D.T4.4.1 POLICY RECOMMENDATION AND ACTION PLAN

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Objective of the report

The main objective of this report is to summarize policy recommendations and a strategy to pursue for a widespread and homogeneous application of energy efficiency measures in school buildings based on previous activities and bilateral meetings with policy makers to foster the policy implementation.

Target Users: *Local authorities, policy makers*

1. Current situation on energy efficiency in public buidlings

1.1. National legislation and provisions for public buildings

The legislation framework for energy efficiency in buildings in general in the Czech Republic complies with European energy efficiency directive 2012/27/EU (hereinafter the Directive).

The Czech Decree on energy efficiency in buildings 78/2013 Coll (hereinafter the Decree) involves the methodology for calculating the energy performance of buildings, minimum performance requirements for new buildings, requirements for nZEB (Nearly Zero Energy Building), and financial incentives. The Decree also contains the articles on energy performance certificates.

1.2. National Energy Action Plan and other planning documents

The **National Energy Action Plan** has stipulated the national target for 2020 as 1060 PJ of final energy consumption. It identifies measures for energy efficiency in buildings, specific measures for public buildings, measures for industry and transport, heating and cooling, and energy distribution, as well as horizontal measures (e.g. energy audits, energy management systems, EPC, etc.). The Action Plan sets specific target of energy savings to be achieved in buildings of central-government authorities – 6 620 MWh/year. **There are no specific targets for other public buildings** (e.g. municipal buildings as administration, schools, hospitals, senior houses, libraries etc.).

There are introduced no measures related specifically to schools. However, schools are often mentioned as examples of buildings that can benefit from measures for public buildings. The most important instruments to achieve energy efficiency goals in public buildings are considered as follows: energy consumption requirement for newly constructed buildings, funding support programmes, public procurement, in particular purchasing low energy consumption appliances, heating sources, windows.

National Renewable Energy Action Plan presents the goal to achieve 15,3% of RES on final energy consumption; 10% in transport sector in 2020. Concerning the public buildings, there are stipulated requirements for newly constructed buildings and funding of RES in public buildings. No special references to schools are provided. To increase to use RES in public buildings are following measures - Energy requirement for newly constructed buildings and Funding support programmes.

1.3. Local and regional legislation and provisions for public building

There is no specific local nor regional legislation related to energy efficiency of buildings in the Czech Republic. In general, regions and municipalities can issue regional/local decrees, but these cannot go beyond requirements set at the national level, which means that for buildings (schools), requirements of national legislation are being applied.

1.4. Local action plans for public buildings

In the Czech Republic, municipalities has been gradually implementing **Sustainable Energy (and Climate) Action Plans** - SEAP, SECAP under the Covenant of Mayors. These plans set local targets for energy efficiency and renewable energy, including energy efficiency of public buildings. In addition to those plans development of regional energy plans are compulsory. Potential for energy savings in public buildings and already performed measures have to be stipulated in these plans and relevant measures have to be described in order to use as much potential as possible to improve energy efficiency in the buildings. Local (municipal)

energy plans are often developed as well, mainly in towns in which district heating companies deliver significant percentage of heat to households and other sectors - in these plans, the potential for energy savings is often calculated in detail also for public buildings in municipal ownership.

2. National, local and regional measures to stimulate energy renovation of public buildings

To comply with the Article 7 of the Directive, the Czech Republic has chosen to implement a set of so called "other" policy measures (under paragraph 9) of the Directive. The Czech Republic calls this method the "alternative scheme". Of the policy measures, described by the Directive, the Czech Republic uses:

- Financial engineering tools;
- Investment subsidies;
- Non-investment subsidies (analyses of the suitability for using EPC, energy management, educational activities as consulting centres, seminars, publications).

All these financial mechanisms are being used also for municipal buildings and schools.

2.1. Financing from regional/local budget

Schools in the Czech Republic are owned (founded) by the State (state Universities), regions (secondary schools), by municipalities (comprehensive schools, kindergartens) or by private subjects (private universities, private secondary and secondary schools). Based on the Acts (Act No 128/2000 Coll. on Municipalities, Act No 129/2000 Coll. on Regions), the ownership of schools was shifted from the state to municipalities/regions. The owner/founder - regions or municipalities, pays the costs related to the school property (i.e. buildings). Schools, which are owned by municipalities and regions, have well established budget items for planning in last decade due to interest rates below 2.5% in addition to popular financing by grants and subsidies.

The decisions regarding investment and procurement are under the responsibility and management of school owners and founders, i.e. regions or municipalities/cities. Small-scale procurement of operational material (e.g. sanitary material) and basic services (e.g. repair) can be delegated to schools; many schools have its economist / financial manager. Investment measures, which cannot be financed from the operational budget, have to be planned in cooperation with the founder and paid by the founders' budget.

2.2. Funding from ERDF

Funding from the ERDF is the most common way of financing in case of energy efficiency investments in public buildings including schools.

ERDF - Operational Programme Environment 2014 - 2020, Priority axis no. 5 focuses on energy efficiency and RES implementation in public buildings. The subsidy is focused on public sector (e.g. schools, administration buildings, sport facilities and other state, regional or municipal buildings), private sector is excluded. The subsidy can reach 35 to 50 % of eligible costs and the percentage is related to the value of planned saving in energy efficiency investments, and it can reach 70 % in case of installation of systems of forced ventilation with waste heat recovery. The Operational Programme Environment can only be used in case when energy performance standards of the building are met after the investment (more ambitious than according to the EPBD requirements). In historical buildings, the values of energy performance must be met

only in renovating parts. In addition, minimal values of energy savings and minimal values of CO_2 reduction are set for the energy efficiency investment. Energy management implementation is also required. The Operational Programme Environment in the Priority axis no. 5 also supports the EPC projects – in case the project is implemented as EPC project the subsidy of eligible cost is by 5% higher than in case of non-EPC energy efficiency project implementation. Additional savings in water savings, RES implementation and heat consumption control are often identified by the EPC project. The guaranteed savings agreement and introduced professional measurement and verification of achieved energy savings provide reliable results of the investment to the financing authority and the building owner.

2.3. National funding

Schools can also use the national programme EFEKT (State programme on support of energy savings and use of RES). The Ministry of Industry and Trade as a complementary programme to the EU funds have developed this programme. The allocation for the period of 2017 – 2021 totals to € 30 mil. The Programme provides primarily non-investment subsidy, nevertheless, part of the programme supports following investment activities:

- Reconstruction of heating system and heating source - not open for 2020 and 2021
- Reconstruction of public lighting systems
- Energy efficiency measures in buildings implemented by using EPC method (50% of eligible costs) - not open for 2020 and 2021

In the three activities subsidy can achieve maximum 50% of eligible costs, and maximum subsidy to 2 mil. CZK (approx.. € 80 thousand).

The non-investment activities supported by the EFEKT include many soft activities promoting energy efficiency and RES utilisation. Maximum subsidy is mostly up to € 8-15 thousand and the activities include:

- Information increase and educational activities
- Introduction of energy management systems (70% of eligible costs)
- EPC feasibility studies - analysis whether/which buildings are suitable for EPC (70% of eligible costs)
- Preparation of energy efficiency projects (70% of eligible costs)
- Energy Plans development – regions and statutory towns
- others

2.4. EPC

In the CR, Energy Performance Contracting has been widely used for energy efficiency projects implementation, mainly in the public sector. The EPC provider guarantees the achievement of the contracted level of savings of energy, and/or related costs, and bears contractually agreed risks of technical implementation and operation. Thanks to the support of the Ministry of Industry and Trade which in cooperation with the Association of Energy service providers promotes wide use and improvements of pilot contracts and methodologies for procurement of the EPC providers, the EPC process has been well standardised. In addition, ESCo (Energy Service Company) find that finance for EPC project is available as they can obtain long-term credits under commercially viable terms and low interest rates from several

reliable banks. EPC contracts as off-balance sheet financing do not increase municipal debts. Usually approach of ESCOs in the CR has been the resale of receivables to finance their EPC projects.

EPC is used mainly in the public sector, school buildings are often key buildings in the umbrella project implemented for a municipality/region. In many school buildings EPC is implemented even after the school has already been partly renovated (e.g. envelope insulation and windows replacement), so EPC projects can focus on measures with lower payback period, which makes the projects economically attractive - heating control, lighting, water savings, etc.)

EPC projects are mostly implemented in a way that each project covers several public buildings of the same owner, so called “packages” or “umbrella” projects. The reason for including more buildings into one EPC project is to increase the amount of investment which brings better bank terms for the credit, and also to extend the number (and benefits) of energy efficiency measures with different payback terms that can be combined and implemented.

2.5. Loans

Czech commercial banks offer standard loans, and in last years operated financing facility (so-called credit lines) of foreign or international banks (e.g. EIB, KfW).

There are not any widely spread specific programmes (financial products) for energy efficiency projects in public buildings or schools. On the other hand, regions and municipalities are considered as low-risk clients for banks and can obtain credits with much lower interest rates than private clients can.

Loans can also be combined with EPC methodology. Money for investment is then provided by a bank to the municipality or region and not to the ESCO Company. This does not have any influence on the contract with the EPC provider, though, guaranteed savings contract is concluded and the loan can be repaid from the savings achieved.

The conditions of commercial loans provided to municipalities have been quite favourable (2, 5% interest with payback period 10 – 15 years) for the past 10 years; the municipalities often use commercial loans to co-finance projects funded from operational programmes.

2.6. PPP financing

Up today, PPP financing has been used mostly for infrastructural projects in the Czech Republic, financing of energy efficiency projects has not been used by PPP financing (although in some studies EPC is considered as a form of PPP)

3. Pilot projects findings

Instructions: You can use as the Source: D.T3.2.3 Energy simulations and technical improvement options – summarization and D.T3.5.3 Evaluation of pilot actions

- *Number of audits: 8*
- *Local specifications/problems with energy efficiency renovations (to nZEB standard)*

During pilot action activities energy audits in 8 schools were performed, discussion with school managers on energy efficiency topic were held and the energy efficiency measures leading to nZEB standard were proposed and explained. The results of the energy audits were presented to school managers and respective local authorities, open lessons on energy efficiency with pupils in schools were organized.

Generally can be concluded that the Czech Republic supports the implementation of energy efficiency measures in public buildings and schools. The subsidy programmes are in place since 2007. Many schools already implemented some of the standard energy efficiency measures – namely building envelope thermal insulation and windows replacement. Many school buildings has limited options for energy efficiency projects due to its preservation (ranked as cultural heritage with special care).

Energy-saving measures leading to the nZEB standard are costly and usually return in decades (e.g. 50 years, in case of better thermal insulation almost 100 years). The payback period of the recommended option of energy audits is most influenced by structural measures, without which it is almost impossible to reach the nZEB standard. Other sub-indicators also influence the payback period of the measure such as investment cost, energy prices, operation of equipment and, last but not least, user behaviour.

School management, staff and students are not motivated to save energy, usually no motivation programmes are developed by the school's owners (region/city/municipality) nor by school's managements.

The level of technical knowledge on energy efficiency issues of the school staff and local authorities' administration officers is generally low and not sufficient for energy efficiency projects identification. The exception are regions and cities with internal or external service of energy manager. Low number of internal staff needed for energy efficiency project administration limits small municipalities.

4. Barriers and opportunities

During the FEEDSCHOOLS activities performed in the Czech Republic, the following barriers obstructing more extensive growth of number of energy efficiency projects in schools were identified.

4.1. Financial barriers

Barrier	Description	Opportunity
No existing financial support in the energy efficiency project preparation phase (the exception is the EPC feasibility study)	Cities/regions/municipalities do not develop the energy efficiency plan of their asset and specific energy efficiency project of a school.	Financing of external service in project preparation phase – investment plan can be developed, potential for savings and investments needed can be specified in the plan, timing of investments etc.
High administrative burden in relation to apply and manage subsidies (e.g. many documents, long approval process, then not enough time for realization, etc.)	Cities/regions/municipalities often do not have respective staff for subsidies administration. Some of cities/regions established a budgetary organization for this purpose or a specialized department. Small municipalities do not have respective staff - both external and internal.	Financing of subsidy administration for small municipalities. Cost for development and administration of the application for subsidy and for project development and implementation phase is eligible cost financed by the EU subsidy and that is why external assistance is often hired to assist in the whole process.
Not enough financial resources for co-financing in budgets of school owners (i.e. municipalities, cities or regions) to renovate to nZEB standard	Energy efficiency not being the priority investments, investments are made in other areas of the municipal property and located to other activities.	The nZEB standard is very difficult to achieve in most school and other public buildings and the investments needed are huge. Budgets of regions and municipalities are limited, though.

	Moreover, the investments needed for the achievement of nZEB standard is often so extensive that the approval of such investment is difficult to obtain from the local authorities (decision makers of the region or municipality).	
Other investment projects are prioritized	Cities/regions/municipalities solves also other projects as infrastructural or new constructions which are often prioritized, are more visible and often more urgent. In new public constructions, the nZEB is compulsory by building regulations, though.	Energy efficiency is not a priority at the state level, nor in regional and municipal level. Moreover, due to limited budgets and many other investment needs representatives of regions and municipalities who finally decides upon the allocation of funds (councils, deputies) mostly prioritize other necessary investments.

4.2. Legislative barriers

The schools are budgetary organizations of territorial units, the buildings are in ownership of region/city/municipal administration but at the same time, they are operated by organizations - schools. Schools are managed according to the budgetary rules of territorial budgets (Cities/regions/municipalities).

Barrier	Description	Opportunity
There is no legislative requirement nor obligation for regions/cities/municipalities to develop a strategical document as energy efficiency action plan for renovation of its asset.	The energy action plan and renewable energy action plans are developed on the country level, not on the region/city/ municipality levels. Even if the energy plan has been developed, it cis focused on energy supply to individual sectors, recommendations are made for energy efficiency improvements in the sectors. Even in case that recommendation are made for public buildings and the municipal assets, they are not often fully implemented due to long payback period and high investment requirements.	More financial support to SEAP/SECAP, or other strategical documents, More robust promotion of existing activities - MPO EFEKT - activity 2F - Preparation of energy efficiency projects based on the best practice - MPO EFEKT - activity 2E - Development of documentation for preparation of EPC projects European projects focused on development of strategical documents CEESEU - support of SECAPs development in CEE EUCF - development of energy strategy documents in cities/municipalities
No financial support for specialists for public tendering of energy efficiency projects	Difficulty in organization of public tenders - cooperation of different experts is necessary (energy auditor/specialist, designer, procurement expert)	Regions/municipalities often rely on their standard practices and rarely accept new approaches and assistance in less known procurement procedures needed for a complex energy efficiency projects implementation.

		Moreover, no monitoring and verification of results is applied in case of energy efficiency investments, which - if not subsidized from ERDF - are rarely complex but rather partial.
Technical equipment is often owned by third parties	This barrier mainly relates to heat sources, which are most often operated by a third party. The operation of the boiler house usually starts with the heating source modernisation, the investment then is repaid by the heat price. No motivation exists for the third party to reduce heat supply to the building(s).	Concluded contracts for the boiler house operation should include clear statements as to monitoring and reporting energy efficiency of the boiler house. The potential for energy savings should be specified by energy audit, in building heating, hot water preparation, lighting, ventilation. Recommendation for energy efficiency investments must be provided to the school director and these must be reported to the owner of the building as well.

4.3. Technical barriers

High administrative burden in relation to energy efficiency projects (e.g. documentation for obtaining a building permit or an approval of changes, etc.)

Barrier	Description	Opportunity
Lack of experts for identification of nZEB projects	List of energy specialists accredited by the Ministry of Industry and Trade is publicly available; expertise exists, in case experts are selected in a tender lowest price win, which does not always bring satisfactory results at the end.	nZEB projects development methodology and change in procurement practices. Training of experts in new approaches, technologies, proper planning.
Buildings protected as a cultural heritage	Many school buildings belonging to historical protected heritage cannot technically achieve the nZEB standard.	Even in case achievement of nZEB building is not possible, potential for savings still exists in heating, ventilation, lighting, RES applications.
Insufficient space (e.g. for installation of HVAC units, piping, cabling, etc.)	This has to be specified building by building. Not all buildings can achieve nZEB standards.	Technical – construction - barriers are difficult to overcome.
Partly finished renovations carried out in recent period	This relates to a large number of school buildings renovated after 2007	Many of such schools/their founders will have to plan energy modernisation in the future.
Building stability, in particular roof bearing capacity (e.g. it makes it impossible to install PV panels)	This relates to many buildings built after 1950. Rarely the information exists about the status of the roof.	The founder must operate PVs anyway. Schools are not businesses. Most electricity generated is sold to the grid, because schools are closed in summer.

No financial support to renovation to nZEB standard, usually long payback period of some energy efficiency measures installation (e.g. 50 years and even more) leading to nZEB standard	Grants are provided from the funds of the Operational Programme Environment, the application criteria require achievement of stricter requirements in energy performance of buildings are close to nZEB. The subsidy covers maximum 50 % of the eligible costs. Investment funds for co-financing such an investment are high and are very high for municipalities and towns – buildings must be selected by founders for the reconstruction.	The founders must develop investment plans, with external assistance. Benefits must be well specified in the plans so that the investment is attractive for the founder.
Absence of secondary metering of individual parts of buildings (classes, kitchen and gymnasium), energy consumption were calculated as theoretical values based on technical data and information from the responsible persons	Secondary metering is missing in all school buildings. In addition, energy management that would make use of the data is very scarce.	Secondary metering is costly and must be well designed to correspond to monitoring and reporting of expected effects.

4.4. Communication and organizational barriers

Barrier	Description	Opportunity
Absence of central energy management in local administration corresponding with systematic detailed renovations plan of asset owned by municipalities/regions/cities	This is fully true for all smaller municipalities and even for most of the towns. Energy managers or energy management teams are established by most of the regions and big cities. Nevertheless, detailed knowledge of energy performance of the assets of the region are rare and renovation plans do not exist. Even if it exists, communication between individual departments of the city/municipal office is not very good – and for energy investments, communication is needed from the very beginning – for existing and for new constructions as well.	Energy management introduction can bring cost savings, which are sufficient to pay for the management staff and its activities. Responsible authorities and decision makers rarely understand this.
Absence of the option to manage the operational budget including energy cost on the school management side (energy savings cost to use for other school activities)	Savings in energy costs usually belong to schools after the investment in refurbishment is finished (with the exception for EPC projects). Czech schoolmasters manage their operational budget. Most energy savings are not regularly monitored, verified and properly reported after the energy efficiency investments was made - with the exception for EPC projects. The directors have often little idea what	School managers are not interested in reporting the energy cost savings, because the school budget would be then cut in the future - regardless the external factors influencing the energy demand. Motivation of schoolmasters can be developed – cooperation of the school should result in shared benefits between the schools and their founders.

	the benefits of the investment are - taking into account all external factors influencing the energy cost (climate, prices, etc.).	
Low motivation of the school management to manage energy of school - School directors are not financially engaged (and so not motivated) to implement energy savings	School directors are not professionals in energy management and their role is in educational activities. Motivation is hardly to be expected, although many of them cooperate very well after they are informed about potential for energy savings and savings then belong to school at least partially.	As above. Measurement and verification of benefits brought by energy efficiency investments is not trivial, it is not the plain difference between the cost before and after. Non-qualified monitoring and planning of energy costs is often the case of missing collaboration of schools.
Absence of systematic energy efficiency plans of particulars buildings - Relevant projects are not identified	This is true for most of schools and their founders with the exception for those towns that have the EPC feasibility studies developed. The feasibility study gives a n overview of possibilities in saving energy cost, some of the studies even recommend proper timing, identify buildings in which application for subsidy can be successful, etc.	Support to plans development in the municipal and regional assets would be of help, planning must be well discussed at the municipal office with all departments involved in investment actions development (e.g. financial, investment, construction and school departments)

4.5. Information and knowledge barriers

Barrier	Description	Opportunity
Lack of technical knowledge on the site of local authorities and mainly of the side of school management	True for Czech smaller municipalities and school masters. In towns, technical expertise often exists, not in nZEB details.	Educational / informational campaign for local authorities – e.g. using of existing ministries and organisations – MIT, MOE, APES, Association of towns and municipalities, Association of energy managers of cities and municipalities, etc. Such detailed knowledge does not exist even at many energy specialists – they have to be educated as well.
Problems in communication between building owner (local authorities) and its operator (school management)	The priority of school management are educational activities in schools, the priority of local administration owning schools and other budgetary organization is save financial resources. The communication concerning the energy efficiency (EE projects, energy management implementation, EPC project implementation) is usually by the order from the side of local authorities	In case the founder does not have the expertise, external assistance has to be tendered.

	which is not motivating and energy efficiency activities becomes a "unpleasant or annoying duty" and the result is not satisfactory.	
The amount of energy budget respective to last year energy consumption	Energy budget is planned by the founder based on past years costs for energy. This does not include proper planning according to variables influencing the energy cost.	Planning energy costs should be professional and well established mainly at the founders° offices.
Lack of time for energy efficiency issue of the school staff	True for most schools.	Energy efficiency, RES and all related issues of climate protection should become one of important issues in curriculum of basic and secondary schools.
Absence of operation plans in relation with energy efficiency in schools involving all staff and students on behaviour leading to energy consumption	True for nearly all schools.	Energy efficiency being still marginal issue for many inhabitants, education can start with pupils and students, in the form of e-learning, practical examples, etc.

5. Policy recommendations and action plan

5.1. To overcome the financial barriers

- **To support the project preparation itself and thus create a pipeline of public sector projects for rapid implementation.**
- **More financial support to SEAP/SECAP, or other strategical documents - this support is not provided. In these documents to concentrate also on the assets of the town and a refurbishment plan can be developed.**
- **To involve the banking and other sectors in the promotion and distribution of renovation programs, for example through a guarantee part of the renovation loan.**
- MPO EFEKT - activity 2F - Preparation of energy efficiency projects based on the best practice - subsidy can be used to develop investment opportunities.
- MPO EFEKT - activity 2E - Development of documentation for preparation of EPC projects. Feasibility analysis is financed of potential for EPC project implementation in the property of the town. In assets selected by the town for the analysis energy efficiency measures are analysed and EPC project is proposed. Co-financing of the investment by the town is possible in case energy savings do not seem to repay the investment by themselves. Combination of a subsidy from the Operational programme and an EPC project is supported. Nevertheless - nZEB parameters cannot be obtained in EPC projects without significant financial support of the town.
- Better dissemination strategy for energy efficiency projects managed by European financing programmes - HORIZON 2020, INTERREG, etc. as for instance:
    - CEESEU - support of SECAPs development in CEE - ENVIROS participates in the project, three SECAPs will be supported.

- EUCF - development of energy-related investment concepts in cities/municipalities - ENVIROS participates in the project

5.2. To overcome the legislative barriers

- To update technical standards and ensure their enforcement.
- To support a method for public procurement that evaluates the parameters of the building with regard to long-term operation costs, not just the lowest initial cost (so called, life cycle costing).

5.3. To overcome technical barriers

- nZEB projects development methodology needs to be promoted and change in procurement practices - to tender the achievement of set criteria.
- Training of experts in new approaches, technologies, proper planning seem inevitable, incl. Design&Built concept.
- Many of such schools/their funders will have to plan energy modernisation in the future, which should be always made in cooperation with well-qualified experts.
- The founders must develop investment plans in assets modernisation, with external assistance. Benefits must be well specified in the plans so that the investment is attractive for the founder.

5.4. To overcome communication and organizational barriers

- Energy management introduction and energy management of assets is inevitable in towns, cities and regions. Proper monitoring and targeting is necessary, also cost planning and investment planning, verification of results ideally based on improved measurement of energy consumption. Energy management must provide well-supported reports to the founder - towns, cities, regions.
- Motivation of schoolmasters has to be developed when investing into energy efficiency - cooperation of the school should result in shared benefits between the schools and their founders.
- Measurement and verification of benefits brought by energy efficiency investments is not trivial, it is not the plain difference between the cost before and after. Well qualified monitoring and planning of energy costs in collaboration of schools can bring better information and motivation.
- Support to plans development in the municipal and regional assets might be made in close collaboration with qualified experts in nZEB. Planning must be well discussed at the municipal office with all departments involved in investment actions development (e.g. financial, investment, construction and school departments)

5.5. To overcome information and knowledge barriers

- Best practice - In particular, the state should became a good example for both, renovation of its own buildings and in the construction of new ones, with the highest parameters of economy and energy efficiency.
- Energy specialists have to be trained and educated in nZEB and possibilities in various types of buildings.
- Procurement experts should have examples of well-developed procurement cases for nZEB buildings. In case the founder does not have the expertise, external assistance has to be tendered, qualification of experts should be major evaluation criteria.
- Planning energy costs should be professional and well established mainly at the founders offices. Reliable information on consumption and costs development mainly after energy efficiency investment have been made should be available and promoted.