Agency (EPA) will reduce Japan's growth rate in fiscal 1973 by about 2.9 to 8.1%. Industries affected are steel, automobiles, petrochemicals, heavy and light electrical manufacturing, tires, man-made fibers, aluminum, non-ferrous metals, cement, plateglass, paper and pulp.[22]

The Japanese were finally waking up to the awful reality of what had befallen them. They had experienced economic collapse before, with their defeat after World War II. They had known hardships, and had coped before with scarcities of consumer goods, rampant inflation, and hunger. They saw history repeating itself. Their reaction to what they perceived -- the end of the great bubble of Japanese prosperity -- was understandable. Mothers and wives took their savings and began to spend it at the marketplaces, determined to hoard or stock up in preparation for the terrible times which they felt surely would be upon them any day. Their ferver brought about new problems of logistics.

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[21] Japan Quarterly, "Chronology," Vol. XXI, No. 1, Jan-Mar 74, p. 113.

[22] Koji Nakamura, "For Japan, Zero-Growth Pains," Far Eastern Review, Vol. 82, No. 47, 26 Nov 73, p. 41.

> To cope with dire shortages of daily necessities throughout Tokyo, Osaka and other major city areas triggered by the oil crisis, that is, cuts in the crude oil supply by Arabian states, the Ministry of International Trade and Industry instructs detergent makers to release about 1,000,000 cartons of detergents. It also orders five major manufacturers to increase production by 22 percent as compared to the same period last year. The ministry announces the release (on 22 Nov) of 1,200,000 packs, or 4,800,000 rolls, of toilet paper in 30 supermarkets in Tokyo and its three neighboring prefectures.[23]

Labor organizations such as Sōhyō and Chūritsurōren enlisted over 2,200,000 persons to participate in nationwide demonstrations protesting the unchecked problem of inflation, and asking for the government to impose price controls.[24]

Also in November, the Exxon Corporation informed the Japanese that it would have to reduce its shipments of oil to Japan by an additional 20 percent, retroactive to 18 October at the points of loading.[25] This cut was over and above the original ten percent reduction.

Partly in response to such widespread pessimism, and partly in recognition of the simple arithmetic of the deepening oil crisis, the Dow-Jones index on the Tokyo Stock Exchange plunged to its lowest ebb of the year (at that point), a dismal 4,293.50 yen, down from January's high point of 5,359.74 yen."[26] Pressure was growing on Japanese policy-makers to do something

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[23] Ibid., p. 118.

[24] Ibid., p. 117.

[25] Ibid., p. 115.

[26] Ibid.

about reaching an understanding, an agreement, or a concession with the OPEC states.

C. THE JAPANESE REACTION

Japan's official position on the Middle Eastern dispute had always been one of neutrality. Japan depends entirely upon the United States to cover the high costs of Japan's strategic defense. As long as Washington supported Israel in opposition to the Arab nations, Japan was hard-pressed to come up with any policy, other than neutrality, which could hope to avoid direct conflict with its own national interests. However, if worse should come to worse, the ultimate realities of the situation were clear enough. Trade between Israel and Japan amounted to no more than $100 million dollars per year. In contrast, Japan depended on Middle Eastern oil for 80 percent of its total oil supply.[27] These kinds of issues were new to Japan. Part of the reason was simply cultural.

> The Japanese population has a mass abhorrence ...about considering questions of national security and defense. As a result, within the Japanese bureaucracy and political circles the notion had grown up that economic matters should be kept separate from political matters (a policy known as Seikei Bunri)...Japan naively assumed that the rest of the world would also accept its separation of economics from politics. Japan had long believed that Arab countries would treat it as a friendly nation simply because it harbored no malice toward the Arabs.[28]

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[27]Koji Nakamura, "Japan vs the US: New Agonies," Far Eastern Economic Review, Vol. 82, No. 45, 12 Nov 73, p. 36.

[28]Yoshi Tsurumi, "The Oil Crisis In Perspective: Japan," Daedalus, Fall 1975, Vol. 104, No. 4, p. 113.

Even before the oil crisis had even been considered possible, the Japanese had assumed that a neutralist policy, in the end, would accomplish what alignment and alliance never could.

> Japan has been extremely reluctant to become involved, either in favor of the Arab or Israeli side, or in favor of more active support of a compromise settlement. Rather, as some Japanese have frankly intimated, the Japanese calculate that eventually the West will be driven from the region and a neutralist position will make it possible for Japanese interests to pick up the pieces.[29]

To the surprise and dismay of the Japanese, OPEC did not automatically consider them to be a friendly nation, nor were they automatically to be accorded any special ration of oil. To be sure, they were in limbo, and their status was uncertain at first. However, Japan was certainly sharing the discomfort of the oil supply reductions.

> In September the Arab nations were producing more than 20 million barrels per day (b/d). About 15 million b/d (were) available at the new production levels. Although those countries marked 'hostile' by the Arabs (the U.S., Canada, Holland, and South Africa) absorbed about 2.5 million b/d of the cutbacks, others were certain to feel the pinch. Most Asian countries, especially those predominantly Muslim, were on the 'friendly' list...Japan, with West Germany, Italy and Scandinavia...were supposedly ranked somewhere in between.[30]

As the crisis progressed, Japan's doubts, fears, and panic intensified. The Ministry of Foreign Affairs turned to the

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[29] Zbigniew Brzezinski, The Fragile Blossom, (New York: Harper and Row, Publishers, 1972), p. 64.

[30] L. Howell and M. Morrow, "The Oil Storm Spills Into Asia," Far Eastern Economic Review, Vol. 82, No. 45, 12 Nov 73, p. 33.

United States for advice. Secretary of State Kissinger advised the Japanese not to capitulate to OAPEC in their demands. Kissinger felt that the interests of the oil consuming nations (not to mention the Israeli interests) would be better served if the "oil weapon" were met by a firm wall of unified resistance. The Japanese were not convinced. Rumors were prevalent in Japan that Kissinger and the Israelis had formed a conspiracy designed to play havoc with the world economy for the benefit of Israel and the United States.

> According to one version of the conspiracy, the United States was happy to see the foreign exchange reserves of Japan and West Germany drained off to the United States via the OPEC nations. The Kissinger-conspiracy theory, combined with the spreading suspicion that the American-based oil majors were diverting oil to the United States at the expense of Japan, was sufficient to convince Japan that it should endorse OAPEC's position in the Middle Eastern dispute.[31]

On 22 November the Japanese government issues four propositions concerning a solution to the problems in the Middle East.

1. The acquisition and occupation of territory through military force is not to be allowed.
2. Israel should withdraw from all territories occupied since the war of 1967.
3. The integrity and safety of every nation's territory should be respected and the means provided to ensure this.
4. To ensure a fair and continuing peace in the Middle East, the rights of the Palestinians, as per the Charter of the United Nations, should be acknowledged and respected...Toward the end the Japanese statement alluded to a review of its policy in relation to Israel.[32]

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[31]Yoshi Tsurumi, op. cit., p. 124.

[32]Miyoshi Shūichi, "Oil Shock," Japan Quarterly, Vol. XXI, No. 2, April-June 74, pp. 148, 149.

The Japanese proposals, which were a significant departure from their previous position, did not come as a complete surprise to the rest of the world. A nation can be suffocated economically just as surely as it can be destroyed militarily. Japan had been threatened; pressure had been applied. Japan was being forced to modify its foreign policy under duress. (This isn't a new idea. This is exactly the purpose behind any introduction of a coercive "weapon" into the international political arena.) Relatively defenseless, Japan had no military option available. Japan's Self Defense Forces are strictly oriented, both militarily and politically, to nothing more than a short-term defense of the home islands.

All that remained to the Japanese were three choices: (1) find or develop new sources of oil, (2) learn to live with less oil, and perhaps even less oil as time progressed, or (3) reestablish good, even friendly, relations with the oil producing countries. The latter choice was the most expedient option, and was accomplished most expeditiously.

Some Japanese in a face-saving stance will deny that the embargo "pressured" them into a significant policy shift. They will cite their longtime support for the 1967 United Nations Resolution #242 of the Security Council as proof of a consistent support for the OAPEC cause. Also, Japan's own "Peace Constitution" declares that it cannot accept the right of any nation to acquire or hold territory through the use of military force. Combined with the reality of Japan's affirmative vote for the 1971 U.N. Resolution concerning self-determination for the Palestinian people, Japan's recent

contributions of foreign aid for the relief of the Palestinian refugees were believed to prove out the point that Japan was, and deserved to be called, a "friend" of the Arab nations.[33]

If such were actually the case, and Japan had been a "friend" all along, the question that comes immediately to mind is why the Arab nations ever allowed their restrictions on oil to Japan to continue as long as they did. One explanation might be that OPEC was looking for a more direct and forceful endorsement for their cause than Japan had yet supplied. Another reason might have centered around the strategic aspects of "sealing off" the United States from any possible source of Arab oil, which meant that the oil had to be stopped prior to reaching Japanese storage facilities.

Japan may claim that they have always supported the basic Arab causes; to disguise any "loss of face," they may even now insist that they had not given in to the "oil weapon." Still, it is doubtful that any unilateral statements concerning the Middle East would ever had proceeded from the mouths of Japanese diplomats had their national interests not been in jeopardy.

Reaction in the United States to news of the Japanese concessions was understandably negative, but not bitter. It was feared at first that Japan's position would weaken Kissinger's negotiating leverage. However, the U.S. limited its response to simply an expression of regret which, in the

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[33]Ibid.

diplomatic vernacular, is considered to be a mild sort of disapproval.

> This moderate U.S. reaction was due to several factors: Japan's vulnerability in terms of energy had been acknowledged the previous summer at high level negotiations in Washington; the United States could not guarantee adequate supplies of appropriately priced oil; and Tokyo avoided any extreme action, such as terminating diplomatic or economic relations with Israel.[34]

> The goal of Japan's energy policy is to obtain assured supplies of energy at minimum cost. Because of Japan's unique dependence on imports, the security objective must take precedence over cost considerations. Of all the energy importers, Japan is least able to join in any action which entails risking even a brief interruption of Middle East petroleum shipments. Similarly, Japan has the strongest reasons to pursue closer diplomatic and economic ties with the oil exporters.[35]

Therefore, in the short-term, the only way for Japan to solve its immediate energy problem and renew its supply of oil is to court the OAPEC and submit to the Arab political will. For the Japanese, this is very embarrassing, and very worrisome, for they are still every bit as vulnerable to such coercion in 1978 as they were in 1973.

Oil accounts for nearly three-fourths of Japan's total energy supply. Because of this dangerous dependence on a single source of energy, the Japanese government began immediate steps toward diversification. In December of 1973, plans were being

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[34] J. S. Szyliowicz and B. E. O'Neill, eds., The Energy Crisis and U.S. Foreign Policy (New York: Praeger Publishers, 1975), p. 195.

[35] E. W. Erickson and L. Waverman, eds., The Energy Question: An International Failure of Policy, Vol. 1, (Toronto: University of Toronto Press, 1974), p. 113.

made to reactivate domestic coal production[36] in preparation for future energy requirements. Such production may be further enhanced by future breakthroughs in coal technology. Japanese coal, however, is not plentiful.

On 18 December the Dow-Jones Index on the Tokyo Exchange dropped to 3,958.57 yen. The oil crisis was blamed, but also there had been rumors that the Bank of Japan was about to raise the discount rate, and heavy selling followed.[37] The Bank of Japan did, indeed, raise its discount rate to 9 percent, on 21 December, in an effort to combat the extreme rates of inflation.[38] December saw 17% higher consumer prices than the previous year.[39]

On 15 December an Asahi Shimbun poll revealed that dissatisfaction over rising commodity prices accounted for the fact that only 22% of the public still supported the Tanaka Cabinet, down from 62% when he took power in 1972.[40] Times were grim.

> The Japanese Shipbuilders Association gave this somber picture of the situation...With refueling becoming increasingly difficult in the Persian Gulf, Singapore and many other ports, most ships would have to carry sufficient bunker oil supplies for the return voyage to Japan. As the tanker fleet would be excluded from any cutbacks, the bunker oil supplies to the rest of the non-tanker fleet would dwindle. Cuts of this kind would have savage effects...on the raw material and export situation of Japan.[41]

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[36] Henry Hymans, "Oil Eclipses the Rising Sun," Far Eastern Economic Review, Vol. 82, No. 50, 17 Dec 73, p. 40.

[37] Japan Quarterly, "Chronology," Vol. XXI, No. 2, Apr-Jun 74, p. 214.

[38] Ibid., p. 215.

[39] Ibid.

[40] Ibid., p. 212.

[41] Henry Hymans, op. cit., p. 39.

So the oil shortage was also restricting the amounts of raw materials available to the Japanese industries. Most of the news as to what had happened was either too foreign, too technical, or the consequences too indirect for the majority of the general public to really understand. Many people suspected the entire oil industry to be conspiring in some sort of plot against the consumer. A better explanation is in order.

> Saudi Arabia's abundant and popular "light" crude often serves as a base for price calculations. First, the six OPEC members named a 'market' price of $3.65 f.o.b. for one barrel of Arabian light. They called this a 17% increase in the prevailing market price: that would imply a cost of about $3.12 before October 16. But India, Japan and other purchasers paid closer to $2.80 to $2.85 beforehand; therefore the increase in their market price was closer to 28%...(Royalties involve a complicated set of sums, but, roughly, come to about 60% of the posted price.[42]

In the period immediately prior to 1973, the rapid increases in demand for oil had allowed the market value to actually exceed the posted price. The producing companies, who computed and collected their profits as a function of the posted price, were obviously unhappy with that situation, and collectively through OPEC, forced a price increase upon the consuming nations. By using their collective, cartel power, OPEC raised the market price of their oil. The posted price, always an arbitrary figure, was arbitrarily set at a value which was 40% higher

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[42] L. Howell and Michael Morrow, "Inside the Arab Mind," Far Eastern Economic Review, Vol. 82, No. 49, 10 Dec 73, p. 50.

than the market price. OPEC declared that the posted price would always maintain this 40% relationship, within 1%, even through the actual market price might vary considerably. The post-October 16 market price was set at $3.65 per barrel; adding 40%, the new posted price became $5.119 per barrel.[43]

Up until that time the oil companies had been able to pass any price increases along to the consumers. The new OPEC policy hampered them in this, however, because they found that if they raised their market price, they would automatically trigger off the 40% relationship with the posted price, and just add to OPEC's earnings.[44]

On 22 December the Japanese government declared itself to be in a state of emergency in connection with the oil crisis. It stated its intention to implement, beginning with the new year, a further 20% reduction in electrical power supplies based on September's levels.[45] The state of emergency gave it the authority to incorporate into national policy some of the toughest anti-inflationary measures ever undertaken. Some of the proposed measures are listed here.

1. The new budget reduced public spending (for the first time since 1956).

2. The discount rate was raised to 9 percent.

3. Controls would be placed on oil distribution and commodity pricing.

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[43] Ibid.

[44] Ibid.

[45] Japan Quarterly, "Chronology," Vo. XXI, No. 2, Apr-Jun 74, p. 215.

4. New road construction curtailment.

5. The 2,000,000 million yen tax cut, which Tanaka had promised, was reduced to 'only' 1,450,000 million yen.

> Finance Minister Fukuda said the tax cuts would threaten the anti-inflation drive and should be reconsidered. Obviously too many government members had next year's House of Councillors elections in mind to take notice of economic logic.[46]

6. A twenty percent energy reduction would be imposed on certain major industries.

7. Restrictions were placed on holiday motoring. Gas stations were closed on holidays.

8. Daylight savings time was given year-round status.[47]

Apparently, certain entrepreneurs were taking advantage of the panic, and boosting their prices without regard to holding to a fair or moderate profit margin. These practices only fueled the fires of inflation. Japanese businessmen are not immune to the temptations of greed.

> While consumers across the country are complaining that they cannot get enough heating oil from retail shops and filling stations, as many as 288 oil dealers were found cornering and concealing, during the month of November, 2,009,394 liters of kerosene, gasoline as well as light and heavy oil, an amount equivalent to 10,047 drums, or enough to meet the demand of 38,636 households for a month, according to the results of a study conducted by the Asahi Shimbun.[48]

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[46] Koji Nakamura, "Japan Braces For Crisis '74'," Far Eastern Economic Review, Vol. 82, No. 52, 31 Dec 73, p. 32.

[47] Ibid.

[48] Japan Quarterly, "Chronology," Vol. XXI, No. 2, Apr-Jun 74, p. 217.

When OAPEC declared its intention on 23 Dec 73, to double the price of oil, the dollar's future market took a giant leap upward.[49] The yen was in trouble.

At this point the Japanese believed they were on a sinking ship. Their much vaunted economy was in trouble, inflation was eating away at the yen, the oil companies had cut their deliveries, and now Japan even doubted that she could afford to pay for the oil that was available. This must have been the lowest, most miserable point of the oil crisis for the Japanese.

On 25 December the Diet passed two bills, the Oil Supply-DemandAdjustment Bill and the Livelihood Stabilization Emergency Measures. These bills asked for the following: (1) Voluntary reductions in private auto use, (2) a 10% reduction in industrial oil and electricity allocations, (3) a 5-day work week, (4) voluntary gas station closures on holidays, (5) direct, government control over supply, demand, and price functions within the Japanese economy.[50]

Deputy Prime Minister Mikitakeo set out in mid-December on a desperate mission to the eight nations of the Middle East, hoping to work out a fair solution to the Middle East disputes and somehow ensure a stable supply of oil to Japan.[51] Perhaps he succeeded. Prior to his return home, some good news had surfaced.

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[49] Ibid., p. 215.

[50] Wu, op. cit., p. 6.

[51] Ibid., p. 213.

On 26 Dec 73, the OAPEC had announced that Japan would be given "preferential treatment" with respect to its oil supply requirements. Stocks on the Tokyo Exchange took a sudden turn upward.[52]

There were mixed feelings among the Japanese concerning the two OAPEC announcements. While it was true that being given "preferential treatment" was better than nothing, the new price increase was stunning. OAPEC had decided to use the other side of its double-edged "oil weapon." Cutting production was one thing, but doubling the price again seemed to impose a disproportionate burden upon the lesser developed nations of the world who could not afford to pay the price. Many were outraged. Here was the new situation.

> Under the new arrangement, the posted price... went from $5.119 to $11.65 for Arabian light crude...The new production dictates will keep oil flowing at 15% below September's levels, except for 'friendly nations.' Japan and apparently the Philippines have just been given that status.[53]

So, apparently, if a nation is friendly, it may have all the oil it needs, but at a premium price. OPEC argues that as long as their oil is a finite resource, and since the demand for that oil among the consuming nations seems to support the new price, then the price increase was justified. The added revenues will be invested in and toward the economic development

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[52] Ibid., p. 215.

[53] L. Howell and M. Morrow, "The Energy Game: Asia Loses," Far Eastern Economic Review, Vol. 82, No. 53, 7 Jan 74, p. 26.

of the producing countries, in preparation for the day when there is no more oil.

D. OIL DIPLOMACY

In an attempt to prepare for its own energy future, Japan dispatched a number of high-level dignitaries to the producing countries of the world. The Japanese objective was to establish direct, government-to-government relations with these countries, bypassing the multinational oil conglomerates.[54]

During his trip of 10-28 December 1973, Deputy Prime Minister Miki, Takeo visited Saudi Arabia, Egypt, Abu Dhabi, Kuwait, Qatar, Syria, Iraq and Iran. He pledged $280 million in loans to Egypt to help them dredge the Suez Canal. He also began negotiations for Japanese construction of chemical, oil, steel and copper refining facilities in Saudi Arabia.

Prime Minister Tanaka, Kakuei, between 7 and 17 January, 1974, visited the Philippines, Thailand, Singapore, Malaysia, and Indonesia -- all members of ASEAN. Malaysia received $100 million in credit, and Indonesia was pledged $200 million for development of LNG facilities, an aluminum refinery, and oil storage facilities at Lombok.

From 7-18 January MITI director Nakasone, Yasuhiro, visited Iran, Iraq, the U.K. and Bulgaria. Iran obtained a $1000 million credit with Japan to build a huge oil refinery. Iraq

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[54]The following discussion of trip itineraries is outlined in more detail in Yuan-li Wu, Japan's Search for Oil, op. cit., pages 4-6.

was extended $1000 million in credit for an oil refinery, plus a LPG plant, $350 million for a petrochemical complex, and $150 million for a cement factory. In return, Iraq agreed to supply Japan with 160 million tons of crude oil and LPG over the next ten years, with an option to 200 million tons.

Past Foreign Minister Kosaka, Zentaro, visited Morocco, Algeria, Tunisia, Libya, Jordon, Sudan, Lebanon, and Yemen between 15 January and 2 February 1974. Algeria received $40 million for an oil refinery, and further oil and gas exploration. Morocco and Jordon received $10 million for a communications network. Sudan received $10 million for a fertilizer plant.

"One Japanese estimate has put the total amount of credits thus pledged in Japan's 'resource diplomacy' in the critical winter of 1973-74 at 3.3 billion."[55]

That figure is slightly mitigated by the fact that Iran cancelled its deal for the $1000 million oil refinery on 4 March 1974.[56]

When the world builds its industry and consumer markets under the assumption that a certain commodity, oil would be a stable source of energy--and when this assumption involves massive outlays of capital investment incorporating the processing, distribution, and utilization of this energy--it is foolish to assume that the resultant demand for that

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[55]Wu, op. cit., p. 5.

[56]SIPRI, Oil and Security, Humanities Press, NY, 1974, p. 117.

commodity will fluctuate in rapid conjunction with rapid changes in price. For the producing nations to assume that demand, which appears inelastic with respect to the price of oil, will therefore sustain rapid and arbitrary price increases within relatively short periods of time is probably fallacious logic. New technologies are becoming available, and new sources of oil and energy are being found and developed in order to circumvent the Arabian cartel. If successful, demand for Arabian oil will indeed level off or even fall, leaving OPEC with a surplus of unsaleable, greasy, black stuff.

The point has been made that, no matter what the dismal projections on oil supplies may indicate, there will be surplus oil available for a long time, perhaps 25 more years. There is a catch, however; one must have the money to pay for its production.[57]

> Available or not, Asia's developing countries cannot afford oil. The rising cost of naphtha alone will have dramatic effects on agriculture. Fertilizer costs will continue to rise. Less will be used when more should....All industrial materials will cost more.[58]

In view of the plight of the Third World's developing countries, or any of the shakier economies of the industrialized world, OPEC apparently felt that some conciliatory remarks were in order. On 27 Jan 74, the Saudis made an interesting remark.

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[57] L. Howell and M. Morrow, "Arab Actions Alarm Asia," Far Eastern Economic Review, Vol. 82, No. 44, 5 Nov 73, p. 42.

[58] L. Howell and M. Morrow, FEER, 7 Jan 74, p. 26.

> Saudi Arabian Oil Minister Sheikh Ahmed Zaki Yamani at a Tokyo press conference disclosed his nation's readiness to lower the oil price. He also declared that Saudi Arabia will supply oil to countries resolved to help his country develop its industry.[59]

On 18 Feb 74, in a Tokyo meeting between Deputy Prime Minister Miki and his Egyptian counterpart, Mohammed Abdul Hatem, Japan pledged to extend 30 billion yen credit in economic aid to the United Arab Republic. Two days later Hatem made an additional request for a billion dollar loan in exchange for Egyptian efforts to persuade the Arab nations to lower their oil prices, a request which Japan ignored.[60]

Japan has contributed mightily to the industrialization efforts of the oil producing nations, especially Iraq and Kuwait. No discounts in oil prices are yet evident.

It is known that Middle Eastern oil can be produced for 20-30 cents per barrel.[61] In contrast, Japan's import bills, at $5,046 million dollars, were up 400 percent over the previous year for the month of January, 1974. The increase was due in large part to the tremendous increase in the price of oil.[62] This is not a natural or justifiable economic condition.

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[59] Japan Quarterly, Apr-Jun 74, p. 216.

[60] Ibid., p. 214.

[61] L. Howell and M. Morrow, op. cit., FEER, 5 Nov 73, p. 42.

[62] Japan Quarterly, Apr-Jun 74, p. 216.

> No thoughtful American can have failed to appreciate that, whether justified by past events or not, the nations of OPEC and particularly the Arab oil producers, are practicing wholesale extortion with the present rigged prices, and they are cheerfully engaging in blackmail as to U.S. guarantees of Israel's integrity. Since they clearly do not have the military power to sustain them in the face of American intervention, they are, in the ultimate sense, relying on the armed forces--specifically the naval forces--of the Soviet Union to protect them. This they may or may not fully comprehend.[63]

"Politics, exposed to petroleum pressure, has a dangerous proclivity to explode.'[64]

E. THE CONTINUING CRUNCH

"On January 24, 1975, Prime Minister Miki...told the Japanese Diet that he regarded the question of Arab oil as being indivisible from the Arab-Israeli conflict.[65]

One can imagine more than one reason for Miki having made that statement to his peers. First, it appears as though he is trying to re-emphasize the fact that economics and politics go hand-in-hand, especially in the Middle East. The Japanese had tried, previously, to ignore this fact, and were brutally reminded of it in late 1973. Second, given the continued vulnerability of the Japanese to irregularities in their oil supply, Japan must realize that any recurrence of fighting in the Middle East will probably have a serious impact on Japan

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[63]Howard Backnell III, Energy Policy and Naval Strategy Beverly Hills: Sage Publications, 1975), p. 54.

[64]L. Howell and M. Morrow, "Asia's Own Persian Gulf," Far Eastern Economic Review, Vol. 82, No. 50, 17 Dec 73, p. 42.

[65]Yoshi Tsurumi, op. cit., p. 113.

as well. Third, until a resolution is reached in the Middle Eastern dispute, the "oil weapon" will remain a threat to Japan and the other consuming nations of the world.

The massive increase in the price of oil has caused numerous other problems to develop, one of the most significant of which is the transfer of the world's real resources to the OPEC nations. The balance of payments in international trade has been upset by disproportionate payments to the Middle East.

> OPEC countries are presently investing in financial assets of one form or another close to $50 billion annually in the oil-consuming countries. The accumulation of these 'surplus petro-dollars,' together with unremitted interest and dividends, constitutes massive indebtedness of the importing countries that sooner or later they must repay by exports of goods and services to OPEC countries at far above present levels. The potential size of such transfers of real resources is enormous--several hundred billion dollars by the end of the decade...The developed consuming countries need to find means to channel recycled petro-dollars deposited with them into productive investment and not merely into financing existing or higher levels of consumption by underwriting deficits on current accounts.[66]

As a defense against complete bankruptcy in the consuming nations, the idea of an import tax on foreign oil has been considered. Such a tax, however, would require the unified cooperation of the consuming countries to apply the tax evenly over the majority of OPEC's oil market. The International Energy Agency would most likely be the vehicle for such a tax.

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[66]Sperry Lea, Higher Oil Prices: Worldwide Financial Implications (Washington, DC: British-North American Committee, 1975), p. vii.

> As to OPEC's reaction to an IEA import tax, there is not a great deal it could do. Most OPEC members are so dependent on export revenues that another embargo is unlikely; in any case the 1973-74 embargo was largely ineffectual in cutting off oil supplies to the embargoed countries. The main adverse effect of an import tax might be a reinforcement of political cooperation within the cartel.[67]

Edward Fried and Charles Schultze of the Brookings Institution have offered the following two-stage synopsis of the overall impact of the oil crisis.

The initial impact of the oil price increase meant that (1) consumers paid more for energy, and spent less on other products; (2) sales being down, output and employment had to be reduced in the consumer goods industries; (3) the economy was being depressed, but the high prices of gasoline, oil, petrochemicals, electricity and petroleum-related products combined to force an overall inflated condition; (4) wages were forced upward in response to the higher prices; (5) prices followed wages, and cost-push inflation resulted.

The second stage of the oil price increase became evident in 1975. (1) Demand for oil had become increasingly restrained by the higher prices. (2) A gradual elasticity for oil was evidenced through conservation and the slow replacement of oil by alternate sources of energy. (3) Overall prices were higher and the Consumer Price Index was higher than it otherwise would have been had there been no "oil crisis." (4) All this resulted in a reduced standard of living, because more economic resources

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[67] Hendrick S. Houthakker, The World Price of Oil: A Medium Term Analysis (Washington, DC: American Enterprise Institute for Public Policy Research, 1976), p. 33.

are required now to pay for each unit of energy consumed.[68]

A black picture for the future of the energy situation is painted by the U.S. Central Intelligence Agency.

> By 1985 we estimate that demand for OPEC oil will reach 47 to 51 million b/d. Even if all other OPEC states produce at capacity, Saudi Arabia will be required to produce between 19 and 23 million b/d if demand is to be met. This is well above present Saudi capacity of 10 to 11 million b/d, and projected 1985 capacity of at most 18 million b/d...Alternative oil supplies are not likely to come on stream rapidly enough to significantly alter the situation...Non-oil energy supplies cannot be counted on to appreciably relieve the problem between now and 1985.[69]

It should be remembered, however, that as the price of oil increases, the quantitites which become economically available are increased. The prices may be higher, the standard of living for the consuming public may be reduced, but the oil will be there to perform the necessary tasks to which it is assigned.

In summary, the so-called "oil crisis" of 1973 was significant to Mid-East/Japanese relations because it pointed up Japan's dangerous dependency on the coalition of the oil-producing nations. Japan discovered that it was very much at the mercy of OPEC, and the Japanese saw that America, while not quite so dependent on imported oil as Japan, was either unable or unwilling to reduce further its consumption in order

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[68] E. R. Fried and C. L. Schultze, eds., op. cit., pp. 4-6.

[69] Central Intelligence Agency, The International Energy Situation: Outlook to 1985, (Washington, DC: Government Printing Office, April 1977), pp. 1, 2.

to help Japan weather the oil embargo. In the absence of U.S. support, Japan had no choice but to submit to the political demands of the producing states. Japan, recognizing this to be a rather undesirable position in which to be, has since sought to diversify its oil and energy supplies. It has met with limited success. Even in 1978, Japan depends on oil from the Middle East to meet over 70 percent of its oil requirements.

Japanese/U.S. relations during a future oil embargo will depend on the nature of the OPEC position, and the nature of the decrease in the oil supply. If the U.S. perceives an OPEC-sponsored threat to its national interests, it has been suggested that comparable countermeasures would be enacted.[70] The likelihood of a fifth Arab-Israeli war, and resultant reductions in the flow of oil from that region, are very high. It is in both the United States and Japan's interests to encourage a reduction of tension in the Middle East.

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[70]On 21 November 1973, U.S. Secretary of State Kissinger stated, "It is clear that if the Arab shutdown of oil to the United States continues unreasonably and indefinitely, the United States will have to decide what countermeasures are necessary." ("Kissinger Says Oil Ban Will Not Change US Policy," International Herald Tribune, 22 Nov 73). Then on 7 January 1974, Defense Secretary James Schlesinger said, "It is plain that one should not tempt fate by pushing the concept of national sovereignty too far. The United States is dedicated to the independence of free states, and that includes the state of the Middle East. But it should be recognized that the independent powers of sovereign states should not be used in such a way as would cripple the large mass of the industrialized world. That is running too high a risk, and it is a source of danger not only from the U.S. standpoint but from the standpoint of the oil-producing nations." (J. R. Schlesinger, "Arabs Risking Use of Force," International Herald Tribune, 8 Jan 74).

A second forecast, which is also quite probable, is that production simply will not be able to keep pace with demand, and a shortage will occur in the supply of oil. Prices will increase in response to the higher demand. Japan will emerge as a direct competitor with the United States in its bid to secure the oil which it requires to survive.

III. THE SEARCH FOR OIL

A. CHINA AS AN OIL SOURCE

China has been perceived by many observers as being a vast untapped resource with enormous potential. The sheer weight of China's massive population, now over 900 million people, commands the respect of her enemies, and the attention of entrepreneurs the world over. Since the oil crisis of 1973, Japan and a number of other oil importers have speculated over the likelihood of tapping into a barter situation with China. The hope is that if sufficiently stable relations can be achieved with the PRC, and if China agrees to import the appropriate drilling technology and equipment, a great deal of oil might then be introduced into the world markets. That prospect has a special appeal to Japan, who in any case would like to improve her relations with China. The added advantage of having the oil supply so near at hand would be in reduced import costs, and in the minimization of the length of Japan's oil "life-line" which presently stretches to the Persian Gulf.

Hopeful as the Japanese may be, other parties are not so optimistic. The U.S. Central Intelligence Agency has qualified its assessment of China's reserves with an element of uncertainty.

> Actually, not even the Chinese know the size of their reserves. While we have no evidence that China's reserves are on the Middle East scale, we nonetheless believe they are considerable. Working with limited information, experts in academia, oil companies, and the U.S. Geological Survey generally agree that China's onshore oil reserves are comparable with the 39 billion barrels

> remaining in the United States. We share this view. Offshore, the latest studies are dampening earlier hopes that the eastern continental shelf might be one of the world's most prolific oil and gas reservoirs. The most optimistic estimates now suggest offshore oil reserves are about the same as those onshore.[71]

The question of onshore and offshore drilling sites is a matter of interest here. China's onshore fields are old, producing near capacity with present Chinese technology. While better equipment would yield more oil, the offshore potential remains largely untapped. China wants very much to develop her oil resources without the assistance of the "exploitive capitalists." Self-reliance is the key to China's policy on this issue. The offshore reserves, which are said to rival the onshore deposits, have simply not been developed. The problem is larger than the political question of self-reliance, however.

China's continental shelf extends well into waters presently claimed by Taiwan, Japan, South Korea, the Philippines, Malaysia, and Vietnam. The South China Sea appears to hold the most potential for future oil production, but until China has sufficiently prepared itself to defend against any infringements or incursions on its claims to these contested areas, she is apt to remain conservative in her involvement. Certainly there will be no Chinese drilling in the contested waters until China has both the technology and the naval capability to protect her investments.

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[71] China Oil Production Prospects, Central Intelligence Agency, #ER77-10030U, June 77, Washington, DC, p. 1.

According to Selig Harrison, a noted "China-watcher," the potential Chinese threat to any drilling rig in contested waters is sufficient to discourage any further outside investment from taking place.

> Some observers have suggested that the development of the contested offshore areas will be delayed until sea boundary settlements can be reached...This view is supported by the element of vagueness in the Chinese stand on Law of the Sea issues as they apply to Asia. By avoiding a precise definition of its attitude toward possible boundary settlements, Peking helps to paralyze offshore oil and gas production until it is prepared to play its hand.[72]

Aside from the political issues surrounding the offshore oil potential, what other problems is China facing with respect to increased oil production? Briefly, her problems must be outlined under the following areas: (1) China will need massive capital investments and infusion of costly technology at the expense of other priorities; (2) new technology must be developed to hasten China's access to her offshore reserves; (3) there still exists the necessity to establish, in China, the proper organizational structure for a complex industry, coordinating exploration, production, distribution, transportation, and sales functions.

> The transportation of oil presents special problems. With the exception of Shengli and Takang, major oil fields are situated far from industrial centers and often close to foreign borders. Yet railroad, barge, and truck capacities are already overburdened. Port facilities for coastal and outbound shipping are known to be

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[72]Selig S. Harrison, "Time Bomb in East Asia," Foreign Policy, #20, Fall 1975, p. 22.

> inadequate, as are cargo vessels and tankers... Progress has been made in building long-distance pipelines, but many obstacles are being encountered.[73]

(4) Obviously mobility is a problem within China, and will need to be addressed as a matter of high priority in the future. According to Park and Cohen, China has purchased, in the space of a year and a half, 120 ships from Japan alone," ...of which more than 60 percent were for dredging and improving ports."[74] Apparently, the Chinese are working toward a solution to this particular problem even now.

So far as Japan's dreams of expanded trade relations with China are concerned, it can at least be said that the Japanese have their foot in the door.

> As usual, Japan was China's leading trade partner in 1976 and as 1977 drew to a close, seemed assured of maintaining the top spot, with a total turnover of about US$ 3000 million.[75]

More progress can be expected as a result of the signing of the Sino-Japanese treaty of peace and friendship on August 12, 1978.

A full text of the Sino-Japanese Peace and Friendship Treaty is provided in the Appendix.

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[73]Choon-ho Park and Jerome Alan Cohen, "The Politics of China's Oil Weapon," Foreign Policy, #20, Fall 1975, p. 36.

[74]Ibid.

[75]Asia Yearbook 1978, Far Eastern Economic Review, Hong Kong, 1978, p. 169.

> With the ink only just dry on the Aug 12 China-Japan peace treaty, Japanese officials and businessmen are losing little time in stepping up the already considerable economic cooperation between the two countries...China's complete plant purchases in the next decade are expected to reach about $30 billion... Japanese economists anticipate Sino-Japanese trade will double in the next three years, and crude oil imports from China to increase six times in the coming 12 years...Japan will be importing 7 million tons of Chinese crude this year.[76]

Since the peace and friendship treaty has been signed, Japan can concentrate on expanding its trade relations with the PRC. Even though oil production in China is increasing, reaching 1.69 million b/d in 1976, exports dropped in that year to 200,000 b/d from the previous level of 240,000 in 1975.[77]

Japan must be aware that China's domestic requirements are rapidly increasing, and it is conceivable that China may need all of its oil for its own development once its distribution system is more complete. The CIA believes this will happen.

> On balance, we believe that China will produce 2.4-2.8 million b/d by 1980. Most of this oil will be needed for domestic consumption; exports are likely to be only 200,000-600,000 b/d. Within a decade or so, continuously expanding demand will absorb total capacity unless deposits in the west or offshore are proved and exploited much more rapidly than expected.[78]

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[76] V. G. Kulkarni, "Japan Sets Out to Build China Trade," Christian Science Monitor, 25 Aug 78, pp. 1, 11.

[77] International Petroleum Encyclopedia, The Petroleum Publishing Co., Tulsa, OK, 1977, p. 206.

[78] China Oil Production Prospects, loc. cit.

Even if Japan does import 42 million tons of crude from China in 1990, that figure provides for only 5 to 6 percent of Japan's total energy requirement projections for that year. Japan must look elsewhere.

B. INDONESIA AS AN OIL SOURCE

About twelve percent of Japan's total oil supply for 1976 comes from Indonesia. (See 128 Appendix.) The future of continued supplies of Indonesian oil is in doubt, however, because new production is simply not being developed, and the older wells are being drained. Japan has had to deal with the following economic realities in Indonesia.

The Indonesian national oil company, Pertamina, under the direction of army General Ibnu Sutowo, managed to lose more than $10 billion on loans for projects which were completely unrelated to oil. Pertamina dabbled in airplanes, ships, hotels, office buildings and other projects, but so mismanaged its accounts that the company actually lost money at a time when oil resources virtually guaranteed economic success.

Prior to 1976, the oil that was being produced in Indonesia was distributed as follows:

> Original contracts provided for a recovery of investments by operators from the first 40% of production. About 20% of production was turned over to refineries operated by the state-owned Pertamina at 20¢/bbl above cost of production. The remainder was split 65-35 (sometimes higher) in favor of Pertamina, with the government imposing an 'excess profits tax' on operator sales.[79]

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[79] International Petroleum Encyclopedia 77, op. cit., p. 82.

In an attempt to recover from the catastrophic financial losses it suffered in 1975, the sinking Pertamina drew up new contracts with the various oil producers. The new contracts, in effect give the government 88-89% of all foreign oil production within Indonesia.

> The new contract system was expected to net Indonesia an additional income of about $350 million per year. But the net result was suspension of exploration drilling by non-producing operators as well as producers.[80]

Indonesian oil and gas resources are considerable, presently estimated to be at about 10 billion barrels of oil and 24 trillion cu. ft. of gas. Indonesia profits by its trade with Japan. The tragedy is that the Indonesian government and company management are so infested with graftprone executives that a net profit cannot seem to be turned. Aside from superfluous judgments on the relative morality or immorality of Indonesian corruption, the fact is that new exploration and new wells are not being financed because sufficient investment incentives have not been provided.

> ...Indonesia's oil industry is sick and the disease is affecting all of Asia. Authoritative sources say at least two confidential oil industry surveys and a study of U.S. economic experts indicate that Indonesia may cease to be a significant exporter of oil far sooner than had been expected. The nation, now the ninth-ranked producer among the Organization of Petroleum Exporting Countries, could be a net oil imported within a decade.[81]

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[80] Ibid.

[81] George McArthur, "Future of Indonesia's Industry Called Bleak," Monterey Peninsula Herald, 8 Apr 78, p. 11.

Since the contracts were renegotiated, exploration has been limited to known areas where infrastructure surveys are available and successful wells are a virtual certainty. Drilling is an extremely expensive investment, and when the profit margin is critically small, the risks must also be small.

The combined effects of the large government royalties on oil production, the growing trends toward nationalism and resource protectionism, and the problem of corruption and "speed money" all contributed to a stifling of foreign investments in Indonesia.

> Total foreign investments plummeted from almost US$ 2000 million in 1975 to US$ 245 million in 1976, and through August 1977 remained at a mere US$ 197 million--with most of this additional capital for investment in existing projects rather than new ones.[82]

In August of 1977 the government set out on a new anti-corruption campaign, chiefly designed to reduce shipping delays in the harbors by customs personnel. By forbidding the use of "speed money" in the bureaucracy, the government succeeded only in creating longer tie-ups and more delays than before.

Japanese involvement in the Indonesian economy has been extensive in the past. Significant new production for Japanese energy requirements can be found in the US$ 700 million Badak liquid natural gas (LNG) facility in East Kalimantan. The Badak LNG facility should add substantially

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[82]Asia 1978 Yearbook, Far Eastern Economic Review, Hong Kong, 1978, p. 202.

to Japan's gas supplies, but its rate of production will depend upon the quantities of natural gas that are actually taken from the wells.

Natural gas seems to be the new focus of Indonesia's energy development plans. The Arun gas field in northern Sumatra constitutes Southeast Asia's largest known reservoir of natural gas and condensate. It is the scene of some major development efforts.

> Mobil Oil Indonesia, which operates the Arun field under a production sharing contract with Pertamina, is spending US$ 400-500 million to bring the gas to the surface. At Lhokseumawe, 20 miles away on the Straits of Malacca, work is nearing completion on a US$ 920 million LNG plant and storage installation.[83]

Japanese financing for the major portion of the Sumatran development projects comes from three Japanese government agencies: the Import-Export Bank, the Overseas Economic Cooperation Fund, and the Japanese International Cooperation Agency. The hope is that Indonesian LNG can be supplied to Japan through long-term, development-supply contracts on a stable, consistent schedule.

Even in the face of these large, government-backed investments in Sumatra and Kalimantan, the likelihood of Indonesia becoming the chief supplier of energy to Japan is not on the increase, her oil production is not expanding. Moreover, projected production capacities are still not sufficiently large to alter Japan's dependency on OAPEC.

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[83]David Jenkins, "Indonesian's Challenging New Frontier," Far Eastern Economic Review, 4 Aug 78, p. 36.

C. THE SOVIETS AS AN OIL SOURCE

During the past year, two conflicting views of Soviet oil prospects have emerged, one mildly optimistic and the other wildly pessimistic. The validity of either view depends upon which set of assumptions one will accept, at which point the arguments become extremely complex. The pessimist view, in the words of a CIA study for the Congressional Joint Economic Committee, is based on the following analysis.

The Soviet economy has grown very rapidly during the past twenty years. Russia has made a maximum effort to (1) equal the United States militarily, (2) expand its industrial base and (3) respond to internal rising expectations and consumer demand for improved standards of living. The rate of growth, however, seems to be slowing. Labor is in short supply; margins of capital productivity are diminishing; harsher weather-pattern trends may reduce future agricultural output; only limited exchange reserves are available to purchase additional, necessary technology; the economy also faces sharp costs increases for the retrieval of natural resources.[84]

> The more readily accessible fuel and mineral reserves west of the Urals are being rapidly depleted, while the abundant but more remote resources of Siberia and Central Asia require enormous investment outlays...Soviet exploration and extraction policy has long favored increasing current output over developing sources of future output. As a result, new oil deposits have not been discovered rapidly enough to offset inevitable declines in older fields.[85]

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[84]U.S. Congress, Joint Economic Committee, Soviet Economic Problems and Prospects, Study, 8 Aug 77, USGPO, Washington, DC, 1977, pp. V-VI.

[85]Ibid., pp. VI-VII.

The study does acknowledge the presence of extensive oil deposits, coal, natural gas, and hydroelectric potential to the east of the Ural Mountains. The problems with such resources, however, are that (1) they are located a great distance away from the centers of population and industry, and (2) their development will require massive capital investments and several years' lead time. The Soviets apparently do not have the necessary surplus capital to develop their resources to the extent they would like, nor have they been able to attract sufficient foreign capital thus far.

Soviet negotiations with the Japanese could easily have resulted in extensive development of oil and gas resources in the Far East. Due to an apparent Soviet uncertainty over how much oil they could afford to lose to the Japanese, severe modifications were made to the initial contract estimates, and the Japanese balked. Concerning this, Professor Wu writes, "One gains the impression that in pressing the Japanese for additional concessions on the terms of the loan and the magnitude of the credit, or in introducing the Baikal Amur railway proposal, the Russians overplayed their hand unnecessarily."[86] The problem may have been sociological.

> The Soviet attitude toward foreign trade is somewhat different from the customary view in a market economy...Ideally they would like not to have to trade at all, since not only is economic independence regarded as a virtue, but foreign trade is a difficult

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[86]Wu, op. cit., p. 59.

> kind of activity for the command economy to plan and administer effectively.[87]

Whatever the precise motivation may have been, the Soviet Union has not taken full advantage of its vast nature resources. Given the economic pressures that the Soviets must anticipate in the near and long term, their polities as we perceive them seem likely to result in ever-increasing competition and possible conflict with the Western world over the available oil supplies.

The Director of the Federal Energy Administration for International Energy Affairs, Mr. Melvin Conant, gave the following testimony at a Congressional hearing last year.

> ...Over this next decade, we emphasize that competition for access to Middle East oil hold a very great potential for divisiveness between the United States, Europe, and Japan... We suggest...that there is a probability that the Soviet Union may also, if to a comparatively minor degree, find itself competing for this oil, and it will be the first time in history that the Soviet Union, Japan, Europe, and the United States will be in such a race.[88]

This whole outlook was decidedly so gloomy that it provoked a reassessment effort. The Senate Select Committee on Intelligence did some further investigating in 1978, and came to the conclusion that the CIA had channeled its predictions along a "worst case" scenario progression. Few,

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[87] Robert W. Campbell, The Economics of Soviet Oil and Gas, Johns Hopkins Press, Baltimore, MD, 1968, p. 231.

[88] U.S. Congress, Senate, Committee on Interior and Insular Affairs, Political and Economic Factors Governing Access to Energy in the Decades Ahead, Hearing, 1 Feb 77, USGPO, Washington, DC, 1977, p. 5.

if any analysts really expect the worst case to actually occur.

> The CIA, in its report of April 1977, indicated supply from Middle East countries could begin to fall short of demand from free world and Communist countries as early as 1982-1983. That was expected to trigger a burst of higher prices, and usher in a period when the Soviets became major competitors for oil...That seems less likely today. The Soviets will take every possible step to conserve oil, and to continue as net exporters into the 1980's, the Senate study indicates. This could lessen pressure on supplies, and maintain stable, or even falling prices during the next several years.[89]

Much less credibility has been given in recent months to last year's speculation that the Soviets would soon be importing oil to meet their energy requirements. Naturally, the Soviets themselves tend to minimize that likelihood in their own public statements--but the strength of their optimism is physically manifested too. Only 20 to 25 of Western Siberia's 150 known oil and gas fields have been developed. Potential yields are enormous.

> To back up the ambitious development schedules, $38 billion will be invested in the Tyumen region during the 1976-1980 period, according to Yuri Rogachev, deputy chairman of the region's executive committee. The figure is nearly 2.5 times what was spent on the region in 1970-1975.[90]

What has been the Japanese experience with regard to its Soviet oil possibilities? Not surprisingly, the Japanese

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[89]John Dillon, "Soviet Demand for World Oil Minimized," CSM, 23 May 78, p. 3.

[90]Dan Fisher, "Soviet Union's Oil-Gas Resources are Staggering," Monterey Peninsula Herald, 12 Feb 78, p. 5B.

have been considering the joint development of Soviet oil and gas resources for at least a decade. In June 1967 the first meeting of the Japan-Soviet Economic Committee took up a Soviet proposal to develop oil resources in the Tyumen fields. The committee also considered a Yakutsk Natural Gas project at a later meeting in February, 1968. The Sakhalin oil and gas project was first proposed in February of 1972.

According to Professor Wu of the Hoover Institute, these three projects, as they were all being considered in the fall of 1972, were to require a total credit of only $4 billion from the Export-Import Bank of Japan. The Tyumen project initially involved the construction of a 4,300 km pipeline to the port of Nakhodka for $1 billion. For another $2 or $3 billion, the Yakutsk Natural Gas project involved both a pipeline and an LNG plant at Nakhodka. That plant would facilitate LNG exports to Japan or the U.S. Sakhalin, because of its convenient location, would only need a $230 million investment.

> One of the contested issues in the negotiation concerned the rate of interests: the Japanese were asking for 6.3 percent while the Soviet side proposed a rate of 6 percent in addition to a four-year deferment of payment.[91]

Delay followed delay. By August of 1973, the Soviets returned to the tables with requests for larger loans, but

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[91]Wu, op. cit., p. 41.

holding less incentive for Japanese investors. The Japanese had been lead to believe that if Tyumen oil production could reach 125 million tons/yr by 1975 and 230 million tons/yr by 1980, then the Soviet export of Tyumen oil to Japan would also rise from 25 to 40 million tons/yr in direct proportion to increases in production. The Soviets put the cap at 25 million tons/yr, even at peak production; the three projects would cost the Japanese an initial outlay of $5.6 billion. What was more, the Soviets wanted to use rail transport instead of a pipeline.

The harder negotiating posture on the part of the Soviets may simply have been the result of a reassessment of the Tyumen potential and Soviet domestic oil requirements. Possibly the Soviets were only stalling in anticipation of the Arab-Israeli War and OPEC embargo--feeling that the Japanese position would inevitably weaken.

The Japanese needed better security on such an investment in any case, and the political ramifications of building rail lines so close to the Chinese border would require some U.S. political reassurances. U.S. involvement through U.S. investment in these projects would offset Russia's leverage over the Japanese in further contract disputes or negotiations.

In March of 1974, when the prospect of U.S. involvement was introduced, the U.S. Congress was quite deeply involved in the question over linkages between enhanced trade relations with the Soviets and the free emigration of Russian Jews.

No U.S. Export-Import Bank credits materialized; no relaxation of the Soviet offer became public; the Tyumen project was shelved--and remains shelved thus far. The Yakutsk Natural Gas project was also shelved for lack of joint U.S. financing. The Sakhalin project, although more successful, has also run aground of the Japan-Soviet dispute over the status of the "northern territories," the Habomai Island group, Shikotan, Etorofu, and Kunashiri.

Both Japan and the USSR could realize significant advantages by cooperating on the development of Siberian resources. The Japanese, on the one hand, may have the opportunity to tap into one of the world's greatest energy reservoirs.

> A survey shows that the USSR by Jan. 1, 1977, had discovered at least 49 giant gas fields, each with proved-plus-probable reserves of 3.5 trillion cu. ft. or more. Of these, more than 30 are not yet in production.[92]

For a nation so desperately dependent on imported oil as is Japan, the availability of such a store of energy is certainly a hope for the future. Secondly, the proximity of Siberian energy is also important to Japan. Presently, Japan's energy lifeline extends through the shallow waters of the South China Sea and the Malacca Straits all the way to the Persian Gulf. The costs of shipping, the opportunities for interdiction or interference, territorial waters disputes, and Middle Eastern instability have all been seen to be

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[92] International Petroleum Encyclopedia 1977, op. cit., p. 216.

detrimental to Japan's energy interests. If large quantities of oil could be had at an east Siberian port--some uncertainties and disadvantages could be removed. Third, and most important, Japan is located in the midst of two very large and powerful communist states, with whom she must coexist. The communist satellites, notably North Korea, Vietnam and Cambodia, are all capable of irrational or aggressive behavior--and Japan is unable to project her small defense forces over the long, vulnerable lifeline coming from the Middle East. The United States provides some balance to the potential military threats which Japan faces. The U.S.-Japan Mutual Security Treaty has served both countries well for nearly 20 years. With respect to the major Asian powers, it is possible and even likely that the Sino-Soviet rift has provided Japan an additional degree of security against communist adverturism in Asia. To the extent that this is true, Japan must try to avoid siding or aligning with either of the two major communist powers, and maintain a neutral position with regard to Sino-Soviet disputes. Japan has had only limited success in her recent discussions with the Soviets, and it is in Japan's interests to improve relations with Russia--especially in light of Japan's recent peace and Friendship Treaty with China. The balance must be maintained.

The USSR's advantage in such joint development projects as have been discussed thus far, stem largely from the added

national benefits of enhanced resource availability. When the pipelines or railroads are built, these "tools" only add to the overall productivity of the Soviet Union. Second, strategic advantages are realized by (1) a major refueling terminal becoming available on the eastern coast, (2) enhanced troop mobility (by rail), and (3) extension of significantly more Soviet influence and control over its eastern affairs. Third, Japanese and American technology would become available as the projects were planned and built, providing a possible template for even further Soviet development in other regions. Fourth, the Soviets would gain a political advantage with respect to Japan, China, and in world opinion. Japan's dependency, and her economic alignment, would slap at China. Development of such huge energy resources is a very impressive undertaking in today's world.

Soviet disadvantages are more subtle. By allowing Japanese and, possibly, US technicians into the country, the possibility of an information leak is increased. Russia treasures her secrets, and this may worry them a great deal. Also, oil is a finite resource, and it would seem better to minimize its outflow and keep it for domestic use. However, if the fields are not developed, and oil eventually has to be imported, the resultant outflow of exchange capital would severely limit Russia's ability to pay for the kinds of

technology she needs to raise her low productivity to Western levels.

> Russia is determined to maximize gas exports even if it requires, as expected, smaller gains in domestic consumption and a switch to alternate fuels by Soviet industry. This is a policy already being followed with respect to oil exports.[93]

Japan knows that it must maintain reasonable good relations with the Soviets. Whether she decides to go ahead with her plans to work with the USSR on Siberian developments will depend upon her assessment of political vs. economic costs and benefits. The Middle East is an unstable oil vendor, but would the Soviets provide a much more stable supply? Will the pending Peace and Friendship Treaty with China require that some countervailing concessions be made to the Soviets? Will the Japanese accept lower interest rates from the Russians as "partial payment" for their treaty with the Chinese? If the treaty is signed, the Japanese will most assuredly be looking for ways to reassure the Soviets that the anti-hegemony clause (included at Chinese insistence) has little significance for Japanese-Soviet relations. An economic concession may, indeed, provide such a reassurance.

D. VENEZUELA AS AN OIL SOURCE

Japan is one of Venezuela's least important accounts. In all of 1976, Japan imported only 300,000 metric tons of crude

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[93]Ibid, p. 215.

oil from Venezuela, down from 387,000 mt in 1974. That amounts to little more than a thousandth of Japan's total annual oil requirement. The Japanese market receives about .82 percent of Venezuela's oil exports. In contrast, the United States and Canada combine to receive 69 percent. The vast majority of the remaining 30 percent is sold in Europe. Japan has had only limited success in diversifying her oil sources through Latin America.

Since the early part of this century, Venezuela has been the second largest producer of oil in the western hemisphere. A member of OPEC, Venezuela did not participate in the Arab oil embargo of 1973, and continued to supply oil to the United States and the Netherlands. The situation has changed in Venezuela since that time, however.

Production has steadily fallen off, partly due to a slow depletion of her older wells, and partly due to a worldwide oil surplus which has remained in effect since the end of the oil embargo in 1974. Higher oil prices have cushioned the impact, but the future is somewhat uncertain. The oil surplus is rapidly becoming an oil glut.

> After a heady two-year era of soaring oil profits, Venezuela is facing the prospect of some economically lean years ahead. In large measure, the current world oil glut is to blame--an unexpected factor that has forced Venezuela to significantly reduce oil production...Production this year will hover at 1.7 million barrels daily, a 27.5 percent drop from the 1977 figure of 2.35 million.[94]

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[94]James Nelson Goodsell, "Oil Profit Plunge Heats Up Election in Venezuela," Christian Science Monitor, 31 May 78.

A second major change in the Venezuelan oil industry took place January 1, 1976, when Venezuela nationalized oil operations throughout the country, expropriating private holdings connected with oil production and refining. During that year she announced an ambitious 5-year plan designed to expand her oil industry to even higher levels of activity, exploration, development, and production. A government-owned holding company, Petroven, was established. Its function was to oversee the operations of 14 subsidiary companies acting under its direct control.

Concerning the terms of the nationalization, several aspects are especially significant. No private-capital participation is allowed, neither foreign nor domestic, within the Venezuelan oil industry. Private companies were compensated for their lost holdings, and appeals were allowed concerning the amount of compensation. Private "participation" continues in a new capacity, that being in the form of operating contracts. These contracts bring in the necessary foreign expertise, and provide that a fee be paid for their services.

Except that a company, by drilling a successful well, has incrementally increased the world's oil supply, it realizes no direct benefit from its success (and suffers no loss from a dry hole.) Venezuela retains complete control over the well's production and profits. Argentina

uses a similar system--with similar results. Production is dropping off.

Venezuela has done some experimentation with tar sands, a form of "unconventional" oil reserves, but the process of extraction is still very expensive and costly, too, in terms of energy investment for energy gained. She has other alternatives, however.

> Additional conventional reserves...are also a distinct possibility in relatively unexplored areas, both onshore and offshore. The entire continental shelf or the Caribbean, the delta of the Orinoco River, and the Gulf of Venezuela are often mentioned as prime targets for the future...Activity in the Gulf of Venezuela continues to be held back by a diplomatic tiff between Columbia and Venezuela over the boundary of territorial waters....[95]

Prospects for expanded Japanese involvement in the Venezuelan oil industry would seem to hinge upon her ability to outbid her American and Canadian competitors for either crude or refined petroleum products. One would suspect that American firms would have the technological comparative advantage in securing Venezuelan contracts for oil exploration and development. For Japan, Venezuelan oil is expensive anyway, because of its distance from Japanese ports. The prospects, therefore, do not seem favorable.

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[95] International Petroleum Encyclopedia 1977, op. cit., p. 139.

E. MEXICO AS AN OIL SOURCE

Where Japanese prospects for diversification are concerned, Mexico has a lot more potential.

> Mexico is rapidly becoming a major oil producer. In 1976, local oil output approached 1,000,000 b/d and furthur increases planned for the next 6 years should bring the total to over 2,200,000 b/d by 1982.[96]

Mexico's successes are recent developments. Only a few years ago, Mexico was a desperately poor country and getting poorer with each new wave of her ongoing population explosion. Proper management of her oil industry, however, can attract the necessary foreign investment, technology and industry necessary to provide for substantial economic growth.

> During 1972, in the states of Chiapas and Tabasco, government owned Petroleos Mexicanos (Pemex) tapped a new Creataceous oil province that in 1975 began to raise eyebrows around the world and sent a number of official and unofficial fact-finding missions from OPEC member countries to court Mexico. This became the first firm indication of a major discovery, potentially capable of threatening the OPEC cartel.[97]

Japan would do well to find a way to aid Mexico in its efforts to achieve a higher standard of living. This action would, incidentally, be of some benefit to the United States as well; more jobs in Mexico would reduce the demographic pressures of "illegals" looking for work in America. Japan must realize that Mexico is a potential goldmine.

> Crude exports, to average 150,000 b/d in 1977, will climb at a rate of 50,000 b/d per year starting in

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[96] Ibid., p. 129.

[97] Ibid.

> 1977, bringing the total to 400,000 b/d by 1982. By then, Pemex expects to have a surplus of 700,000 b/d of refined products available for export.[98]

Presently, Mexico has no Pacific terminal for crude export upload. Refined products are piped to Salina Cruz, a small Pacific terminal, from the refining centers at Coatzacoalcos. However, the major share of Mexico's petroleum exports depart from Tampico, Tuxpan, Veracruz, and Coatzacoalcos, all of which are located on the Gulf of Mexico.

For Japan, that fact means oil must either transit the Panama Canal in undersized tankers, or continue eastward around the southern tip of Africa, through the Lombok Straits, and north again to Japan. For the time being, neither of these options is economically practical. If a Pacific terminal, capable of berthing supertankers for crude uploads, is ever made available by Mexico, Japan will certainly jump at the chance to be first in line.

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[98] Ibid., p. 134.

IV. ALTERNATIVE ENERGY SOLUTIONS

It is unreasonable to expect that the supply of oil will continue to expand in similar proportions ad infinitum. Japan's economy in 1978 is still growing at a rate considerably in excess of 6 percent per year, and has even threatened to exceed ten percent. Consequently, the ACE projections for 1985 energy demand levels will soon be void of meaning. Unless Japan's economic growth is curtailed in the energy-intensive sectors, her energy requirements will not be reduced. A quick look at the statistics (Appendix) will point out Japan's failure to diversify her oil sources.

Therefore, a major policy goal for Japanese planners must be concerned with the development of alternative sources of energy. In the past, the only sources of energy which had been able to respond to large increases in demand were coal and, later, oil. Japan's fragile eco-system will no longer tolerate the extensive coal-burning which was so prevalent prior to and during World War II. Oil is the only major fuel in Japan today. However, oil production no longer can expand so quickly, or so immediately, in response to ever-increasing world demand. Exploration and advanced recovery technology involves massive capital investments and longer production lag times. Because of its expense, and uncertain future, oil has lost much of its appeal as a long-term energy source. The new rationale is simply this. As long as massive

investments are inevitable, why not channel them into an energy source with a future?

The following section of this thesis will examine sources of energy other than oil which may play a major role in reducing Japan's oil dependence. While these sources do open up new possibilities in the prognoses of future energy production levels, the ultimate observation is that they are simply not sufficiently developed to provide the quantities of power which will be required over the next two decades. Barring a major technological breakthrough in energy production, the environmental risks and initial investments required by these alternatives make their feasibility quite remote.

A. *NUCLEAR ENERGY*

The Japanese people have a deep-seated abhorrence for nuclear energy. Government programs in Japan, designed to develop and incorporate new, nuclear energy sources of energy have been consistently met with active resistance. However, even in the face of its unpopularity--nuclear energy does pose an attractive alternative to Japan's continued oil dependency.

Many people believe that nuclear energy provides the answer Japan is looked for as regards her energy question. Using breeder reactors, Japan in theory could have a perpetual energy source for the production of electricity. The initial investments are extremely large, and there are environmental costs, but an autonomous energy production capability could be achieved for an unlimited duration.

In a 1976 government white paper on atomic energy, Japan pointed out that her nuclear programs were not progressing as smoothly as had been originally hoped. Popular sentiment against any new nuclear installations was proving to be a tremendous bottleneck. The report noted that "the biggest task in respect to the development of A-energy was to obtain the cooperation and the understanding of the people."[99]

Japan established its Bureau of Atomic Energy Safety within the Science and Technology Agency in January of 1976. Its purpose, beyond the task of improving the safety and screening features of Japan's reactors, was to offer some positive input to the public sector concerning the relative safety and desirability of nuclear development.

Japan has, essentially, no indigenous uranium deposits of comparative value. In order for Japan's nuclear reactors to function, outside sources of atomic fuel need to be

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[99]"White Paper on Atomic Energy," Asian Recorder, January 22-28, 1977, p. 13563.

developed while breeder research is being conducted. In order to do this, Japan must work out cooperative agreements with countries possessing such resources, such as the United States or Canada.

However, Japan is already heavily dependent upon the United States. The U.S. provides military security forces for the defense of Japan, and also happens to constitute nearly a third of Japan's export market. For Japan to rely upon United States uranium supplies for the maintenance of her economic life-blood and well-being would only deepen her dependency problem. Japan's inclination, therefore, is to look elsewhere for her nuclear fuels, if possible. "Japan has already contracted to buy a total of 145,000 metric tons of uranium by 1985 from Australia, Canada, and South Africa, as well as from the Congo and Niger, through France."[100]

> Japan started nuclear power production in 1966 and now has 13 lightwater reactors fueled by enriched uranium, capable of generating 7.4 million kilowatts of electricity...It plans to increase the capacity to 33 million kilowatts by 1985....[101]

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[100] Yuko Nakamikado, "Japan Tiptoes Ahead on Peaceful Nuclear Energy," Christian Science Monitor, 4 October 1977, p. 14.

[101] Ibid.

One aspect of Japan's nuclear policy, however, greatly concerns the Carter administration. Japan wants to reprocess its own nuclear fuels, using technologies that would result in weapons grade plutonium and highly enriched uranium (HEU) being manufactured. Under the terms of U.S. uranium supply contracts, this cannot be done without U.S. authorization.

Fearing that possession of weapon's grade fuels would inspire a nation to join the "nuclear club," or give incentive to terrorist attempts to acquire such materials for their own purposes, the U.S. has been extremely reluctant to authorize any such reprocessing. The alternative, for the recipient country, is to rely upon U.S. supplies of low-enriched uranium (LEU), which the U.S. is able to supply in large quantities. LEU is not a weapons grade fuel. This has been the thrust of U.S. nuclear policy for the last several years, and it has brought the U.S. and Japan into direc-disagreement over the status of Japan's $200 million Tokai-mura reprocessing plant. Located 60 miles northeast of Tokyo, the plant would have cut Japan's nuclear fuels dependency significantly. Spent fuels in Japan's reactors could be reprocessed in Japan, and used again to generate even more power. The reprocessing techniques, however, result in plutonium byproducts. Plutonium is a basic ingredient in the manufacture of nuclear weapons.

Faced with U.S. resistance to her reprocessing program coupled with intense domestic restiveness over the issue, Japan took up another course.

> Japan has told the United States it will spend more than $1 billion to finance plutonium reprocessing plants in France and Great Britain, thus ending any (US) hope that Japanese will not use plutonium as a nuclear fuel. The Japanese plan comes as a hard blow to the Carter administration, which earlier this year asked Japan to forego any plutonium reprocessing plans for at least two years...Japan insists it cannot count on fueling... (their reactors) with enriched uranium and thus needs to power them with plutonium.[102] (parenthesis added)

Japan plans to sign long-term supply contracts with France and Great Britain wherein these two countries would reprocess Japan's spent nuclear fuels, extract the plutonium, and ship the plutonium back to Japan. Japan's billion dollar investment will serve as a sort of prepayment device. In time, France and Britain will "buy out" Japan's share of the investment by supplying her with reprocessed plutonium. This course of action was considered to be more expedient for the Japanese, as Japan's environmental, safety and land utilization constraints would have slowed her own reprocessing capabilities to an impossible pace. Moreover, the United States was applying pressure to scrap her entire reprocessing program.

The British plant at Windscale will be capable of reprocessing 1600 tons of spent fuel per year. The French plant, already in place at LeHavre, will be expanded from a rated capacity of 400 tons per year to 1600 tons per year.[103]

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[102] "Japan Takes Step Toward Using Plutonium as A-Fuel," Monterey Peninsula Herald, 20 May 78, p. 2.

[103] Ibid.

> Each reactor that produces 1000 megawatts of electric power requires about 5,500 tons of uranium (in the form of uranium oxide) to operate during an expected 30-year life span.[104]

Apparently then, the British and French reprocessing facilities would each be able to completely service the spent fuel coming from nine, 1000 megawatt generators. Obviously, Japan's reactors will take some priority over most of the world's 200 or so nuclear facilities. Japan has 13 reactors in operation, and 13 more in various stages of planning of construction. Brazil recently acquired a reprocessing plant through West Germany, and Pakistan may yet receive one through France. Pressure from the United States, however, has succeeded in restricting further sales of such technology to "non-nuclear" nations. The free world's nuclear fuel consumers will, barring a major technological breakthrough, be forced to rely on one or more of the world's three major uranium sources, the U.S., Canada, and/or Australia.

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[104] David J. Rose and Richard K. Lester, "Nuclear Power, Nuclear Weapons, and International Stability," Scientific American, April 1978, p. 46.

B. SOLAR ENERGY

During his very brief visit to the United States in May, 1978, Japanese Prime Minister Fukuda proposed yet another alternative to the world's energy dilemma. Recognizing that solving the world's energy problems will require large sums of money, Fukuda suggested that the United States and Japan establish a joint fund to carry out research and development in science and technology.

Japanese Foreign Ministry officials expanded upon Fukuda's statement, saying that such a fund might range anywhere from $50 million to $1 billion. Each nation would contribute half.

> Fukuda singled out nuclear fusion and solar energy as 'particularly useful areas for joint research and development' but also suggested development of nuclear fuel cycle technology that by itself would provide guarantees against proliferation of nuclear weapons and research to improve the safety and reliability of nuclear reactors.[105]

Solar power does have a tremendous appeal for a number of reasons. The supply is inexhaustible, though perhaps intermittent in direct application. It leaves no waste product and is, therefore, non-polluting. It would be very difficult to embargo such a commodity, or restrict access. The potential for economic growth, given a dependable energy source such as solar power, would be very great indeed.

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[105] "Fukuda Makes Proposal for Research Fund," Monterey Peninsula Herald, 5 May 78, p. 9.

Solar energy can be collected in solar panels which are filled with a circulating liquid. The heat is drawn off and put to use. A second, and potentially more significant collector of solar energy is the photovoltaic cell.

The photovoltaic cell, when exposed to photon pressures, develops an electric current. If the cells can be made to work more efficiently, and if enough of them can be gathered together and exposed to sunlight, an extremely valuable energy source would be realized.

The disadvantages to either system stem from the fact that the sun is only intermittently in the sky, and weather systems can obscure it for long periods of time. Second, the costs of initial investments in solar energy are too high to warrant their purchase for the time being--oil still being a relatively inexpensive commodity by comparison.

However, in the United States, the National Aeronautics and Space Administration is developing a plan to orbit a series of 20 "solar collector" satellites, each equipped with photovoltaic cells, and capable of converting solar electricity into microwave energy. The microwaves would be beamed toward specific receivers on earth, converted back into electricity, and distributed through existing power networks. In this way, the problems of intermittent sunlight and clouds would be overcome. Valuable land would not have to be sacrificed to massive collector facilities,

and no pollution would result. These advantages make solar energy especially appealing to the Japanese.

> Although such a satellite would be cheap to operate, it would take more than a billion dollars to launch one experimentally. No federal money is currently budgeted for this, but 25 million dollars is proposed for next year.[106]

The joint fund proposed by Prime Minister Fukuda could go a long way toward reducing the costs of research and experimental development of solar satellites. Joint successes in this field would bring a great deal of prestige and world esteem to the joint venture, and Japan's self-image as an important, contributing world actor would be enhanced. If important progress is made in photovoltaic research, Japan may even be willing to contribute more than her 50% share of the expenses in order to bring the project to fruition.

Further optimism for the world's future energy situation can be justified through recent developments in the efficiency ratings of the photovoltaic cells. U.S. scientists, using a "thin'film" solar cell, have demonstrated a 9.15% light-to-electricity power conversion, and expect to achieve 10 percent efficiencies by the end of 1978. Costs, the chief

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[106] "Here's a Fresh Look at Far Out Fuels," US News and World Report, 17 Apr 78.

obstacle to widespread use, amounted to $30 per watt as recently as two years ago. At this writing, the cells can be had for $6 per watt, and through mass production techniques could cost as little as 25 cents per watt by 1982.[107] At that price, solar electricity will constitute a viable option when compared to the world's diminishing fossil fuels.

C. GEOTHERMAL ENERGY

What other energy options might Japan pursue? One neglected possibility is that of increased utilization of geothermal energy. The volcanic islands of Japan literally thrust themselves out of the sea many millions of years ago. Japan's mountainous topography still includes about 50 volcanos which are yet active to some degree. Properly harnessed, the hot magma which flows somewhere beneath her islands would theoretically become one of Japan's most valuable natural energy resources.

> Former Interior Secretary Rogers Morton placed geothermal power in its proper perspective when he stated: 'In this time of critically high energy requirements, the various fuels are not alternatives to each other. We need them all, including geothermal.[108]

Japan presently has four geothermal installations, producing a total of 50 megawatts, which is only a very

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[107] "Solar Electric Cell May Beat 1986 Deadline," Monterey Peninsula Herald, 7 Jun 78, p. 11.

[108] Horace S. Mazet, "Tapping the Earth's Pool of Energy," Monterey Peninsula Herald Weekend Magazine, 28 Aug 77.

tiny contribution to Japan's total energy requirements. The potential for growth in this field is very large.

The Russians have already developed some of their geothermal potential, and Iceland, too, is building a 55 megawatt geothermal plant. Steam reservoirs at Lardarello, Italy, are generating nearly 400 megawatts. New Zealand is producing 170 megawatts from a part of its geothermal potential. Mexico developed 75 megawatts. El Salvadore invested $44 million in her 30 megawatt geothermal plant, and is now saving $5 million per year in imported oil.[109] The point is that Japan could take advantage of its own geothermal potential to a greater extent.

Part of Japan's problem as it relates to geothermal development is environmental. The vast majority of Japan's geothermal outlets, hot springs, and volcanic activity, are located within national parts or refuges. In order for these areas to be developed, staunch conservationist factions will have to be overruled, an action which could be politically dangerous to the ruling party. Geothermal energy sources could account for one percent of Japan's total energy requirement if conservationist objections could be circumvented.

MITI, in their "Case B" projection for 1990, conceived a possible 60-fold increase over present geothermal output (See Table VII). Perhaps this was a signal to the conservationists

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[109] Ibid.

that, given the choice between economic survival and environmental conservation, Japan will choose to survive.

D. OCEAN ENERGY RESOURCES

In other energy realms, Japan may see some potential in growing and harvesting seaweed, or kelp, so that it can later be converted into methane gas by bacterial digestion.

> A 1974 Federal Administration Study set $4.20 per million British thermal units (Btu) on energy (the equivalent of 1000 cubic feet of gas) as the breakeven price for synthetic natural gas, assuming there were no other by-products...[110]

Unregulated, intrastate gas prices in the U.S. range from $2.50 to $3.50 per 1000 cubic feet. By-products from the harvested seaweed, such as fertilizer, combined with the shellfish and other seafood scooped up along with the seaweed, could bring synthetic gas costs down enough to be competitive with natural gas.

An island nation such as Japan could set up huge kelp farms several miles offshore. Pumps powered by wave action could bring low-level nutrients to the surface in those deeper waters. Seaweed is an efficient collector of solar energy; some varieties grow as fast as two feet per day. With proper facilities (certainly the Pacitic Ocean is large enough) Japan could provide itself with a significant

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[110] Brad Knickerbocker, "Methane From Lowly Seaweed," Christian Science Monitor, 7 Sep 77, p. 6.

percentage of its total energy requirement through synthetically manufactured methane.

Two other energy resources closely tied to Japan's maritime situation can be found in tidal power and thermal conversion. Such energy sources are ideal for island nations such as Japan. However, their utilization is not widespread. "France, Russia, and China are the only countries that now operate tidal plants. A plant is planned by the South Koreans."[111]

Tidal power works on a principle which takes advantage of the moon's gravitational pull on the ocean surfaces. Between low and high tides, huge potential energies are sotred in the elevated sea levels. This potential energy can be bottled up and released at low tide when the difference in water levels is greatest. Japan's western coast provides several such bottlenecks. Most notably, Japan's Inland Sea seems to have the greatest potential for such a project.

Placing dikes across the narrow entrances to the Inland Sea, however, would entail massive investments. Provisions would have to be made for commercial shipping. The environmental impact probably would be significant. Public reaction to such a project would doubtless be vehement in its opposition, as the Inland Sea is considered something as a national treasure. Still, with

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[111]"Here's a Fresh Look at Far Out Fuels," loc. cit.

proper planning and public relations, Japan may yet find a way to introduce pollution-free, tidal energy into her energy program.

Another ocean-related energy source, ocean thermal energy conversion (OTEC), would also involve massive initial investments. The theory seems plausible enough. The ocean surface acts as a collector of solar energy (heat). A fluid, such as ammonia, cooled by the colder waters from below, would be heated and expanded by the warmer waters topside. The expansion would drive the generators, yielding a limitless supply of non-polluting electrical power. Enough electricity would be produced to run the cold-water pumps as well, resulting in a self-contained generating station.

Presently, two large U.S. aerospace contractors, Lockheed and TRW, are competing to perfect their designs for such an installation. A great deal of enthusiasm has been generated by these projects, if little electricity. There is reason, however, to question the efficiency of such a concept.

> The temperature differences that are available between surface and deep waters in tropical latitudes are only 34° to 44°F. At such temperatures an ideal heat engine would have an efficiency of 6 percent, and in practice OTEC will not achieve more than 2 or 3 percent efficiency. Such a meager performance rating requires that a plant draw in enormous amounts of seawater. A 100-megawatt plant would have

> to pump through 100,000 gallons per second... and a thin layer of marine slime on the heat exchanger surfaces could push the energy balance into the red...Only 1/4 millimeter of slime would reduce the plant's performance by 60 percent.[112]

It is not impossible to build a series of such installations around Japan. However, Japan's waters would not provide wide, tropical temperature differentials. Sited in tropical waters, security and power transmission difficulties arise. The probability of Japan ever utilizing an OTEC system is very small. If Japan were able to devise an OTEC system with significantly better efficiency than either the Lockheed or the TRW systems, she may wish to market such a product. Reduced worldwide demand for fossil fuels works to Japan's advantage.

E. MAGNETOHYDRODYNAMICS

Another way Japan can maximize her energy resources is to improve the efficiency of her existing facilities. In order to produce electricity, conventional generating plants must use some fuel, uranium, oil or coal, to heat water into steam. The steam is passed through the blades of a turbine generator to make electricity. Such methods result in about 30 to 40 percent conversion efficiencies.[113]

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[112] William D. Metz, "Ocean Thermal Energy: The Biggest Gamble in Solar Power," Science, 14 Oct 77, pp. 178, 179.

[113] Michael Woods, "New Way to Get Electricity From Heat Told," Monterey Peninsula Herald, 25 Apr 78, pp. 1, 4.

Such efficiencies leave room for improvement. Advocates of a new technique, based on an old principle, claim that magnetohydrodynamics (MHD) can convert heat into electricity at efficiency levels ranging upward from 50 to 60 percent.

Eliminating the steam and turbine generator, MHD involves only the use of superheated ionized gases, which are called plasma, and an extremely powerful magnet. When the plasma is channeled through the magnetic field, an electrical flux is induced, and "electrodes placed in the path of the plasma pick up high-voltage current directly from the gas stream."[114] There are no moving parts.

Another advantage to MHD, especially where Japan is concerned, is that high sulfur coals can be burned without fear of air pollution. Alkali "seed particles" injected into the plasma to enhance electrical conductivity combine with the sulfur to form new materials which are easily filtered.

The technology exists to put MHD into widespread use. The Russians have designed a 500 megawatt MHD plants, scheduled to become operational in 1983 or 1984. For Japan, MHD remains a question of cost vs. benefit, compounded by uncertainties surrounding the source of her future fuel supplies. MHD would be of little use to the Japanese if coal, oil, and gas suddenly became unavailable.

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[114] Ibid.

F. CONCLUSIONS

In addition to conservation measures, and its search for alternate sources of petroleum, Japan has actively pursued policies of diversification as a solution to her basic energy problem. While the importance of oil cannot be minimized here, it should also be clear that alternative sources of energy must be developed to augment Japan's oil supplies, and to provide a transition period during which Japan can ultimately choose which forms of energy to pursue.

Japan is aware of its need for a comprehensive energy policy. The Japanese government must find a way to overcome the conflicting interests expressed by private industry and consumer groups. Local politics have played havoc, for example, with Japan's nuclear programs. Certain fears, such as pertain to reactor integrity during earthquakes, are justifiable. On the other hand, interminable delays in reactor installation and certification will only intensify the energy vulnerability with which Japan must cope.

> The alternative to an integrated national energy policy--which might come with some unplatable political side-effects--would be a supply-demand balance of energy

at a low level and slower rate of overall economic growth.[115]

Japan's Ministry of International Trade and Industry (MITI) provided itself with an Advisory Committee for Energy (ACE) in an attempt to discover the possible courses Japan may follow with respect to a comprehensive energy solution. ACE is comprised of a broad base of energy experts, both in and out of government, and also includes representatives from related industries.

After some study, ACE published a dual-scenario, energy supply and demand forecast for the year 1985, and extrapolated even further to the year 1990 (See Table IX). These numbers were based upon an original premise that the Japanese economy would continue to grow at a rate approximating 6 percent per year. A second premise was that current energy-saving programs would result in a 5.5 percent reduction in overall energy requirements for 1985 (Case A). If a concerted energy conservation program were to be instituted and carried out, it is conceivable that Japan's energy requirement for 1985 could be reduced by 10.8 percent (Case B).

In order to achieve such a level of conservancy within the Japanese economy, ACE recommended that several areas be given concentrated attention.

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[115] Susumu Awanohara, "Energy Policy Priority or a Major Bottleneck," Far Eastern Economic Review, 16 Dec 77, p. 48.

> Energy saving and reduction of dependence on oil are obvious areas (needing emphasis). Full development and use of domestic resources, diversification of foreign sources of energy, stockpiling of most essential materials, public education to win acceptance for establishing energy facilities--as well as intensified research and development to improve use of existing sources of energy and commercialize new ones--are also called for. It is advocated, too, that Japan play a positive role in the international dialogue between producer and consumer countries to stabilize the world energy market and secure supplies.[116] (parenthesis added)

Critics within the establishment are unhappy with the ACE projections. The main complaint, it seems, is that the forecasts ignore the possibility of rather severe shortages. Also, the government statistics are said to reflect the distorted views of politicians who wish to deal in terms of unbridled optimism. A tenfold increase in total geothermal output in ten years was cited as a good example of an official exaggeration.[117]

While labeled a "supply and demand forecast," ACE's figures are more likely reflections of projected demand patterns. The problem still remains as to where all this energy will be obtained, and, even assuming that it does become available, can it be afforded at tomorrow's prices?

One fact remains clear throughout. For Japan to assure herself of an expanding energy base sufficient to meet the

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[116] Ibid.

[117] Ibid.

projected demand patterns for 1985-1990, she will have to invest large sums of money. There is no avoiding this simple fact.

Who will pay for facilities large enough to stockpile 90 days' worth of oil to offset the impact of future supply interruptions? Which companies will risk the uncertainties of overseas oil development? Who will build the necessary coal-fired power plants to supplement the slowing growth in oil imports? Where will that coal originate? How will it be supplied? Liquid natural gas facilities must also be financed and built and brought on-stream. Who can afford to contract for a nuclear reactor in the face of such widespread public opposition and delay?

The Japanese government, if it expects to foot the bill for many of these projects will have to sacrifice a number of other, very popular services. Agricultural programs and perhaps even military expenditures will have to be subordinated to the priorities of energy development.

The government cannot be decisive on this issue and remain popular, too. Too many interests will be affected. For the good of Japan in the long-term, the government will have to shrug off the lobbyists.

> The concentration of power could go far beyond what most Japanese now envisage, with the Government conceivably taking a tough position on land acquisition for plants or transport facilities, on energy saving requirements or even in energy-related foreign policy all in the name of national interest.[118]

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[118] Ibid., p. 49.

Sustaining Japan's economic growth will be complicated further by three limiting factors: rising costs for resources and raw materials, a continuing labor shortage, and environmental constraints on certain kinds of production. The increased costs for production that each of these constraints will entail will also fuel another problem--inflation.

In response to such limits to sustained growth, Japan may choose to follow one or more of the following policy goals.[119]

First, the diversification of resource supplies must be sought. Japan has made a valiant attempt to reduce her dependence on Middle Eastern oil, for example. Though she has failed in this attempt, her efforts have tended to preclude her falling into even greater dependency. As for non-fuel resources, cooperative development projects have been negotiated in various countries, especially with the members of ASEAN. Through cooperative development, Japan's supply of raw materials becomes more assured and predictable.

> Major resource development will still have top priority for investment, including oil, natural gas, timber and bauxite. Efforts in the early 1970's to enter small-scale industries such as textiles, agriculture, food processing, electrical appliances and pharmaceuticals will be downplayed...Major emphasis will be placed on "processing industries" such as aluminum smelters, steel plants, lumber mills, and oil refineries... As this coincides with increasing demands

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[119]Saburo Okita, "Natural Resource Dependency and Japanese Foreign Policy," Foreign Affairs, July 1974, pp. 720-722.

in Japan for pollution control, Japanese investor and government-led consortiums are likely to favor such investments.[120]

Second, Japan must also place a much larger emphasis on the importation of finished goods as opposed to raw materials. The advantage to this is threefold. If Indonesia, for example, were to mine its own bauxite, and use its own oil resources to process it into aluminum, by purchasing that aluminum Japan would eliminate her requirement for oil imports to that fractional extent. To that same extent, Japan's tankers would be free to carry fuel for other, more critical applications. Also, the burning of that oil, and the waste products released from the production of aluminum, would have added incrementally to Japan's already serious environmental problems. By buying processed aluminum from Indonesia, Japan is able to export some of her pollution problems away. In addition, by allowing other countries to participate in the finishing process, scarce Japanese labor reserves are made available for more productive tasks. Japan will also derive a larger advantage in exporting, through foreign investment, of her heavy industries.

Japan must shift, or modify her domestic industries along new modes of operation which are more energy conservative. By promoting growth in energy-intensive industries, such as

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120 Richard L. Wright, "The Enigmas and Patterns of Japanese Economic Investment and Cooperation in Indonesia," Naval Postgraduate School Paper, NS3610, 16 Sep 77, p. 31.

computers, micro-processors, precision parts, communications systems, and applications research involving high technology, Japan can save on its consumption of oil to a substantial degree. Naturally, such shifts will be costly. Some of the costs may be absorbed through natural depreciation on dated facilities which would simply not be replaced. Japan's goal, however, would be to find industries in which the contribution of raw materials to the cost of the finished product is minimal.

A fourth policy goal must be to encourage the Japanese people to find ways to save, conserve, and fully utilize their resources. This would involve changing the lifestyles of about 115 million people, and much will have to depend upon the style of leadership employed. Renewed emphasis on mass transportation, as opposed to the private auto, lowered thermostats, durable consumer goods as opposed to throwaway items, and recycling programs will also contribute to a reduced, domestic demand for energy.

Fifth, within practical limits, a conceivable goal might be to apply certain kinds of brakes to Japan's economic growth. Between the years 1968 to 1973, Japan's GNP grew at an average rate of ten percent per year. Her imports of oil and oil products during the same period, however, grew at the rate of 16.4 percent per year.[121]

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[121] Okita, loc. cit.

V. OIL REMAINS PARAMOUNT

Interesting as nuclear, solar, geothermal and tidal energy sources may be, one does not have to read very far into Japan's own energy forecasts to ascertain the hard reality of her oil dependence. Even wildly optimistic projections for 1990 see Japan as needing 452 million kilolitres of imported oil and gas, up from the 286 Mkl imported in 1975. Japan is not alone in her oil dependence. Her plight is shared by the United States and the rest of the industrialized world.

> ...I would like to emphasize that it is virtually impossible for even the U.S. to become energy independent before the turn of the century. This is not to imply that our strategic vulnerability could not be drastically reduced...rather it is merely to emphasize that...oil will remain the dominant fuel for the industrialized world for the rest of the century.[122]

Recognizing this, and recognizing that the United States has been and probably will remain unable to formulate a viable solution to such oil dependence, Japan has gone her own way, What are her options?

> ...The Europeans and Japanese...have little choice but to continue to expand the nuclear sectors of their economies and to attempt to the degree possible to diversify the source of their fossil fuel imports. But they will remain crucially dependent on the Middle East.[123]

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[122] Melvin Conant, "The Geopolitics of Energy," Statement before the U.S. Senate Interior Committee, 1 Feb 77.

[123] Ibid.

A. HORIZONTAL AND VERTICAL COOPERATION

U.S. and Japanese foreign policy objectives seem to vary widely on the matter of how to deal with the energy crisis in general, and the OPEC oil cartel in particular. Both the U.S. and Japanese approaches are rational, progressive forms of international conduct, but are basically different in concept. Neither approach is reactionary, attempting to restore an older or previous status quo. Both accept the fact of growing interdependence among nations in a rapidly changing world.

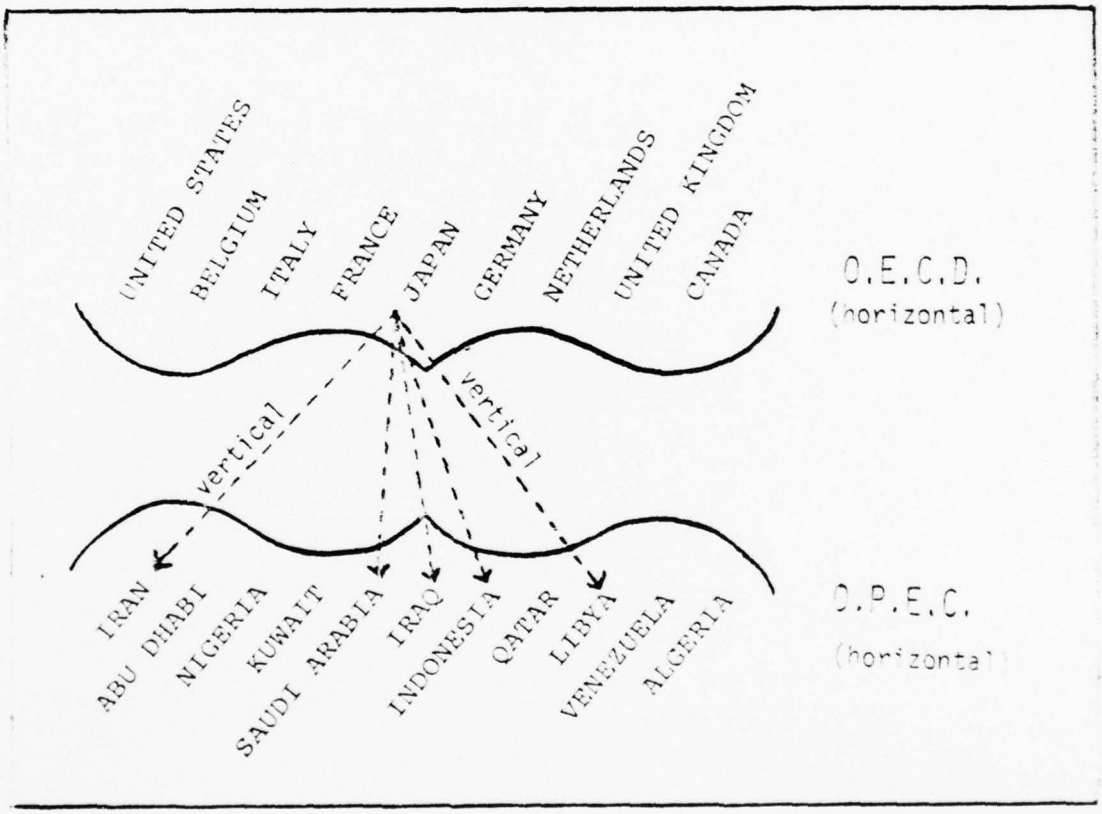
By viewing the OPEC oil cartel as a horizontal cooperative among producers having similar interests, the U.S. approach would endorse a parallel collective, a consumer's organization, to preserve economic stability. Vertical cooperation between the two horizontal groupings could then be accomplished in a balanced and mutually equitable manner. Competition within each horizontal grouping is offset by increased cooperation. However, competition and confrontation would be more likely between opposing organizations on the vertical plane. The Organization for Economic Cooperation and Development (OECD) was the offspring of this perception.

> 'Inevitably the American position,' as (Under-Secretary of State) Casey put it, ' requires that consumer countries intensify consultation among themselves and with producer nations on their policies and avoid misunderstandings of each other's positions which could lead to a competitive struggle for exclusive arrangements.'[124]

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[124] Szyliowicz, op. cit., p. 151.

TABLE II - HORIZONTAL AND VERTICAL COOPERATION



The Japanese, and also the French, did not see the U.S. approach as being an effective instrument with which to deal with the oil producers. Instead, Japan saw the primary axis for cooperation as being vertical. This approach seemed to have some real advantages: (1) Bilateral relations between consumer and producer can be conducted without regard to third parties in either grouping, greatly simplifying national policy decisions, (2) National interests are not held subordinate to collective authorities of dubious motivation. How much should Japan be expected to sacrifice for the perpetuation of U.S. oil interests, U.S. Economic hegemony, or Israeli intransigence? (3) Multilateral confrontation is not a factor in vertical relations. Moreover, confrontation between consumers is not inevitable.

Japanese activities during the oil embargo of 1973-74 bear out this attitude. Government-to-government agreements, oil contracts and credit extensions at that time evidenced Japan's decision to break with U.S. policies and "go vertical" in her efforts to guarantee a sufficient and continuous oil supply in the future. Over three billion dollars worth of Japanese credit and technological aid were pledged in those short months. As a result, the pumps were opened once again to Japanese tankers, and the oil flowed in greater quantities than ever before.

Though considerably out of step, Japan did not find itself at odds with U.S. national interests. U.S.-Japanese cooperation

and trade remained as positive functions of the national interests of each partner--and were not linked to the vagaries of some larger, collective interest of oil consumerism in general.

Four years after the OPEC oil embargo, Japan is still seeking to maintain its position as a major economic power through its bilateral relations. During the week of January 13-20, 1978, Japanese Foreign Minister Sunao Sonoda made a visit to the middle eastern countries of Saudi Arabia, the United Arab Emirates, Iran, and Kuwait. The purpose of Mr. Sonoda's trip was to reassure these countries of Japan's sincere commitment to their development plans. This trip was considered necessary because of delays which had crept into some of the development programs negotiated some four years ago.

On the other hand, Japan still needs reassurances from the Arab states concerning the relative stability of oil prices on the world market. Without those assurances, Japan will be at a distinct disadvantage as it tries to cope with U.S. and European pressures for accelerated trade and growth within Japan's domestic economy. A sudden Arab price increase on oil would disrupt Japanese planning and her ability to accept increased foreign imports.

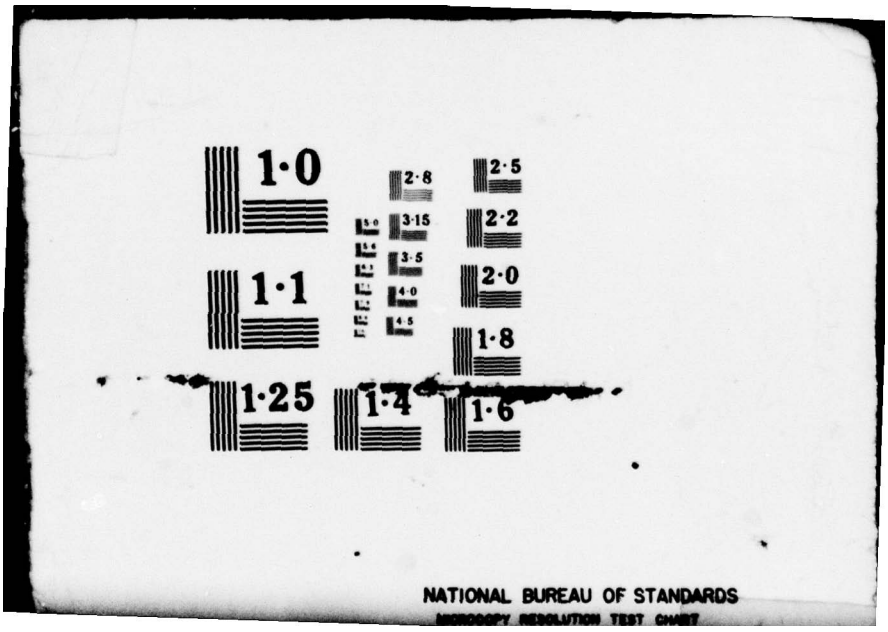
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> Mr. Sonoda's recent trip especially helped to underpin relations with Saudi Arabia, where Japanese credibility had been badly undermined by foot-dragging on a promise to help the Saudis build a multi-million dollar petro-chemical plant. As a result of the Foreign Minister's visit a feasibility study on the plant has been expedited, and plans call for a possible start of construction later this year.[125]

In view of the urgency with which these various projects were initially negotiated, delays of four to five years before construction commencement do seem unusually excessive. On the other hand, OPEC did conspire to quadruple the price of oil in 1973, an action which could hardly have been termed a "good-faith" gesture. Economic hostility with the Middle East, however, is not in Japan's best interests at any time during the remainder of this century.

Japan is experiencing heavy pressures, from Europe and the United States, to expand her market and accelerate her economy in order to absorb more imports. The Middle East is rich and becoming richer, offering Japan a growing opportunity for expanding export markets in that area. Middle East business would help Japan balance her oil deficits, and reduce the pressures to export in such large quantities to the U.S. and Europe.

Through bilateral (vertical) negotiation and cooperation, therefore, Japan seems to be succeeding in her attempts to

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[125]David Tharp, "Japan's Oil Line to the Mideast," Christian Science Monitor, 24 Jan 78, p. 4.

even the imbalance in her relationships with other nations. Trade deficits, oil diplomacy, security alliances, and friendship treaties are all examples of bilateral activities which are an integral part of Japan's foreign policy.

Through such bilateral relations, Japan hopes to continue to elude the hegemonial influence of the major powers, while at the same time still maintain her place in the strategic, economic, and political balance of power in the western Pacific. It is a neutralist sort of policy. It is a policy which recognizes an interdependent world, in which no single actor can maintain autarky or absolute autonomy for very long.

Japan's vertical cooperation provides flexibility in the face of social change in either country. Change being a near-absolute certainty in today's world, it would seem that "united fronts," military blocs, collective organizations and the like are losing their battles for longevity. Collectives require two forms of cooperation and sacrifice; each nation must first forego certain disputes for the benefit of collective unity, and may have to sacrifice again in the face of another collective's opposition. Vertical cooperation, eliminating the possibility of disharmony within a group, is more efficient. In Japan's case, it has helped to insure against political interference in her oil supply.

B. CONCLUSIONS - VARIABLES IN THE JAPANESE OIL QUESTION

Objective	Goal	Interest
Support, encourage US Naval presence along lines of communication.	Guarantee transit security of oil supply.	National security.
Vertical cooperation with oil producers through credit, investment, long-term contracts.	Reduce collective influence of OPEC.	Economic stability, political leverage.
Stockpile 90-day oil supply.	Minimize impact of fluctuations in oil supply.	Economic stability.
Diversification of oil investments, contracts.	Guarantee source continuity of oil supply.	Economic stability.
Nuclear projects, solar research, joint-research ventures with United States, others.	Find and develop other kinds of energy.	Economic growth, political credibility.
Vertical cooperation, bilateral trade agreements, neutralist posture.	Minimize US influence over Japanese policy.	Political autonomy.
Resource development in developing countries, loans, aid, investment.	Expand materials resource base, stimulate market growth.	Political leverage, economic growth.
Barter agreements with PRC, oil exchange.	Develop China market; secure more oil.	Economic growth & political benefits.
Conduct negotiations with the USSR.	Return of the northern territories, improve relations with Soviets.	National security.
Stimulate domestic demand without accelerating inflation or energy consumption.	Reduce exchange imbalances with trading partners.	Economic stability.

The kinds of solutions which Japan has chosen to incorporate into her oil-resource strategy are not unusual, unique or radical. Her investments are sound. Her political posture does not involve turning cartwheels for the pleasure of either producers nor other consumers. Rather it exemplifies a concerted, determined effort to approach those nations, with whom she must deal, from a position of economic partnership, seeking to enhance mutual benefits.

Japan must face her economic future in a changing world through increased involvement with developing nations, yet still maintain enough flexibility to maximize her policy options in the event of unforeseen crises. Such flexibility may mean a neutralist stance in future postures, with some departure from U.S. policy lines.

There is no question that Japan's oil dependence is inescapable in the near-term, and nothing short of a major technological breakthrough will change that fact in the long-term. Even if Japan were wildly successful in her Tyumen oil negotiations, her Chinese oil deals, Indonesian explorations, and Mexican market penetration, by the mid-1980's she would still be utterly dependent on the Middle East for more than 70 percent of her total oil requirements.

Unquestionably, other oil sources can be developed. Sudan is a recent example. But the world is burning up petroleum resources at an ever-increasing rate. World producers are pumping a wide, black river of oil from out of the ground, and every second that passes sees another 28,500 gallons gone forever.

Given enough time and money, no upper limit on world oil reserves has yet been established. But over time, the costs of oil production must rise as oil becomes more scarce. Eventually the costs of alternative energy sources will seem cheap by comparison, and the world will convert to the next more economic substitute. Japan will be among the first to have to make such a decision. Her choice may have a major impact on the course of modern industrial history. She bears watching.

TABLE III
CONVERSION TABLE

From	To	Multiply by
Barrel (42 US gal)	cubic metre	.15899
foot cubic	cubic metre	.02832
gallon US liquid	cubic metre	.00379
ton mass US short	tonne	.90718
tonne	kilogram	1000.0
metric ton	barrels	7.31
metric ton	kilolitres	1.16
barrels	kilolitres	.159
barrel US 42 gal	litres	158.99

Abbreviations

b/d	barrels per day
t/y	tons per year (metric)
cu m	cubic meters
cu ft	cubic feet
cf/d	cubic feet per day
Mkl	million kilolitres

TABLE IV

G.N.P. AND TOTAL ENERGY SUPPLY [126]

YEAR	Real GNP Trillion yen	Total Energy Supply M kl Oil Equiv.	Dependence on foreign supply %
1960	25.4	99.7	44.2
1965	40.9	176.2	66.2
1970	70.6	330.3	83.5
1971	75.8	341.1	84.9
1972	82.7	366.3	86.4
1973	98.8	407.0	89.9
1974	89.6	408.0	88.5
1975	91.8	390.0	88.0
1976	97.5	405.4	88.5
Annual Growth % *			
'73/'60	11.0	11.4	
'76/'73	-4.4	-1.3	

(*) Real GNP in 1970 prices.

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126 A Guide to Japanese Petroleum Industry, Petroleum Association of Japan, Tokyo, OCT 1977, p.1.

TABLE V

THE WORLDWIDE OIL MARKET [127]

Country	(Production 1000 b/d) 73	74	75	76	(Consumed) 76	(Oil, Gas Reserves) Mb	/ MMcfd
Middle East							
Abu Dhabi	1298	1412	1403	1590	-	31,000	20,000
Bahrain	68	67	61	58	48	270	3,000
Dubai	220	239	254	315	-	1,400	1,500
Iran	5861	6026	5350	5875	469	62,000	500,000
Iraq	1964	1850	2240	2070	112	34,500	28,000
Israel	88	100	75	1	152	1	20
Kuwait	2761	2276	1807	1820	145	67,000	31,500
Neutral Zone	525	541	496	450	40	6,200	5,000
Oman	293	290	342	365		5,650	2,000
Qatar	570	518	441	485		5,600	40,000
Saudi Arabia	7334	8210	6827	8570	314	150,000	85,000
Sharjah	-	-	38	40		25	-
Syria	99	132	175	175	72	2,150	3,100
Turkey	66	65	60	67	303	370	540
Asia-Pacific							
Afghanistan	-	-	-	150	-	84	2,600
Australia	419	389	409	430	641	2,000	32,000
Bangladesh	-	-	-	-	-	-	8,000
Brunei	320	328	175	200	361	1,550	8,250
Burma	20	20	20	20	40	55	150
Taiwan(China)	2	3	5	4	180	12	700
India	148	149	165	180	535	3,000	3,500
Indonesia	1324	1396	1313	1500	228	10,000	24,000
Japan	15	15	12	10	5195	63	525
Malaysia	-	-	100	155	364	2,500	1,700
New Zealand	-	-	-	10	129	105	6,000
Pakistan	8	9	6	12	115	280	15,500
Philippines	-	-	-	-	192	100	-
South Korea	-	-	-	-	263	-	-
Thailand	.3	.2	.2	.3	194	270	4,500

TABLE V (Cont'd)

Country	(Production 1000 b/d) 73	74	75	76	(Consumed) 76	(Oil, Gas Reserves) Mb / MMcfd	
Africa							
Algeria	1070	986	946	950	60	6,600	125,000
Angola	154	169	166	47	21	1,160	1,500
Congo Repub.	42	32	38	38	-	360	10
Egypt	165	144	230	325	153	2,450	3,200
Gabon	147	177	200	220	-	2,050	2,450
Libya	2187	1491	1488	1900	38	25,000	25,700
Morocco	-	-	-	-	54	-	44
Nigeria	2053	2256	1787	2020	63	18,700	43,000
Tunisia	83	88	95	77	38	2,670	6,400
Zaire	1	1	3	20	25	150	50
Europe							
Austria	49	46	40	37	230	154	490
Denmark	4	3	3	3	335	50	1,700
France	26	23	20	20	2385	43	4,800
Germany, W.	129	121	112	158	2885	320	7,300
Greece	-	-	-	-	210	25	4,000
Italy-Sicily	15	19	19	20	1970	600	8,300
Netherlands	29	30	30	28	800	80	60,000
Norway	32	35	189	300	800	6,000	20,000
Spain	16	37	36	34	955	265	200
U.K.	2	2	12	230	1870	19,000	29,000
Yugoslavia	68	67	75	70	265	325	1,400
Western Hemisphere							
Argentina	418	413	387	390	495	2,503	8,120
Barbados	-	-	.3	.4	-	1	-
Bolivia	47	49	42	41	-	350	5,000
Brazil	169	179	174	171	795	880	1,200
Canada	1798	1690	1444	1300	1790	6,000	58,000
Chile	32	29	25	24	143	440	2,000
Columbia	199	173	160	146	195	960	6,360
Ecuador	204	153	160	185	190	1,640	5,000

TABLE V (Cont'd)

Country	(production 1000 b/d)				(Consumed)	(Oil, Gas Reserves)	
	73	74	75	76	76	Mb /	MMcfd
Guatemala	-	-	-	-	-	16	-
Mexico	465	551	705	850	675	14,000	30,000
Peru	69	76	73	74	130	730	1,300
Trinidad & Tobago	164	178	205	224	62	650	8,500
Venezuela	3364	2976	2345	2290	255	18,200	41,000
U.S.A.	9189	8812	8351	8105	16980	29,500	210,000
Communist							
Bulgaria	-	-	-	2.4	-	18	71
China	860	1200	1480	1690	1320	20,000	25,000
Czechoslavakia	-	-	-	2.6	330	19	671
Hungary	41	70	-	152	312	312	4,271
Poland	7	20	-	11	308	81	4,386
Rumania	292	290	-	294	280	2,149	22,592
U.S.S.R.	7975	9176	9820	10365	7500	75,000	920,000
Total World					58676	641,897	2,343,223

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127 International Petroleum Encyclopedia 1977, The Petroleum Publishing Co., Tulsa, OK, 1977; production statistics from pages 277-280; consumption statistics from pages 391-393; estimated proved reserves updated from The Oil and Gas Journal, 26DEC77. Figures are current as of that date.

TABLE VI

JAPAN'S SOURCES OF CRUDE OIL IMPORTS -(in 1000 kl) [128]

	1973	%	1976	%	% shift
ABU DHABI	29198	10.10	30893	11.20	+ 1.1
ALGERIA	67	-	-	-	
AUSTRALIA	200	.10	133	.05	- .05
BAHRAIN	39	-	-	-	
BRAZIL	24	-	-	-	
BRUNEI	10637	3.10	12573	4.56	+ 1.46
CABINDA	957	.30	164	.06	- .24
CHINA	1639	.6	7268	2.63	+ 2.03
DUBAI	2028	.7	846	.31	- .39
EGYPT*	-	-	90	-	
INDONESIA	42433	14.7	33494	12.14	- 2.56
IRAN	89508	31.0	53958	19.56	-11.44
IRAQ	978	.3	8345	3.02	+ 2.72
KUWAIT	23628	8.2	17619	6.39	- 1.81
LIBYA	1484	.5	2131	.77	+ .27
NEUTRAL ZONE	15406	5.3	11373	4.12	- 1.18
NIGERIA	5350	1.9	242	.09	- 1.81
OMAN	5365	1.9	9457	3.43	+ 1.53
QATAR	216	.1	495	.18	+ .08
SAUDI ARABIA	57397	19.9	86409	31.33	+11.43
U.S.A.	78	-	-	-	
U.S.S.R.	1423	.5	93	.04	- .46
VENEZUELA	554	.2	334	.12	- .08
TOTALS	288,609	100	275,827	100	

PERCENT OPEC: 1973 / 92.3% ; 1976 / 89.24%

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[128] Guide to Japanese Petroleum Industry, op.cit., p.7.
(*)Egypt statistic from the International Petroleum Encyclopedia 1977, op.cit.,p.325.

TABLE VII

JAPAN'S ENERGY SUPPLY PATTERN (%) [129]

	1960	1965	1970	1973	1976
Solid Fuel	41.5	27.3	20.7	15.5	15.4
Liquid Fuel	37.7	58.4	70.8	77.6	74.4
Nuclear	-	-	.4	.6	2.2
Natural Gas	1.0	1.4	1.3	1.5	2.7
Hydro. etc.	19.8	12.9	6.8	4.8	5.3

TABLE VIII

JAPAN'S IMPORTS OF PETROLEUM, PRODUCTS (x 1000kl) [130]

	Crude	Naptha	Fuel Oil	Total
1970	204872	6722	17098	228692
1971	224379	5030	15537	244946
1972	246085	6476	15094	267655
1973	288494	6222	13217	307933
1974	275217	7138	11645	294000
1975	262848	5939	8379	277166
1976	275826	7994	9235	293055

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[129] Guide to Japanese Petroleum Industry, op.cit.,p.2.

[130] Ibid., p.7.

TABLE IX

PRIMARY ENERGY SUPPLY AND DEMAND FORECAST [131]

	Actual '75	Case A '85*	Case B '85**	Case B '90**
DEMAND (Mkl equiv)	390	740	740	916
CONSERVED DEMAND TOTAL	-	700	660	792
PERCENT CONSERVED	-	5.5	10.8	13.5
SOURCE/Unit @ SHARE %				
HYDROPOWER / Mkw	24.9 @ 5.7	39.0 @ 3.3	41.0 @ 3.9	51.0 @ 3.9
GEOTHERMAL / Mkw	.05 @ .-	.5 @ .1	1.0 @ .3	3.0 @ .7
DOMESTIC OIL+GAS / Mkl	3.5 @ .9	8.0 @ 1.2	11.0 @ 1.7	14.0 @ 1.7
DOMESTIC COAL / Mt	18.6 @ 3.4	20.0 @ 2.0	20.0 @ 2.1	20.0 @ 1.8
NUCLEAR / Mkw	6.62 @ 1.7	26.0 @ 5.4	33.0 @ 7.4	60.0 @ 11.2
LNG / Mt	5.06 @ 1.8	24.0 @ 4.9	30.0 @ 6.4	44.0 @ 7.7
IMPORTED COAL / Mt	62.34 @ 13.1	93.0 @ 10.7	102 @ 12.4	144 @ 14.1
NEW ENERGIES/Mkl equiv	- @ -	- @ -	2.3 @ .4	13.0 @ 1.6
IMPORTED OIL+GAS / Mkl	286.0 @ 73.3	505 @ 72.2	432 @ 65.5	452 @ 57.1

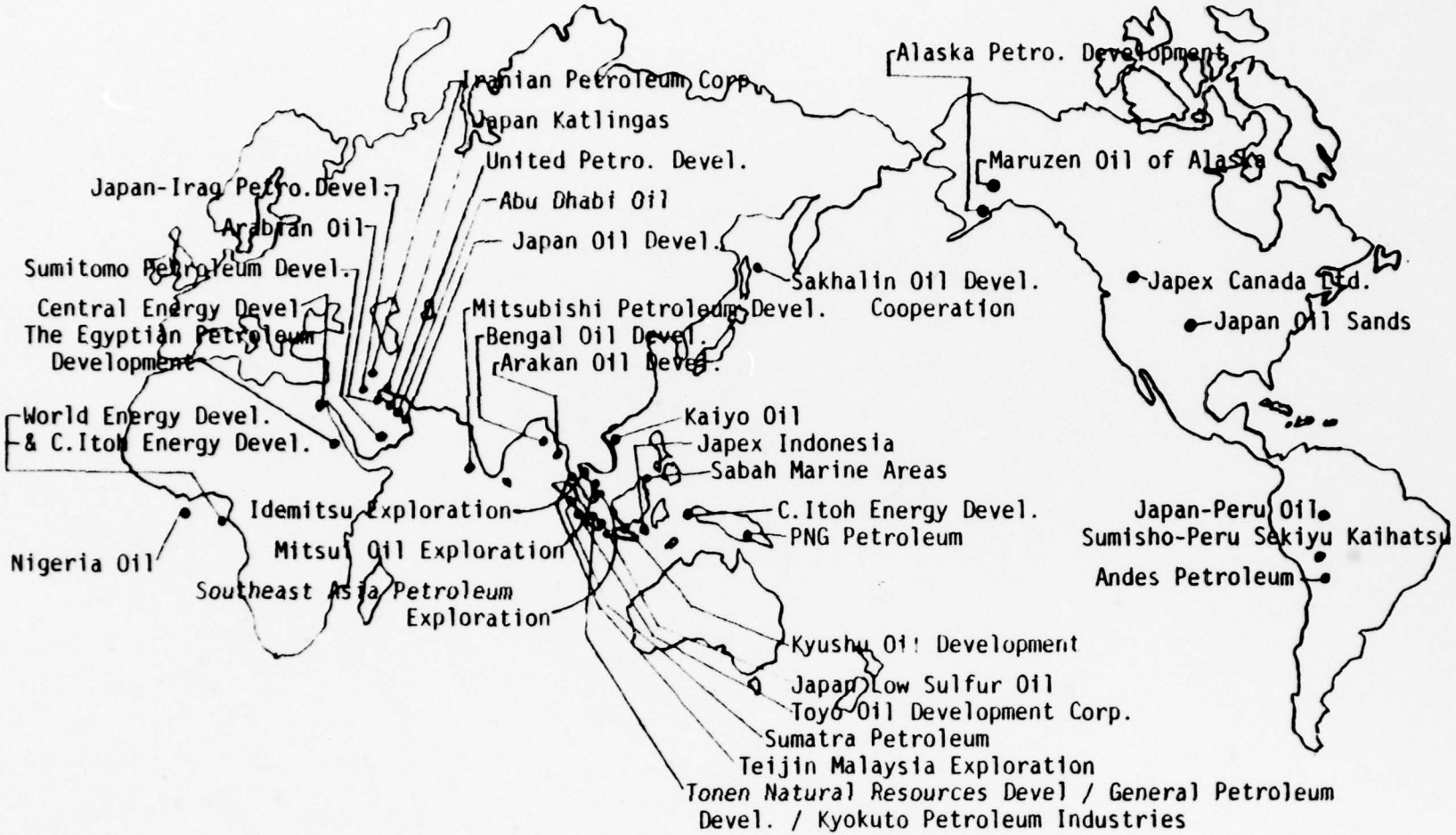
(*)Case A represents an extension of present levels of energy conservation and nuclear/LNG development efforts. (**)Case B represents a maximum attainable target to be achieved by Government/industry/public joint efforts to minimize oil imports. (Source:MITI)

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[131] Guide to Japanese Petroleum Industry, op.cit., p.3.

TABLE X

JAPANESE OVERSEAS OIL ACTIVITIES [132]



132 The Petroleum Industry in Japan:1976, The Japanese National Committee of the World Petroleum Congresses, Tokyo, 1977, p.6.

TABLE XI

PARTICIPATION OF WESTERN OIL COMPANIES IN JAPAN'S OVERSEAS OIL EXPLORATIONS - 1974 [133]

% Foreign participation and companies involved		Numbers of Japanese Oil companies involved						
		Middle East	S.E.Asia	Africa	N.America	S.America	Australia	Total Number
USA -								
(71.4%)	Sun Oil	1	1	1	-	1	1	5
	Mobil Oil	1	2					3
	Cities Service	1			1	1		3
	Continental		1				2	3
	Ocean Venture					1	2	3
	Union Oil		1		1			2
	Stanvac		2					2
	Ashland Oil		2					2
	Gulf Oil			1	1			2
	Getty Oil				1	1		2
	Signal Oil				1	1		2
	Occidental Petroleum					1		1
	IIAPCO		1					1
	Amoco		1					1
	Trend		1					1
	Skelly Oil				1		1	2
	Pan Ocean					1		1
	Transworld					1		1
	Superior					1		1
	Cayman					1		1
	Reserve Oil					1		1
UK-	City Investing					1		1
(5.3%)	British Petroleum	1	1				1	3
France	CFP	1	1			1		3
(10.7%)	Aquitaine		1					1
	FRAP	1		1				2
Germany-								
(3.6%)	Deminex		1			1		2
Italy-								
(3.6%)	AGIP			1		1		2
Belgium-								
(1.8%)	Cometra			1				1
Canada-								
(3.6%)	Bour Valley		1					1
	Union Oil				1			1
100%	TOTALS	6	17	5	7	15	6	56

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[133] Wu, op.cit., p.78.

TABLE XII

ADVANTAGES OF OVERSEAS INVESTMENT AS PERCEIVED BY JAPANESE MANUFACTURING FIRMS [134]

	(1965)	(1966-69)	(1970-71)
Number of Cases Reported	367	527	461
Host Countrys' policies of Protection for Industry.....	32	25	21
Abundant Supply of Labor.....	25	36	36
Abundant Supply of Raw Materials and Energy Reserves...	8	5	7
Abundant Supply of Land and Water.....	4	5	4
Proximity to Market.....	19	16	17
Trade Advantage Between Host Country and Third Countries.....	9	10	11
Other.....	3	3	4
Total Percentages	100%	100%	100%

[134] Wu, op.cit., p.87.

TABLE XIII

ALTERNATIVE MEASURES OF VULNERABILITY [135]

Percentage vulnerability by source of import:	1967	1972	1973	1976
Arab countries	55.3	43.4	46.6	60.75
Middle East countries	91.2	80.7	77.6	80.31
USSR[a]	1.4	.2	.5	.04
PRC	-	-	.6	2.63
Areas west of Malacca Straits	91.4	83.1	80.3	80.46
Areas west of Hormuth Strait[b]	89.1	80.6	77.3	77.29
Areas east of Malacca	6.7	16.4	13.6	12.14
Major supplier-Iran	35.9	37.3	31.0	19.56
Major supplier-Saudi Arabia	18.2	16.7	19.9	31.33
Major supplier-Indonesia		16.3	13.6	12.14
Degree of diversification:				
Least number of countries supplying 20 percent	1-Iran	1-Iran	1-Iran	1-Saudi Arabia
Least number of countries supplying 50 percent	2[c]	2[d]	2[e]	2[f]

[135] Wu, op.cit., Adaptation from Table 20, p.73. Data for 1976 adapted from Guide to Japanese Petroleum Industry, op.cit., p.7.

[a] Direct import only, excluding swap.

[b] Obtained by subtracting Iraq from the Middle East total because of the pipeline to the Mediterranean. Amount of oil from Saudi Arabia dependent upon transit through the Persian Gulf would be lower to the extent the Trans-Arabian pipeline might be used.

[c] Add Saudi Arabia or Kuwait or Neutral Zone.

[d] Add Saudi Arabia or Indonesia or Kuwait

[e] Add Saudi Arabia; adding Indonesia would nearly equal 45%.

[f] Add Iran.

APPENDIX

TREATY OF PEACE AND FRIENDSHIP BETWEEN JAPAN AND THE PEOPLE'S REPUBLIC OF CHINA[136]

JAPAN AND THE PEOPLE'S REPUBLIC OF CHINA, RECALLING WITH SATISFACTION THAT SINCE THE GOVERNMENT OF JAPAN AND THE GOVERNMENT OF THE PEOPLE'S REPUBLIC OF CHINA ISSUED A JOINT COMMUNIQUE IN PEKING ON SEPTEMBER 29, 1972, THE FRIENDLY RELATIONS BETWEEN THE TWO GOVERNMENTS AND THE PEOPLES OF THE TWO COUNTRIES HAVE DEVELOPED GREATLY ON A NEW BASIS.

CONFIRMING THAT THE ABOVE MENTIONED JOINT COMMUNIQUE CONSTITUTES THE BASIS OF THE RELATIONS OF PEACE AND FRIENDSHIP BETWEEN THE TWO COUNTRIES AND THAT THE PRINCIPLES ENUNCIATED IN THE JOINT COMMUNIQUE SHOULD BE STRICTLY OBSERVED.

CONFIRMING THAT THE PRINCIPLES OF THE CHARTER OF THE UNITED NATIONS SHOULD BE FULLY RESPECTED.

HOPING TO CONTRIBUTE TO PEACE AND STABILITY IN ASIA AND IN THE WORLD.

FOR THE PURPOSE OF SOLIDIFYING AND DEVELOPING THE RELATIONS OF PEACE AND FRIENDSHIP BETWEEN THE TWO COUNTRIES.

HAVE RESOLVED TO CONCLUDE A TREATY OF PEACE AND FRIENDSHIP AND FOR THAT PURPOSE HAVE APPOINTED AS THEIR PLENIPOTENTIARIES:

JAPAN: MINISTER FOR FOREIGN AFFAIRS
SUNAO SONODA

PEOPLE'S REPUBLIC OF CHINA: MINISTER OF FOREIGN AFFAIRS
HUANG HUA

WHO, HAVING COMMUNICATED TO EACH OTHER THEIR FULL POWERS, FOUND TO BE IN GOOD AND DUE FORM, HAVE AGREED AS FOLLOWS:

ARTICLE 1

1. THE CONTRACTING PARTIES SHALL DEVELOP RELATIONS OF PERPETUAL PEACE AND FRIENDSHIP BETWEEN THE TWO COUNTRIES ON THE BASIS OF THE PRINCIPLES OF MUTUAL RESPECT FOR SOVEREIGNTY AND TERRITORIAL INTEGRITY, MUTUAL NONAGGRESSION, NON-INTERFERENCE IN EACH OTHER'S INTERNAL AFFAIRS, EQUALITY AND MUTUAL BENEFIT AND PEACEFUL CO-EXISTENCE.

2. THE CONTRACTING PARTIES CONFIRM THAT, IN CONFORMITY WITH THE FOREGOING PRINCIPLES AND THE PRINCIPLES OF THE CHARTER OF THE UNITED NATIONS, THEY SHALL IN THEIR MUTUAL RELATIONS SETTLE ALL DISPUTES BY PEACEFUL MEANS AND SHALL REFRAIN FROM THE USE OR THREAT OF FORCE.

ARTICLE 2

THE CONTRACTING PARTIES DECLARE THAT NEITHER OF THEM SHOULD SEEK HEGEMONY IN THE ASIA-PACIFIC REGION OR IN ANY OTHER REGION AND THAT EACH IS OPPOSED TO EFFORTS BY ANY OTHER COUNTRY OR GROUP OF COUNTRIES TO ESTABLISH SUCH HEGEMONY.

ARTICLE 3

THE CONTRACTING PARTIES SHALL, IN THE GOOD-NEIGHBORLY AND FRIENDLY SPIRIT AND IN CONFORMITY WITH THE PRINCIPLES OF EQUALITY AND MUTUAL BENEFIT AND NON-INTERFERENCE IN EACH OTHER'S INTERNAL AFFAIRS, ENDEAVOR TO FURTHER DEVELOP ECONOMIC AND CULTURAL RELATIONS BETWEEN THE TWO COUNTRIES AND TO PROMOTE EXCHANGES BETWEEN THE PEOPLES OF THE TWO COUNTRIES.

ARTICLE 4

THE PRESENT TREATY SHALL NOT AFFECT THE POSITION OF EITHER CONTRACTING PARTY REGARDING ITS RELATIONS WITH THIRD COUNTRIES.

ARTICLE 5

1. THE PRESENT TREATY SHALL BE RATIFIED AND SHALL ENTER INTO FORCE ON THE DATE OF THE EXCHANGE OF INSTRUMENTS OF RATIFICATION WHICH SHALL TAKE PLACE AT TOKYO. THE PRESENT TREATY SHALL REMAIN IN FORCE FOR 10 YEARS AND THEREAFTER SHALL CONTINUE TO BE IN FORCE UNTIL TERMINATED IN ACCORDANCE WITH THE PROVISIONS OF PARAGRAPH 2.

2. EITHER CONTRACTING PARTY MAY, BY GIVING ONE YEAR'S WRITTEN NOTICE TO THE OTHER CONTRACTING PARTY, TERMINATE THE PRESENT TREATY AT THE END OF THE INITIAL 10-YEAR PERIOD OR AT ANY TIME THEREAFTER.

IN WITNESS WHEREOF THE RESPECTIVE PLENIPOTENTIARIES HAVE SIGNED THE PRESENT TREATY AND HAVE AFFIXED THERETO THEIR SEALS.

DONE IN DUPLICATE, IN THE JAPANESE AND CHINESE LANGUAGES BOTH TEXTS BEING EQUALLY AUTHENTIC, AT PEKING, THIS TWELFTH DAY OF AUGUST, 1978.

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[136] English translation of the Treaty of Peace and Friendship as released by the Japan Foreign Office and published by the JIJI Press in Tokyo, August 12.

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