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SCENARIOS FOR THE PHASING-OUT OF CHRYSOTILE ASBESTOS AND A PROPOSED ROADMAP

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TABLE OF CONTENT

EXECUTIVE SUMMARY

Vietnam's policy is to phase out the use of Chrysotile asbestos in sheet roofing, as part of its commitment under the Rotterdam Convention of 10th September 1978 on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.

The implementation of this policy needs to start by recognising certain social realities in Vietnam. A survey has been conducted of 18 producers of Chrysotile asbestos sheet roofing and one producer of polyvinyl alcohol (PVA) sheet roofing. The low price of Chrysotile asbestos sheet roofing derives in part because Vietnam has the necessary domestic production capacity. Alternatives such as polyvinyl alcohol (PVA) are significantly more expensive, in part because the raw materials are more expensive For the time being there is no alternative product that offers an equivalent combination of durability and price on the Vietnamese market.

A significant subset of Vietnam's rural population has to rely upon Chrysotile asbestos sheet roofing because the alternatives are at present unaffordable. The key to being able to implement the policy, therefore, is to remove Vietnam's reliance upon external suppliers by enabling it to develop its own domestic PVA production and fabrication technology.

Taking all of these factors into consideration, the following strategy is now proposed in order to implement the policy:

- A development phase, with an indicative completion date of 31st December 2020. This would have two components:
  - Technology development. The Vietnamese Government will need to allocate budget to the Ministry of Science and Technology with the aim of developing a royalty-free process (i.e. a process that does not infringe international patents) for the non-asbestos production and fabrication sheet roofing. The cost to the Government would be quantifiable and limited (because the development phase is of finite duration). The benefit to Vietnamese society would be significant and ongoing, besides providing the possibility to export.
  - Financial support development. The aim of this would be to make the case for financial support in order to assist producers with process changes, also to support new enterprises wishing to enter the domestic market for sheet roofing. This should then ensure the setting aside of government funds to ensure that the funds are committed by 31st December 2020. The most appropriate form of such support would be a revolving fund to be operated by one of the Vietnamese banks through its network of local branches, for which the Vietnamese Government would provide the initial capital, possibly co-financed by the bank in order to offer soft loans as opposed to interest-free loans. Loans would then be made to qualifying beneficiaries, with the capital repayments and interest charges (if appropriate) serving to maintain the fund in operation.

This respects the timetable envisaged by the Vietnamese Government and would enable implementation to commence as soon as the technology development phase is complete. The baseline date for implementation is therefore assumed to be 1st January 2021. On that basis the main implementation strategy would be as follows:

- An implementation preparatory phase, to run from 1st January 2021 to 31st December 2021. In this phase the main parameters of implementation are discussed and agreed between the various stakeholders. The process would be led by the Ministry of Industry and Trade. The revolving fund parameters

(eligibility criteria, terms of reference for the managing bank, procurement documents) need discussed and agreed. All of the aforementioned information would then be incorporated into the information to be disseminated via an information campaign, for which it may be possible to obtain external financial assistance.

- Phase 1, to run from 1st January 2022 to 31st December 2023. In this phase the information campaign is launched and the procurement process completed for the appointment of a bank to operate the revolving fund. It will be necessary to assess the most likely scenarios regarding the responses of producers, in order to forecast with as much confidence as possible the likely outcome in terms of supply and demand for the domestic sheet roofing market (for which a contingency plan is needed, see below). Legislation to ban the import of raw Chrysotile asbestos fibre and all processed forms of Chrysotile asbestos would be drafted and approved during this phase. The phase would end with the ban coming into effect.
- Phase 2, to run from 1st January 2024 to 31st December 2025. In this phase existing producers use up their stocks of raw Chrysotile asbestos fibre and re-equip to start production based on PVA or alternatives. Start-ups should be encouraged by offering either interest-free or soft loans also to new producers who express an interest in the market and submit qualifying proposals. The legislation banning the import of Chrysotile asbestos would be amended during this phase, extending the ban to the production of Chrysotile asbestos sheet roofing. The phase would end with the amended ban coming into effect.
- Phase 3, to run from 1st January to 31st December 2026. In this phase it continues to be legal to sell Chrysotile asbestos sheet roofing (in order to use up stocks as far as possible), without any further supplies reaching the market. The legislation banning the import and use in production of Chrysotile asbestos would be amended during this phase, extending the ban to the sale of Chrysotile asbestos sheet roofing. The phase would end with the amended ban coming into effect. Loans from the revolving fund would continue to be available until the end of this phase, helping to ensure that the cash flow of producers that have made the switch to PVA (or alternative) is not compromised by a temporary distortion of the market. No new loans should be made after 31st December 2026.
- Phase 4, to run from 1st January to 31st December 2027. This is in the nature of a clearing phase, intended to minimise as far as possible the burden on producers, suppliers and construction companies of having to process residual stocks as waste. The legislation banning the import, use in production and sale of Chrysotile asbestos would be amended during this phase, extending the ban to the installation of Chrysotile asbestos sheet roofing and designating all remaining stocks apart from existing installations as hazardous waste. The phase would end with the amended ban coming into effect.
- A contingency plan, which should anticipate a possible need to obtain sheet roofing supplies through import in case domestic demand exceeds domestic production capacity.
- A remediation action plan for the gradual replacement over time and safe disposal of existing installed Chrysotile asbestos sheet roofing. It is recommended that this should be addressed nearer the time in order to take more realistic account of the prevailing circumstances.
- The programme of work as described above is realistic, in that it recognises social realities in Vietnam without detracting from the commitment to the

Rotterdam Convention, while also allowing ample time for the normal processes of governance.

I. INTRODUCTION

Vietnam wishes to phase out the use of Chrysotile asbestos as a sheet roofing material. The purpose of this report is to provide the basis of an implementation plan to achieve that. Before proceeding to discuss possible implementation issues, it is helpful to summarise the key principles of policy implementation planning.

A policy implementation plan must be based absolutely and exclusively upon reality. Statements of aspiration, however laudable, do not form the basis of an implementation plan. The key parameters that drive any implementation plan are:

- The resources that can actually be committed to the task of implementation
- The activities to be completed and the resource demand of these activities
- The scheduling of the activities to be completed

If the resources that can be committed for an activity are not equal to or greater than the resource demand of that activity, at the time the activity needs to take place, then implementation will not proceed according to plan.

The activities to be completed in the present case will depend upon various factors:

- The policy objective of phasing out Chrysotile asbestos and the deadline by which this must be done
- The need to respect applicable legislation in relation to environmental protection and occupational health and safety
- The strategy that is adopted for ensuring that market demand for products is satisfied
- The need to remove any incentive on the part of producers to continue producing Chrysotile asbestos sheet roofing
- The strategy that is adopted in relation to employment and business confidence

In order to form the basis of an implementation plan, it must be possible to convert the policy objective into discrete tasks. Each task must be specified in sufficient detail to enable resource scheduling to be considered properly.

This report applies these principles in order to develop the Road Map for phasing out Chrysotile asbestos.

II. SUMMARY OF CONCLUSIONS FROM THE SURVEY OF EXISTING PRODUCERS IN VIETNAM

1. Scope

A survey has been conducted, in which detailed questionnaires were sent to 18 manufacturers of Chrysotile asbestos sheet roofing and one manufacturer of polyvinyl alcohol (PVA) sheet roofing. The questionnaire focused on:

- production processes using Chrysotile asbestos;
- associated issues of environment and occupational health and safety; and
- level of readiness to switch to non-Chrysotile-based production technologies and processes.

2. Manufacturers of Chrysotile Asbestos sheet roofing

Regarding the 18 establishments surveyed:

(a) All use more or less the same production technology (the Hatschek process for the wet rolling of asbestos cement).

(b) Only five of the establishments have a fully enclosed process for bag breaking and grinding.

(c) Total production yield in the period 2012 to 2016 fluctuated between 43,000,000m^2 and 52,000,000m^2 per annum.

(d) The total cost of production ranged from 18,000 to 34,000 VND/m^2, of which the cost of Chrysotile asbestos accounted for 42% on average.

(e) All establishments recycle water after separating suspended solids from waste arising from burr and flaws or damage to the product.

(f) Only nine of the establishments (which include the five mentioned in (b) above) deal with the issue of airborne asbestos dust, by extending the process to include fully enclosed bag breaking and grinding or removal of dust by suction through bag filters.

(g) The 18 establishment directly employ a total of 602 production workers (i.e. excluding white collar employees) of whom only 6% have more than 20 years' working experience. (The significance of 20 years is that this is typically the period over which symptoms of asbestos-related health problems develop.) These 18 establishments report that none of their production workers have to date developed an asbestos-related disease, based upon routine chest X-Ray examination.

3. Manufacturers of PVA sheet roofing

There were formerly two manufacturers of PVA sheet roofing in Vietnam. However one has ceased production because demand was insufficient to justify continuing.

Regarding the one establishment surveyed:

- The manufacturer reports that the production technology is broadly similar to that described above for Chrysotile sheet roofing. There is in addition a grinding step at the materials preparation stage of the process, also slight differences at the drying and curing stage. It should be noted that the technology is proprietary and the terms of the manufacturer's licence to use it prohibit disclosure of the details. Nevertheless there is no reason in principle why other manufacturers could not access this and other technologies under the terms of separate licensing agreements.
- PVA sheet roofing production cost is 200% of the cost for producing the Chrysotile equivalent. The main contributory factor is the cost of raw PVA fibre, which is roughly 400% of the cost of Chrysotile asbestos.

- The primary market demand remains for Chrysotile asbestos sheet roofing because of its better durability and lower price.
- Consequently the production yield of PVA sheet roofing remains for the time being at only 85,000m^2/year. It is understood that the vast majority of this is exported.

4. Manufacturing outlook

The 18 manufacturers of Chrysotile-based sheet roofing fall into four distinct groups. If Chrysotile asbestos were to be banned outright then of the 18 manufacturers surveyed:

- five would change to another product range (including but not necessarily limited to block or cements);
- nine would continue to produce sheet roofing by switching to another technology using alternative materials, as long as the Vietnamese Government identifies a replacement product of equivalent durability and cost;
- two have no form of plan in place;
- two would cease operation.

The switch to alternative technology would enable those manufacturers planning to do this to use their existing machinery with the addition of one additional processing step. This would be in line with advice from the World Health Organisation (WHO), the European Union (EU) and the Government of Vietnam. Workers would benefit from improved standards of occupational health and safety.

Nevertheless the higher product price would place them at a market disadvantage for as long as an outright ban on Chrysotile asbestos is not in place and effectively enforced.

III. SCENARIOS FOR THE PHASING-OUT OF CHRYSOTILE ASBESTOS

1. Clarifying the policy objective

For the purposes of designing a policy implementation plan, a policy objective needs to be stated in a very specific way. The core of the objective is clearly to phase out the use of Chrysotile asbestos as a sheet roofing material. However there are various ways in which that could be done combined with various ways in which the transition could be phased over time.

For the time being the low price of Chrysotile asbestos sheet roofing is a reflection of the fact that Vietnam has the necessary domestic production capacity. Alternatives such as polyvinyl alcohol (PVA) are significantly more expensive, in part because the raw materials are more expensive but also because Vietnam's only domestic producer relies on process technology that is licensed from a commercial Japanese supplier. That price differential will exist for as long as Vietnam is reliant upon commercially licensed external process technology. At present there is no alternative product that offers an equivalent combination of durability and price on the Vietnamese market, nor is it likely that one would be become available in the short-to-medium-term.

A significant subset of Vietnam's rural population has to rely upon Chrysotile asbestos sheet roofing because the alternatives are at present unaffordable. The key to being able to implement the policy, therefore, is to remove Vietnam's reliance upon external suppliers by enabling it to develop its own domestic PVA production and fabrication technology.

It is evident from the survey that some producers whose product ranges are sufficient diverse might prefer to stop producing sheet roofing altogether rather than bother with any process changes. Such producers might continue to produce sheet roofing if offered sufficient incentive, but the desirability of doing that depends on whether or not their contribution is critical to fulfilling the market demand.

Certain of the small producers, whose only product is sheet roofing, might struggle to meet the transition cost of moving from asbestos to another material. It is possible that unless some form of financial assistance is made available, then they might continue to use asbestos for as long as possible, after which they risk going out of business. Even if such assistance is made available, a small producer has to decide whether to run two production processes in parallel in order to maintain turnover, or alternatively to risk a temporary shut-down while production processes are switched.

Either of the above scenarios might lead to a shortage of sheet roofing on the Vietnamese market, unless producers who can afford to make the transition and are willing to make it have the capacity to meet the demand. With regard to the willingness to make the transition, there is no point in not recognising one essential fact: the search for a replacement product with the equivalent combination of durability and cost is, for the time being at least, pointless, because none exist. It is therefore impossible to satisfy the criterion that would trigger producers into making the change of their own volition.

Vietnam's total annual production of asbestos sheet roofing is about 100,000,000m^2/year. Of this 30% is exported (primarily to Laos, with a smaller amount to Cambodia) and 70% aimed at the domestic market. Any implementation plan must therefore provide reasonable confidence that enough producers can be persuaded to produce sheet roofing based on alternative materials to fulfil a potential domestic market demand averaging 70,000,000m^2/year. Given that at present Vietnam produces only 85,000m^2/year of PVA sheet roofing (and most of that is exported) it is important to avoid a situation in which all manufacturers of Chrysotile asbestos sheet roofing decide to get out of the sheet roofing market altogether. (If that were to happen, Vietnam would be forced to import at prevailing regional international market prices.)

The policy objective, therefore, can be re-stated more accurately as follows: To phase out the use of Chrysotile asbestos as a sheet roofing material while phasing in the use of alternative materials at a price that is affordable for both urban and rural populations, maintaining a satisfactory supply to the market for sheet roofing and minimising any loss of production capacity.

2. An overview of Financial incentives, taxes and regulatory incentives

a. Financial policy instruments

It is implicit in what is written above that the reaction of any producer in response to any type of ban that could be introduced cannot be predicted. No producer is obliged to continue serving the sheet roofing market and the decision to continue or not is purely a commercial one. Given that there is a substantial domestic market to be served, it would be in Vietnam's interest to consider one or more types of incentive that might help to mitigate the risk of the domestic market being under-served. (Note that a contingency plan is needed in case the forecast supply cannot satisfy the forecast demand.)

Not all forms of incentives that could be envisaged would be legally admissible. Financial incentives in the form of grants, soft loans and subsidies could in principle be offered as long as they are in compliance with Vietnam's international obligations.

Vietnam imports all of its raw Chrysotile asbestos fibre, there being no domestic sources. The taxation of asbestos imports conflicts Vietnam's international commitments. However Vietnam could choose in principle to ban the import of asbestos, pursuant to the Rotterdam Convention of 10th September 1978 on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. If it were to do so, producers would need a period in which to use up their existing stocks of raw Chrysotile asbestos fibre, while putting in place whatever measures they consider appropriate once stocks are exhausted. The higher cost of alternatives is a consideration only for as long as Chrysotile asbestos sheet roofing remains on the market.

The issue of taxes and incentives is linked to the cost of implementing the policy. Vietnam should plan to cover the entire cost of making the changes required from its internal budgets, because with very few specific exceptions none of the costs to be incurred would be eligible for external financing. The following types of cost could be involved:

- Information campaign. This might include advisory leaflets, public announcements and a website for importers and producers. It may be possible to obtain an external loan or (less likely) a grant to help cover the cost of this.
- Transition costs for producers. The Vietnamese Government could consider offering financial assistance for this. The most realistically possible way of doing this would be for the Vietnamese Government to capitalise a revolving fund to be administered by one of Vietnam's banks. The fund could be used to offer interest-free loans (if operated with initial capitalisation only from the Government) of soft loans (if capitalised with a blend of Government and bank funds). The option of imposing a purchase surcharge on Chrysotile asbestos products has been considered but rejected because of incompatibilities with existing Vietnamese legislation.
- Public sector administration costs linked to the development of new legislation, liaising with stakeholders, processing of grant applications, administration of the grant fund and in the longer-term enforcement of the bans on imports and production.

There is one specific type of financial incentive that has been considered but is not recommended, namely putting in place a subsidy to reduce the cost of PVA or other alternative sheet roofing on the Vietnamese market. The reasons are as follows:

- Such a subsidy would be irrelevant after a ban takes effect. Its only interim purpose would be to eliminate price differentials. Doing this by subsidising alternative products costs money without raising any revenue. However if it is done by taxing Chrysotile asbestos products, then this raises revenue while limiting the cost to administration.
- A subsidy would in any case have to be financed from internal sources because it would not be eligible in any way for external financial support. Financing this from tax revenue would divert funds that could more effectively be employed to finance grants to producers
- For the time being the price of PVA sheet roofing on the Vietnamese market is likely to be higher than its longer-term price, because there is only one producer hence no price competition.

b. Regulatory policy instruments

Regulatory incentives usually take the form of delays or derogations that allow a producer or investor to enjoy a more lenient regulatory regime (e.g. in relation to environmental regulatory requirements) temporarily or permanently. Such incentives need to be used with a great deal of caution because they would almost certainly conflict with Vietnam's international commitments.

Therefore for the purposes of the present Road map, regulatory incentives are considered not to be a viable option.

3. Key milestones for a phased approach

For the purposes of phasing implementation, four distinct types of ban are envisaged, not necessarily at the same time:

- Ban the import of raw Chrysotile asbestos. This has the effect of forcing producers into making a decision regarding their future operations. The associated risk is that some may decide to get out of the sheet roofing market altogether.
- Ban the manufacture of Chrysotile asbestos sheet roofing. This forces producers to implement the decision referred to above, also with the risk that some may decide to get out of the sheet roofing market altogether.
- Ban the sale or re-sale of Chrysotile asbestos sheet roofing. This is the point at which a surcharge on the sale of Chrysotile asbestos sheet roofing becomes obsolete and can be discontinued. Any remaining grant funds can be disbursed for as long as the fund remains solvent.
- Ban the use of Chrysotile asbestos sheet roofing. This has the effect of re-designating any residual stocks of Chrysotile asbestos sheet roofing and raw Chrysotile asbestos as hazardous waste, for the disposal of which the 'polluter pays' principle should apply.

The four key milestones, therefore, for an implementation plan are:

- The date (d_1) on which a ban on the import of Chrysotile asbestos into Vietnam comes into effect. The actual date to be set will be a function of various logistical considerations, which are discussed in the next section of this report, of which the most important is the prior need to establish a Vietnamese technology for the production of PVA or other alternative sheet roofing products. Ideally producers would be notified of this date sufficiently far in advance to put a transitional action plan in place. Appropriate controls would need to be introduced at the point of import, which would impose a small incremental public sector revenue cost. The practical effect of this ban would be to force producers to use up stockpiles and take action to pre-empt a 'cliff edge' scenario when stocks are exhausted. It is possible the some form of incentive may be needed in order to ensure that producers do not choose simply to stop altogether production of sheet roofing materials.
- The date (d_2) on which a ban on the production of Chrysotile asbestos sheet roofing comes into effect. This would need to allow time to run down stockpiles of raw fibre and switch to alternative technologies. It is suggested that d_2 should be d_1 plus two years. At the end of this period, Chrysotile asbestos sheet roofing would cease to be available on the Vietnamese market. It would also close off the market for export of such sheet roofing. It may

therefore be diplomatically advisable for the Government of Vietnam to notify the Governments of Laos and Cambodia of its intention to cease production.

- The date (d_3) on which a ban on the sale of Chrysotile asbestos sheet roofing comes into effect. This would effectively close off the market, removing any incentive to continue producing or stocking the product.
- The date (d_4) on which a ban on the use of Chrysotile asbestos sheet roofing comes into effect. At this point all residual liability passes to companies and individuals who continue to hold stocks of Chrysotile asbestos sheet roofing and raw Chrysotile asbestos, obliging them to dispose of the stocks as hazardous waste in accordance with applicable Vietnamese law, applying the 'polluter pays' principle.

4. Establishing a baseline date

Certain practical considerations apply when establishing a baseline date for the Road map.

For the time being there is only one producer of PVA sheet roofing in Vietnam. That producer uses a process licensed from a Japanese company, to which proprietary rights and certain exclusivity terms apply. While processes from other foreign suppliers could in principle be licensed for use by other Vietnamese producers, this would still result in a product that is unaffordable for a subset of the Vietnamese population.

Poorer, rural communities in Vietnam depend upon Chrysotile asbestos sheet roofing because it is the only affordable option that offers reasonable protection in the longer-term. Imposing a ban on such roofing would have a significant and negative social impact unless the price of an alternative product could be brought within the bounds of affordability. The only realistic way of doing that would be to develop PVA or other production technology in Vietnam, basing local production upon local process technology. This would require a programme of technological development, financed through the Ministry of Science and Technology. It is now estimated that such a programme would require up to three years for completion, after which the implementation programme now envisaged could proceed. Therefore the baseline date should coincide with the completion of the development programme.

The policy itself forms part of Vietnam's implementation of the Rotterdam Convention. Therefore it is logical that the implementation of the Road map should be co-ordinated by the competent authority for the Rotterdam Convention, namely the Ministry of Industry and Trade (MOIT). Any financial policy instruments to be deployed would need to be co-ordinated by the Ministry of Finance (MOF). The other key government stakeholders are the Ministry of Construction (MOC), the Vietnamese Customs Authority, the Ministry of Science and Technology (MOST) and the Ministry of Natural Resources and Environment (MONRE).

The terms of reference for the financial support programme would need to be discussed in detail between the MOIT and the MOF, bearing in mind the possible role of a bank in helping to promote the scheme as well as manage disbursements and repayments in relation to the fund. The total value of the capitalisation needed would need to be estimated, based upon the costs of technology yet to be developed in Vietnam, and bearing in mind also the fee that a bank would charge for administering the fund. Eligibility criteria would need to be established and the availability of such financial assistance publicised. A combination of public announcements and internet-based information campaign could be used for such purpose.

Bearing in mind the possible logistics of the abovementioned considerations, it is suggested that 1st January 2021 should be adopted as the baseline date for the main implementation phase of the policy. It would then be reasonable for the ban on the import of Chrysotile asbestos to come into effect on 1st January 2022.

5. Meeting industry expectations

From the survey undertaken it is clear that producers are expecting guidance from the Vietnamese Government regarding the choice of alternative sheet roofing material and possible technologies. Such information would become available during the research and development phase. It would not be unreasonable to envisage a website (which should be fully responsive[1]) through which producers and other stakeholders could be informed about the policy and everything associated with it. This is explained in detail in the Strategic Action Plan that follows.

[1] A responsive website is one that can be viewed effectively on any device (e.g. a computer screen, a tablet or a smart phone). This is an important consideration because these days the majority of people access the internet through smart phones. A range of templates for such websites are available. See for example https://nickcatesdesign.com/preview/rapidweaver/clearing/

IV. ROAD MAP

1. Strategic action plan

a. Introduction

The implementation strategy proposed is described in detail in subsequent sections. In summary it is as follows:

- A development phase, with an indicative completion date of 31st December 2020. This would have two components:
    - Technology development. The Vietnamese Government will need to allocate budget to the Ministry of Science and Technology with the aim of developing a royalty-free process (i.e. a process that does not infringe international patents) for the non-asbestos production and fabrication sheet roofing. The cost to the Government would be quantifiable and limited (because the development phase is of finite duration). The benefit to Vietnamese society would be significant and ongoing, besides providing the possibility to export.
    - Financial support development. The aim of this would be to make the case for financial support in order to assist producers with process changes, also to support new enterprises wishing to enter the domestic market for sheet roofing. This should then ensure the setting aside of government funds to ensure that the funds are committed by 31st December 2020. The most appropriate form of such support would be a revolving fund to be operated by one of the Vietnamese banks through its network of local branches, for which the Vietnamese Government would provide the initial capital, possibly co-financed by the bank in order to offer soft loans as opposed to interest-free loans. Loans would then be made to qualifying beneficiaries, with the capital repayments and interest charges (if appropriate) serving to maintain the fund in operation.
- An implementation preparatory phase, to run from 1st January 2021 to 31st December 2021. In this phase the main parameters of implementation are discussed and agreed between the various stakeholders. The process would be led by the Ministry of Industry and Trade. The revolving fund parameters (eligibility criteria, terms of reference for the managing bank, procurement documents) need discussed and agreed. All of the aforementioned information would then be incorporated into the information to be disseminated via an information campaign, for which it may be possible to obtain external financial assistance.
- Phase 1, to run from 1st January 2022 to 31st December 2023. In this phase the information campaign is launched and the procurement process completed for the appointment of a bank to operate the revolving fund. It will be necessary to assess the most likely scenarios regarding the responses of producers, in order to forecast with as much confidence as possible the likely outcome in terms of supply and demand for the domestic sheet roofing market (for which a contingency plan is needed, see below). Legislation to ban the import of raw Chrysotile asbestos fibre and all processed forms of Chrysotile asbestos would be drafted and approved during this phase. The phase would end with the ban coming into effect.

- Phase 2, to run from 1st January 2024 to 31st December 2025. In this phase existing producers use up their stocks of raw Chrysotile asbestos fibre and re-equip to start production based on PVA or alternatives. Start-ups should be encouraged by offering either interest-free or soft loans also to new producers who express an interest in the market and submit qualifying proposals. The legislation banning the import of Chrysotile asbestos would be amended during this phase, extending the ban to the production of Chrysotile asbestos sheet roofing. The phase would end with the amended ban coming into effect.
- Phase 3, to run from 1st January to 31st December 2026. In this phase it continues to be legal to sell Chrysotile asbestos sheet roofing (in order to use up stocks as far as possible), without any further supplies reaching the market. The legislation banning the import and use in production of Chrysotile asbestos would be amended during this phase, extending the ban to the sale of Chrysotile asbestos sheet roofing. The phase would end with the amended ban coming into effect. Loans from the revolving fund would continue to be available until the end of this phase, helping to ensure that the cash flow of producers that have made the switch to PVA (or alternative) is not compromised by a temporary distortion of the market. No new loans should be made after 31st December 2026.
- Phase 4, to run from 1st January to 31st December 2027. This is in the nature of a clearing phase, intended to minimise as far as possible the burden on producers, suppliers and construction companies of having to process residual stocks as waste. The legislation banning the import, use in production and sale of Chrysotile asbestos would be amended during this phase, extending the ban to the installation of Chrysotile asbestos sheet roofing and designating all remaining stocks apart from existing installations as hazardous waste. The phase would end with the amended ban coming into effect on 1st January 2028.
- A contingency plan, which should anticipate a possible need to obtain sheet roofing supplies through import in case domestic demand exceeds domestic production capacity.
- A remediation action plan for the gradual replacement over time and safe disposal of existing installed Chrysotile asbestos sheet roofing. It is recommended that this should be addressed nearer the time in order to take more realistic account of the prevailing circumstances.

b. Institutional set-up (present – 31/12/2017)

Task 1

Set up an Implementation Steering Group (ISG). This should be chaired by the MOIT (as the implementing institution for the Rotterdam Convention). The Ministry of Finance, the Ministry of Construction and the Ministry of Science and Technology should participate from the outset. The General Department of Vietnam Customs should participate from Phase 1 onward. MONRE should participate from Phase 3 onwards. The Ministry of Health should participate from Phase 4 onward. The ISG should include two Vietnamese policy implementation specialists. It should have the authority to request the support of one international implementation specialist from time to time as necessary.

Task 2

The ISG would need to review the implementation plan overall, identify and define any supplementary tasks needed to achieve the key milestone dates and revise the implementation action plan to take account of these. This should include discussions with international financing institutions (IFIs) regarding the possibility of external co-financing for the media campaign and web portal components of the implementation action plan.

c. Development phase (1/1/2018 – 31/12/2020)

Task 3

The Vietnamese Government will need to allocate budget to the Ministry of Science and Technology with the aim of developing a royalty-free process (i.e. a process that does not infringe international patents) for the production and fabrication of PVA sheet roofing.

The amount of such budget will need to be based upon a realistic estimate of the work effort and research investments needed to provide reasonable confidence of being able to deliver the required outcomes before the end of 2020. As long as this is done based upon reasonable assumptions, then the cost to the Government would be quantifiable.

The justification for such a budget rests upon a highly favourable ratio of benefit to cost. As noted, the costs are quantifiable and required for a limited duration (i.e. until the end of 2020). The benefit to Vietnamese society is not easy to quantify, but the following can be said with certainty:

- The disparity in living standards between urban and rural areas will be reduced, as poorer households become able to afford sheet roofing that has a less potentially deleterious impact on health.
- The benefits are ongoing.
- The benefits include the mitigation of the perceived health hazards linked to the use of Chrysotile asbestos for sheet roofing purposes.
- The development of a Vietnamese process for the production and fabrication of PVA sheet roofing opens up the potential to expert to countries such as Laos and Cambodia, for which affordability in rural areas is also a significant consideration. Vietnamese products would enjoy a price advantage in such a market.

Task 4

In parallel with the technological development, the mechanisms for providing financial support to producers should be discussed and agreed. The aim of such financial support would be to assist producers with process changes, also to support new enterprises wishing to enter the domestic market for sheet roofing.

The most appropriate form of such support would be a revolving fund, which would operate in the following way:

- The Vietnamese Government draws up detailed Terms of Reference (ToR) for the management of the fund, on the assumption that these would form the basis of a contract between the Vietnamese Government and a qualifying bank.
- Since the ToR would include delegating to the bank the responsibility for assessing and approving loans, also for conducting due diligence audits to ensure that loan recipients are using the money in accordance with the terms

of the loan, the Government of Vietnam will need also to discuss and agree a set of criteria to determine

  - eligibility of existing producers for loans;
  - amount of loan, on a case-by case basis, for eligible existing producers;
  - eligibility of new producers for loans;
  - amount of loan, on a case-by case basis, for eligible new producers.

- The parameters of loans will need also to be established (period of loan, capital repayment terms, requirements for record-keeping for audit purposes, default conditions and so on).
- The fund would be set up initially with capital to be provided by the Vietnamese Government. Two options can be envisaged:
  - Interest-free loans. The Government pays to the bank a management fee. The bank contributes none of its own money to the fund, having the responsibility only to management the fund on behalf of the Government in the manner prescribed in a contract. Loan recipients repay only the loan capital and are not charged interest.
  - Soft loans. The Government pays to the bank a management fee. The bank contributes some of its own money, so that the fund is a blend of (a) an interest-free component and (b) a commercial component. The interest charge on loans would then be less than the normal commercial rate, reflecting the balance of Government / bank contributions to the fund. The bank has the responsibility to management the fund on behalf of the Government in the manner prescribed in a contract, which should include proper accounting of the different fund components in order to ensure transparency. Loan recipients repay the loan capital and the interest.
- The fund capital would be maintained by loan repayments, also by interest repayments (if charged), thereby enabling early repayments to be used for subsequent loans (hence the term 'revolving fund').
- After a certain period of time, no further loans would be issued. The fund would be replenished as loans are paid back. In due course the Government and the bank would recoup the capital that they contributed.

Ideally the budget needed to capitalise the fund should be identified and approved by 31st December 2020.

Task 4 needs to produce the following outputs:

- Definitive ToR for the fund management contract
- A clear statement of how the bank is to be selected, its services procured and what may be reasonable in terms of a management fee
- A shortlist of banks to be invited to tender for the fund management contract.

These considerations will then be the basis for the procurement process to be conducted in Task 7.

d. Implementation preparatory phase (1/1/2021 – 31/12/2021)

Task 5

Compile a functional specification for a web-based loan application procedure, to form a sub-system of the web portal to be designed in Task 6 below. This should include a database to store and facilitate processing of loan applications, allocations and disbursements. This part of the system will need to be accessible by the managing bank.

Task 6

Compile a functional specification for a web-based information portal for importers, producers, retailers and members of the public. The portal should be in the form of a CSS (cascading style sheet) / HTML5 / php website, designed to be fully responsive and to minimise load times. This will enable it to work effectively over a slow internet connection. The portal should be easily navigable in an intuitive manner and provide at least the following information in an appropriately structured form:

- A headline banner, with the simplest message possible, such as:

- The policy, its implementation plan, the deadlines that apply and the implication of these deadlines for producers and other stakeholders.
- A presentation of the market opportunities for companies interested in providing sheet roofing to modern international standards, for the domestic Vietnamese market.
- The decisions that existing producers will need to make at each key stage of the implementation programme.
- The options available to producers, which could include links to Vietnamese technology centres, companies that supply process plant and equipment for the manufacture of sheet roofing based on alternative materials.
- Details of the financial assistance that is available to existing producers and start-up enterprises.
- The loan application sub-system (see Task 5 above).
- Formal notification that from 1st January 2028 all unused stocks of Chrysotile asbestos sheet roofing and raw Chrysotile asbestos will be re-classified as hazardous waste in accordance with Vietnamese law. Anyone still in possession of such stocks would be liable for disposing of them in accordance with the law.

Task 7

Task 7 addresses two procurement requirements:

- Procurement of services for the setting-up of the web portal based on the aforementioned functional specifications. This should include a requirement for the contractor to liaise with the managing bank (see below) when appointed.
- Procurement of services from a bank to fulfil the scope of work developed in Task 4 above.

Task 8

Design and approve a targeted media campaign, notifying all existing importers, producers and retailers of the launch of the web portal and summarising the key points of the policy.

e. Implementation phase 1 (01/01/2022 – 31/12/2023)

Task 9

Launch the targeted media campaign and follow-up as necessary.

Task 10

Launch the web portal with all of its associated sub-systems.

Task 11

Commence the implementation of the revolving fund contract. Evaluate applications for loans. Note that no disbursements from the fund will occur until the next phase. In parallel with this it may be necessary for the MOIT to engage in dialogue with the larger producers in the interests of ensuring as far as possible that domestic demand can continue to be met from domestic supply.

Task 12

Draft, approve, finalise and enact legislation to ban the import of raw Chrysotile asbestos fibre and all processed forms of Chrysotile asbestos from 1st January 2024.

Task 13

Continue to monitor and evaluate the responses of producers to the media campaign and via the web portal, with the aim of forecasting as far as reasonably possible any differences between the domestic market demand for sheet roofing and the ability of domestic producers to satisfy that demand. If at any stage supply seems likely to fall short of demand, implement the contingency plan (see below).

f. Implementation phase 2 (01/01/2024 – 31/12/2025)

Task 14

Commence lending from the revolving fund. Submit monthly reports on its status to the members of the ISG. The monthly status reports should be summarised also on the web portal. This is important because it is an essential aspect of managing expectations during the implementation process. It should not be necessary to re-capitalise the fund during its period of operation. Nevertheless, if the rate of disbursement were to exceed by a significant amount the rate of capital repayment, the fund could in theory require re-capitalising.

Task 15

Amend the legislation banning the import of Chrysotile asbestos, extending the ban to the production of Chrysotile asbestos sheet roofing from 1st January 2026.

g. Implementation phase 3 (01/01/2026 – 31/12/2026)

Task 16

Continue operation of the revolving fund loan scheme on the same basis as described under Task 14 above. Post a notice on the web portal announcing that lending will cease at the end of December 2026.

Task 17

Amend the legislation banning the import and use in production of Chrysotile asbestos, extending the ban to the sale of Chrysotile asbestos sheet roofing from 1st January 2027.

h. Implementation phase 4 (01/01/2027 – 31/12/2027)

Task 18

Amend the legislation banning the import, use in production and sale of Chrysotile asbestos, extending the ban to the installation of Chrysotile asbestos sheet roofing and designating all remaining stocks apart from existing installations as hazardous waste from 1st January 2028. Notify all stakeholders of this deadline, making them aware that from 1st January 2028 anyone holding residual stocks of Chrysotile asbestos and products containing it will be wholly liable for disposing of it as hazardous waste in compliance with applicable laws.

i. Remediation phase (01/01/2028 onwards)

Task 19

Discuss and agree an action plan for the longer-term removal, replacement and safe disposal of Chrysotile asbestos sheet roofing in Vietnam.

j. Contingency planning

Task 20

Identify potential suppliers of PVA sheet roofing in Vietnam's trading partner countries. Investigate potential supply options and the likely cost of these to the Vietnamese consumer.

2. Work programme

The recommended periods to be allocated for the completion of each of the tasks described above are as shown in Table 1 and Figure 1.

Table 1: Timing of phases and tasks

Phase / Task	**Indicative implementation period**
Institutional set-up	Present – 31/12/2017
Task 1: Set up Steering Group	Present – 31/10/2017
Task 2: Review/update implementation plan	01/11/2017 – 31/12/2017
Development Phase	01/01/2018 – 31/12/2020
Task 3: Technology development	01/01/2018 – 31/12/2020

Task 4: Financial support modalities	01/01/2018 – 31/12/2020
Implementation preparatory phase	01/01/2021 – 31/12/2022
Task 5: Functional specification for loans procedure	01/01/2021 – 30/04/2021
Task 6: Functional specification for web portal	01/01/2021 – 30/04/2021
Task 7a: Procurement, fund management	01/01/2021 – 30/04/2021
Task 7b: Procurement, IT services	01/05/2021 – 31/08/2021
Task 8: Design and approve media campaign	01/01/2021 – 31/12/2021
Implementation Phase 1	01/01/2022 – 31/12/2023
Task 9: Launch media campaign (Milestone date)	02/01/2022
Task 10: Launch web portal (Milestone date)	02/01/2022
Task 11: Commence revolving fund contract (Milestone date)	02/01/2022
Task 12: Legislation to ban import	01/01/2022 – 31/12/2023
Task 13: Review supply/demand scenarios	01/03/2022 – 31/12/2023
Implementation Phase 2	01/01/2024 – 31/12/2025
Task 14: Commence lending, manage loans, monitor status	01/01/2024 – 31/12/2025
Task 15: Legislation to ban production	01/01/2024 – 31/12/2025
Implementation Phase 3	01/01/2026 – 31/12/2026
Task 16: Continue operation of revolving fund	01/01/2026 – 31/12/2026
Task 17: Legislation to ban sale	01/01/2026 – 31/12/2026
Implementation Phase 4	01/01/2027 – 31/12/2027
Task 18: Legislation to ban use	01/01/2027 – 31/12/2027
Remediation Phase	01/01/2028 onwards
Task 19: Prepare remediation action plan	01/01/2028 – 31/12/2028
Contingency Plan	01/03/2022 – 31/12/2023
Task 20: Contingency planning	01/03/2022 – 31/12/2023

Figure 1: Work Programme