Trabajo Final de Grado

Ingeniería en Tecnologías Industriales

Contribución al Desarrollo de la Multimedia de Física de Reactores Nucleares

ANEXOS

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A.1 Documento para la traducción de la versión flash.

MULTIMEDIA ON NUCLEAR REACTOR PHYSICS V4.0

Basic information and guidelines for translation

Before planning to undertake the task of translating the "Multimedia on Nuclear Reactor Physics", I think it would be convenient that I provide some general information about it and give you some advice.

To begin with, I should say that the Multimedia was not initially conceived to be translated to other languages. And it is due to its continued expansion and improvement and the progressively increasing interest arisen at an international level than the English and French versions have been later developed. For this reason the translation to other languages is not an easy task. I think that most of the work shouldn't be particularly challenging to someone who has some experience with Macromedia Flash 8, but it will still involve quite a lot of work. Additionally, some of the included material in the Multimedia may require a high level of attention to details to get the desired results, particularly when working with figures and animations, as well as with some Multimedia relatively complex sections like the index. Finally, there are a few parts of the content that may be quite challenging to translate because they are not in plain text format. That includes buttons, movie clip titles, chapter titles in the main menu and index, and possibly a few other details. All this text has been previously transformed to graphic objects to be able to apply various effects to enhance its visual appeal. Its translation is therefore more complicated, time consuming and makes it more difficult to obtain identical results if the initial creation process is not known in detail.

To ease the task as much as possible I'll provide here some guidelines that, although not comprehensive, I hope will allow you to correctly understand the basics of the Multimedia structure and proceed without significant difficulties with the translation process.

It would also be very useful to familiarise with the Multimedia operation, contents, navigation and interaction options prior to dealing with the translation, as it would be easier to understand the function and structure of the material when editing it and also to understand the explanations given here.

The Multimedia is structured in different levels of SWF movies loaded simultaneously one on top of another to achieve the desired final result. Not all of them include text, so a few of these movies won't need to be translated.

The content builds itself upon the MULTIMEDIA.EXE file as a basis, which is responsible of loading the needed SWF files onto the right levels. Some of the files are related to the background and the interactive environment, while most of them correspond to the different chapters' content, which constitutes the bulk of the text to be translated.

It is important not to modify the ActionScript of any of the files, because it could bring unexpected and undesired results. It's especially important to insist in this aspect because some of the script changes could have effects that are not immediately obvious or may even cause malfunctions in other parts of the Multimedia, due to the existing interrelations between different files.

It is also essential to keep the names of the SWF files unchanged for the Multimedia to work. Additionally, due to the implemented Multimedia structure, the new SWF files published need to be tested within the Multimedia. To do so a test folder should be kept in the hard drive and it should contain all the files of any one of the languages, a copy of the ENGLISH folder of the Multimedia CD-ROM would do. Once a new version of any SWF file is published it should be copied to the mentioned folder overwriting the previously existing file before running the file "MULTIMEDIA.EXE" and accessing the corresponding content to be tested by means of any the navigation options available. As stated in the Multimedia CD-ROM READ_ME file, it is advised to copy the Multimedia to the hard drive for better performance anyway, but the use of special characters (such as accent-marked letters) in the path name may prevent it to work at all. That consideration also applies to the mentioned test folder.

Due to some problems experienced while converting the material from older Flash versions to Flash 8, I recommend you to use Macromedia Flash 8 to carry out all edition tasks. I'm aware that newer Flash versions allow files to be saved, as well as published, in Flash 8 format, and they should work ok, but I feel it's safer to avoid any possible version issues if possible. In any case, it is essential to keep the save options to Flash 8, and the publish options to .SWF also in Flash 8 and ActionScript 1.0.

Below these lines a list of the FLA files (editing files) and their contents is included to help identify their purpose and allow choosing the right one when trying to edit a particular part of the Multimedia content:

Chapter 1:	Introduction to nuclear energy	**Introducció.fla**
Chapter 2:	Neutron interaction	**Neutrons.fla**
Chapter 3:	Fission process in a nuclear reactor	**Fissió.fla**
Chapter 4:	Neutron multiplication in a nuclear reactor	**Multiplicació.fla**
Chapter 5:	Neutron balance	**Balance Neutrones.fla**
Chapter 6:	Two-group criticality	**Criticidad.fla**
Chapter 7:	Reactor kinetics	**Cinètica.fla**
Chapter 8:	Effects of control rods	**Barres Control.fla**
Chapter 9:	Chemical shim	**CShim.fla**
Chapter 10:	Burnable poison	**Burnable.fla**
Chapter 11:	Temperature effects on reactivity	**Reactivitat.fla**
Chapter 12:	Fission product poisoning	**Productes Fissió.fla**
Chapter 13:	Neutron sources	**Fonts.fla**

Index + bibliography	**Índex.fla**
Initial chapters menu	**Menú.fla**
Background contents	**Indicadors.fla**
Quit confirmation	**Quit.fla**

The remaining SWF files don't need to be translated, with the exception of the intro. The intro contents are difficult to edit since its elements are not in plain text format, like it also happens with a few other parts of this material as previously mentioned, and presents some other difficulties. To ensure the uniformity of the contents it would be better that you send us the additional authors' information to be included, and the translation of any text that you would like to appear translated in the intro and title page.

The previously listed FLA files for edition are enclosed in a ZIP file that can be downloaded from this link: http://www.mediafire.com/Multimedia-FLA
(The password needed for downloading the file is "NERG-UPC").

Although this is supposed to be a safe and reliable procedure, I ask you to confirm the correct downloading and decompression of the data by sending and email to the following e-mail address: francesc.puig@upc.edu. This also would help to prevent the edition files from being available on-line longer than necessary, as they are not meant to be freely distributed.

As extended support cannot be warranted along the translation process to solve future possible queries, it has been found essential to offer some initial guidance and tips to deal with this task as easily as possible. It is also recommended that those who had to implement the translation had significant experience with Flash to be able to infer the way things are built and be able to replicate them or find equivalent other means to accomplish equivalent results.

Translation and editing tips

The main text paragraphs of the chapters' pages present few translation difficulties. The only thing that has to be taken care of is its total length. If too long they may overlap other contents. To maintain uniformity along all the material the font size have been keep unchanged, so the usual solution is to try to explain the same thing a bit more briefly using other words. Resizing the accompanying illustrations is another possibility, but great care has to be taken when doing so. Because the process could be tricky it would be explained later in detail.

Sometimes the text is included into objects (or Symbols, using Flash terminology) so, first of all, the symbol should be double clicked to enter it and then edit the text inside. That situation appears in a number of parts of the Multimedia, where smooth text transition between pages has been implemented.

In many occasions the text paragraphs are also accompanied by equations or symbols that should maintain their appropriate position in relation to the text. Moving them to the appropriate location is much easier than with illustrations but it's important to make sure that the corresponding equation shadow is selected when trying to move it. When an equation is positioned between two text lines or paragraphs it is useful to add as many void text lines of the minimum possible height until the content fits as desired.

The main difficulties when dealing with illustrations, figures or tables is that they are usually included within enlargement or amplification movie clips. All these kind of graphic objects are frequently able to be magnified for greater detail, which means

The main difficulties when dealing with illustrations, figures or tables is that they are frequently able to be magnified for greater detail, which means they are in turn included within enlargement or amplification movie clips. It is therefore very important to modify the figures without modifying unwanted aspects of the enlargement movies. The only aspects that may need to be modified in these movie clips are the figures' footnotes present in their first and last frame. Inadvertent displacement of any of the related objects is a frequent and sure cause of malfunctions.

If, as mentioned earlier, a figure or table need to be moved or resized in a particular page the process to follow is this: First of all the corresponding enlargement movie ("Ampliació") should be accessed. Once inside it, the figure, table or picture should be selected along with the corresponding transparent button of the same size. Once both are selected it is possible to move and/or resize them as needed. It is very important to modify only these aspects of the first frame of the enlargement movie to achieve the right results. It's even more essential to NEVER modify the size or position of the illustration before entering the enlargement movie clip (that is, moving the whole movie clip from the main timeline). If done the enlarged picture, the background and any interaction buttons will appear where they are not intended to, and this is a problem quite difficult to correct afterwards. Another important thing to take into account before modifying the illustration is to ensure that the enlargement movie is not used anywhere else in that chapter to avoid undesired changes in other pages. If the object under consideration is also used elsewhere but only needed to be modified locally, a copy of it should be made for that frame prior to any modification.

It is advised that all the objects or symbols are modified or checked directly from the symbol library to ensure the translation of none of them is missed. All unused library items have already been deleted, so all the ones listed are used somewhere, although they may have been skipped when performing the translation from the main time line. Special care has to be taken not to move anything, as without its actual background visible when examined through the symbol library the real effect of any displacement may not be apparent.

It is strongly advised to keep the equations as they are, without modifying symbol subscripts or superscripts to match the Russian translation of the English words they refer. This is recommended for consistency along the whole content when referring to the same variables or parameters, and because equation management is complex and time consuming, given the fact they are to be imported to Flash as images, converted and finally treated as graphic objects. However, you may notice that a few of these equations contain full words or even sentences in plain text that can be easily edited.

Movies contain only small amounts of text that always belongs to a Flash object, so as stated previously it may be advisable to edit them directly from the Flash symbol library to be sure none has been skipped. The title of each movie, which appears at the beginning of them, is a bit more difficult to translate because it is not all in plane text form. In fact it has a near red plain text as a basis in the upper layer accompanied of a red blur effect on a lower layer. This effect (although some times implemented in a different way) can be accomplished by making a copy of the text layer, changing its colour to red, braking apart the text twice, and finally accessing the menu "Modify>Shape>Soften Fill Edges...", selecting a distance of 3 px, a number of steps from 3 to 6 (as desired) and "Expand" option.

There is another particular type of enlargement movie that may be a bit tricky. That is the case for illustrations that appear enlarged directly by clicking on a piece of text, working similarly to a hyperlink. It is also essential not to move the whole movie, but going inside it and displacing only the transparent button, the starting position of the emerging figure and the text that acts as hyperlink to match the correct position of the underlaying text paragraph on the main storyline.

The labelled interaction buttons (like "Return", "Index" and "Bibliography", as well as those of "Yes" and "No" of the Quit file) and the chapter titles of the index and main menu are a bit challenging to translate. It would be also long and difficult to give a detailed procedure on how to accomplish it. For this reason it is advised to examine carefully the way they are implemented to infer how they are built and try later to replicate them. The process should require the creation of additional temporary layers for construction, not only modifying the existing ones.

The index structure also requires some explanation. To begin with, it includes the bibliography pages on its last few frames. The other important consideration is that the index page list is duplicated. That has a definite purpose. The first section of the index is accessed when accessing chapters different from the one already opened, while the second part is used only to change the page number within the same chapter. That helps avoiding unnecessary loading delays and allows returning to the content page from where the index was initially called. From the point of view of the translation it is important to know that the text needs only to be modified once to change it in both parts of the index. However the overlaying transparent buttons size should be changed individually on both sections to fit the translated text. That is needed because the button script is different for each section, and therefore they are completely different objects.

Consequently these invisible buttons should not be copied from one section to the other, and obviously their script should not be modified.

The Multimedia main menu is a rather complex part of the material, as needed to be able to achieve the observed visual effect when the cursor is placed over each chapter title. Again it would be exceedingly long and difficult to give a detailed description of the translation process to follow.

The Multimedia main menu is a rather complicated part of the material as a result of the complex design needed to achieve the observed visual effect when the cursor is placed over each chapter title. Again it would be exceedingly long and difficult to give a detailed description on how it is built or a procedure to follow for the translation process. If it's to be modified very special care is advised, trying always to modify the lowest possible object of the symbol structure to accomplish the desired result, thus preventing unintended alteration of the operation structure. Detailed examination and a bit of trial and error will surely be needed.

In any case, it is strongly advised to always keep a copy of the original FLA files for reference in case undesired modifications are carried out and it is not clear how to undo them.

Please, let us know if you have any difficulties or additional questions about any aspect of the translation process. However, as mentioned earlier, we cannot guarantee at this time that proper support to the task will be available.

A.2 Instrucciones para la edición de nuevos idiomas en la versión HTML

Multimedia on Nuclear Reactor Physics v7.0

Basic information and guidelines for translation

In order to edit a new language of the nuclear reactors physics course the program Dreamweaver is strongly recommended. Available at www.adobe.com (student license available). Although a previous knowledge of this program is useful it is strictly not needed to fulfil the translation of the course.

To begin I would like to thank you for undertaking the translation of the Multimedia on Nuclear Physics Reactors. I would like to encourage to finish the whole process, although it could be long, it doesn't hide any difficulty.

*Before starting, **reading the whole document attentively is highly recommended**, due to the fact that ten minutes of extra reading can save lots of hours of work.*

Once the files have been provided by Professor Javier Dies and the program Dreamweaver is installed the translation can begin:

1. *First a **new folder structure** must be created. To do so, copy all the files in the folder "English" into a new folder with the name of the language you are editing. Example: "French".*

2. *Now a link from the START to the new language is needed. To do so:*

a. *Open the file "START.html"*
b. *In the top left corner choose code view (Button "Code")*
c. *Find the language that is being edited (lines 146 to 156 approx.) and take out the attribute visibility or display. The tag <td> should be left like this. If your language does not appear write it in the place of "Other"*

```
<td><span class="nav">
<a href="#"><h4>French</h4></a></span></td>
```

d. *Click on href and in the property panel beside the place where the link should appear click the small folder.*
e. *Select the file "INTRO.html" placed in "chapters/intro". Please make sure you select the INTRO that is inside the new folder you have just created with the name of the language that you are translating the multimedia to.*

3. *Now it is just a matter of translating each document present in the multimedia. Open each file translate the text present in the document, save it (CTRL+S) and then you may close it. Following some type of order is strongly advised.*

Considerations:

The main content of the course is in "chapters/chapter #/slides". Translating these slides will be the main part of the translation.

In order to translate the text, it is recommended to do it in code view so all the tags will be preserved, specially text tags such as:

- *: Text between these tags becomes cursive.*
- *: Text between these tags becomes bold.*
- *: Text between these tags becomes subscript.*
- *: Text between these tags becomes superscript.*

In general, it is desirable not to erase any tag or attribute, to avoid any problem in the code.

Links:

These elements are one of the bases of HTML language and on them depend much of the functionality of the ***Multimedia on Nuclear Reactor Physics v7.0.***

The links must be ***relative*** *and not absolute. Relative links are relative to the place where the HTML file is, and absolute links give all the file path from C unit (C:).*

Images

Translated images are available on translated flash versions of the multimedia (if the multimedia has already been translated to your language). Please ask for the flash version to Professor Javier Dies (further flash instructions are available at the end of this document).

If the multimedia has not been translated to your language previously, image managing programs, such as Photoshop, are strongly recommended.

To change an image by another one, replace the image by your translated

image. Images for each chapter are available in "chapters/chapter #/images/".

Ensure that the new image has the same name and the same format (normally .png) as the one you want to replace. The names are normally coded like this: "page number_fig-figure number", if the image it is not considered a figure the name is the page number, and when there is more than one image a letter using the alphabetical order is added (normally used with equations).

Examples:
Image name: "24_fig1" corresponds to slide 24 figure 1.
Image name: "8c" corresponds to slide 8 the third image added to the slide.

Another option is to change the attribute source of the image tag.

Example of image tag.

```
<img src="../images/6b.png" width="400" height="57" alt=""/>
```

It is really important not to take or change any other attribute from the image tag. Normally this tags are the width, the height, alternative text if the image cannot be loaded (alt="") or a call of the program "ampliar" (zoom it).

Videos

*The videos of the **Multimedia on Nuclear Reactor Physics v7.0** are loaded from YouTube.*

Two options are available related to videos:
1. Uploading the videos to the existing account "Multimedia Nuclear Reactor" (To do so ask for the password to professor Javier Dies).
2. A new account of YouTube can be created, from where loading the videos.

On both cases, once the video has been uploaded, under the video click on the option share and then on embed. Now a tag should be visible. Insert it in the place where the video that you want to replace is.

Example of video tag:

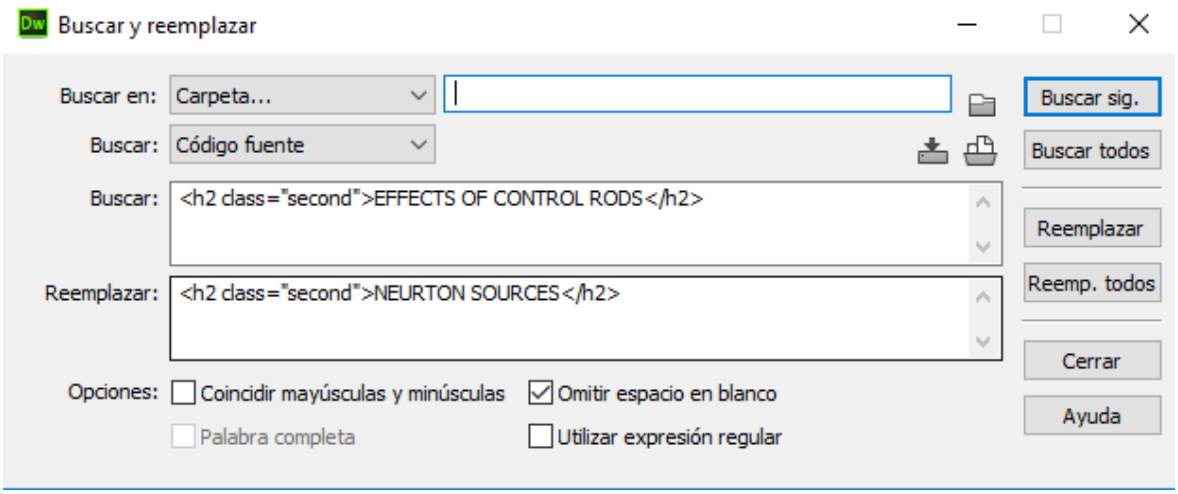
<iframe width="560" height="315" src="https://www.youtube.com/embed/yH-

vXzg" frameborder="0" allowfullscreen></iframe>

Useful tools

To translate the files that are the frames of the slides (present at:" chapters/chapter #/number_of_frame") it is highly recommended to use the tool ***search and replace.***

To find this tool, simply, over the code press right click and select it. The next window will appear:



Please take a moment to explore all the options available, because it can save lots of hours of work. In the other hand, this tool can make undesired changes on the ***Multimedia on Nuclear Reactor Physics v7.0****. Please use it carefully.*

It is recommended to search and replace the whole tags in order to avoid undesired changes. Also it is recommended to use the tool with the settings: "Search on: Folders" and "Search: Code".

Extract material from flash versions

To elaborate this instructions, the program Adobe Animate CC 2015.2 has been used. Some procedures may change if another version is used.

- ***To extract text****: click until you are on the correct layer, select it, copy (CNTRL+C) and paste it (CNTRL+V) on Dreamweaver.*

- ***To extract images**: click until you are on the correct layer, right click, select show on library, on the library item, right click again select "export png", choose a place to save the image and select "export".*
- ***To extract videos:** click until you are on the correct layer, right click, select show on library, on the library item, right click again select "export SWF", choose a place to save the video and select "save".*

Videos must be converted to mov format using an additional software (Recommended: "Free SVF to AVI converter").

Please let us know if any technical support is needed during the translation process.

A3. Simulación de la visualización de las páginas en diferentes dispositivos.

En este apartado se presentan las diferentes pantallas escaladas al tamaño aproximado que ocuparían en diferentes dispositivos. El objetivo es de valorar si la dimensión de sus componentes es suficiente como para que un usuario pueda operar con ellos.

En todos los casos se han omitido los elementos correspondientes a otros software, como pueden ser navegadores, sistemas operativos u otras aplicaciones.

En el caso de los móviles, la escala de la reproducción es cercana a la real. En el resto de casos se reducen las escalas.

1. Móviles

MULTIMEDIA ON NUCLEAR REACTOR PHYSICS
Technical University of Catalonia (UPC), BarcelonaTech (Spain)
7 EDITION Barcelona 2016
CREATED BY
Javier Dies
Francesc Puig
Claubia Pereira
IAEA
CREDITS
CONTENTS
MULTIMEDIA DEVELOPMENT
BRITISH ENGLISH TRANSLATION
FRENCH TRANSLATION
RUSSIAN TRANSLATION
CHINESE TRANSLATION
CONTACT
Escola Tècnica Superior d'Enginyeria Industrial de Barcelona (ETSEIB) a

MULTIMEDIA ON NUCLEAR REACTOR PHYSICS
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NEUTRON MULTIPLICATION IN A NUCLEAR REACTOR
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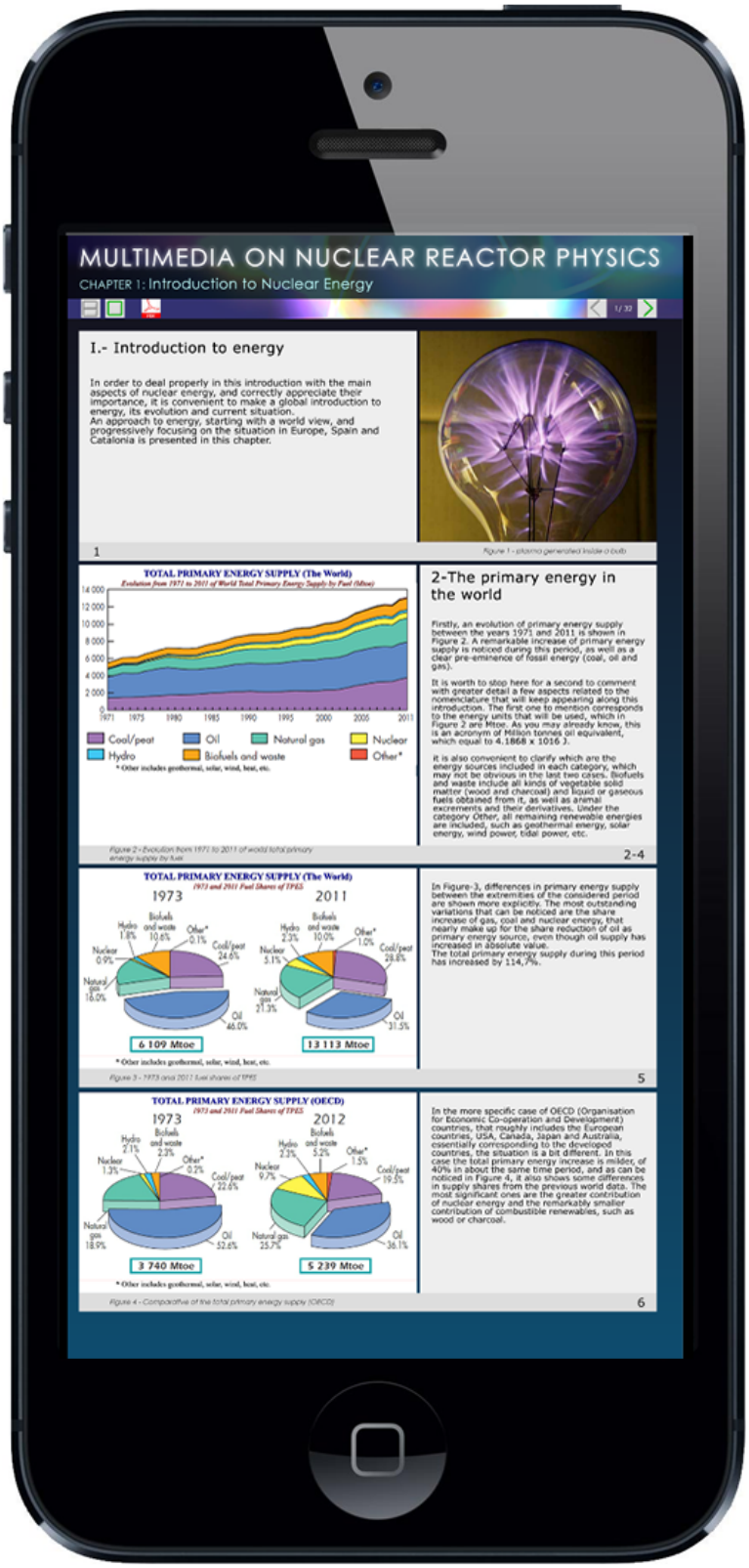
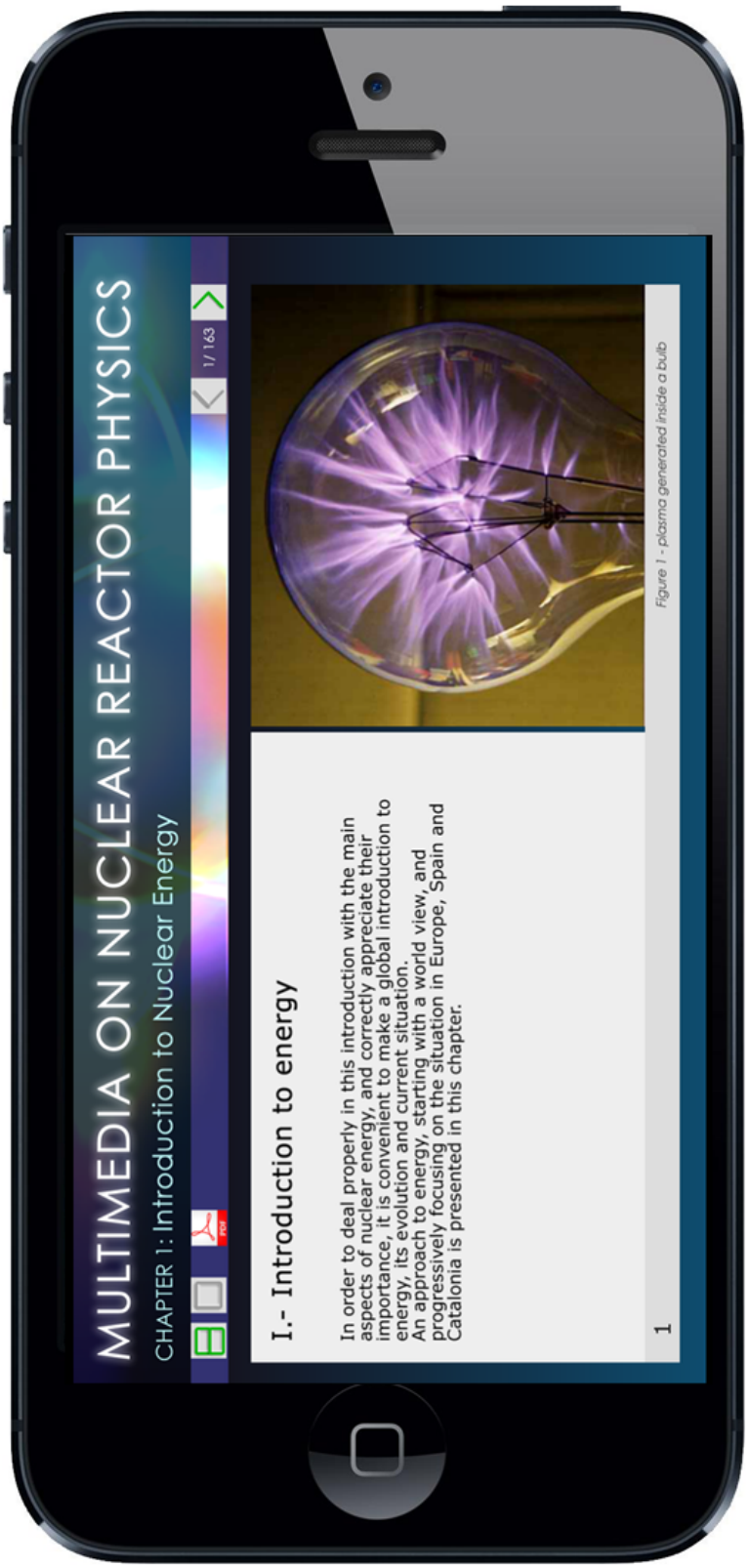
REACTOR KINETICS
EFFECTS OF CONTROL RODS
CHEMICAL SHIM
BURNABLE POISONS
TEMPERATURE EFFECTS ON REACTIVITY
FISSION PRODUCT POISONING
NEUTRON SOURCES
CONTENTS DISTRIBUTION
MEDIAS
PUBLICATIONS
SCHEDULE
REFERENCES
CONTACT


MULTIMEDIA ON NUCLEAR REACTOR PHYSICS
CHAPTER 1: Introduction to Nuclear Energy
I.- Introduction to energy
In order to deal properly in this introduction with the main aspects of nuclear energy, and correctly appreciate their importance, it is convenient to make a global introduction to energy, its evolution and current situation.
An approach to energy, starting with a world view, and progressively focusing on the situation in Europe, Spain and Catalonia is presented in this chapter.
1
TOTAL PRIMARY ENERGY SUPPLY (The World)
Coal/peat
Oil
Natural gas
Nuclear
Hydro
Biofuels and waste
Other*
2-The primary energy in the world
2-4
TOTAL PRIMARY ENERGY SUPPLY (The World)
1973
2011
6 109 Mtoe
13 113 Mtoe
5
TOTAL PRIMARY ENERGY SUPPLY (OECD)
1973
2012
3 740 Mtoe
5 239 Mtoe
6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CHAPTER 1: Introduction to Nuclear Energy
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In order to deal properly in this introduction with the main aspects of nuclear energy, and correctly appreciate their importance, it is convenient to make a global introduction to energy, its evolution and current situation.
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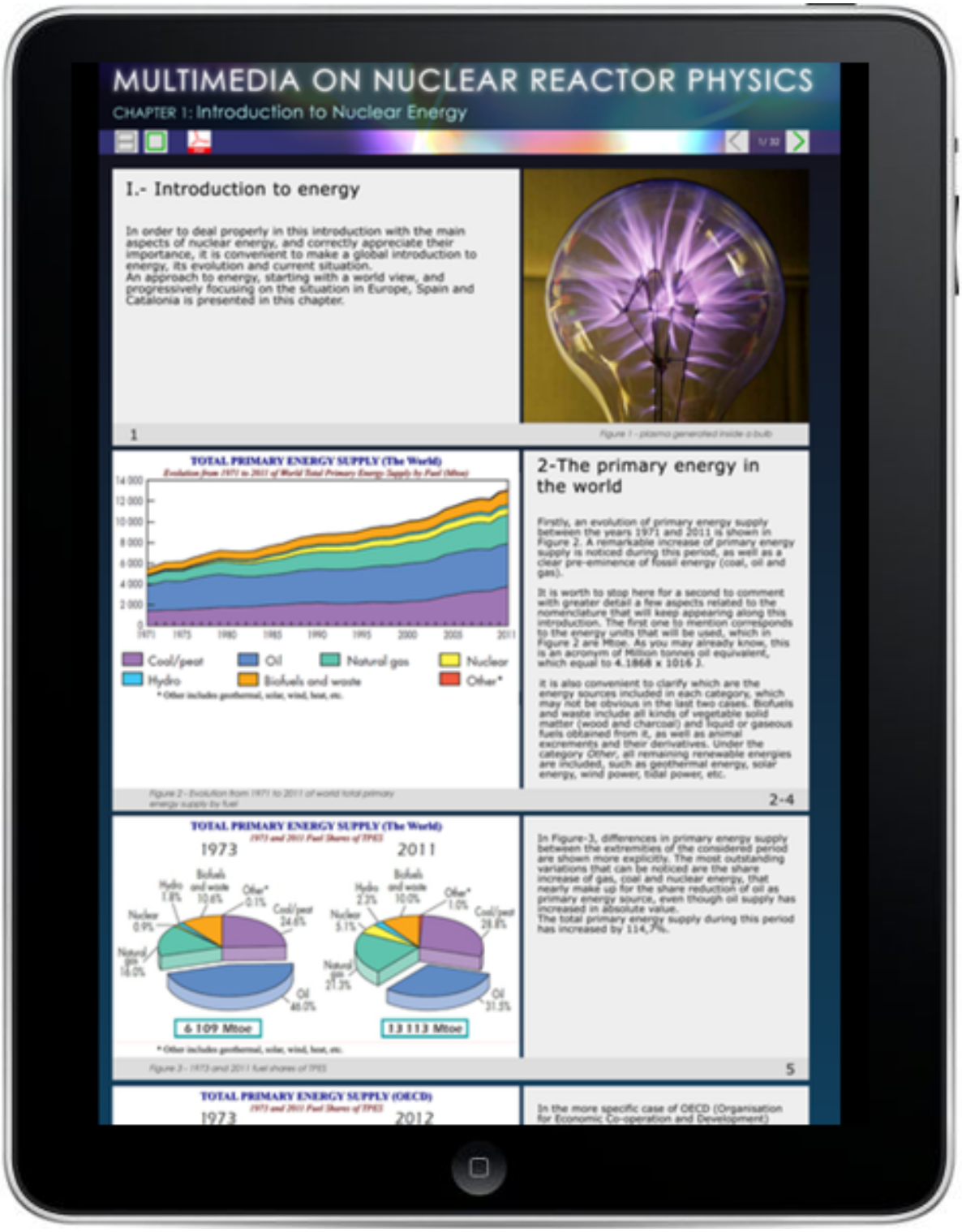
Figure 1 - plasma generated inside a bulb
1

2. Tabletas

MULTIMEDIA ON NUCLEAR REACTOR PHYSICS
Technical University of Catalonia (UPC), Barcelonatech (Spain)


MULTIMEDIA ON NUCLEAR REACTOR PHYSICS
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Coal/peat
Oil
Natural gas
Nuclear
Hydro
Biofuels and waste
Other*
2-The primary energy in the world
Firstly, an evolution of primary energy supply between the years 1971 and 2011 is shown in Figure 2. A remarkable increase of primary energy supply is noticed during this period, as well as a clear pre-eminence of fossil energy (coal, oil and gas).
It is worth to stop here for a second to comment with greater detail a few aspects related to the nomenclature that will keep appearing along this introduction. The first one to mention corresponds to the energy units that will be used, which in Figure 2 are Mtoe. As you may already know, this is an acronym of Million tonnes oil equivalent, which equal to 4.1868 x 1016 J.
it is also convenient to clarify which are the energy sources included in each category, which may not be obvious in the last two cases. Biofuels and waste include all kinds of vegetable solid matter (wood and charcoal) and liquid or gaseous fuels obtained from it, as well as animal excrements and their derivatives. Under the category Other, all remaining renewable energies are included, such as geothermal energy, solar energy, wind power, tidal power, etc.
2-4
TOTAL PRIMARY ENERGY SUPPLY (The World)
1973
2011
6 109 Mtoe
13 113 Mtoe
In Figure-3, differences in primary energy supply between the extremities of the considered period are shown more explicitly. The most outstanding variations that can be noticed are the share increase of gas, coal and nuclear energy, that nearly make up for the share reduction of oil as primary energy source, even though oil supply has increased in absolute value.
The total primary energy supply during this period has increased by 114,7%.
5
TOTAL PRIMARY ENERGY SUPPLY (OECD)
1973
2012
In the more specific case of OECD (Organisation for Economic Co-operation and Development)

MULTIMEDIA ON NUCLEAR REACTOR PHYSICS
CHAPTER 1: Introduction to Nuclear Energy
1 / 163
I.- Introduction to energy
In order to deal properly in this introduction with the main aspects of nuclear energy, and correctly appreciate their importance, it is convenient to make a global introduction to energy, its evolution and current situation.
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