

# Soviet Timber Resources and Utilization: An Interpretation of the 1988 National Inventory

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## Executive Summary

### Overview

This study of the forest resources of the Soviet Union and the export potential has revealed that the national timber base, while dominating the global timber supply picture, cannot be expected to support increased exports to either European or Asian markets in the short to medium term. A chaotic distribution system, uncertain replacement of existing domestic capital stock, environmental concerns further restricting timber supply, a huge and largely unfulfilled domestic appetite for forest products, low valued species located in a hostile environment, and uncertain ownership of the resource all conspire to restrict the likelihood of large positive changes in export volumes. Although very little is expected to take place in the short term, substantial development may be possible in the medium to long term should the political and economic uncertainties be resolved however.

The forest resources of the European USSR are almost completely utilized. While harvest levels from the coniferous resource are expected to decline due to industrial pollution and past forest management practices, the hitherto unutilized deciduous resource will compensate for this. Thus, the harvest from the European USSR is expected to be unchanged, although the share of deciduous species will rise.

Current log export levels to Europe, however, may be in doubt. European USSR imports a higher volume of logs from the Asian USSR than it exports to the west. Under current economic reforms, the timber surplus regions in Asian USSR may not be as sanguine about substituting for fiber which is exported for hard currency. Thus, internal exports hitherto to European USSR may be redirected to external Asian markets.

Increased harvest from the forest resources of Asian USSR is dependent in large measure on foreign technology and large investments in infrastructural development. While the Asian USSR supports a wealth of forest inventory, a large part is presently unavailable due to economic and environmental considerations. Substantial volumes are available, but only with huge investments in infrastructure, incremental volumes are possible with importation of western technology to permit increased utilization of the deciduous resource and harvest of forests from steeper slopes. While hitherto exports to the rest of the Soviet Union may be directed for external export to Asian markets, inherent difficulties with the existing infrastructure may work against a substantial portion being available for export.

In the medium to long-term, a huge and largely unsatisfied domestic demand for forest products throughout the Soviet Union could possibly absorb a significant share of the potentially available timber resource. While great strides are being made at a more intensive utilization of the existing resource, substantial increases in domestic harvest are still necessary to meet the higher consumption levels generally encountered in western economies.

With the decline in harvest from federal lands in the United States Pacific Northwest in response to environmental pressures, there is a growing need to develop a better understanding of the timber resources in the Soviet Union. The USSR accounts for more than 800 million hectares of the world's inventory of stocked forest land and nearly 86 billion cubic meters of growing stock. This represents almost 27 percent of the global forested land and more than 25 percent of global standing volume. The Soviet share of world coniferous forested area (52 percent) and world coniferous volume (57 percent) is especially significant. While the USSR contains sizable area and volume of deciduous species (250.9 million hectares and 19.2 billion cubic meters), it accounts for only 13 percent of the global deciduous stocked forest land and 8 percent of the global deciduous growing stock. An appreciation of the forest resources of the Soviet Union is clearly necessary to develop a realistic picture of future developments in the international timber economy. The next sections review the forest resource inventory, harvest, and internal demand from a national perspective. An overview of the regional distribution of various forest industry statistics is then presented. The outlook for each of the four regions is then examined.

## **Forest Resources**

### ***Ownership***

The government, through various ministries and organizations, controls 98 percent of the Soviet Union's forest resource. One half of the stocked forest land and almost 60 percent of the standing volume have been classified as mature or over-mature.

Most of the land in the forest fund in government controlled forests is under the management of organizations belonging to the forest economy, otherwise called the forest authorities. These organizations, primarily belonging to *Goskomles* or the USSR State Committee for Forestry, account for over 90 percent of the stocked forest land and nearly 90 percent of the standing volume.

### ***Species***

The dominant share of the forest resource is concentrated in coniferous species which account for three-quarters of the stocked forest land and growing stock. The primary coniferous species is larch, which accounts for more than half of the coniferous area and volume and nearly 40 percent of the total stocked forest land area and growing stock in the Soviet Union. Larch is followed by pine, cedar pine, spruce and true firs in descending order of importance. Deciduous species collectively occupy nearly 20 percent of the forest resource. The predominant deciduous species are birch and aspen. Brush and other species of lower importance account for the remainder.

### ***Topography***

Mountain forests contain a significant share of the timber resources of the Soviet Union. More than one-third of stocked forest land and growing stock are contained in mountain forests. Mountain forests also account for 43 percent and 37 percent of the total stocked forest land and corresponding growing stock of Group I forests, 27 percent and 30 percent of Group II forests and 64 percent and 39 percent of Group III forests. Group I forests have primarily environmental protection roles while Groups II and III forests are directed more to providing products for the forest industry.

### ***Accessibility***

Stocked forests which could be managed by the forest authorities for the production of timber account for 703 million hectares of the 803 million hectares of forest land. Almost one-quarter of the forests are classified as being in reserve. They are believed to be beyond the limits of major transportation systems expected to be completed within the course of the next 15 to 20 years. Additional forested land amounting to more than 100 million hectares has been set aside due to non-commercial species and low volumes per hectare, and forests in which harvesting directly conflicts with the environmental protection role. Thus, the exploitable forest amounts to 406 million hectares, or just 60 percent of the forest land base managed by the forest authorities.

Of the 406 million hectares and 50 billion cubic meters considered exploitable by the Soviets, coniferous species account for nearly 75 percent of the accessible and potentially accessible growing stock. Deciduous species represent almost 25 percent. This realistically exploitable forest managed by the forest authorities is believed to have supported an MC of about 625 million cubic meters in 1989.

In addition to the forest resource administered by agents of the forest economy, another 62 million hectares of stocked forest land supporting 7 billion cubic meters of wood are available for timber harvest in the near to medium term. Coniferous species account for less of the forest resource; but still occupy slightly more than half of the stocked forest land and nearly two-thirds of the growing stock. This additional forest resource is believed to support an AAC of approximately 35 million cubic meters.

Total forested land and growing stock, then, available for exploitation is thus thought to be 468 million hectares and 57 billion cubic meters. The MC supported by this total forest resource is estimated to be between 660 million and 670 million cubic meters.

### ***Allowable Annual Cut***

The realistically exploitable forest managed by the forest authorities is believed to have supported an AAC of about 625 million cubic meters in 1989. The forest resource managed by non-forest authorities is believed to support an AAC of approximately 35 million cubic meters. The total MC is estimated to be between 660 million and 670 million cubic meters.

The AAC in forests which are believed to be beyond the location of major transportation systems which are

projected to be completed within the course of the next 15 to 20 years amounts to between 192 million and 201 million cubic meters. These forests are thought to be under the administration of the forest authorities. This volume is not expected to be realized, and hence is not realistically considered as relevant to potential harvest over the next two decades.

While overcutting in the past definitely contributed to the present decline in the MC, future stability of the current AAC may be in jeopardy from completely separate factors. These factors include air pollution, insect and disease attacks, and forest fires. These factors have contributed to an estimated decline in the carrying capacity of the forests of the Soviet Union of at least 10 percent. Thus, an AAC in the short to medium term of 570 million cubic meters seems likely for forests under the management of the forest authorities and approximately 600 million cubic meters for the country as a whole when including the forest resource managed by organizations other than those of the forest economy.

### ***Reforestation - Maintaining the Resource Base***

Current reforestation efforts appear to be keeping pace with clear cutting. However, more disturbing developments are evident in the rate at which previously reforested stands are passed into the youngest age categories of the forest fund. Between 1985 and 1989, the average area of forests which were admitted into the youngest age classes has never exceeded 1.7 million hectares. In 1989 in fact, there was a sharp drop to 1.4 million hectares, only slightly more than two thirds of the area which is reported clearcut annually in the Soviet Union. In addition, there has been a marked deterioration in the share of stands admitted to the forest fund which were initially restocked using artificial means. While in 1980 and 1985 plantations accounted for almost 50 percent of the new stands that were considered stocked, by 1989 this share had decreased to 33 percent or only 468 thousand hectares. Assuming a 20 year period between the time a stand was established and reaching the lowest age class for the forest fund, only about 36 percent of the stands originally restocked using artificial means have been successful.

While the above discussion would suggest that the forest wealth of the Soviet Union is being reduced, estimates of the stocked forest land from successive forest inventories shows a constant increase. From 1953 until 1988, forest land has increased continuously from 815 million hectares to 942 million hectares. Stocked forest land has increased from 697 million hectares to 814 million hectares. Thus, even though the national statistics suggest an expanding forest resource, the underlying quality of that resource may in fact be decreasing.

### **Harvest Levels**

The forest industry of the Soviet Union has "officially" produced between 355 million and 390 million cubic meters of roundwood annually since 1960. Excluded from these figures are thought to be approximately 80 million cubic meters of harvest from small operations which lie outside the control of the main participants of the forest economy. This additional harvest amounts to nearly one-fifth of the "official harvest figures generally reported by the Soviet authorities.

Clearcut harvest accounts for almost four-fifths of the total harvest. Selective harvesting in mature stands accounts for a small share of overall harvest volume. It is the harvest from these methods of cutting which is accounted against the AAC. The remaining 20 percent of the harvest is derived through thinnings and sanitation harvesting, and harvesting connected with economic development: This balance of one-fifth is not considered when examining the degree to which the AAC is utilized; but is still believed to be part of the "official harvest.

The AAC from the non-forest authority resource is believed to be fully utilized, and may in fact be over committed. The AAC under administration of the forest authorities however, appears to be not completely utilized. While almost 50 percent of the AAC was harvested in 1969, coniferous species are more heavily utilized than the deciduous species. In 1989, 60 percent of the AAC attributed to coniferous species was harvested versus nearly 40 percent for deciduous species.

From this discussion, it follows that most of the unutilized AAC is under the administration of the forest authorities which is estimated to be 293 million cubic meters.

### **Timber Demand and Consumption**

The potential pent up demand in the USSR is enormous. For the USSR to approach the per capita consumption of West Germany in 1989, let alone the United States, would require additional import/production of 15 million metric tons of pulp. This is the equivalent of a 40 percent increase in existing capacity; and represents an impressive 60 percent of the 1969 world exports of wood pulp. For paper and paperboard, this would require more than 45

million metric tons of new capacity. This represents more than a 400 percent increase over the current production level; and nearly 100 percent of the 1989 world paper and paper board trade. For wood based panels, an increase in capacity or imports of nearly 30 million cubic meters is required. This is nearly 200 percent above the current capabilities; and would represent nearly 100 percent of current world export volume.

The additional fiber requirement represented by these potential consumption volumes is 255 million cubic meters. The additional requirement is less than the 293 million cubic meters of the currently unutilized AAC.

Soviet estimates for fiber needs in the near to medium term are more modest, suggesting an additional 100 million cubic meters of fiber are needed. While the higher demand is expected to be satisfied by an increase in use of by-products such as chips and recycling of paper products, overall harvest is projected to rise between 30 million and 40 million cubic meters as well.

It is unlikely that Soviet exports will be voluntarily decreased in the near term in order to meet the projected increase in internal demand due to the need to generate hard currency. Thus any increase in consumption must come from either imports (unlikely given the shortage of hard currency) or from increased domestic production.

The ability of the industry in the USSR to meet the demands placed on it can best be answered by examining the inventory and harvest on a regional basis. Statistics which describe the forest inventory, harvesting, and consumption on a national level mask a wide regional variation that effectively divides the country into four separate regions. These regions are: (1) The European USSR; (2) Central Asia; (3) Transition RSFSR or Western Siberia; and (4) Pacific Asian USSR or East Siberia and the Far East.

### **Regional Distribution**

The European region contains the majority of the population and forest industrial activity. Pacific Asian USSR, on the other hand, contains the majority of the forest resource but is underdeveloped in terms of industrial activity. The Transition RSFSR region is located between these two major regions of the Soviet Union and thus has a more balanced pattern. Central Asia is a minor contributor to the forest industry of the Soviet Union.

*The European USSR and the transition RSFSR regions have the least rugged terrain. Mountain forests generally account for less than 15 percent of the forest resource. In both the Central Asia and the Pacific Asian regions, mountain forests account for more than one-third of the stocked forest land and more than one-half of the growing stock.*

The large difference in terrain impose broad restrictions on the species make up of the forest resources in each of the four regions. The European region, due to more temperate climate, contains a disproportionately higher share of the deciduous resource. The distribution of the forest resource among the two principal species groups is reflected in the allocation of the AAC. While accounting for approximately one half of the AAC in the European and Transitional RSFSR regions, coniferous species contribute almost three-quarters of the regional AAC in the Pacific Asian region. Just over one half of the coniferous AAC for the total USSR is located in the Pacific Asian region. The MC from deciduous species, on the other hand, account for almost fifty percent of the regional MC in each of the Transitional RSFSR and European USSR region. The European region alone accounts for nearly 50 percent of the MC from deciduous species.

While the coniferous resource is the dominant species group across the country, the species which compose this group in each of the regions are decidedly different. In the European USSR, spruce and pine account for all of the coniferous resource. While pine is the major species in Transition RSFSR, occupying one half of the coniferous forested area, cedar pines contribute nearly one-quarter. Spruce and larch account for most of the remainder. Larch dominates the forest resource of Pacific Asia, occupying almost three-quarters of the forested land and nearly three-fifths of the growing stock. Pine is the next major species, accounting for only 12 percent of the forested land and 16 percent of the inventory volume. Spruce and cedar pine account for most of the remainder. Birch and aspen account for the majority of the deciduous resource except in Central Asia where the principal deciduous species are those species commonly encountered in desert environments.

The age structure of the forest resources also differs across the regions. Since the European USSR is the most developed region and has supported the dominant share of the harvest over most of this century. It is not surprising to see that immature stands predominate, accounting for 53 percent of the forested area and 60 percent of the growing stock. In the Transition RSFSR and the Pacific Asian regions, because development started in earnest only after the Second World War, the forest resource is predominantly mature and over-mature. Mature and over-

mature forests account for 53 percent of the forested land and more than 60 percent of the growing stock of these two regions respectively. The forests of Central Asia consists mainly of immature stands which account for more than three-quarters of the stocked forest land and nearly two-thirds of the growing stock. The generally younger age structure of the forests is due to a strong afforestation program started in the region to prevent further encroachment of the desert areas onto the cultivated and habitable parts.

As the European region supports the largest share of the harvest (and other industrial activities as well), but contains only 40 percent of the accessible and potentially accessible resource, it is not surprising to see the allowable annual cut nearly completely utilized. The MC in the Transition RSFSR and the Pacific Asian region account for nearly 60 percent of the accessible and potentially accessible AAC. However, no more than 40 percent of the resource is being utilized. The balance of the unutilized MC requires substantial investments in infrastructure to bring it to the developed stage. An insignificant share of the AAC is located in Central Asia, amounting to less than one percent or 3 million cubic meters. Thus most of the potential for harvest increase is located in the Asian Pacific and Transitional RSFSR regions.

## **Regional Outlook**

### ***Roles***

It is possible to hypothesize four roles played by the four regions. In addition to supplying the needs of the domestic industry, the non-Central Asia regions must also seek to meet export commitments which in the past five years have mounted to between 15 million and 20 million cubic meters, or almost 5 percent of the "official" harvest of nearly 385 million cubic meters. Approximately half of the log exports have been destined for Asian markets of China and Japan. The remaining half has been exported to East and West Europe. Since exports to Asian markets originate no further west than Pacific Asia, the forest industry in Pacific Asia must in addition to domestic and other internal demands to the USSR, also meet the export requirements of the Pacific Basin. Correspondingly, the forest industry in the European USSR must also consider the market needs in Europe. Transitional RSFSR, thought to be a marginal supplier for international export markets, also provides raw material for the industry of the European USSR in addition to meeting its own internal supply needs.

The export of unprocessed logs is one of the commodities which the Soviet Union currently is successful in exporting to markets where payment is in hard currency. There will likely be pressure to maintain unprocessed log exports, at least in the short to medium term, in order to generate hard currency necessary to finance the import of needed equipment and consumer goods. At the same time, the consumption of wood fiber has been projected to increase by up to 100 million cubic meters in the near to medium term.

While it is projected that 60 percent to 70 percent of the needed increase will come from more intensive use of wood residues and by product material, additional roundwood must still be obtained in the amounts of between 30 and 40 million cubic Meters. In the absence of major shifts in processing capabilities, most of the projected demand for roundwood is expected to occur in the European USSR where the majority of the population and manufacturing capacity are located. In the absence of decreasing log export, there are questions as to where this additional output can be obtained.

### ***European USSR and Transition RSFSR***

#### ***Short to Medium Term Outlook***

Most of the potential increases in the near to medium term are expected to occur in the European and Transition RSFSR regions. Almost 36 million cubic meters of deciduous species are thought to be accessible subject to securing the appropriate manufacturing technology. An additional 10 to 12 million cubic meters consisting of two-thirds coniferous species (pine and spruce) and one third deciduous species (birch and aspen) can be generated simply by changing the regulations governing harvest from Group i forests. In addition, introduction of fiscal incentives to compensate for the higher harvesting costs connected with selective harvesting techniques could increase volume from intermediate harvesting by 30 million cubic meters. Only half of this is thought to be of commercial quality however. The high cost connected with this source of incremental volume makes it sub-marginal.

This suggests that the ceiling on the level of potential increases in harvest from both European USSR and Transition RSFSR regions is in the neighborhood of 45 million cubic meters. But how does this compare with the projected fall down in AAC connected with industrial pollution and past forest management practices?

The forest resources of the European USSR are being exploited at or beyond the current ability of the resource to sustain itself. On account of poor harvesting and forest management practices when coupled with a climate which is more favorable to deciduous species (than that existing in the Pacific Asian region), their share of the total harvest is likely to increase in the near to medium term. Thus, while the overall coniferous component is expected to decline, the total harvest will not because of the substitution of hitherto unutilized deciduous resource for the over developed coniferous resource.

Incremental harvest is possible from *greater* intermediate utilization by increasing the degree of thinning in immature stands. However, without fiscal incentives and new technology to compensate for the higher costs associated with selective harvesting techniques, it is unlikely in the short to medium terms to lead to any sizable increase.

Thus, any increase in manufacturing capacity of the *forest* industry in the European USSR must be achieved through a more intensive utilization of existing forest resource, including a shift to greater use of the available deciduous resource.

#### *Long-term Outlook*

In the short term in the Transition RSFSR region, the harvest might be increased by 6 million cubic meters of mainly deciduous species if appropriate manufacturing technologies can be introduced. Longer term increases in the Transition RSFSR region are dependent on foreign capital. An additional 55 million cubic meters could be possible but only with the investment of large sums of capital for infrastructure development. This additional volume is connected with the potentially accessible MC. However, even with capital investment, the potential harvest increase in Transition RSFSR is far from foreign markets, thus decreasing the attractiveness in the eyes of foreign investors. Therefore, it is unlikely Transition RSFSR will witness any large increase beyond the projected rise in harvest of deciduous species. The projected increase more or less compensates for the potential reductions in the accessible MC believed to be likely from industrial pollution and past forest management practices.

The reserve and inaccessible forest resource in both European USSR and Transition RSFSR represented by about 20 million cubic meters of AAC is believed to have either high economic or high environmental costs associated with it. Thus, it is unlikely that additional wood volume can originate from these forests.

#### ***Pacific Asian USSR***

##### *Short to Medium Term Outlook*

Some potential additional increases from the stands which are presently developed is possible. By making better use of the deciduous resource believed to be developed (except for the appropriate manufacturing technology) an additional harvest of 7 million cubic meters of deciduous species could potentially be possible. An extra 15 million cubic meters of mainly coniferous species is believed to be accessible at this time in all ways except for the appropriate harvesting technology. Thus, the increase in harvest from either importing the harvesting technology for steeper slopes or manufacturing processes which can use the deciduous resource amounts to approximately 22 million cubic meters, or nearly 20 percent of the present harvest.

##### *Long-term Outlook*

With so much of the reserve forests and remaining unallocated volume, Pacific Asian Region has always seemed like a cornucopia of growing stock, particularly now in light of the *restrictions placed on the harvest or timber from federal lands in the United States*. However, most of the volume and land area is located in Yakut ASSR and the undeveloped parts of Khabarovsk Kray. Weather conditions are severe and timber is reportedly of smaller size and poor quality. Stocking per hectare is low, almost 80 cubic meters per hectare in the reserve forests of Yakut ASSR. This makes development economically marginal at best. In addition, the uncertainty surrounding the regeneration of stands once harvesting is complete in the harsh climates has yet to be resolved.

The combination of low quality and low value species, low stocking, and harsh climate contribute to high operating costs. Together with the uncertain sustainability of the resource, these factors all mitigate against large supplies of wood originating from the reserve forests coming to market from the Asia Pacific region in the short to medium term, let alone over the longer-term.

The difference between the stated AAC in the currently and potentially accessible forest land, and the actual harvest, represents the currently undeveloped portion of the "official" AAC. The development of this added volume, estimated to be 135 million cubic meters in Pacific Asia and 55 million cubic meters in Transitional

RSFSR, is dependent on capital investment

### ***Capital Investment***

What *is* the outlook for massive capital injections from Soviet sources in the near to medium term?

Individual forest enterprises can no longer expect to receive capital infusions from the central government(s). The individual enterprises are currently being placed on a self-financing basis under economic and price *reforms*.

While retaining a share of the hard currency earnings generated by the sale of their products, the share of earnings remaining with the enterprise was reportedly recently reduced from 25 percent to 15 percent for 1991 to assist the central government to meet its hard currency obligations. Thus the ability of the individual enterprises to import foreign technology in its own right is uncertain and does not look very promising in the near to medium term.

Reported administrative changes in the share of hard currency retained by the individual enterprises may seriously undermine the ability of the Soviet forest industry to continue harvesting at current levels, let alone increasing the volume of exports. In addition, as the centrally planned economy shifts to a market oriented one, the ability of the forest industry to replace Soviet made capital stock from within the country may decline. Thus, while harvest increases in the order of 70 million cubic meters seem to be potentially possible with minimum investment in the infrastructure, the ability of the forest industry to attain this harvest may in the short term be deteriorating. Actual declines in the current harvest levels *cannot be* ruled out.

One alternative heavily promoted is investment by foreign firms to help bring to production currently undeveloped forest land and provide marketing expertise to facilitate the export of Soviet manufactured products. Backman and Waggener observed that the investment conditions in 1990 were murky, thus clouding the outlook for foreign investors. Since then, a number of joint ventures have started to operate, the most notable being the joint venture between Hyundai and the Primory'e forest industry association. While Hyundai has made great strides in developing what is believed to have been forest resource classified as "potentially developable", it is far from clear whether other major foreign companies will decide to make the commitment for investment in the near term. Although very little is expected to take place in the short term, substantial development may be possible in the medium to long-term should the political uncertainties be resolved.

The joint venture between Hyundai of South Korea and the Primory'e Forest industry Association of the Soviet Far East demonstrates that there is definite interest on the part of foreigners to cultivate the potential wood supply. However, the interest, particularly in the Pacific Asian region, to invest in developing the harvesting potential depends on the ability of the investment to generate hard currency profits and to be able to repatriate the profits. Given the distribution of the resource and industrial activity, the European USSR is a more likely candidate for investors seeking opportunities in manufacturing and secondary processing while those seeking additional raw material should examine the Pacific Asian region.

### ***Foreign Market Considerations***

Regardless of the impediments to foreign investment internal to the Soviet Union, the increase in harvest connected with increasing foreign investment is limited by market considerations. The size of the market in which it is possible to receive hard currency and in which Soviet timber (species and quality) are competitive affect the ability of the foreign investor to recoup the investment. The market size in the Pacific Basin for sawlogs of coniferous species was nearly 28 million cubic meters in 1989. The United States supplied approximately two-thirds of the market while the USSR supplied about 20 percent. Through partial substitution, an increase in Soviet exports may be possible. Should the Soviets be able to capture two-thirds of the market for coniferous sawlogs presently serviced from North America, the harvest in the Pacific Asian region would need to increase by at least between 10 and 15 million cubic meters.

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