

# Using the Machine-Tool Principle To Save the U.S. Industrial Republic

by Richard Freeman

There is a successful historical precedent for *retooling*, conversion, and diversification of the collapsing U.S. auto sector, as Lyndon LaRouche has proposed since April 2005. Between 1940 and 1944, under the leadership of President Roosevelt, the United States retooled its auto factories as a leading part of the economic mobilization for World War II. Little known, is that among the forces who pushed through this proposal, a central role was played by the United Auto Workers union. A UAW founder and president, Walter Reuther, a highly skilled machinist, along with other skilled labor leaders, were a powerful political and moral force for the conversion of the auto industry into the “Arsenal of Democracy.”

On Dec. 23, 1940, Reuther shook up the nation, releasing his report, “500 Planes a Day—A Program for the Utilization of the Automobile Industry for the Mass Production of Defense Planes.” Reuther discussed how the United States could retool its auto sector, 50% of whose capacity was underutilized—just as it is today. He had assembled a team of skilled machinists which had conducted a several-month, plant-by-plant, tool-and-die room by tool-and-die room survey/study of the shut-down capacity.

In addition to his own extraordinary tooling skills, Reuther was a great organizer who, in combination with the UAW and Congress of Industrial Organizations (CIO), could mobilize auto workers, the broader labor movement, and the American population behind the plan—giving out literature, holding forums, making retooling a social force. This strengthened President Franklin Roosevelt’s hand, and educated the population on how to operate an economy in a superior way, from the perspective of the *machine-tool principle*.

Reuther later conducted the same kind of mobilization again at the war’s end, in 1945, promoting *reconversion* of the war/auto plants to railroad and housing construction (see *Documentation*). And in the middle 1950s, he became one of the most forceful advocates for America’s rapid development of a much broader new technology, nuclear power (see box).

## A Master Tool- and Die-Maker

A “born machinist” who became one of the best in the world at his trade, Walter Reuther was so generally skilled that by 1940, in his 30s, he already had a dozen years experience

directing teams of much older and more experienced tool-and-die machinists. At the same time, he had been a leading organizer in the Detroit and Flint labor drives and the Flint 1937 sit-down strike which led—under the special impetus and leadership of Franklin Roosevelt’s Presidency—to the recognition of the UAW.

Reuther’s 1940 auto conversion report originated while he was Director of the General Motors Division of the UAW. It was presented to Philip Murray, President of the CIO, who in turn, presented it to President Roosevelt as a joint proposal of the UAW and CIO.

This proposal examined how the auto industry could produce military aircraft in the context of the 50% underutilization of auto capacity then existing.

In May 1940, Sidney Hillman, then a key figure in the National Defense Advisory Commission, had appointed Reuther to the NDAC manpower training committee. (In 1941, the NDAC was turned into the National Defense Production Board, headed by Donald Nelson, which directed the economic mobilization for World War II). In August 1940, Reuther brought up a preliminary concept for the plan to Hillman. The NDAC would not adopt the Reuther plan. Nonetheless, Hillman urged Reuther to pursue it. After a careful study of idle auto production capacity, Reuther’s team, led by his brother Victor and his staffer Ben Blackwood, had assembled enough data by November to hold an unofficial production council at Cass Technical School in Detroit. There, skilled tradesmen from more than a dozen factories assessed, made critical comments on, improved, and endorsed the plan. It said:

England’s battles, it used to be said, were won on the playing fields of Eton. This plan is put forward in the belief that America’s can be won on the assembly line of Detroit.

In an age of mechanized warfare, victory has become a production problem. The automotive workers for whom I speak, think our industrial system a productive giant capable of any task, provided it is not forced into battle with one hand tied behind its back. They also believe that we need send no men to a future conflict

with the Axis powers if we can supply enough machines now to our first line of defense in Britain. The machines we and the British need most are planes, and the survival of democracy depends on our ability to turn them out quickly.

The workers in the automotive industry believe that the way to produce planes quickly is to manufacture them in automobile plants. *The automotive industry today is operating at only half its potential capacity.* This plan proposes that the unused potential of the industry, in machines and men, be utilized in the mass production of aircraft engines and planes. It is our considered opinion that it would be possible, after six months of preparation, to turn out five hundred of the most modern fighting planes a day, if the idle machines and the idle men of the automotive industry were fully mobilized, and private interests temporarily subordinated to the needs of this emergency.

Time, every moment of it precious, its tragic periods ticked off by bombs falling upon London and the Midlands, will not permit us to wait until new mass production factories for aircraft and aircraft engines finally swing into action late in 1942. Emergency requires short-cut solutions. This plan is labor's answer to a crisis.

### Capacity Half or More Unused

American aircraft production then was 30% behind the schedule needed just to support Britain's war effort. Reuther insisted it would stay far behind schedule with simple expansion of aircraft plants utilizing the slow and costly methods of an aircraft industry geared to hand-tooled custom-made production. "New plants cannot be built and put into operation in less than 18 months. In 18 months Britain's battle . . . may be lost, and our own country left to face a totalitarian Europe alone." And then the key driver-concept: "We propose, instead of building entirely new machines, to make the tools required to adapt existing automotive machinery to aircraft manufacture. "We propose to transform the entire unused capacity of the automotive industry into one huge plane production unit. . . . No industry in the world has the tremendous unused potential productive capacity of the American automotive industry, and no industry is as easily adaptable to the mass production of planes."

Reuther reviewed in detail the gross under-utilization—then, as now—of the American auto company's production capacities. An example:

During the automotive year ending August 1940, Nash



FDR Library

*In 1940, Walter Reuther proposed converting the 50% under-utilization of auto capacity, into military aircraft production, to be supervised by an aviation production board. As a result, planes were produced much earlier. Ford Motor Co. embraced war retooling more quickly than General Motors. Here, Reuther is standing fifth from the left.*

used only 17% of its productive capacity; Dodge used 36.5%. Nash, working at maximum capacity, could have maintained its total output for the twelve months in 49.5 working days; Dodge, in 111 working days. Chevrolet, the largest single producer of motor cars, turned out over a million cars during the last model year, and yet used less than 50% of its potential productive capacity.

The Chevrolet Motor plants at Flint, Michigan and Tonawanda, New York had a combined production capacity at peak of 470 motors per hour, but were building only 347 motors per hour, he reported.

With an unused capacity of 123 motors per hour at the peak of the production season, it is obvious that Chevrolet has an unused reserve which becomes tremendous during the month[s] of reduced operating schedules.

The availability of automotive production facilities for plane production in Chevrolet is again shown in the case of the Chevrolet drop-forge plant in Detroit, the largest drop-forge shop of its kind in the world. If this shop were operated at full capacity, it could produce all the drop-forgings required for the production of five hundred airplane motors per day, and still supply the Chevrolet company with sufficient drop-forgings for one million Chevrolet cars a year. Skilled labor to operate this shop at full capacity is available. Other forge shops, including the Buick and the Dodge forge shops, are also working at far less than capacity.

The report took on then-current claims that the aircraft engine was so vastly more complex than an automobile engine, that it could not be produced at an auto factory.

True, there are differences between the automobile engine and the airplane engine, as there are differences of a lesser degree between the engine of the Chevrolet and the engine of the Cadillac. These differences between different engines are produced by adding certain tools,

dies, jigs, or fixtures to the basic machine in order to make a difference in the product. The same 'tooling' process adapts the same basic machinery to the production of the airplane engine. Graphic proof of this statement is even now being supplied by General Motors. Many of the most difficult and precise parts of the Allison aviation engine are being manufactured in the Cadillac plant in Detroit, much of it retooled Cadillac machinery. The new Allison plant in Indianapolis, still in

## Reuther's 'Atoms for Peace'

*From Reuther's "A separate opinion to the Joint Congressional Committee on Atomic Energy, submitted as a member of the Panel on the Peaceful Use of Atomic Energy"—Jan. 25, 1956.*

In the cold war—in freedom's struggle against the forces of Communist tyranny—in the struggle for the hearts and minds of men—speed, all speed, in harnessing the atom to man's peaceful needs, can be decisive.

Access to low-cost nuclear power may prove the key to the economic development of backward areas, and make possible the liberation of millions of people from poverty, hunger, ignorance, and disease. America's leadership is essential if we are to block the Communists in their efforts to forge poverty into power.

Our success in harnessing the atom to lift the burden of poverty and disease from hundreds of millions of the world's people living in hunger and ill-health, would establish America in a position of moral leadership against which Communist propaganda would be impotent.

Harnessing of the atom for peaceful purposes will give the tools with which to wage freedom's most powerful propaganda to these people—the propaganda of the democratic deed. Failure on the part of America to pursue the peaceful harnessing of the atom with maximum speed, determination, and dedication, may prove to be the Achilles Heel of the cold war.

### Build Nuclear Plants at Home

We shall not give leadership to other people if we refuse to exercise it on our own behalf. The fact is that the United States is failing to demonstrate the outstanding leadership in releasing atomic energy for peaceful purposes, which it demonstrated in putting the atom to work for war.

We are not working with speed and determination to convert atomic energy into an instrument of peaceful progress. Our program for developing atomic energy as a

source of electric power is moving too slowly.

For many years after the war, no really significant beginning was made to apply the atom to peaceful uses. Finally, one year ago, the AEC [U.S. Atomic Energy Commission] invited private enterprise to submit proposals for participating in the development of atomic reactors for the development of electric power. But no private power reactors are now under construction, and none has completed the initial stages of design.

The one large-scale reactor now building is the AEC demonstration reactor in Shippingport, Pennsylvania. Apart from this government project, the sobering fact is that, today, ten and a half years after the end of the war, America's peacetime atomic program has not advanced beyond the drawing boards. The head of the AEC reactor division states that as of today, there is no certainty when, if ever, private industry will build and operate a power reactor. . . .

The need to develop atomic energy as a practical source of power for use in the United States, is urgent. There are power-hungry areas in our country today. There are other areas where the high cost of power retards economic progress and is encouraging the flight of industry to other parts of the country.

Total power requirements in the United States will expand at a tremendous rate over the next twenty-five years. We shall need nuclear power to meet those requirements. I cannot accept the comfortable assurance that our conventional fuel resources will meet all our power needs for the next twenty to twenty-five years. Nor will I rely on the Federal Power Commission's consistently conservative forecasts of power requirements as reflecting the true growth potential of our economy or the increasing needs of the American people.

No power ceiling should be imposed upon the normal and necessary expansion of our economy. Of that, we must make sure. We must develop every source of energy we have, including atomic energy. . . .

A fivefold increase in power supply in twenty-five years, presents a tremendous challenge. We should enthusiastically welcome the opportunity which the advent of nuclear power gives us, to meet that challenge.

process of expansion, is being used largely for assembly.

[This] should also dispose of the bugaboo of ‘tolerances.’ ‘Tolerances’ are the allowable fractional variations in size of engine parts, and they must be far finer in the plane engine than in the automobile engine. But these more precise dimensions can be obtained by more precise tooling.

## Organization of Production

Driving home the point then crucial to U.S. national security and economic security, Reuther gave his forecast timetable for retooling—a forecast which thankfully proved accurate: “In this way, a job that will otherwise take at least eighteen months [ie, building new airplane factories] can be done in six months.”

Turning to the vital element of skilled labor for the Arsenal of Democracy, Reuther could have been speaking, today, of the 500,000 or more American skilled auto sector production workers and engineers being *lost to American industry* just during the first decade of the 21st Century.

Skilled labor is necessary to turn out the tools and dies required to adapt these various types of automotive machinery to plane production. The auto industry has the largest reservoir of skilled labor in the world. More than twenty-five thousand tool and die workers, jib and fixture men, patternmakers, draftsmen and designers, and allied craftsmen are employed in the auto industry at the peak of its tooling program.

Tooling is even more seasonal than production. Each year, thousands of the industry’s most skilled craftsmen work at top speed for a few months to complete the necessary tooling work to adapt the old machinery to the new [car] models. When the tooling program is completed, only a skeleton crew of these skilled craftsmen is retained for maintenance and duplicate tooling. Three or four thousand skilled craftsmen are shifted to ordinary production jobs while more than ten thousand are laid off entirely until their labor is needed for the next tooling season. During the past five years more than half of the tool- and die-makers in the industry, or more than ten thousand, averaged less than six months’ work per year. At the present time, there are approximately three thousand tool- and die-makers unemployed in the auto industry; some twenty-five hundred have been transferred to ordinary machine-tending production jobs. Many of the remainder are on short week.

Thus in manpower, as in machines, we have unused capacity; the highly specialized and valuable skills of seventy-five hundred tool and die workers are available to do the necessary tooling for the plane production program here outlined. . . . If the introduction of new models in the auto industry could be delayed for six

months, from twelve to fifteen thousand skilled mechanics could be made available to build the necessary tools, dies, jigs, and fixtures for the production of an all-metal pursuit ship on a mass production basis.

Finally, Reuther proposed that President Roosevelt appoint an aviation production board with “full authority to organize and supervise mass production of airplanes in the automobile and automotive parts industry,” from a full national plant survey by production and tooling engineers, to the allocation of aircraft needs to plants or regions of the auto industry on the basis of skills and unused capacity. He was writing at a time that Detroit and its environs, functioned as one unit, and there was an efficient railroad system, and shipping on Lake Erie, to move parts from one plant to another quickly.

Offering the total cooperation of labor, he concluded, “The merit of our plan is that it saves time, and time is our problem. Normal methods can build all the planes we need—if we wait until 1942 and 1943 to get them. This plan is put forward in the belief that the need for planes is immediate, and terrifying. Precious moments pass away as we delay. We dare not invite the disaster that may come with further delay.”

(Whereas Reuther oversimplified some things in his plan—a fighter plane had 10 times as many moving parts as an auto body, and they required frequent design changes—his fundamental thrust on the need, and the ability, to retool on a crash basis, was completely borne out by the history of World War II.)

## Organizing Offensive

Then came the organizing blitz on the plan’s behalf. By Dec. 27—four days after its presentation to FDR by the CIO’s Philip Murray—Reuther was already able to explain his “500 Planes a Day” production plan to a nationwide radio audience; the next day, Sunday, he had a morning breakfast meeting with some of the top New Deal proponents of the Roosevelt administration, including John Carmody, who had succeeded Harry Hopkins as head of the Works Progress Administration (WPA); Treasury Department’s Harry Dexter White, who would draft the Bretton Woods accords; and the National Defense Advisory Commission’s Leon Henderson. With the dawn of 1941, Reuther presented his plan at the Washington Press Club. Even Joseph Rauh, who at the time was a lawyer for the defense mobilization, conceded about Reuther’s Washington Press Club address, “This young man took Washington and all its cynical reporters by storm that day.” He said that Reuther’s plan to accelerate aircraft production “was the greatest thing he ever did . . . because it combined his gigantic knowledge of social forces, his mastery of technical forces, and his idealism.”

Meanwhile, Undersecretary of War Robert Patterson—the number-two man in the Defense Department under Harry Stimson—had taken notice. Patterson’s assistant Robert Lo-

vett asked General Motors chairman William Knudsen to turn over aircraft engine blueprints to Reuther. A military aircraft was put at Reuther's disposal to tour defense plants in January 1941. Accompanied by Army Air Force officers, Reuther inspected the Pratt & Whitney engine factory in Hartford, Connecticut, and the Glenn L. Martin plant in Baltimore. According to a letter from H.H. Arnold to Patterson on Jan. 29, 1941, at both facilities, management attitudes toward Reuther quickly changed from "hostility to tolerance" because "he was earnestly trying to help the cause of National Defense."

General Motors was slower than Ford Motor Co. to embrace the war retooling, with the harmful Morgan-DuPont controlling influence at the company. Once the U.S. government organized for implementation on Feb. 1, 1942, of the cessation of all auto production and its replacement by war production, GM chairman William Knudsen became a leading figure of the Defense Production Board, which oversaw the economic mobilization for the war.

GM objected to Reuther's proposal, contained within the plan, whereby the U.S. government would set up a tripartite aviation production committee, through which workers would participate in determining how retooling would be done, the levels of production, what goods would be produced, etc. GM disapproved of what it called a current of "planning" in Reuther's proposal and for his call for pooling all underutilized machine-tool capacity, irrespective of the company it came from. GM President Charles Wilson stated, "Everyone admits that Reuther is smart, but this is none of his business. . . . If Reuther wants to become part of management, GM will be happy to hire him. But so long as he remains Vice-President of the Union, he has no right to talk as if he were Vice President of a company."

But the big opposition came from the FBI's Gay Edgar Hoover. He circulated charges that Walter and Victor Reuther were Communists. Hoover put the Reuthers on the FBI's "custodial list" of dangerous individuals slated for arrest should the President declare a national emergency. As well, shortly after Christmas 1940—i.e., a few days after Reuther presented his "500 Planes a Day" plan—Hoover started to circulate a vile dossier on Reuther to several parties, including Roosevelt's secretary Edwin Watson, GM's Knudsen, Dixiecrat Representative Eugene Cox of Georgia, etc.

Putting Hoover to the side, Reuther's "500 Planes a Day" retooling, and the associated matter of the development of the real scientific-technological capabilities of the economy, became a national issue. It was absolutely instrumental in realizing Roosevelt's industrial conversion for Lend-Lease and then war. Had Reuther's proposal not been advanced, retooling would have occurred far less efficiently and forcefully. *Time* magazine praised Reuther's plan as "on a braver, broader scale than Mr. Knudsen's proposal." The *Detroit News*' Washington correspondent, Blair Moody, reported that Reuther's plan was "being seriously regarded as perhaps the most constructive production proposal ever to come from the ranks of organized labor."

Furthermore, Reuther energetically spoke on the plan across the country, and the UAW, aided by the CIO and others, actively circulated the plan to auto workers, the broader labor movement, and the American population. The machine-tool principle, and the productive powers of labor, were featured in the proposal as the power that would uniquely protect and save freedom and the American republic.

Now, as then, leadership of the republic is defined by the ability to take such action for national security and for the general welfare of a once-great industrial nation and people. The adversary is globalization. The time for action, as Walter Reuther would have understood, is running out.

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## Documentation

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### Reuther's Retooling Plan To Build Rail and Housing

*These are excerpts from "Are War Plants Expendable? A Program for the Conversion of Government-owned War Plants to the Mass Production of Modern Railroad Equipment and Low-Cost Housing," written by UAW founder Walter Reuther and published in July 1945.*

*During the war, the U.S. Reconstruction Finance Corporation (RFC) had extended billions of dollars for wartime production, and the government now owned a very large percentage of the nation's aircraft, machine-tool, aluminum, magnesium, and other facilities, which had immense machine-tool capacity and employed hundreds of thousands of workers. These factories, many of them retooled automobile plants, were beginning to close; the Willow Run aircraft assembly plant near Ypsilanti, Michigan, which had employed 42,000, was being shut.*

Our soldiers, sailors and marines who have won the victory in Europe . . . have an equity in these plants. They have paid for them with blood. The use or non-use of these facilities will provide the answer—jobs or unemployment for our returned soldiers and our home-front war workers? These plants must be geared to the needs of the nation. . . .

We need not be baffled or dismayed by the magnitude of this challenge. For there is a peacetime need for these facilities as vast as the needs of war. . . .

As long as the arteries of commerce are clogged and our whole economy is victimized by the necessity of moving freight in hopelessly antiquated railroad rolling stock, these plants will have a job to do, turning out by mass-production methods, modern, lightweight railroad equipment.

The following proposals represent the outline of a program to utilize certain government-built war facilities in an

attack upon serious defects in two vital sectors of our economy . . . rail . . . and housing.

There will be those who will label this program impracticable; who will assert that wartime production facilities cannot be converted. A similar cry was raised by spokesmen of the automotive industry in the fall of 1940, when labor called for conversion of that industry to war production. At that time, we heard that only 10-15% of the industry's machinery was convertible. Yet three years later, on November 22, 1943 . . . Mr. K.T. Keller, President of the Chrysler Corporation, testified before the Truman Committee of the United States Senate that "around 89%" of Chrysler's machines had been converted to war production—and could be converted back to civilian production. . . .

### **Public Authorities Proposed**

We propose that the Congress set up two public authorities, similar in organization and function to the Tennessee Valley Authority: a Housing Production Authority, and a Railroad Equipment Production Authority.

These public corporations will be authorized to operate government-owned war plants as they become available in a comprehensive program for the manufacture and distribution of low-cost housing and modern railroad rolling stock.

Within 90 days after this program had been authorized, modern railroad cars could be rolling out of the Willow Run plant. . . .

With final victory, we can employ, through this two-fold program, six million people who would be engaged directly and indirectly in the mass production and mass distribution of rolling stock and low-cost housing.

Each of the two authorities will be empowered to:

- 1) lease plants to private manufacturers, to be operated as part of the program
- 2) directly operate government-owned plants;
- 3) lease plants to workers' producer cooperatives, to be operated as part of the program.

The sharp tapering off and eventual complete curtailment of war production will leave unparalleled plants and equipment available for integration into a program for mass production of rolling stock for the railroads. Here are some of the facilities which will be available:

Aircraft engine plants contain the most modern cutting tool machine equipment. Such machinery can be retooled for the machining of the smaller functional parts needed in the railroad equipment production program. Government-owned plants such as those operated by Studebaker in South Bend, Chicago and Fort Wayne, which employed over 20,000 workers at peak production, are now completely shut down. They can be drawn into this program. . . .

If re-tooled, and properly organized and integrated into an over-all production program such as we propose, we can replace the nation's antiquated rolling stock with modern, lightweight, streamlined, efficient equipment.

Modern, streamlined [railroad] equipment built on a mass-production basis and utilizing light metals and alloys with roller and ball bearings, will considerably reduce the weight of rolling stock and permit drastic reduction in freight rates in the post-war period. Our whole economy will thereby be stimulated.

A country like ours, proud of its B-29 technology and efficiency, should not be forced to keep in operation rolling stock that saw its best days before the dust of the last covered wagons had fairly settled over the Western plains. . . .

The Railroad Equipment Authority will set production goals consistent with the requirements of the industry and with the national employment level.

The Authority will contract for the total production of the plants participating in this program, and will make this equipment available to all railroads. . . .

### **Housing: Cadillac Homes at Ford Prices**

The Housing Production Authority will make a survey of government-owned plants and facilities for the purpose of determining the extent to which these facilities are adaptable to the mass production of prefabricated, low-cost modern housing. The program will include production of complete houses, including all fixtures, complete bathroom, kitchen, garbage disposal and air conditioning units, electric dish washers and other appliances. . . .

### **Financing the Authorities**

Financing of the operations of the Housing and Railroad authorities will present no problem. As in the case of the TVA, the Housing Authority and the Railroad Authority will derive their funds from Congressional appropriation, from the sale of bonds and from the sale of their products. Immediate working capital may come from direct government advances, from government payment for work in progress, or by government guarantee of loans made in the private money markets—all practices followed during the war, when about half the expansion in business assets was financed by the government.

There is no reason why the Authorities may not obtain loans from the Reconstruction Finance Corporation, with favorable amortization terms. The public interest will by paramount. . . .

The Railroad Authority we propose, moving boldly into the center of the industry, may flutter the doves of a minority of investors, but it, will break the deadlock of monopoly and inadequate public regulation. A technical staff in the employ of the Authority, as engineering personnel are employed by the TVA, will encourage and accelerate the tempo of technological development in the industry, guiding the introduction of new discoveries in design, materials, construction and safety devices.

Such a positive corrective force will ramify into every area of the economy.